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# **Dealing with Computers**

**For students of higher schools**

**Lutsk 2013**

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# Англійська мова для студентів комп'ютерних спеціальностей

Навчальний посібник для студентів  
вищих навчальних закладів

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М 29

*Рекомендовано Міністерством освіти і науки України  
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*Рецензенти:* доктор філологічних наук, професор, завідувач кафедри журналістики Запорізького національного технічного університету Погребна В.Л., кандидат філологічних наук, доцент кафедри практики англійської мови Східноєвропейського національного університету імені Лесі Українки Коляда Е.К., кандидат філологічних наук, ст. викладач кафедри німецької філології та перекладу Запорізького національного університету Захарова Н.В.

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Мета посібника – збагатити словниковий запас студентів комп'ютерних спеціальностей професійною лексикою. Посібник дозволяє сформувати системні знання і підготувати студентів до подальшого опрацювання технічної професійної літератури. Варто зазначити, що завдання градуїровані. Тому викладач може легко використати принцип диференційованого підходу. Посібник базується на комунікативному підході до вивчення іноземних мов та розрахований на три семестри навчання.

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## Передмова

Пропонований навчальний посібник призначений для студентів I-II курсів комп'ютерних спеціальностей, які володіють основами граматики англійської мови, лексичним мінімумом в обсязі програми загальноосвітньої школи та навичками усного мовлення. Посібник розрахований на 3 семестри аудиторних занять і покликаний поповнити знання студентів комп'ютерних спеціальностей професійною лексикою, збагатити їх словниковий запас та підготувати до подальшого вивчення адаптованої та оригінальної літератури за фахом.

Посібник складений на основі комунікативного принципу вивчення іноземної мови і ставить за мету:

- об'єднати лексику та граматику за тематичним принципом;
- розвивати навички читання та перекладу фахової літератури;
- контролювати засвоєння мовного та мовленнєвого матеріалу та запобігати типовим граматичним помилкам.

Посібник складається з 8 модулів, кожний з яких містить 4 або 5 тем, які включають в себе базовий текст (призначений для закріплення активної лексики певної теми) з активним тематичним словником та текст (для індивідуальної роботи студентів) для самостійного опрацювання, які наочно ілюструють функціонування у мові лексичних одиниць, що вивчаються; умовно-комунікативні та комунікативні тренувальні вправи для засвоєння лексики та граматики активного словника.

Завдання-тести пропонуються у форматах, що відповідають міжнародним екзаменам (TOEFL, FCE) на рівні володіння англійською мовою, які передбачені програмою „Англійська мова для професійного спілкування”.

Автори сподіваються, що посібник буде корисним для студентів і викладачів, усіх тих, хто цікавиться професійною англійською мовою і хоче досягти успіху в її викладанні і вивченні.

# Module I

## Computer Literacy for All

### Unit 1

#### Text Study: Lutsk National Technical University

#### Additional Texts:

Text 1. My Future Speciality is Automation

Text 2. My Future Speciality is Computer Systems and Networks

Text 3. My Future Speciality is Professional Training

Grammar: The Present Simple Tense

#### Text Study

##### I. Pre-reading Exercises

##### 1. Repeat the words in chorus:

Accreditation, establishment, correspondence, agreement, competition, comprehensive, qualified, reorganized, the curricula, to envisage, well-equipped, bilateral, representatives, facilities.

##### 2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:

Technical, history, faculty, institute, polytechnical, industrial, interest, speciality, programme, specialist, result, candidate, economics, complex, laboratory, apparatus, international, conference, basis, method, contact, profession, music, club, concert, popular, sports, regional.

##### 3. Pay attention to some grammatical points:

1) Lutsk National Technical University is one of **the youngest** higher educational establishments of Ukraine. 2) The University widely **opens** the way for young people **who** have the ability to work and reveal much interest to knowledge and mysteries of science. 3) There **is** a full time **training** and training by correspondence at the University, the latter **being** for those who want to combine their work and study. 4) The students **are given** the opportunity to choose the curricula and subject courses by themselves. 5) All educational and scientific work **is organized** and **carried out by** highly qualified teachers. 6) The University is a complex of modern lecture and study rooms and **well-equipped** laboratories. 7) **It provides** all the conditions and facilities necessary for the comprehensive education and training of future engineers, researchers and scientists.

##### II. Reading

*Read the text and be ready to find in the text the answers to the following questions:*

- *What is the history of LNTU?*
- *Why should we study foreign languages?*

## **Lutsk National Technical University**

Lutsk National Technical University is one of the youngest higher educational establishments of Ukraine. It was founded as the General Engineering Faculty of Kyiv Motor-Car and Highway Engineering Institute in 1966. In 1975 it became the Branch of Lviv Polytechnical Institute and in 1991 it was reorganized into the independent Industrial Institute. In 1997 it has got the highest - the fourth grade of accreditation, the Status of University and in 2008 it has got the status of the National University and at present its name is Lutsk National Technical University.

The University widely opens the way for young people who have the ability to work and reveal much interest to knowledge and mysteries of science.

The University trains specialists for various fields of knowledge. There is a full time training and training by correspondence at the University, the latter being for those who want to combine their work and study. There is also the Preparatory department for those who want to enter the University.

The students are given the opportunity to choose the curricula and subject courses by themselves. The university programmes are: Bachelor and Master. There is also a Post-graduate programme which envisages thorough training in a chosen speciality. The final result of post-graduating training is the defence of a thesis for a Candidate degree in engineering or economics.

All educational and scientific work is organized and carried out by highly qualified teachers.

The students of the University are involved in research work right from their first year of study. The contest of students' works, competitions, exhibitions are held annually here. A lot of students are prize-winners of all Ukrainian students' competitions and participants of international students' conferences.

The University is a complex of modern lecture and study rooms and well-equipped laboratories. It provides all the conditions and facilities necessary for the comprehensive education and training of future engineers, researchers and scientists.

Foreign languages are taught at all faculties of the University. To read and translate original scientific and technical literature in English, German or French is the main aim of study here.

The University devotes much attention to the promotion of cooperation with institutions of higher education in foreign countries on the basis of bilateral agreements. International contacts are maintained with higher schools in Germany, Poland, Czechia, Slovakia, Belgium.

The students of the University are not only mastering their future profession, but also have a good rest. The University has all necessary facilities for the development of young people's abilities and for their rest. They organize evening parties with interesting concert programmes prepared by representatives of all faculties. The Club of cheerful and ready-witted is popular not only in our town but also beyond it.

Students go in for different kinds of sports. They have all facilities for this: sports complex embracing 3 gyms, a swimming pool and various sports grounds. The University teams are winners of many town, regional, all-Ukrainian competitions. Sport has become an important part of students' life.

### *Vocabulary Notes*

**General Engineering Faculty** — загальнотехнічний факультет

**Motor-Car and Highway** — автодорожній

**Engineering Institute** — технічний інститут

**to reveal** ['rIvJl] — виявляти

**to carry out** — виконувати

**full time training** — навчання на денному відділенні

**training by correspondence** — навчатися на заочному відділенні

**to give the opportunity** — дати можливість

**curriculum** [kq' rIkjulqm] — курс навчання, навчальний план

**Bachelor** ['bxtS(q) lq] — бакалавр

**Master** ['mRstq] — магістр

**a post graduate** ['grxdjuqt] — аспірант

**to envisage** [In'vIzIG] — передбачати

**defence of a thesis** ['TJsIs] — захист наукової роботи

**facilities** [fq' sIlItI] — можливості

**comprehensive** ["kOmpri'hensIv] — всебічний

**to involve** — залучати, включати в себе

**a contest** [kqn'test] — дискусія, гостра полеміка

**a competition** ["kPmpI'tIS(q)n] — змагання

**a prize-winner** — призер

**a participant** [pR'tIsIpqnt] — учасник

**to devote** — присвячувати

**promotion** [prq'mqVS(q)n] — подяка, нагородження

**bilateral agreement** — двосторонній договір

**to maintain contacts** — підтримувати зв'язки

**to master** — оволодіювати, засвоювати

**to be engaged** — бути залученим

**activity** [xk'tIvItI] — діяльність

**club of cheerful and ready-witted** — клуб веселих і кмітливих

**to go in for** — займатися

**embrace** [Im'breis] — користуватися, приймати, охоплювати

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) Lutsk National Technical University is one of the oldest higher educational establishments of Ukraine. 2) In 1975 it became the Branch of Lviv Polytechnical Institute. 3) In 1997 it has got the Status of University and in 2008 it has got the status of the National University. 4) There is only a full time training at the University. 5) The university programmes are: Bachelor and Master. 6) The students of the University are mastering their future profession and they also don't have a good rest. 7) Students have all facilities for going in for sport and it has become an important part of students' life.

#### *2. Choose the right answer:*

1) In 2008 LNTU has got the status of the ... University.

- a) National;
- b) State;
- c) Private.

2) Training by correspondence at the University are organized for those who want ... .

- a) to have a lot of rest;
- b) to attend periods every day;
- c) to combine their work and study.

3) There is also the Preparatory department for those who want ... .

- a) not to enter the University;
- b) to enter the University;
- c) to know more interesting information about the university.

4) The students are given the opportunity to choose ... and subject courses by themselves.

- a) books and equipment;
- b) teachers;
- c) the curricula.

5) All educational and scientific work is organized and carried out by highly qualified ... .

- a) teachers;
- b) teachers and students;
- c) engineers.

6) The University devotes much attention to the promotion of cooperation with institutions of higher education in foreign countries on the basis of ... .

- a) good relationship;

b) telephone conversations;

c) bilateral agreements.

**3. Complete the sentences:**

1) Lutsk National Technical University was founded as ... in ... . 2) In 1975 it became the Branch of ... . 3) In 1991 it was reorganized into the independent ... . 4) In 1997 it has got ... . 5) In 2008 it has got the status of the ... . 6) There is a ... training and training by ... at the University. 7) There is also the ... department for those who want to enter the University. 8) There is also a ... programme to get the Candidate degree in engineering or economics. 9) The University is a complex of ... . 10) The students of the University are not only mastering their future profession, but ... . 11) Students go in for ... .

**4. Answer the questions:**

1) When does the history of the formation and the development of LNTU begin? 2) What are the landmarks of its history? 3) Who does the University open the way for? 4) What are the University programmes? 5) What does a Post-graduate programme envisage? 6) What is the final result of post-graduating training? 7) What conditions and facilities does the University provide for future engineers? 8) Are the students involved in research work? 9) What countries does the University maintain contacts with? 10) What facilities does the University have for developing the abilities of young people and for their rest?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- the history of LNTU
- cooperation with foreign universities
- facilities for having a rest.

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Higher educational establishment; fourth grade of accreditation; reveal much interest to knowledge and mysteries of science; those who want to combine their work and study; those who want to enter the University; the defence of a thesis for a Candidate degree in engineering or economics; exhibitions are held annually here; translate original scientific and technical literature in English, German or French; the promotion of cooperation with institutions of higher education in foreign countries on the basis of bilateral agreements; facilities for the development of young people's abilities and for their rest; sports complex embracing 3 gyms, a swimming pool and various sports grounds.

## 2. Give English equivalents of the following.

Виявляти значний інтерес до знань, наукова робота, поєднувати роботу і навчання, програми підготовки аспірантів, передбачати поглиблене вивчення, захист дисертації, вчений ступінь кандидата, аудиторія, бути оснащеним, забезпечувати всіма умовами, бути залученим до науково-дослідної роботи, конкурси студентських робіт, олімпіада, приділяти багато уваги, на основі двосторонніх угод, обмінюватись досвідом, підтримувати контакти, обмін студентами, оволодіти майбутньою професією, вечори з концертними програмами, клуб веселих і кмітливих, займатися спортом.

## 3. Match each word in the left-hand column with the best in the right-hand column.

- |                   |   |
|-------------------|---|
| 1. university     | a. instruction, teaching  |
| 2. college        | b. a person who has completed a university degree course  |
| 3. don            | c. short piece of writing on a subject  |
| 4. syllabus       | d. part of a university   |
| 5. a postgraduate | e. one of the periods of time into which university year is divided                               |
| 6. exam           | f. an arrangement of subjects for study   |
| 7. term           | g. money given by the state to a university to support a student during his/her studies           |
| 8. tuition        | h. a teacher  |
| 9. essay          | i. an institution for teaching and learning   |
| 10. grant         | j. a person doing studies that are done at a university after one has received one's first degree |
| 11. a graduate    | k. the act or process of testing students   |

## 4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.

*reorganization / decision / transformation / formation / resolution / branch / subordinated / introduced / improved / talented / requirements / established*

1. The history of Lutsk National Technical University (LNTU) goes back as far as 1966, when according to the ..... of the former Ministry for higher and secondary specialized education of the USSR the branch of General Engineering Faculty of Kyiv Road-transport Institute was founded in Lutsk. 2. In 1971 the faculty was ..... to Ukrainian Institute of Water Transport Engineers. 3. The first director of the ..... was I.M. Khorolsky and later on V.V.Bozhydarnik. 4. Soon after a full-time education was ..... with establishing the civil engineering faculty. 5. The structure of the branch was being ..... and modified. 6. So, step by step, the branch was approaching to its

memorable day - April 1, 1991 when the Council of Ministers of the USSR passed a ..... T87 on the ..... of Lutsk Industrial Institute on the basis of Lutsk Branch of Lviv Polytechnical Institute. 7. It was a great dream that had come true in sovereign Ukraine, in the time of social taking place in the country. 8. .... of the institution took place. 9. The institute always met the ..... of Ukrainian national economy and the economy of Volyn. 10. In October, 1991 the postgraduate courses were ..... . 11. University teaching staff is made up of ..... people, professionals with great pedagogic and life experience.

***5. Translate sentences into English using words and word combinations from the Vocabulary Notes.***

1) Аспіранти зробили підготовку та ретельні наукові дослідження до захисту дисертації. 2) Навчання на заочному відділенні дає можливість студентам поєднувати навчання і роботу. 3) Ми підтримуємо контакти з нашими французькими партнерами починаючи з вересня минулого року. 4) Студенти денного відділення будуть мати можливість займатися різними видами спорту у функціональному оздоровчому комплексі нашого університету. 5) Щоб оволодіти іноземною мовою студентам необхідно виконувати всі завдання, що вимагаються в курсі навчання. 6) Наукові дослідження магістрів та бакалаврів інституту виявили фактори, які впливають на збій роботи механізмів.

***Grammar in Use***

**The Present Simple Tense**

***1. Put the following into the singular.***

1. The students work hard at their exams. 2) My friends study English. 3) The boys go in for sports. 4) The engineers design the buildings. 5) These universities have sufficient quantity of study-rooms and laboratories fitted out with modern educational and production equipment. 6) Software Engineers produce the programs which control the internal operations of computers. 7) University teachers are professionals with great pedagogic and life experience. 8) The Universities devote much attention to the promotion of cooperation with institutions of higher education in foreign countries on the basis of bilateral agreements.

***2. Put the verbs in brackets in the Present Simple..***

1) The University (to occupy) a large campus. 2) On entering Lutsk National Technical University, students (to follow) a four year course leading to the award of a bachelor's degree. 3) During a semester students (to attend) lectures. 4) At the end of the semester she (to pass) her exams. 5) A modular system (to provide) greater variety of the courses. 6) Students (not to have) to

waste time travelling between lectures. 7) The University buildings are concentrated on a single campus, and everything (to be) on hand there. 8) A computer (to be) a device that ( to process) data to produce further data or information. 9) When the computer (to process) data it actually ( to perform) a number of separate functions. 10) A computer ( to have) four basic components: input, processor, memory, and output. 11) The central processing unit ( to consist ) of two parts: the control unit and the arithmetic-logic unit.

**3. Put sentences of ex.1 into negative and interrogative form.**

**Additional Text  
(for individual work)**

***Read, translate the text and be ready to speak about your future speciality***

**Text 1. My Future Speciality is Automation**

Engineering is one of the most ancient occupations in history. Without the skills included in the broad field of engineering our present-day civilization never could have evolved.

An engineer is the main motive power of the technological progress. He concerns himself with the application of science and technology to satisfy human needs. In his work he is guided by the latest achievements of science and technology. A modern engineer cannot do without knowledge in many fields other than those of engineering. He must get a substantial training in subjects of his speciality as well as in such subjects as computers and robotics, computer-aided design, environmental engineering, management science, etc. He must have a scientific attitude, imagination, initiative and good judgment.

Thorough knowledge of foreign languages is also quite necessary for an engineer as a lot of complicated devices are imported from Great Britain, Germany, Japan and other foreign countries. An engineer must know perfectly well not only our home ones. He must know them very well to be able to install the devices correctly at a plant and to repair when necessary.

I am a student of Lutsk National Technical University. I study at the Faculty of Computer Science and Information Technologies. My speciality is Automated Control of Technological Processes and Productions. The students of this trend are trained for the industrial design and research, activities at the structures of the state's mechanical engineering complex. They can solve the administrative and economic problems using computer technologies, marketing, management and monitoring.

In modern industry the specialists can solve the problems of mechanization and automation, including resources saving and computer integrated technologies in all branches of national economy.

At present the students of the faculty have sufficient quantity of study-rooms and laboratories fitted out with modern educational and production equipment. A powerful computer centre linked up to the local network gives the opportunity to get acquainted with modern achievements in the field of production control and data-processing. There are also laboratories of industrial electronics and automated production. Availability of the Internet allows to communicate with colleagues all over the world and to obtain the newest information in the field of computer technologies.

The combination of theory and practice is of great importance. While studying at the University all students do practical work in order to get experience.

Students should not forget that only when their theoretical knowledge is profound enough they will succeed in practical work and vice versa. That's why the students of our faculty do their best to become skilled specialists and take an active part the life and progress of this country.

#### *Vocabulary Notes*

**engineering** — інженерна справа, техніка

**occupation** [ "Okju 'peISqn ] — заняття

**skills** — знання, навички

**to evolve** [ I 'vOl v ] — розвиватися

**motive power** – рушійна сила

**to concern oneself (with)** — займатися, цікавитися

**to be guided** [ 'gaIdId ] — керуватися

**to do without** — обходитися без...

**other than** — крім

**robotics** [ rQv 'bPtIks ] — робототехніка

**good judgement** [ 'dZAdZmqnt ] — розсудливість

**environmental** [ In "vaIqrqn 'mentl ] **engineering** — техніка моделювання експлуатаційних умов

**computer-aided design** — система автоматизованого проектування

**management science** — наука про управління

**scientific attitude** [ 'xtItjHd ] — науковий підхід

**thorough knowledge** [ 'TArq 'nOlIG ] — глибокі знання

**complicated devices** [ 'kOmplIkeItId ] — складні прилади

**home devices** — вітчизняні прилади

**Faculty of Computer Science and Information Technologies** — факультет комп'ютерних наук та інформаційних технологій

**substantial** [sqb'stɪxnʃql] **training** — ґрунтовна підготовка  
**Automated Control of Technological Processes and Productions** —  
автоматизація технологічних процесів і виробництв

**trend** — профіль

**design and research** [rɪ'swɔ] **activities** — проектно-конструкторська  
робота

**mechanical engineering complex** — машинобудівний комплекс

**monitoring** ['mɒnɪt(ɪ)ŋ] — моніторинг

**resources saving technology** — ресурсозберігаюча технологія

**fitted out** — обладнаний

**availability** [q'veɪlɪ'bɪlɪtɪ] — наявність

**to get experience** — набувати досвід

**to succeed** [sqk'sɪd] **in** — мати успіх в ...

**vice versa** ['vaɪsɪ'vɔsq] — навпаки

**to do one's best** — робити все можливе

### *Comprehension*

#### *1. Complete the following statements:*

1 Without the skills included in the broad field of engineering...

2 An engineer is the main motive power of...

3. He must get a substantial training in...

4 He must know them very well to be able to install...

5 I study at ...

6 My speciality is...

7 The students of this trend are trained for...

8. In modern industry the specialists can solve the problems of...

9 At present the students of the faculty have sufficient quantity of...

10 There are also laboratories of...

11 Students should not forget that only when their theoretical knowledge is profound enough...

#### *2. Answer the following questions:*

1. What is the main motive power of the technological progress?

2. What is a modern engineer guided by in his work?

3. In what subjects must an engineer get a substantial training?

4. What features must an engineer possess?

5. Why is it necessary for an engineer to know a foreign language?

6. What faculty do you study at?

7. What is your speciality?

8. What are the students of this speciality trained for?

9. What have the students of the Faculty of Computer Science and Information Technologies at their disposal?

10. What do the students of the faculty use the Internet for?
11. What must students remember concerning their theoretical knowledge?

**3. Do the following tasks:**

- 1) State the most important facts from the text and write them down;
- 2) Write out the key words from the text
- 3) Put questions to the text in order to retell it;
- 4) Retell the text.

**Text 2. My Future Speciality is Software Engineering**

I am a student of Lutsk National Technical University. I study at the Faculty of Computer Science and Information Technologies. My speciality is Software Engineering. I'll be an engineer-programmer by profession.

The students of this trend are trained to be high-qualified computing and information systems professionals. The program aim is to educate and train students in those aspects of information technology concerned with the implementation of information systems in wide variety of organisational contexts. They concern themselves with the utilisation and support of technology in a modern enterprise. The learning objectives are that students will be able to:

- Demonstrate an understanding of the fundamental characteristics of information systems and their role within organisations,
- Know how to evaluate and select appropriate methods and technologies for representing, managing and disseminating information,
- Contribute to information system implementation, using sound principles of analysis and design,
- Demonstrate practical competence in a range of current software systems
- Able to adapt themselves and learn new evolving technologies and implement them in their line of work.

At present the students of the faculty have sufficient quantity of study-rooms and laboratories fitted out with modern educational and production equipment. A powerful computer centre linked up to the local network gives the opportunity to get acquainted with modern achievements in the field of computing and data-processing.

Availability of the Internet allows to communicate with colleagues all over the world and to obtain the newest information in the field of computer technologies.

Thorough knowledge of foreign languages is also quite necessary for an engineer-programmer as a lot of complicated devices are imported from Great Britain, Germany, Japan and other foreign countries. He must know perfectly well not only our home ones. He must know them very well to be able to install the devices correctly at a plant and to repair when necessary.

The combination of theory and practice is of great importance. While studying at the University all students do practical work in order to get experience.

Students should not forget that only when their theoretical knowledge is profound enough they will succeed in practical work and vice versa. That's why the students of our faculty do their best to become skilled specialists.

### *Vocabulary Notes*

**Faculty of Computer Science and Information Technologies** — факультет

комп'ютерних наук та інформаційних технологій

**an engineer-programmer** — інженер-програміст

**to concern oneself (with)** — займатися, цікавитися

**trend** — профіль

**utilisation** [ˈjʌtɪlaɪˈzeɪʃn] — використання

**learning objectives** [ˈlɜːnɪŋ ɒbʤɪktɪvz] — цілі навчання

**to disseminate** [dɪˈsemɪneɪt] — поширювати

**sufficient quantity** [sɪˈfɪʃ(ə)nt ˈkwɒntəntɪ] — достатня кількість

**fitted out** — обладнаний

**availability** [əˈveɪləˈbɪlɪtɪ] — наявність

**to get experience** — набувати досвід

**to succeed in** — мати успіх в ...

**vice versa** [ˈvaɪsɪˈvɜːsə] — навпаки

**to do one's best** — робити все можливе

### *Comprehension*

#### *1. Complete the following statements:*

- 1) I am a student of ... .
- 2) I study at ... .
- 3) My speciality is ... .
- 4) I'll be ... by profession.
- 5) The learning objectives are that students will be able to: ... .
- 6) At present the students of the faculty have sufficient quantity of...
- 7) Availability of the Internet allows ... .
- 8) Thorough knowledge of foreign languages is ... .
- 9) Students should not forget that ... .

#### *2. Answer the following questions:*

1. Where do you study?
2. What faculty do you study at?
3. What is your speciality?
4. What are the students of this speciality trained for?
5. What is the program aim?
6. With what do students concern themselves?

7. What have the students of the Faculty of Computer Science and Information Technologies at their disposal?
8. What do the students of the faculty use the Internet for?
9. Why is thorough knowledge of foreign languages also quite necessary for an engineer-programmer?
11. What must students remember concerning their theoretical knowledge?

**3. Do the following tasks:**

- 1) State the most important facts from the text and write them down;
- 2) Write out the key words from the text
- 3) Put questions to the text in order to retell it;
- 4) Retell the text.

**Text 3. My Future Speciality is Professional Training**

I am a student of Lutsk National Technical University. I study at the Faculty of Computer Science and Information Technologies. My speciality is Professional Training (Computer technologies in managing and training). The graduates of this speciality will be engineer-educators by profession.

An engineer-educator is an educational category of a specialist which comprises the profound engineering training to computer technologies in managing and fundamental psychological and pedagogical knowledge. An engineer-educator is trained to perform functions as a teacher of computer technologies in managing, to work as a foreman of industrial training and social educator in different vocational schools, lyceums, training schools, colleges and institutes. The graduate of this speciality can also work as an engineer of computer technologies in managing and as an engineer of technical training in different enterprises.

Thorough knowledge of English is also quite necessary for an engineer as computer program instructions, the software itself, all the information stored in millions computers around the world, over half the world's technical and scientific periodicals are in English. A lot of complicated devices are imported from Great Britain, Germany, Japan and other foreign countries. An engineer must know perfectly well not only our home ones. He must know them very well to be able to install the devices correctly and to repair when necessary.

At present the students of the faculty have sufficient quantity of study-rooms and laboratories fitted out with modern educational and production equipment. A powerful computer centre linked up to the local network gives the opportunity to get acquainted with modern achievements in the field of computing and data-processing.

Availability of the Internet allows to communicate with colleagues all over the world and to obtain the newest information in the field of computer technologies.

The combination of theory and practice is of great importance. While studying at the University all students do practical work in order to get experience.

Students should not forget that only when their theoretical knowledge is profound enough they will succeed in practical work and vice versa. That's why the students of our faculty do their best to become skilled specialists and take an active part in the life and progress of this country.

#### *Vocabulary Notes*

**Faculty of Computer Science and Information Technologies** — факультет комп'ютерних наук та інформаційних технологій

**Professional Training** — професійне навчання

**computer technologies in managing and training** — комп'ютерні технології в управлінні та навчанні

**an engineer-educator** — інженер-педагог

**software** — програмне забезпечення

**periodical** [ˈpɪərɪˈɒdɪkəl] — періодичне видання

**educational category** — педагогічна категорія

**engineering training** — інженерна підготовка

**psychological** [ˈsaɪkəˈlɒɡɪkəl] **and pedagogical knowledge** — психолого-педагогічна категорія

**foreman** — майстер

**industrial training** — виробниче навчання

**social educator** — соціальний педагог

**vocational school** — профтехучилище

**lyceum** [ˈlaɪˈsi:əm] — лицей

**training school** — технікум

**technical training** — технічне навчання

**complicated** [ˈkɒmplɪkeɪtɪd] **devices** — складні прилади

**home devices** — вітчизняні прилади

**sufficient quantity** [sqˈfɪsɪqnt ˈkwɒntɪtɪ] — достатня кількість

**fitted out** — обладнаний

**availability** — наявність

**to get experience** — набувати досвід

**to succeed in** — мати успіх в ...

**vice versa** — навпаки

**to do one's best** — робити все можливе

#### *Comprehension*

*1. Complete the following statements:*

1) I am a student of ... .

2) I study at ... .

- 3) My speciality is ... .
- 4) I'll be ... by profession.
- 5) An engineer-educator is trained ... .
- 6) Thorough knowledge of foreign languages is ... .
- 7) At present the students of the faculty have sufficient quantity of...
- 8) Availability of the Internet allows ... .
- 9) Students should not forget that ... .

**2. Answer the following questions:**

1. Where do you study?
2. What faculty do you study at?
3. What is your speciality?
4. What is an engineer-educator trained for?
5. Whom can the graduate of this speciality also work?
6. Why is thorough knowledge of foreign languages also quite necessary for an engineer-educator?
7. What have the students of the Faculty of Computer Science and Information Technologies at their disposal?
8. What do the students of the faculty use the Internet for?
9. What must students remember concerning their theoretical knowledge?

**3. Do the following tasks:**

- 1) State the most important facts from the text and write them down;
- 2) Write out the key words from the text
- 3) Put questions to the text in order to retell it;
- 4) Retell the text.

## Unit 2

**Text Study: Computer Literacy.**

**Additional Text: The Need for Computer Literacy in Modern Society.**

**Grammar: The Past Simple Tense.**

### Text Study

#### I. Pre-reading Exercises

**1. Repeat the words in chorus:**

Society, arithmetics, quickly, efficiently, requirements, either, existing, compile, retrieving, through, vehicles, throughout, irreverently, societies.

**2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:**

Potential, privileged, bank credit card, clerk, detailed, packages, specification, to adapt, logical, modifying.

**3. Pay attention to some grammatical points:**

1) They bring with them **both** economic and social changes. 2) All of us are already on the way to **becoming** computer-literate. 3) Many actions that

you **have taken or observed** have much in common. 4) He makes a detailed analysis of the **employer's** requirements. 4) He **either** uses standard computer packages **or** writes a specification for programmers to adapt existing software or to prepare new software.

## *II. Reading*

*Read the text and make notes about main responsibilities of jobs in computing*

### **Computer Literacy**

Informed citizens of our information-dependent society should be computer-literate, which means that they should be able to use computers as everyday problem-solving devices. They should be aware of the potential of computers to influence the quality of life.

There was a time when only privileged people had an opportunity to learn the basics, called the three R's: reading, writing, and arithmetics. Now, as we are becoming an information-becoming society, it is time to restate this right as the right to learn reading, writing and computing. There is little doubt that computers and their many applications are among the most significant technical achievements of the century. They bring with them both economic and social changes. "Computing" is a concept that embraces not only the old third R, arithmetics, but also a new idea — computer literacy.

In an information society a person who is computer-literate need not be an expert on the design of computers. He needn't even know much about how to prepare programs which are the instructions that direct the operations of computers. All of us are already on the way to becoming computer-literate. Just think of your everyday life. If you buy something with a bank credit card or pay a bill by check, computers help you to process the information. When you check out at the counter of your store, a computer assists the checkout clerk and the store manager. Many actions that you have taken or observed have much in common. Each relates to some aspect of a data processing system.

Here is the description of jobs in computing.

**System analyst** studies methods of working within an organization to decide how tasks can be done efficiently by computers. He makes a detailed analysis of the employer's requirements and work patterns to prepare a report on different options for using information technology. This may involve consideration of the hardware as well as software. He either uses standard computer packages or writes a specification for programmers to adapt existing software or to prepare new software. He may oversee the implementation and testing of the system and acts as a link between the user and the programmer.

**Software Engineer/Designer** produces the programs which control the

internal operations of computers. He converts the system analyst's specification to a logical series of steps. Software Engineer translates these into the appropriate computer language. He often compiles programs from libraries or sub-programs, combining them to make up a complete systems program. He designs, tests, and improves programs for computer-aided design and manufacture, business applications, computer networks and games.

**Computer Systems Support Person.** Systems support people are analyst programmers who are responsible for maintaining, updating and modifying the software used by a company. Some of them specialize in software which handles the basic operation of the computers. This involves the use of machine codes and specialized low-level computer languages. Most of them handle application software. They may sort out problems encountered by users. Solving problems systems support people may involve amending an area of code in the software, retrieving files and data lost when a system crashes and a basic knowledge of hardware.

**Computer System Analyst Programmer** creates the software programs used by computers. He may specialize in the internal operating systems using low level computer language or in application programs. He also may specialize in one aspect of the work, e.g. programming, systems design, systems analysis or cover them all. He may support the system through advice and training, providing user manuals and by helping users with any problems that arise.

**Hardware Engineer** researches, designs and develops computers or parts of computers and the computerized element of appliances, machines and vehicles. He also involves in their manufacture, installation and testing.

**Professions and organizations.** As the use of computers has spread throughout society, there are an increasing number of careers involving computers. Following the theme of hardware, software and firmware, the brains of people who work in the industry are sometimes known irreverently as wetware or "meatware".

**Computer-related professions.** Hardware-related: Electrical engineering, Electronics engineering, Computer engineering, Telecommunications engineering, Optical engineering, Nanoscale engineering.

Software-related: Human-computer interaction, Information technology, Software engineering, Scientific computing, Web design, Desktop publishing.

The need for computers to work well together and to be able to exchange information has spawned the need for many standards organizations, clubs and societies of both a formal and informal nature.

*Vocabulary Notes*

**computer literacy** — комп'ютерна грамотність

**be aware of** — розуміти, усвідомлювати  
**basics** — основи  
**to restate** [ˈrɪˈsteɪt] — переглянути, переосмислити  
**significant** [sɪgˈnɪfɪkənt] — значний  
**computing** — обрахування; рахунок; робота на комп'ютері  
**to embrace** [ɪmˈbreɪs] — охоплювати  
**dimension** [dɪˈmenʃən] — вимір  
**to direct the operation** — направляти роботу  
**subscription** [sʌbˈskrɪpʃən] **magazine** — журнал по підписці  
**store manager** — директор магазину  
**system analyst** — системний аналітик  
**consideration** [kənˈsɪd(ə)reɪʃ(ə)n] — аналіз, розгляд  
**computer package** — комплект обчислювального обладнання  
**software designer** [dɪˈzaɪnə] — розробник програмного забезпечення  
**to compile** [kəmˈpaɪl] — компілювати  
**computer-aided design** — автоматизоване проектування  
**business application** — прикладна система для підприємств, торгівельної сфери; застосування комп'ютерів для вирішення економічних та комерційних завдань  
**computer system support person** — спеціаліст з підтримки комп'ютерної системи  
**to encounter** [ɪnˈkaʊntə] — зіткнутися з труднощами  
**computer system analyst programmer** — системний програміст  
**hardware engineer** — спеціаліст з розробки апаратного забезпечення  
**irreverently** [ɪˈrev(ə)rəntli] — неввічливо  
**wetware / "meatware"** — забезпечення користувача  
**engineering** [ˈendʒɪˈnɪərɪŋ] — проектування, конструювання  
**to spawn** [spɔːn] — породжувати

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) Informed citizens of our information-dependent society should be computer-literate, which means that they should be able to use computers as everyday problem-solving devices. 2) There was a time when only poor people had an opportunity to learn the basics, called the three R's: reading, writing, and arithmetics. 3) "Computing" is a concept that embraces not only the old third R, arithmetics, but also a new idea — computer literacy. 4) All of us are not already on the way to becoming computer-literate. 5) Software Engineer produces the programs which control the external operations of computers. 6) Hardware engineer researches designs and develops computers, or parts of

computers and the computerized element of appliances, machines and vehicles.

**2. Choose the right answer:**

- 1) Informed citizens of our information-dependent society should be ... .
  - a) computer-literate;
  - b) illiterate;
  - c) polite.
- 2) If you buy something with a bank credit card or pay a bill by check, ... help you to process the information.
  - a) a store manager;
  - b) computers;
  - c) policeman.
- 3) Many actions relate to some aspect of ... system.
  - a) computer;
  - b) application;
  - c) a data processing.
- 4) System analyst studies methods of working within an organization to decide how tasks can be done efficiently by ... .
  - a) a store manager;
  - b) computers;
  - c) policeman.
- 5) Software Engineer/Designer produces the programs which control the ... operations of computers.
  - a) internal;
  - b) external;
  - c) local.
- 6) Some of computer system support people specialize in ... which handles the basic operation of the computers.
  - a) hardware;
  - b) software;
  - c) firmware.
- 7) Computer System Analyst Programmer may specialize in the internal operating systems using ... or in application programs.
  - a) high-level computer language;
  - b) low-level computer language;
  - c) different kinds of computer languages.
- 8) Hardware Engineer researches designs and ... computers.
  - a) trades with;
  - b) assesses;
  - c) develops.

9) The brains of people who work in the computer industry are sometimes known irreverently as ... .

- a) "meatware";
- b) systems analyst;
- c) designer.

### **3. Complete the sentences:**

1) Informed citizens of our information-dependent society should be computer-literate, which means that they should be able to use computers as ... . 2) There was a time when only privileged people had an opportunity to learn the basics, called the three R's: ... . 3) "Computing" is a concept that embraces not only ... . 4) All of us are already on the way to becoming ... . 5) System analyst makes a detailed analysis of ... . 6) Software engineer designs, tests, and ... . 7) Systems support people are analyst programmers who are responsible for ... . 8) Computer System Analyst Programmer may specialize in ... . 9) Hardware Engineer researches designs and develops computers, or parts of computers and ... . 10) As the use of computers has spread throughout society, there are ... .

### **4. Answer following questions.**

1) What does "a computer-literate person" mean? 2. Why should we be aware of the potential of computers? 3) What do the people mean by "the basics"? 4) What is the role of computers in our society? 5) What changes do computers bring? 6) What is "computing"? 7) What does system analyst use? And what may he oversee? 8) What does software engineer do? 9) In what do systems support people specialize? And what may they involve solving problems? 10) What does computer system analyst programmer create? And what may he support? 11) In what does hardware engineer involve? 12) Why are there an increasing number of careers involving computers? 13) What has spawned the need for many standards organizations, clubs and societies of both a formal and informal nature?

### **5. Find as quickly as possible and read out the sentences containing the following important information:**

- about a person who is computer-literate;
- system analyst;
- software designer;
- computer systems support person;
- computer system analyst programmer;
- hardware engineer.

### **\*6. Try to tell the gist of the text.**

#### **Word Study**

#### **1. Give Ukrainian equivalents of the following.**

An information-dependent society; a computer-literate citizen; an everyday problem-solving device; to influence the quality of life; to learn the basics; the most significant technical achievements; to be on the way of becoming computer-literate; to have much in common; to bring both economic and social changes; the employer's requirements; work patterns; to prepare a report on different options; to oversee the implementation and testing of the system; to act as a link; to control the internal operations of computers; to convert the system analyst's specification to a logical series of steps; to handle the basic operation of the computers; the use of machine codes; to provide user manuals.

## **2. Give English equivalents of the following.**

Стежити за виконанням та випробуванням системи; керувати операціями комп'ютера; інформаційно-залежне суспільство; вивчати основи; бути на шляху становлення компю'терно-грамотної особистості; мати багато спільного; приносити як і економічні так і соціальні зміни; принципи роботи; комп'ютерно-грамотний громадянин; вимоги роботодавця; пристрій, що вирішує щоденні проблеми; впливати на якість життя; готувати доповідь з різноманітних питань; перетворювати специфікацію системного аналітика у логічну послідовність дій; використання машинного коду; найбільш значне технічне досягнення; діяти як сполучна ланка, керувати внутрішніми операціями комп'ютера; керувати основними операціями комп'ютера; забезпечувати інструкцією з експлуатації.

## **3. Make up pairs or groups of words close in meaning.**

*Verbs:* to turn on, to provide, to type, to accept, to help, to learn, to observe, to tell, to keep, to feed, to solve, to relate, to switch off, to communicate, to receive, to supply, to switch on, to assist, to print, to study, to input, to turn off, to decide, to store, to say, to watch.

*Nouns:* work, machine, fundamentals, display, application, capabilities, job, storage, screen, state, basics, use, concept, specialist, journal, character, memory, idea, expert, magazine, position, symbol, command, data, solution, device, instruction, powers, information, decision.

*Adjectives:* basic, tiny, common, small, main, significant, routine, general, remarkable, uninterested, intricate, important, wonderful, complex, little.

*Adverbs:* rapidly, probably, instantaneously, in a moment, quickly, perhaps.

## **4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*Significant/ computing/ to encounter/ system analyst/ to spawn/  
software designer*

1) ... is a necessity for educated citizens. 2) Developing the new hardware they ... with difficulties. 3) This error ... system crash. 4) The latest application software was ... . 5) ... studies his employer's requirements to prepare a report for using new computer technologies. 6) ... has developed new business application for their corporation.

***5. Translate sentences into English using words and word combinations from the Vocabulary Notes.***

1) Громадяни нашого інформаційно-залежного суспільства намагаються стати комп'ютерно-грамотними. 2) Ми повинні усвідомлювати важливість роботи з комп'ютером. 3) Студенти нашого вузу вивчають основи комп'ютерних наук, які також охоплюють автоматизоване проектування та програмування. 4) Розробник програмного забезпечення зіткнувся з проблемою при проектуванні нової прикладної системи для торговельного підприємства. 5) Спеціаліст з розробки апаратного забезпечення розробив новий бортовий комп'ютер для автомобіля. 6) Системний програміст надав інструкцію з експлуатації нового обладнання.

***Grammar in Use***  
**The Past Simple Tense**

***1. Put down the following sentences into the Past Simple Tense.***

1) Many people have an opportunity to use computers. 2) There is no doubt that computers solve problems very quickly. 3) Instructions direct the operation of a computer. 4) Computers bring with them both economic and social changes. 5) Computing embraces not only arithmetics, but also computer literacy. 6) It is well known that computers prepare laboratory tests. 7) Those persons are computer literate and think of buying a new computer. 8) They receive a subscription magazine once a month. 9) Experts know much about how to prepare programs. 10) Graphical plotting tables find application in drawing and inputting manuscript texts. 11) You can draw, add notes and signs to electronic documents by means of a special pen.

***2. Open the brackets using the Past Simple Tense. Translate the sentences into Ukrainian.***

1) Computers (to appear) comparatively recently. 2) In 1940s computers (to evolve) tremendously. 3) By the end of the 1960s, transistors themselves were replaced by tiny integrated circuit boards and a new generation of computers (to be) on the market. 4) During the seventeenth and eighteenth centuries scientists (to develop) many easy ways of calculating. 5) They (to invent) logarithm tables, calculus, and the basis for the modern slide during this period. 6) The first calculating machine (to appear) in the early 1800s and soon after that Charles Babbage (to design) a machine which (to become) the

basis for building today's computers. 7) A hundred years later, scientists (to build) the first analog computer but the first digital computer was not completed until 1944.

**3. Make up sentences using the following words. Don't forget about word order in English.**

- 1) In 1952, took, a major computing company, a decision, of the business, to get out, of making mainframe computers.
- 2) Believed, that, they, there was, only, a market, mainframes, for four, in the whole world.
- 3) IBM, company, that, was.
- 4) reversed, the following, they, year, their decision.
- 5) IBM, in 1980, decided, that, market, there was, for 250,000 PCs.
- 6) so, set up, they, a special, to develop, team, the first IBM PC.
- 7) went, on sale, it, in 1981, set, and, standard, a world-wide, for IBM-compatibility.

**Additional Text  
(for individual work)**

***Read, translate the text and answer the following questions:***

- *Why will almost everyone need to become familiar with computing?*
- *Why have dozens of careers evolved?*
- *What is another major revolution occurring in the use of computers?*

**The Need for Computer Literacy in Modern Society**

The introduction of new procedures and new technology is said to be disruptive. Many people, particularly the older generation, cannot and do not want to change their ways of life. They tend to be afraid of the new systems. They believe that they won't be able to learn the new skills and will appear awkward and dumb. Nevertheless, changing technology tends to enforce this on them.

The introduction of computers is said to follow that pattern. Computers have crept into our life. The microcomputer is now widely accepted as a very efficient device for performing many types of operation, such as the display of business and other information from a data base. It is used for performing computations of varying types at high speed including professional, scientific, engineering and accounting calculations for the classroom as well as for word processing in typing and secretarial departments.

In business the computer is known to be a means increasing administrative efficiency, payroll processing, sales, etc.

Therefore the pressure on those who still are unfamiliar with computers and their use is ever greater. So almost everyone will need to become familiar with data processing and computing, particularly microcomputing to a greater

or lesser extent. No matter whether we need it in the home, office, school, college or factory, it will be almost as commonplace to use a computer as it is to drive a car.

Computers today are said to become more and more user friendly. That is they are becoming much easier to use and understand. To use a computer in the past, one had to learn computer languages such as FORTRAN (FORmula TRANslation) or COBOL (Common Business Oriented Language). The learning process was difficult for many students.

Today's computers are much easier to use. Focus in many schools is shifting away from programming computers to using them for managerial decision making a more enjoyable high-level function. Clerks do not need to become involved with the programming of computers as this is the prerogative of the systems staff. Package programs may be used for the various applications in most instances.

Let's make acquaintance now with some of the terms and uses of computers, robots and other high-tech equipment in today's organizations.

Here are selected computer languages:

Ada: A government (especially military) computer language;

ALGOL (Algorithmic Language): math-oriented language used most often for larger computers;

APL (A Programming Language): IBM-devised language useful for math; BASIC (Beginners All-purpose Symbolic Instructional Code); used mostly for math and statistics;

COBOL (Common Business-Oriented Language): used for business applications such as billing, payroll, or inventory;

FORTRAN (Formula Translation): used most often for scientific problems;

LISP: Advanced artificial intelligence language for programs that deal with human languages;

LOGO: Language useful for graphics; widely used in schools;

PASCAL: Language that teaches a structured approach to programming;

PL1 (Programming Language 1): similar to ALGOL, but handles business files better;

PROLOG (Programming Language 1): basic artificial intelligence program.

Due to computer application, a lot of new jobs have appeared.

Systems analysts have the challenging job of analyzing the many functions of the firm and designing a computer system to perform those functions more efficiently. First the systems analysts study how the job is now being performed. Then they design a system to do the job better. To do that, they must learn what information must be collected and processed, what output is

needed, what computer capacity is needed, and the costs involved. Systems analysts must explain the system to the various computer users and tell the programmers what the system needs to do.

The greatest increase in computer jobs in the future may be for computer service technicians. During the last decades, companies were busy installing computers. Someone has to maintain and fix those computers. This is a great opportunity for someone to start his or her own service business.

Dozens of careers have evolved because of computers and the information revolution. Someone, for example, must teach people how to use computers (computer trainers). There are computer consultants who advise firms which computer to buy. Computer librarians keep track of all the tapes, disks, and other data storage devices. A data processing manager supervises the data processing center. Computer security specialists try to prevent computer crime. Technical writers write the manuals that tell how to use the computer. Naturally, there are also computer engineers who design computers and manufacturers that produce computers.

There is a device that allows people to stay at home and work with a computer at work. It is called a modem. A modem converts data into a form that can be sent over phone lines so that one computer can "talk" to another.

Another major revolution is occurring in the use of computers to run machines, including robots, i.e. the use of computer-driven machines to do work formerly done by humans. Robot technology has improved dramatically in the last few years. Today, intelligent robots are being used in factories. Some robots can see and read using cameras. One robot, for example, detects irregularities in welded seams and corrects any mistakes. Another robot reads identifying numbers in nuclear fuel rods. The newest robots can feel the difference between an egg and a piece of steel and handle each of them accordingly. Some robots even respond to voice commands. Computers linked with robots can perform dirty, difficult, repetitive tasks faster, cheaper, and better than people.

## Unit 3

**Text Study: Personal Computers.**

**Additional Text: Application of Personal Computers.**

**Grammar: The Future Simple Tense.**

### Text Study

#### *I. Pre-reading Exercises*

**1. Repeat the words in chorus:**

Durations, occupied, generally, onslaught, distinguishing, originally.

**2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:**

Interactive, hobbyists, technicians, productivity, company, microprocessor.

**3. Pay attention to some grammatical points:**

1) **Personal computers** are supposed **to appear** in the late 1970s. 2) Although these systems would still have been too expensive **to be owned** by a single individual. 3) During the late 1970s and early 1980s, **new models and competitive operating systems** seemed **to appear** daily. 4) In less than a decade the microcomputer has been transformed from a calculator and **hobbyist's toy** into a personal computer for almost everyone. 5) Regardless of the purpose for which it is used, **either** for leisure activities in the home **or** for business applications in the office, we can consider **it to be** a personal computer.

## ***II. Reading***

***Read, translate the text and point out the main characteristics of PC.***

### **Personal Computers**

Personal computers are supposed to appear in the late 1970s. The capabilities of a personal computer have changed greatly since the introduction of electronic computers. By the early 1970s, people in academic or research institutions had the opportunity for single person use of a computer system in interactive mode for extended durations, although these systems would still have been too expensive to be owned by a single individual. The introduction of the microprocessor, a single chip with all the circuitry that formerly occupied large cabinets, led to the proliferation of personal computers after 1975.

Early personal computers generally called microcomputers, sold often in kit form and in limited volumes and were of interest mostly to hobbyists and technicians. By the late 1970s, mass-market pre-assembled computers allowed a wider range of people to use computers, focusing more on software applications and less on development of the processor hardware. Throughout the 1970s and 1980s, home computers were developed for household use, offering some personal productivity, programming and games, while somewhat larger and more expensive systems (although still low-cost compared with minicomputers and mainframes) were aimed for office and small business use.

One of the first and most popular personal computers was the Apple II, introduced in 1977 by Apple Computer. During the late 1970s and early 1980s, new models and competitive operating systems seemed to appear daily. Then, in 1981, IBM entered the fray with its first personal computer, known as the IBM PC. The IBM PC quickly became the personal computer of choice, and most other personal computer manufacturers fell by the way-side. One of

the few companies to survive IBM's onslaught was Apple Computer, which is sure to remain a major player in the personal computer marketplace. In less than a decade the microcomputer has been transformed from a calculator and hobbyist's toy into a personal computer for almost everyone.

What is a personal computer? How can this device be characterized?

— First, a personal computer being microprocessor-based, its central processing unit, called a microprocessor unit, or MPU, is concentrated on a single silicon chip.

— Second, a PC has a memory and word size that are smaller than those of minicomputers and large computers. Typical word sizes are 8 or 16 bits.

— Third, a personal computer uses smaller, less expensive, less powerful input, output and storage components than do large computer systems. Most often, input is by means of a keyboard, soft-copy output being displayed on a screen. Hard-copy output is produced on a printer.

A PC employs disks and USB flash drive as the principal online and offline storage devices and also as input and output media.

— Finally, a PC is a general-purpose, stand-alone system that can begin to work when plugged in and be moved from place to place.

Probably the most distinguishing feature of a personal computer is that it is used by an individual, usually in an interactive mode. Eventually the market segments lost any technical distinction; business computers acquired color graphics capacity and sound, and home computers and game systems used the same processors and operating systems as office-bound computers. Even local area networking, originally a way to allow business computers to share expensive mass storage and peripherals, became a standard feature of a home computer.

Regardless of the purpose for which it is used, either for leisure activities in the home or for business applications in the office, we can consider it to be a personal computer.

#### *Vocabulary Notes*

**circuitry** ['sWkItɹI] — схеми

**competitive operating systems** — конкуруючі операційні системи

**IBM (International Business Machine)** — фірма, яка виробляє комп'ютери

**to enter the fray** — встрянути у бійку

**computer of choice** — кращий комп'ютер

**to fall by the wayside** — залишитись збоку, уступити дорогу

**to survive onslaught** [sq'vaIv 'Onslɪt] — витримати конкуренцію

**word size** — розмір слова

**soft-copy output** — недокументальні вихідні дані (зображені на екрані)

**hard-copy output** — друковані копії вихідних даних  
**online storage** ['stLrIdZ] — неавтономне зберігання даних  
**offline storage** — автономне зберігання даних окремо від комп'ютера  
**input media** — носій для вхідних даних  
**output media** — носій для вихідних даних  
**to employ**[Im'plOI] — використовувати  
**general-purpose** — універсальний, загального призначення  
**stand-alone** — автономний  
**to plug in** [plAg In] — підключати; під'єднувати  
**office-bound** ['OfIs baund] **computer** — комп'ютер призначений лише для офісної роботи

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) The capabilities of a personal computer have changed greatly since the introduction of electronic computers. 2) Then, in 1981, IBM entered the fray with its first personal computer, known as the IBM PC. 3) Third, a personal computer uses smaller, less expensive, less powerful input, output and storage components than do large computer systems. 4) Eventually the market segments lost any technical distinction.

#### *2. Choose the right answer:*

- 1) Personal computers are supposed to appear in ... .  
a) the early 1970s;  
b) the late 1970s;  
c) 1990.
- 2) The introduction of the ... lead to the proliferation of personal computers after 1975.  
a) laptop;  
b) computers;  
c) microprocessor.
- 3) Early personal computers is generally called ... .  
a) computer;  
b) microcomputers;  
c) mainframe.
- 4) By the late 1970s, ... pre-assembled computers allowed a wider range of people to use computers.  
a) mass-market;  
b) special;  
c) general.
- 5) One of the first and most popular personal computers was ... .  
a) the Apple;

- b) the Apple I;
- c) the Apple II.
- 6) IBM entered the fray with its first personal computer, known as ... .
  - a) the IBM PC;
  - b) software;
  - c) firmware.
- 7) A microprocessor unit, or MPU, is concentrated on ... .
  - a) disk;
  - b) a single silicon chip;
  - c) CD.
- 8) Most often, input is by means of ... .
  - a) a keyboard;
  - b) a printer;
  - c) a monitor.
- 9) A PC employs ... as the principal online and offline storage devices
  - a) CD;
  - b) diskettes;
  - c) disks and USB flash drive.

**3. Complete the sentences:**

1) The capabilities of a personal computer have changed greatly since ... . 2) By the early 1970s, people in academic or research institutions had the opportunity for single person use of a computer system in ... . 3) Early personal computers generally called microcomputers, sold often in ... . 4) By the late 1970s, mass-market pre-assembled computers allowed a wider range of people to use computers, focusing more on ... . 5) During the late 1970s and early 1980s, new ... and competitive ... seemed to appear daily. 6) First, a personal computer being ... . 7) Second, a PC has ... . 8) Third, a personal computer uses ... . 9) Finally, a PC is a ... , ... system that can begin to work when plugged in and be moved from place to place. 10) Probably the most distinguishing feature of a personal computer is ... .

**4. Answer following questions.**

1) When have the capabilities of a personal computer changed greatly? 2) What opportunity had people in academic or research institutions? 3) What leads to the proliferation of personal computers after 1975? 4) What were of interest mostly to hobbyists and technicians? 5) What allowed a wider range of people to use computers? 6) What did home computers offer? 7) What was the Apple II, introduced in 1977 by Apple Computer? 8) What did IBM entered the fray with? 9) What are the main characteristics of a PC? 10) What is the most distinguishing feature of a personal computer?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- the appearance of PC in the early 1970s;
- the first and most popular personal computers;
- the main characteristics of a PC.

**\*6. Try to tell the gist of the text.**

### **Word Study**

**1. Give Ukrainian equivalents of the following.**

The introduction of electronic computers, academic or research institutions, in interactive mode, for extended durations, to lead to the proliferation of personal computers, in kit form and in limited volumes, to be aimed for office, to remain a major player in the personal computer marketplace, microprocessor-based, a single silicon chip, to range in size, local area networking, to share expensive mass storage and peripherals, regardless of the purpose.

**2. Give English equivalents of the following.**

Незважаючи на мету, протягом тривалого часу, поява електронних комп'ютерів, вести до збільшення персональних комп'ютерів, сягати у розмірі, у вигляді комплекту та в обмеженій кількості, інтерактивному режимі, використовувати масивну пам'ять та периферійні засоби, наукові чи дослідницькі інститути, бути призначеним для офісу, мікропроцесорний, локальна мережа, цілісний кристал з кремнію, залишатися головним постачальником на комп'ютерному ринку.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
circuitry	capability
computer of choice	universal
storage	circuits
to employ	the best computer
general-purpose	memory
eventually	to use
capacity	finally

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*General-purpose/to employ/circuitry/self-contained*

1) Any modern computer use ... . 2) Computers that can do many different jobs are called ... computer. 3) The smallest fully functional ... personal computers are notebook computers. 4) Analog computers are devices that ... continuously variable physical phenomena to make computations.

**5. Translate sentences into English using words and word combinations**

*from the Vocabulary Notes.*

1. Комп'ютери компанії ІВМ стали найкращими, а поступились їм комп'ютери Apple. 2) Усі персональні комп'ютери використовують носії для виводу та вводу даних. 3) Усі друковані документи можна назвати друкованими копіями вихідних даних. 4) Ноутбуки – це є автономні, універсальні ПК. 5) CD диски, флеш карти – це автономне зберігання даних окремо від комп'ютера.

*Grammar in Use*

**The Future Simple Tense**

**1. Refer the sentences to future adding adverbial modifiers of time if necessary. Translate the sentences into Ukrainian.**

1) All programs, texts and data on your disk reside in files and each file has a unique name. 2) You refer to files by their filenames. 3) You create a file each time you enter and save data or text at your terminal. 4) You also create a file when you write programs and save them on your disks. 5) The names of files are kept in directories on a disk. 6) These directories also contain information about the size of the files. 7) The directory you work in is called your working directory. 8) If drive A is the default drive MS-DOS automatically searches the disk in drive A for the filename newfile; so it is not necessary to type the drive name. 9) Valid characters for filename extensions are the same as those for filenames.

**2. Make the sentences interrogative and negative.**

1) Floppy disks in particular will become worn. 2) The computer will suddenly decide that it can no longer read them. 3) A disk fault, or even a brief power failure, will lose all the work. 4) You will put a blank disk in one slot and the full disk in the other to copy it. 5) The computer will check the disk and record various things on it. 6) The various forms of hard disks and other storage devices used in the computer department will not form part of the secretary's work.

**3. Replace the Infinitive in brackets by the Future Simple Tense. Translate the sentences into Ukrainian.**

1) If you (to have) a computer it (to help) you to do your work faster. 2) We (to speak) about some negative aspects of this policy. 3) The disadvantages of replacing people with computers in the office (to be) that the people you (to retain) need a higher skill level. 4) The lesser-skilled people (to become) unemployed, and there a fewer jobs for unskilled people. 5) The office (to become) dependent on technology and, if it (to break down), the office can no longer function effectively. 6) It (to take) longer to train newcomers to the office to become effective in their day-to-day jobs.

**Additional Text**

**(for individual work)**

***Read, translate the text and answer the following questions:***

- *What are the main spheres of PC application?*
- *Do you enjoy computer games?*
- *Is it necessary for a person to be an analyst or a programmer to play computer games?*
- *What other home and hobby applications, except computer games, can you name?*
- *What is "a word processing program"?*
- *What possibilities can it give you?*
- *Can you correct mistakes while typing any material and how?*
- *What other changes in the typed text can you make using a display?*
- *Which professions are in great need of computers?*
- *How can computers be used in education?*

**Application of Personal Computers**

Personal computers have a lot of applications, however, there are some major categories of applications: home and hobby, word processing, professional, educational, small business and engineering and scientific.

Home and hobby. Personal computers enjoy great popularity among experimenters and hobbyists. They are an exciting hobby. All hobbyists need not be engineers or programmers. There are many games that use the full capabilities of a computer to provide many hours of exciting leisure-time adventure.

The list of other home and hobby applications of PCs is almost endless, including: checking account management, budgeting, personal finance, planning, investment analyses, telephone answering and dialing, home security, home environment and climate control, appliance control, calendar management, maintenance of address and mailing lists and what not.

Word processing. At home or at work, applications software, called a word processing program, enables you to correct or modify any document in any manner you wish before printing it. Using the CRT monitor as a display screen, you are able to view what you have typed to correct mistakes in spelling or grammar, add or delete sentences, move paragraphs around, and replace words. The letter or document can be stored on a diskette for future use.

Professional. The category of professional includes persons making extensive use of word processing, whose occupations are particularly suited to the desk-top use of PCs. Examples of other occupations are accountants, financial advisors, stock brokers, tax consultants, lawyers, architects, engineers, educators and all levels of managers. Applications programs that

are popular with persons in these occupations include accounting, income tax preparation, statistical analysis, graphics, stock market forecasting and computer modeling. The electronic worksheet is, by far, the computer modeling program most widely used by professionals. It can be used for scheduling, planning, and the examination of "what if situations.

Educational. Personal computers are having and will continue to have a profound influence upon the classroom, affecting both the learner and the teacher. Microcomputers are making their way into classrooms to an ever-increasing extent, giving impetus to the design of programmed learning materials that can meet the demands of student and teacher.

Two important types of uses for personal computers in education are computer-managed instruction (CMI), and computer-assisted instruction (CAI). CMI software is used to assist the instructor in the management of all classroom-related activities, such as record keeping, work assignments, testing, and grading. Applications of CAI include mathematics, reading, typing, computer literacy, programming languages, and simulations of real-world situations.

***1. Find in the texts:***

***a) words similar in meaning:***

*Verbs:* to print; to produce; to convert; to keep; to found; to erase; to name; to change; to use; to start; to switch on; to supply; to give possibility; to involve.

*Nouns:* rate; analyst; possibilities; use; plays; control; post; mode; profession; consultant; teacher; director; book-keeper; fight; producer; attack; amateur; device; crystal; error; storage; primary (memory); monitor; characteristic; aim.

*Adjectives:* flexible; thrilling; main; little; general;

***b) words opposite in meaning:***

*Verbs:* to finish; to switch on; to take; to delete. *Nouns:* online; input; work.

*Adjectives:* cheap; weak; common; general; large; soft; high; easy.

## Unit 4

### **Text Study: PC Configuration.**

### **Additional Text: The Development of the Personal Computer.**

### **Grammar: Revision of the Module I.**

#### **Text Study**

#### ***I. Pre-reading Exercises***

***1. Repeat the words in chorus:***

View, primary, keyboard, delicate, punctuation, surface, smooth, rough, twice, quick, succession.

***2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remindf you:***

Monitor, metal, electronics, stereo, pixels, position, microphone, modem, port.

### 3. *Pay attention to some grammatical points:*

1) **Don't remove** the case's cover unless you **need** to do something inside the unit and always replace the cover when you are done. 2) **Using** it you type instructions and commands for the computer and information **to be processed and stored**. 3) The mouse works **by sliding** it around (ball down) on a flat surface. 4) The mouse **does not work if** you **hold** it in the air like a remote control. 5) The display adapter for your system is **either** built onto the system board **or** is an expansion card plugged into your system board. 6) You should set them for the largest image **without losing** any part of it. 7) DVD Writer - a device used for **both** reading **and** writing data to and from a DVD.

## *II. Reading*

*Read, translate the text and mind the PC configuration.*

### **PC Configuration**

Meet the PC Configuration.

1. *The main part of the system.* An exploded view of modern personal computer: 1. Monitor; 2. Motherboard; 3. CPU (Microprocessor); 4. Primary storage (RAM); 5. Expansion cards; 6. Power supply; 7. Optical disc drive; 8. Secondary storage (Hard disk); 9. Keyboard; 10. Mouse

2. *The case.* The large metal box that is the main part of the computer is called the case. The case and its contents (power supply, system board, etc.) are called the system unit. The case has several functions:

- it protects the delicate electronics inside;
- it keeps electromagnetic emissions inside, so your TV, cordless phone and stereo don't go haywire when you power up the computer;
- it can also hold the monitor.

Don't remove the case's cover unless you need to do something inside the unit and always replace the cover when you are done.

3. *The keyboard.* You communicate with your computer with the keyboard. Using it you type instructions and commands for the computer and information to be processed and stored. Many of the keys on the keyboard are like those on a typewriter, letter keys, punctuation keys, shift keys, tab and spacebar. Your keyboard also has many specialized keys. The instruction manuals for most software applications contain a section describing the functions of each key or combination of keys.

4. *The mouse.* The mouse works by sliding it around (ball down) on a flat surface. The mouse does not work if you hold it in the air like a remote control. The desktop is fine, but a ready-made mouse pad is the best surface to roll the mouse on. Its surface is flat and usually somewhat textured. If a

surface is too smooth or rough, the ball inside can slip. As you glide the mouse, the ball inside moves in the direction of your movement. You will see the arrow on your screen moving in unison. The arrow is called a pointer and the most important part is the very top of its point. That is the only part the computer pays attention to. To use the mouse, slide it on the mouse pad until the pointer's point is on something, like a button or an icon.

Click - position the mouse pointer over an element and press and release the left mouse button once.

Double-click - same as above except press the mouse button twice in quick succession without moving the mouse.

5. *The monitor.* Your computer is not complete without a monitor, a TV-like device. Most computers still use CRT (cathode-ray tube) monitors but in recent years flat screen based on LCD (liquid-crystal display) technology have become increasingly popular. The monitor displays text characters and graphics. It allows you to see the results of the work going on inside your system unit. The image you see is made up of tiny dots called pixels. The sharpness of the picture depends on the number and size of these pixels. The more pixels the sharper the image. This is called resolution.

A display adapter card is actually what builds the video images, the monitor simply displays them. The display adapter for your system is either built onto the system board or is an expansion card plugged into your system board.

Some of the controls on the monitor change the size and position of the image. You should set them for the largest image without losing any part of it. You can set a screen saver to appear on your monitor screen if the computer doesn't work for a period of time.

6. *The floppy drive.* Floppy drives provide a way to pass data from and to the hard drive or another computer. The drives can read and write on floppy diskettes (3.5 inch, usually drive A). If you put a new diskette into the drive you have to format it first.

7. *The hard drive.* Unlike the floppy drive the hard disk drive is inside the computer's case and you cannot see it. Usually it is referred to as drive C, D or F.

8. *The optical drive.* The optical drive is similar to the one you might have in your car or at home. It can play DVDs, music CDs as well as read software program CDs and the new Kodak photo CDs.

To operate the drive, press the eject button to open the tray. Put a CD in the tray (label side UP) and gently start to push the tray in.

9. *Removable media devices*

CD - the most common type of removable media, inexpensive but has a short

life-span.

CD-ROM Drive - a device used for reading data from a CD.

CD Writer - a device used for both reading and writing data to and from a CD.

DVD - a popular type of removable media that is the same dimensions as a CD but stores up to 6 times as much information. It is the most common way of transferring digital video.

DVD-ROM Drive - a device used for reading data from a DVD.

DVD Writer - a device used for both reading and writing data to and from a DVD.

DVD-RAM Drive - a device used for rapid writing and reading of data from a special type of DVD.

Blu-ray - a high-density optical disc format for the storage of digital information, including high-definition video. Currently a rival of HD-DVD.

BD-ROM Drive - a device used for reading data from a Blu-ray disc.

BD Writer - a device used for both reading and writing data to and from a Blu-ray disc.

HD DVD - a high-density optical disc format and successor to the standard DVD. Currently a rival of Blu-ray.

Floppy disk - an outdated storage device consisting of a thin disk of a flexible magnetic storage medium.

Zip drive - an outdated medium-capacity removable disk storage system, first introduced by Iomega in 1994.

USB flash drive - a flash memory data storage device integrated with a USB interface, typically small, lightweight, removable and rewritable.

Tape drive - a device that reads and writes data on a magnetic tape, usually used for long term storage.

## 10. Sound card

Enables the computer to output sound to audio devices, as well as accept input from a microphone. Most modem computers have sound cards built - in to the motherboard, though it is common for a user to install a separate sound card as an upgrade.

*11. Networking.* Connects the computer to the Internet and/or other computers.

- Modem - for dial-up connections.

- Network card - for DS L/Cable internet, and/or connecting to other computers.

- Direct Cable Connection - Use of a null modem, connecting two computers together using their serial ports or a Laplink Cable, connecting two computers together with their parallel ports.

### *Vocabulary Notes*

**motherboard** [ 'mADq"bLd] — системна плата

**primary** [praɪmɪrɪ] /**secondary storage** ['stɪlɪdʒ] — первинна/вторинна пам'ять  
**expansion card** [ɪks 'pænz (ə) n] — плата розширення  
**power supply** — джерело живлення  
**case** — корпус  
**system unit** — системний блок  
**to go haywire** ['heɪ'waɪə] = **out of order** — несправний  
**shift key** — клавіша переключення регістру  
**tab** — клавіша табуляції  
**spacebar** — клавіша пробілу  
**mouse pad** — килим для миші  
**sharpness** [ʃɹɒpɪs] — чіткість зображення  
**a display adapter** [dɪs 'pleɪ ə 'dʌptɪ] — адаптер дисплею  
**life-span** — термін дії  
**high-density** [haɪ 'densɪtɪ] — з високою щільністю розміщення  
**null modem** [nʌl 'mɒdɛm] — безмодемний  
**network card** — мережевий адаптер

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) The large metal box that is the main part of the computer is called the case. 2) You communicate with your computer with the keyboard. 3) The mouse works by sliding it around (ball down) on a rough surface. 4) The monitor displays only text characters. 5) Floppy drives provide a way to pass data from and to the hard drive or another computer. 6) The hard disk drive is inside the computer's case and you cannot see it. 7) CD-ROM Drive - a device used for reading and writing data from a CD. 8) Tape drive is a device that reads and writes data on a magnetic tape, usually used for short term storage. 9) Most modem computers have sound cards built - in to the motherboard. 10) Network card is used for DS L/Cable internet, and/or connecting to other computers.

#### *2. Choose the right answer:*

- 1) The case and its contents (power supply, system board, etc.) are called ... .  
 a) the mouse;  
 b) the keyboard;  
 c) the system unit.
- 2) Using ... you type instructions and commands for the computer and information to be processed and stored.  
 a) the mouse;  
 b) the keyboard;  
 c) the system unit.

- 3) To use ... , slide it on the mouse pad until the pointer's point is on something, like a button or an icon.
- a) the mouse;
  - b) the keyboard;
  - c) the system unit.
- 4 ... allows you to see the results of the work going on inside your system unit.
- a) the mouse;
  - b) the keyboard;
  - c) the monitor.
- 5) Usually ... is referred to as drive C, D or F.
- a) the hard drive;
  - b) the floppy drive;
  - c) the system unit.
- 6) ... can play DVDs, music CDs as well as read software program CDs and the new Kodak photo CDs.
- a) the hard drive;
  - b) the floppy drive;
  - c) the optical drive.
- 7) ... is an outdated storage device consisting of a thin disk of a flexible magnetic storage medium.
- a) Floppy disk;
  - b) Zip drive;
  - c) USB flash drive.
- 8) ... is an outdated medium-capacity removable disk storage system, first introduced by Iomega in 1994.  
Most often, input is by means of ... .
- a) Floppy disk;
  - b) Zip drive;
  - c) USB flash drive.
- 9) ... is a flash memory data storage device integrated with a USB interface, typically small, lightweight, removable and rewritable.
- a) Floppy disk;
  - b) Zip drive;
  - c) USB flash drive.
- 3. Complete the sentences:**
- 1) An exploded view of modern personal computer: ... . 2) Many of the keys on the keyboard are like those on ... . 3) Click - position the mouse... . 4) A display adapter card is ... . 5) To operate the optical drive ... . 6) DVD- ROM Drive is ... . 7) Blu-ray is ... . 8) HD DVD is ... . 9) Modem is ... .

**4. Answer following questions.**

1) What functions has the case? 2) What contains a section describing the functions of each key or combination of keys? 3) What is the best surface to roll the mouse on? 4) What types of screen have become increasingly popular? 5) What is called resolution? 6) What have you do first when you put a new diskette into the drive? 7) What removable media devices do you know? 8) What is the application of networking?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- the using of the keyboard;
- the using of the mouse;
- types of drives.

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

An exploded view of modern personal computer, to protect the delicate electronics, electromagnetic emissions, cordless phone, the instruction manuals, a remote control, the mouse pointer, a screen saver, to press the eject button, to open the tray, to push the tray in, a rival of Blu-ray.

**2. Give English equivalents of the following.**

Курсор мишки, дистанційне управління, безпроводниковий телефон, покомпонентне відтворення вигляду сучасного персонального комп'ютера, захищати чутливу електроніку, інструкція з користування, зберігач екрану, натиснути кнопку викиду, відкрити лоток (піддон), закрити лоток, електромагнітне розповсюдження (емісія), конкурент блу-рей.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
circuitry	capability
computer of choice	universal
storage	circuits
to employ	the best computer
general-purpose	memory
eventually	to use
capacity	finally

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*General-purpose/to employ/circuitry/self-contained*

1) Any modern computer use ... . 2) Computers that can do many different jobs are called ... computer. 3) The smallest fully functional ... personal

computers are notebook computers.4) Analog computers are devices that ... continuously variable physical phenomena to make computations.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1. Комп'ютери компанії ІВМ стали найкращими, а поступились їм комп'ютери Apple. 2) Усі персональні комп'ютери використовують носії для виводу та вводу даних. 3) Усі друковані документи можна назвати друкованими копіями вихідних даних. 4) Ноутбуки – це є автономні, універсальні ПК. 5) CD диски, флеш карти – це автономне зберігання даних окремо від комп'ютера.

**Grammar in Use**

**Revision of the Module I**

**1. Replace the Infinitive in brackets by the necessary tense-form. Translate the sentences into Ukrainian.**

1) The microprocessor chip (to consist) of arithmetic-logic unit, one or more working registers to store data being processed, and accumulators for storing the results of calculations. 2) Accumulators (to be) groups of devices used to store information in a computer system for high-speed access. 3) The control bus (to be) a group of signal lines dedicated to the passing of control signals. 4) The first calculating machine (to appear) in 1820. 5) This machine (to save) a great deal of time and (to reduce) the possibility of making mistakes. 6) Charles Babbage (to work) out plans for several calculating machines which he (to call) 'engines'. 7) But he never (to finish) any of them. 8) The clock (to be) an electrical circuit, usually a quartz crystal, that (to generate) electronic pulses at fixed time intervals to control the timing of all operations in the processor. 9) Next year the machine (to be) on show at a special exhibition in the Science Museum to remind people of Babbage's work.

**2. Make the sentences interrogative and negative.**

1) The computer memory contains all kinds of information. 2) It has information on missing persons and wanted fugitives. 3) Computers have certainly revolutionized police work by providing access to millions of items of information. 3) Almost every medium-sized or large company will use computers to help run the office. 4) You will probably have to work with a computer in your day - to-day duties. 5) You will need to know something about computers. 6) A computer makes office life easier. 7) The operator typed the password and opened the file. 8) He downloaded all the information he could find on the Internet about this subject.

**3. Make up sentences using the following words. Translate the following definitions or explanations.**

- 1) Mainframe, big, is, computer, a, system, used, operations, for, large-scale.
- 2) Mouse, a, device, is, moved, to indicate, by, hand, position, on, screen, the.
- 3) Icon, visual, is, a, symbol, in, a, used, menu, of, instead, natural, language.
- 4) Operating, is, the, system, of, set, software, that, a, computer, controls, system.
- 5) Hardware, physical, is, the, portion, system, of, a, computer.
- 6) Microchip, piece, is, a, small, very, of, a, silicon, carrying, complex, circuit, electrical.

**Additional Text**  
**(for individual work)**

***Read, translate the text and answer the following questions:***

- *How many mainframes did IBM think it was possible to sell in 1952?*
- *How many PCs have now been sold?*
- *Who paid for the initial research into PCs?*
- *Which company later used the results of this research to develop their operating system?*
- *What are command-based operating systems?*
- *DR/DOS is an acronym. What does it stand for?*

**The Development of the Personal Computer**

In 1952, a major computing company took a decision to get out of the business of making mainframe computers. They believed that there was only a market for four mainframes in the whole world. That company was IBM. The following year they reversed their decision.

In 1980, IBM decided that there was market for 250,000 PCs, so they set up a special team to develop the first IBM PC. It went on sale in 1981 and set a world-wide standard for IBM- compatibility which, over the next ten years, was only seriously challenged by another company, Apple Computers. Since then, over seventy million PCs made by IBM and other manufactures have been sold. Over this period, PCs have become commodity items.

The history of the multi-billion dollar PC industry has been one of mistakes. Xerox Corporation funded the initial research on personal computers in their Palo Alto laboratory in California. However, the company failed to capitalize on this work, and the ideas that they put together went into the operating system developed for Apple's computers. This was a graphical interface: using a mouse, the user clicks on icons which represent the function to be performed.

The first IBM PC was developed using existing available electrical components. With IBM's badge on the box it became the standard machine for large corporations to purchase. When IBM were looking for an operating system, they went initially to Digital Research, who were market leaders in

command-based operating systems (these are operating systems in which the users type in commands to perform a function). When the collaboration between IBM and Digital Research failed, IBM turned to Bill Gates, then 25 years old, to write their operating system.

Bill Gates founded Microsoft on the basis of the development of MS/DOS, the initial operating system for the IBM PC. Digital Research have continued to develop their operating system, DR/DOS, and it is considered by many people to be a better product than Microsoft's. However, without an endorsement from IBM, it has become a minor player in the market.

## Progress Check

*Choose the right answer:*

- 1) In 2008 LNTU has got the status of the ... University.  
a) National; b) State; c) Private d) Common; e) Soviet.
- 2) Training by correspondence at the University are organized for those who want ... .  
a) to have a lot of rest; b) to attend periods every day; c) to combine their work and study; d) to miss periods; e) to entertain.
- 3) The students are given the opportunity to choose ... and subject courses by themselves.  
a) books and equipment; b) teachers; c) the curricula; d) groupmates; e) scientific supervisor.
- 4) All educational and scientific work is organized and carried out by highly qualified ... .  
a) teachers and students; b) engineers; c) teachers; d) politicians; e) students.
- 5) The University devotes much attention to the promotion of cooperation with institutions of higher education in foreign countries on the basis of ... .  
a) good relationship; b) telephone conversations; c) bilateral agreements; d) scientific researches; e) laws.
- 6) Informed citizens of our information-dependent society should be ... .  
a) computer-literate; b) illiterate; c) polite; d) wise; e) impolite.
- 7) Many actions relate to some aspect of ... system.  
a) computer; b) application; c) a data processing; d) economic; e) everyday.
- 8) System analyst studies methods of working within an organization to decide how tasks can be done efficiently by ... .  
a) a store manager; b) computers; c) policeman; d) credit cards; e) mobile phones.
- 9) Software Engineer/Designer produces the programs which control the ... operations of computers.  
a) internal; b) external; c) local; d) all; e) most of all.

- 10) Some of computer system support people specialize in ... which handles the basic operation of the computers.  
 a) hardware; b) software; c) firmware; d) application software; e) system software.
- 11) The brains of people who work in the computer industry are sometimes known irreverently as ... .  
 a) "meatware"; b) systems analyst; c) designer; d) engineer; e) system engineer.
- 12) Personal computers are supposed to appear in ... .  
 a) the early 1970s; b) the late 1970s; c) 1990; d) 1980; e) 1985.
- 13) The introduction of the ... lead to the proliferation of personal computers after 1975.  
 a) laptop; b) computers; c) microprocessor; d) minicomputer; e) embedded computer.
- 14) Early personal computers is generally called ... .  
 a) computer; b) microcomputers; c) mainframe ; d) calculators ; e) calculating machines.
- 15) One of the first and most popular personal computers was ... .  
 a) the Apple; b) the Apple I; c) the Apple II; d) the Apple III; e) the Apple IV.
- 16) IBM entered the fray with its first personal computer, known as ... .  
 a) the IBM PC; b) software; c) firmware; d) mainfrain; e) minicomputer.
- 17) A microprocessor unit, or MPU, is concentrated on ... .  
 a) disk; b) a single silicon chip; c) CD; d) tape; e) ROM.
- 18) Most often, input is by means of ... .  
 a) a keyboard; b) a printer; c) a monitor; d) numbers; e) storage.
- 19) The case and its contents (power supply, system board, etc.) are called ... .  
 a) the mouse; b) the keyboard; c) the system unit; d) the monitor; e) the letter.
- 20) ... allows you to see the results of the work going on inside your system unit.  
 a) the mouse; b) the keyboard; c) the monitor; d) fingers; e) eyes.

## Module II

### Computer Evolution

#### Unit 1

**Text Study: Computer Evolution.**

**Additional Text: From the History of the Computers.**

**Grammar: The Present Continuous Tense.**

## Text Study

### I. Pre-reading Exercises

#### 1. Repeat the words in chorus:

An abacus, to arrange, a wheel, an engine, the forerunner, binary, bulky, unreliable, thousands, frequently, a core, to squeeze, due to, to etch, launched, fibre.

#### 2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:

Calculations, mechanical, programmer, automatically, generation, silicon, integrated, plastic, metal, standard, graphical, optics, experts, molecules.

#### 3. Pay attention to some grammatical points:

1) The abacus **emerged** in Asia. 2) It **allowed** people to make calculations **using** moving beads arranged on a rack. 3) Charles Babbage **started** to build his Analytical Engine. 4) Konrad Zuse **built** the first programmable computer, **called** Z3, **working** on the binary system. 5) Second generation computers **were able to** reduce computational time from milliseconds to microseconds, or millionths of seconds. 6) Second-generation computers were **smaller, faster and more reliable** than first-generation computers. 7) Memories **were made** of magnetizable cores. 8) The integrated circuits that **are being developed** have been greatly reduced in size.

### II. Reading

*Read the text and be ready to find in the text the answers to the following questions:*

- *What generations of a computer are given in the text?*
- *What are the characteristic features of the fifth generation?*

#### Computer Evolution

2000 BC (*before Christ*) – The abacus emerged in Asia. It allowed people to make calculations using moving beads arranged on a rack. 1642 – Blaise Pascal invented the first mechanical adding machine, a numerical wheel called Pascaline.

1833 – Charles Babbage started to build his Analytical Engine, the forerunner of the modern computer. He was helped by Augusta Ada Byron, who is considered the first female computer programmer. 1890 – Herman Hollerith used punch cards in a device which automatically read the US census.

1941 – Konrad Zuse built the first programmable computer, called Z3, working on the binary system.

*First generation computers* (1945-1954) – The University of Pennsylvania designed ENIAC (UNIVERSAL Automatic Computer), an electronic computer which used vacuum tubes and was able to calculate at electronic

speeds. Those devices were not only bulky, they were also unreliable. The thousands of vacuum tubes emitted large amounts of heat and burned out frequently.

*Second generation computers* (1955-1964) – Computers used transistors instead of vacuum tubes. So-called second generation computers, which used large numbers of transistors were able to reduce computational time from milliseconds to microseconds, or millionths of seconds. Second-generation computers were smaller, faster and more reliable than first-generation computers. Memories were made of magnetizable cores (the IBM 1401).

*Third generation computers* (1965-1973) – The first computers using silicon chips went on sale. Intel released the first microprocessor. They could perform many data processing operations in nanoseconds, which are billionths of seconds.

*Fourth generation computers* (1974 -2001) – Computers became smaller as more components were squeezed onto microchips. The integrated circuits that are being developed have been greatly reduced in size. This is due to microminiaturization, which means that the circuits are much smaller than before; as many as 100 tiny circuits are placed now on a single chip. A chip is a square or rectangular piece of silicon, usually from 1/10 to 1/4 inch, upon which several layers of an integrated circuit are etched or imprinted, after which the circuit is encapsulated in plastic or metal.

1975 – Bill Gates and Paul Allen founded Microsoft and wrote a BASIC compiler for the Altair.

1976 – Steve Jobs and Steve Wozniak founded Apple Computer, Inc. The first minicomputer was sold.

1981 – IBM sold the IBM PC, a model that became the standard in personal computers. MS-DOS was the operating system for IBM PCs and compatibles.

1984 – Apple produced the Macintosh, the first computer with a mouse and a graphical user interface (GUI).

1995 – Microsoft launched Windows 95 and Sun Microsystems created Java language.

2001 – Intel launched the Pentium 4 running at 2G Hz.

*Fifth generation computers* – Fibre optics and optical disks revolutionize the world of computers. Artificial Intelligence and voice recognition are incorporated into computer applications; experts start making tiny, superfast computers known as nanocomputers. Some are electronics, others are biochemical, working with bio - chips made of millions of molecules.

#### *Vocabulary Notes*

**an abacus** [ ' x b q k q s ] – рахівниця

**to emerge** [ I ' m W d Z ] – виникати, з'являтися

**a bead** [bJd] – бусинка, кружечок  
**a rack** – рама, вішак  
**census** ['sensqs] – перепис, збір даних  
**vacuum tubes** ['vxkjucm 'tjub] – вакуумні трубки  
**bulky** ['bAlkI] – великий, об'ємний, гнучкий  
**unreliable** ['nrI 'laiqbl] – ненадійний  
**a core** [kL] – ядро  
**to release** [rI 'lJz] – звільняти, полегшувати  
**to squeeze** [skwJz] – стискати, здавлювати  
**rectangular** [rek 'txNgjulq] – прямокутний  
**a piece** – частинка  
**to encapsulate** – герметизувати  
**to reduce** – зменшувати  
**tiny** – крихітний  
**to etch** [etS] – гравірувати, витравлювати (на склі, металі)  
**to imprint** – відштамповувати, залишати слід  
**to launch** [lLntS] – випускати, запускати  
**fibre** ['faIbq] – волокно, фібра  
**incorporate** – з'єднуватись, змішуватись, включати в себе

### **Comprehension**

#### **1. Tell what sentences are true and what are false.**

1) The abacus emerged in Africa and it allowed people to make calculations using moving beads arranged on a rack. 2) Konrad Zuse built the first programmable computer, called Z3, working on the binary system. 3) Second generation computers used transistors instead of vacuum tubes. 4) Second-generation computers were bigger, slower and less reliable than first-generation computers. 5) A chip is a square or rectangular piece of silicon, usually from 1/10 to 1/4 inch. 6) Fibre optics and optical disks revolutionize the world of computers in 1975. 7) Artificial Intelligence and voice recognition are incorporated into computer applications of the fifth generation of computers.

#### **2. Choose the right answer:**

- 1) Ada Byron is considered the first ... .  
a) male computer programmer;  
b) female computer programmer;  
c) computer user.
- 2) Konrad Zuse built the first ... .  
a) programmable computer;  
b) big computer;  
c) desk computer.

- 3) The thousands of ... of the first computers emitted large amounts of heat and burned out frequently.
- operations;
  - functions;
  - vacuum tubes.
- 4) Third generation computers used ... .
- silicon chips;
  - petrol;
  - light.
- 5) Bill Gates and Paul Allen founded Microsoft and wrote a BASIC compiler for the Altair in ... .
- 1965;
  - 1975;
  - 1955.
- 6) ... revolutionize the world of computers.
- disks;
  - fibre elements;
  - fibre optics and optical disks.

**3. Complete the sentences.**

1) In 1941 Konrad Zuse built the first programmable computer, called Z3, working on ... . 2) The University of Pennsylvania designed ENIAC, an electronic computer which used vacuum tubes and was able to calculate at electronic speeds in ... . 3) Second generation computers were able to reduce ... from milliseconds to microseconds. 4) The integrated circuits of the fourth generation computers have been greatly ... in size. 5) Fifth generation computers are characterized by ... .

**4. Answer the questions:**

1) When did the abacus emerge? 2) Who designed ENIAC (UNIVERSal Automatic Computer), an electronic computer which used vacuum tubes and was able to calculate at electronic speeds? 3) What did the second generation computers use? 4) What could the third generation computers perform? 5) Why did fourth generation computers become smaller in size? 6) What did revolutionize the world of computers?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- first and second generation computers
- third and fourth generation computers
- fifth generation computers

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

To make calculations, mechanical adding machine, a numerical wheel, the binary system, to emit large amounts of heat, magnetizable cores, to perform many data processing operations, to be squeezed onto microchips, to be reduced in size, a square or rectangular piece of silicon, revolutionize the world of computers, computer applications, voice recognition, integrated circuits, tiny circuits.

**2. Give English equivalents of the following.**

Розпізнавання голосу, інтегровані схеми, виділяти велику кількість тепла, виконувати обчислення, механічні машини додавання, застосування комп'ютера, числове колесо, двійкова система, намагнічені ядра, квадратні чи прямокутні куски силікону, виконувати велику кількість операцій над даними, бути стиснутим у мікрочіпи, бути зменшеним у розмірі, зробити революцію у світі комп'ютерів, крихітні схеми.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
to emerge	small
bulky	to lessen
core	to appear
to release	heavy
to squeeze	to compress
tiny	to free
to reduce	heart

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*to design / rectangular / to imprint / the abacus / bulky / vacuum tubes / cores / to reduce / to squeeze / launch / to etch*

1) ... allowed people to make calculations using moving beads arranged on a rack. 2) ENIAC ... at the University of Pennsylvania. 3) It was an electronic computer which used ... and was able to calculate at electronic speeds. 4) The devices of first generation computers were not only ... , they were also unreliable. 5) Second generation computers were able ... computational time from milliseconds to microseconds, or millionths of seconds. 6) Memories of those computers were made of magnetizable ... . 7) Fourth generation computers became smaller as more components ... onto microchips. 8) A chip is a square or ... piece of silicon. 9) Several layers of an integrated circuit ... or ... upon a chip. 10) Intel ... the Pentium 4 running at 2G Hz in 2001.

**5. Translate sentences into English using words and word combinations**

### *from the Vocabulary Notes.*

1) Рахівниці дозволяли людям робити обчислення, використовуючи рухомі кружечки на рамі. 2) Перший програмований комп'ютер виник у 1941 році і працював на двійковій системі числення. 3) Перші комп'ютери були не лише об'ємні, але й ненадійні. 4) Велика кількість вакуумних трубок виділяли багато тепла і часто згоряли. 5) Комп'ютери другого покоління використовували транзистори замість вакуумних трубок, що дозволяло дуже скоротити обчислювальний час. 6) Комп'ютери третього покоління використовували силіконові чіпи. 7) Комп'ютери четвертого покоління стали значно меншими, і відповідно інтегровані схеми також зменшились у розмірі. 8) Розпізнавання голосу та штучний розум були включені до комп'ютерів п'ятого покоління.

### ***Grammar in Use***

#### **The Present Continuous Tense**

##### ***1. What's happening at the moment? Write sentences.***

- 1) Electronic/control/device/of power/ station/ the work.
- 2) Of IC/new types/now/increase?
- 3) At this moment/operate/control/unit.
- 4) They/by keyboard/data/enter.
- 5) Where/move/the mouse?
- 6) Texts/images/convert/scanners/into/the computer/form.
- 7) Our/laboratory/research/use/types/many/electronic/computer.
- 8) The measuring/send/system/signals/their/to/the computer.

##### ***2. Put the sentences of exercise 1 into negative form.***

##### ***3. Open the brackets using the Present Continuous Tense or the Present Simple Tense.***

1) Computer system (to have) hardware, software and firmware. 2. The computer (to fetch) and (to execute) instruction at this moment. 3. The CPU (to consist) of the ALU and control unit. 4. The speed of computer operation (to depend) on many capabilities. 5. Computer in some cases (to resemble) a calculation. 6. We (know) that a computer (to be) a general-purpose machine. 7) They (to suppose) that their mainframe (to execute) all instruction given to it. 8) He (to prefer) to use a laptop in his work. 9) When we (to come) to the institute, the computer (to work). 10) Software programs (to require) to press one or more buttons.

#### **Additional Text (for individual work)**

***Read and translate the text.***

#### **From the History of the Computers**

Let us take a look at the history of the computers that we know today. The first calculating devices used were ten fingers of a man's hand. The ancient Babylonians, as traders, needed a quick and easy way of working with high numbers, and so they developed a decimal system of writing numerals. They were also the first to use a symbol for zero.

The decimal system depends on the position of each digit. Ten was taken as the basis of the system because men used to count on their fingers. Not all ancient peoples used a decimal system, however, and there are still some primitive tribes who can count no further than three.

Even the Romans, who were so advanced in many ways, were poor mathematicians. They were held back by inefficient system of writing numbers, which included no symbol for zero. The circuits in an electronic computer can either be on or off, according to the impulse they receive. Thus a binary or 'two-based' system of counting is needed to suit the on/off pulses. This is why binary mathematics is now taught in many schools, medicine, trade, science, etc.

Then the abacus was invented. People used some form of abacus till the 16<sup>th</sup> century and it is still used in some parts of the world because it can be understood without knowing how to read. During the 17<sup>th</sup> and 18<sup>th</sup> centuries many people tried to find easy ways of calculating. Napier, a Scotsman, developed a mechanical way of multiplying and dividing which is how the modern slide ruler works. Henry Briggs used Napier's ideas to produce logarithm tables which all mathematicians use today. Calculus, another branch of mathematics, was independently invented by Sir Isaac Newton, an Englishman, and Leibniz, a German mathematician. The first calculating machine appeared in 1820. This machine saves a great deal of time and reduces the possibility of making mistakes.

Most people think of computers as very modern inventions, products of our new technological age. But actually the idea for a computer was worked out over two centuries ago by Charles Babbage, a brilliant mathematician. Babbage was born in 1791. He worked out plans for several calculating machines which he called 'engines'. But he never finished any of them. Recently, however, the Science Museum in London has finished building an engine based on one of Babbage's designs. It has taken six years to complete and more than four thousand parts have been specially made. Whether it works or not, the machine will be on show at a special exhibition in the Science Museum to remind people of Babbage's work.

**1. Divide the text into the logical parts and give a title to each one.**

**2. Put questions to the text.**

**3. Discuss it with your groupmates.**

## Unit 2

**Text Study: Types of Computers.**

**Additional Text: The First Computers.**

**Grammar: The Past Continuous Tense.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Classify, distinction, digital, analog, discrete, occur, measure, circular, variable, smooth, purpose, offer, sufficiently, equipment.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Method, documents, contract, microcomputer, individual, a workstation, model, class of computer, silicon chip, location.

##### *3. Pay attention to some grammatical points:*

1) There are several methods of **classifying** computers. 2) Digital computers **are** by far the **most widely used**. 3) A home computer is a low-cost microcomputer of **limited** capability **designed** for domestic use with programs that typically **are used** for such things as computer games or **controlling** family finance. 4) Many **can be connected** to minicomputers and mainframe computers so that the PC users can also gain access to the facilities **offered** by the larger machine. 5) **There are** mainframes, minicomputers and microcomputers. However, **there are no** sharp dividing lines between them. 6) A model at the top of a manufacturer's range of minicomputers **might** well **be** more powerful than the model at the bottom of a range of mainframes.

#### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What methods of classifying computers are there?*
- *What is the most powerful type of the computer?*

#### **Types of Computers**

There are several methods of classifying computers. The main distinction is between **digital and analog devices**.

**Digital** computers are so called because they process data that is represented in the form of discrete values (e.g. 0,1,2,3....) by operating on it in steps. Discrete values occur at each step in the operation. Counting on one's fingers is probably the simplest digital operation we all know.

**Analog** computers are kinds of measuring instruments such as thermometers and voltmeters with pointers on circular dials. They process data in the form of electrical voltages, which are variable like the variable positions

of a pointer on a dial. The output from analog computers is often in the form of smooth graphs from which information can be read.

**Hybrid** computers, as their name suggests, are computers that have the combined feature of digital and analog computers.

Digital computers are by far the most widely used.

It is also possible to classify computers **by their use**.

**A Word Processor** is a special purpose computer used in the production of office documents, letters, contracts, etc. Note: a general purpose computer can run a word processor program and hence temporarily become special purpose.

**A Home Computer** is a low-cost microcomputer of limited capability designed for domestic use with programs that typically are used for such things as computer games or controlling family finance.

**A Personal Computer** is a microcomputer designed for independent use by an individual at work or at home mainly for business purpose. Some PCs are portable. Many can be connected to minicomputers and mainframe computers so that the PC users can also gain access to the facilities offered by the larger machine.

**A Desktop Computer** is any computer design for use on a desk in an office. Therefore home computers and PCs are types of Desktop computer.

**A workstation** is another kind of desktop computer. Although larger more powerful PCs are sometimes called workstations the term is normally used to imply the presence of advanced features not provided by all PCs.

**A Lap-Top Computer** is a PC sufficiently small and light for its user comfortably to use it on his or her lap.

**An Embedded Computer** is one that is within some other device or system but is not accessed directly. For example, there are embedded computers operating within petrol pumps, watches, cameras, video recorders and many types of domestic and industrial equipment.

It is also possible to classify computers **by their size**.

There are mainframes, minicomputers and microcomputers. However, there are no sharp dividing lines between them. For example, a model at the top of a manufacturer's range of minicomputers might well be more powerful than the model at the bottom of a range of mainframes.

Thus, computers are classified according to their size, power, and type of processing unit.

The most powerful type of computer is the *mainframe computer*. Only large companies are likely to use a mainframe computer, as these machines are very expensive to buy and run.

A *minicomputer* is the next size down, a sort of 'small mainframe'. It is a slower, less powerful version of the same class of computer, and is designed for businesses who do not need (or cannot afford) the capacity and speed of the smallest mainframe.

The smallest type of computer is the *microcomputer*. The name derives not from the small size of the machine – although the largest microcomputers can fit comfortably on a desk - but from the fact that the main processing circuits are on a single silicon chip, known as a *microprocessor*.

From the office worker's point of view the main difference between the two categories is that of location: mainframe and minicomputers require their own special room, often air-conditioned, and trained computer staff to operate them, whereas microcomputers can be found dotted round the building, wherever there is a need for one.

### *Vocabulary Notes*

**digital** – цифровий

**value** [ˈvʌljʌ] – мат. величина

**to occur** [ɔːˈkʊə] – траплятися, мати місце

**circular** [ˈsɪrkjʊlə] – круговий, круглий

**a dial** – циферблат

**variable** [ˈvəriəbəl] – перемінний

**voltage** – напруга

**smooth** – гладкий, рівний, плавний

**feature** – особливість, (характерна) риса

**a purpose** – ціль

**temporarily** – тимчасово

**limit** – обмежений

**domestic** – домашній

**mainly** – в основному

**although** [ɔːlˈðoʊ] – хоч

**access** [ˈæksɛs] – доступ, мати доступ до

**embedded computers** – вмонтований, вкладений

**to imply** [ɪmˈplaɪ] – значити, означати, бути наслідком чогось

**mainframe** – універсальна обчислювальна машина

### *Comprehension*

**1. Tell what sentences are true and what are false.**

1) There are two methods of classifying computers. 2) Digital computers are so called because they process data that is represented in the form of discrete values. 3) Analog computers process data in the form of electrical voltages. 4) A home computer is a high-cost microcomputer of unlimited capability. 5) A personal computer is a microcomputer designed for

independent use by an individual at work. 6) Computers are classified according to their size and type of processing unit. 7) The most powerful type of computer is the minicomputer.

**2. Choose the right answer:**

- 1) The output from analog computers is often in the form ...
  - a) figures;
  - b) digits;
  - c) of smooth graphs.
- 2) A word processor is a special purpose computer used in ...
  - a) the production;
  - b) the production of office documents;
  - c) the maths.
- 3) There are ... according to their size.
  - a) mainframes, minicomputers and microcomputers;
  - b) large and huge computers;
  - c) small computers.
- 4) Only large companies are likely to use a ...
  - a) microcomputer;
  - b) mainframe computer;
  - c) embedded computer.
- 5) A single silicon chip is known as ...
  - a) a microprocessor;
  - b) a processor;
  - c) a microcomputer.

**3. Complete the sentences.**

1) Hybrid computers are computers that ... 2) A word processor is a special purpose computer used in ... 3) A personal computer is a microcomputer designed for ... 4) An embedded computer is one that ... 5) There are ... by the size. 6) The microcomputer is the ... 7) The mainframe computer is the ...

**4. Answer the questions:**

1) What is the main distinction between classifications of computers? 2) What is the purpose of digital computers? 3) What are analog computers? 4) What are hybrid computers? 5) Where is a word processor used? 5) Why is a home computer low cost one? 7) What is a personal computer designed for? 8) What kinds of desktop computers do you know? 9) What are embedded computers? 10) What can computers be according to their size?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- digital and analog computers

- the desktop computer
- a minicomputer

**\*6. Try to tell the gist of the text.**

### **Word Study**

**1. Give Ukrainian equivalents of the following.**

Main distinction, to process data, to occur at each step, the simplest digital operation, measuring instruments, circular dials, to combine feature of digital and analog computers, a special purpose computer, limited capability, workstations, sufficiently small and light, to access directly, embedded computers, domestic and industrial equipment, sharp dividing line, a single silicon chip.

**2. Give English equivalents of the following.**

Робочі станції, основна відмінність, траплятися на кожному кроці, обробляти дані, єдиний силіконовий чіп, домашнє та промислове обладнання, найпростіші числові операції, вмонтовані комп'ютери, вимірювальні інструменти, круглі циферблати, порівняно малий і легкий, прямий доступ, поєднувати риси цифрового і каналового комп'ютерів, обмежені можливості, комп'ютери спеціального призначення.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
purpose	chiefly
feature	momentary
limit	aim
occur	boundary
circular	peculiarity
temporary	happen
mainly	round

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*limited /smooth / variable /electrical voltages /digital and analog / a workstation /mainframe/ embedded*

1) The main distinction of classifying computers is between ... and ... devices. 2) Analog computers process data in the form of ... which are ... 3) The output from analog computers is often in the form of ... graphs. 4) A home computer is a cheap microcomputer of ... capability designed for domestic use. 5) Some PCs can be connected to minicomputers and ... computers. 6) ... is a kind of desktop computer. 7) There are ... computers operating within petrol pumps, watches, cameras, video recorders and many types of domestic and industrial equipment.

**5. Translate sentences into English using words and word combinations**

*from the Vocabulary Notes.*

1) Цифрові і аналогові комп'ютери мають свої характерні особливості. Ми зрозуміли різницю між ними, прочитавши текст. 2) Також існують такі комп'ютери, які поєднують риси аналогового і цифрового комп'ютерів. Однак найпоширеніші – це цифрові комп'ютери. 3) Персональні комп'ютери – це машини, які використовуються для індивідуальної роботи людей дома чи на роботі. 4) Вмонтовані комп'ютери не існують окремо. Їх вміщують у різне приладдя. 5) Комп'ютери можна класифікувати і за розміром. 6) Найпотужніший комп'ютер – це універсальна обчислювальна машина.

**Grammar in Use**

**The Past Continuous Tense**

**1. Open the brackets using the Past Continuous Tense.**

1) The programmer (to write) a program at that moment yesterday. 2) The computer (to work) the whole day yesterday. 3) From 6 till 7 the PC (to compile) the program. 4) When I came he (to write) a new program. 5) When we needed the fast calculations the mainframe (to terminate) the computation. 6) We (to collect) the data the whole day yesterday. 7) The students (to perform) some specialized tasks more easily.

**2. Put the sentences of exercise 1 into negative form.**

**3. Put the questions to the sentences of exercise 1.**

**4. Change the following into the Past Continuous Tense.**

1) An alternative voltage source applied to the circuit. 2) A direct current flows through a circuit in one direction. 3) Digital computers receive new programs quite easily. 4) Transistors found wide application in computers, automatic devices, communication, and aviation. 5) Electronic devices helped people discover new phenomena of nature. 6) They calculated the trajectories of spaceships. 7) Jack Kilby developed the concept of integrating device and built the first IC in 1958.

**Additional Text**  
**(for individual work)**

**Read and translate the text.**

**The First Computers**

In 1930 the first analog computer was built by American named Vannevar Bush. This device was used in World War II to help aim guns.

Many technical developments of electronic digital computers took place in the 1940s and 1950s. Mark I, the name given to the first digital computer, was completed in 1944. The man responsible for this invention was Professor

Howard Aiken. This was the first machine that could figure out long lists of mathematical problems at a very fast rate.

In 1946 two engineers at the University of Pennsylvania, J.Eckert and J.Maushly, built their digital computer with vacuum tubes. They named their new invention ENIAC (the Electronic Numerical Integrator and Calculator).

Another important achievement in developing computers came in 1947, when John von Neumann developed the idea of keeping instructions for the computer inside the computer's memory. The contribution of John von Neumann was particularly significant. As contrasted with Babbage's analytical engine, which was designed to store only data, von Neumann's machine, called the Electronic Discrete Variable Computer, or EDVAC, was able to store both data and instructions. He also contributed to the idea of storing data and instructions in a binary code that uses only ones and zeros. This simplified computer design. Thus computers use two conditions, high voltage, and low voltage, to translate the symbols by which we communicate into unique combinations of electrical pulses. We refer these combinations as codes.

Neumann's stored program computer as well as other machines of that time were made possible by the invention of the vacuum tube that could control and amplify electronic signals. Early computers, using vacuum tubes, could perform computations in thousandths of seconds, called milliseconds, instead of seconds required by mechanical devices.

- 1. Divide the text into the logical parts and give a title to each one.**
- 2. Put questions to the text.**
- 3. Discuss it with your groupmates.**

## **Unit 3**

**Text Study: Three Basic Capabilities of a Computer.**

**Additional Text: Visions of Tomorrow.**

**Grammar: The Future Continuous Tense.**

### **Text Study**

#### ***I. Pre-reading Exercises***

##### ***1. Repeat the words in chorus:***

An intricate, network, to magnetize, to accept, to supply, remarkable, capabilities, addition, subtraction, division, multiplication and exponentiation, a cathode-ray-tube, unfortunately, achievements, instantaneously.

##### ***2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:***

Characters (symbols), basic, idea, signals, information, a program, mathematical, logical, operations, results, user, terminals, diskettes, disks, instructions.

### **3. Pay attention to some grammatical points:**

1) The machine is capable of **storing** and **manipulating** numbers, letters, and characters (symbols). 2) The basic job of computers is **processing** of information. 3) The program, or part of it, which tells the computers what **to do** and the data, which provide the information needed **to solve** the problem, **are kept** inside the computer in a place **called** memory. 4) Some of the most common methods of inputting information are to use terminals, diskettes, disks and magnetic tapes. 5) A computer can **solve** a series of problems and **make** thousands of logical decisions without **becoming** tired. 6) It can **find** the solution to a problem in a fraction of the time it takes a human being **to do** the job. 7) A computer cannot **do** anything unless a person tells it what **to do** and gives it the necessary information; but because electric pulses can **move** at the speed of light, a computer can **carry out** great numbers of arithmetic-logical operations almost instantaneously.

## **II. Reading**

**Read the text and be ready to find in the text the answers to the following questions:**

- *What is computer?*
- *What are three basic capabilities of a computer?*

### **Three Basic Capabilities of a Computer**

A computer is a machine with an intricate network of electronic circuits that operate switches or magnetize tiny metal cores. The switches, like the cores, are capable of being in one or two possible states, that is, on or off; magnetized or demagnetized. The machine is capable of storing and manipulating numbers, letters, and characters (symbols).

The basic idea of a computer is that we can make the machine do what we want by inputting signals that turn certain switches on and turn others off, or magnetize or do not magnetize the cores.

The basic job of computers is processing of information. For this reason computers can be defined as devices which accept information in the form of instructions, called a program, and characters, called data, perform mathematical and / or logical operations on the information, and then supply results of these operations. The program, or part of it, which tells the computers what to do and the data, which provide the information needed to solve the problem, are kept inside the computer in a place called memory.

It is considered that computers have many remarkable powers. However most computers, whether large or small, have three basic capabilities. First, computers have circuits for performing arithmetic operations, such as: addition, subtraction, division, multiplication and exponentiation.

Second, computers have a means of communicating with the user. After all, if we couldn't feed information in and get results back, these machines wouldn't be of much use. Some of the most common methods of inputting information are to use terminals, diskettes, disks and magnetic tapes. The computer's input device (a disk drive or tape drive) reads the information into the computer. For outputting information two common devices used are: a printer, printing the new information on paper, and a cathode-ray-tube display, which shows the results on a TV-like screen.

Third, computers have circuits which can make decisions. The kinds of decisions which computer circuits can make are not of the type: "Who would win the war between two countries?" or "Who is the richest person in the world?" Unfortunately, the computer can only decide three things, namely: Is one number less than another? Are two numbers equal? and, Is one number greater than another?

A computer can solve a series of problems and make thousands of logical decisions without becoming tired. It can find the solution to a problem in a fraction of the time it takes a human being to do the job.

A computer can replace people in dull, routine tasks, but it works according to the instructions given to it. There are times when a computer seems to operate like a mechanical 'brain', but its achievements are limited by the minds of human beings. A computer cannot do anything unless a person tells it what to do and gives it the necessary information; but because electric pulses can move at the speed of light, a computer can carry out great numbers of arithmetic-logical operations almost instantaneously. A person can do the same, but in many cases that person would be dead long before the job was finished.

#### *Vocabulary Notes*

**intricate** ['IntrIkI] – складний, заплутаний.

**electronic circuit** ['sWkIt]– електронний ланцюжок, схема

**to operate switches** – активувати перемикачі

**to store numbers** – запам'ятовувати числа

**to manipulate** – керувати; звертатися; перетворювати

**to input/to feed in** – вводить (інформацію)

**to turn on = to switch on** – вмикати

**to turn off = to switch off** – вимикати

**to process data** – опрацьовувати дані

**to supply** – подавати, вводити, постачати, забезпечувати

**addition** – додавання

**subtraction** – віднімання

**division** – ділення

**multiplication** ["mAltIplI'keiSn]– множення

**exponentiation** ["ekspq'nenSieiSn] – піднесення до степеню

**input device** – пристрій введення

**disk drive** – дисковий запам'ятовуючий прилад, дисковод

**tape drive** – запам'ятовуючий прилад на магнітній стрічці

**cathode-ray tube** ["kxTqud'reI tjub]– електронно-променева трубка

**to make decisions** – приймати рішення

**instantaneously** ["Instqn'teInIqslI]– миттєво, негайно

### ***Comprehension***

#### ***1. Tell what sentences are true and what are false.***

1) A computer is a machine with an simple network of electronic circuits that operate switches or magnetize tiny metal cores. 2) The basic idea of a computer is that we can make the machine do what we want by inputting signals. 3) The basic job of computers is choosing of information. 4) The program is a part of computer, which tells the computers what to do. 5) Most computers, whether large or small, have many basic capabilities. 6) Some of the most common methods of inputting information are to use terminals, diskettes, disks and magnetic tapes. 7) A computer can solve a series of problems and make thousands of logical decisions without becoming tired. 8) A computer can replace people in dull, routine tasks and it works without any the instructions given to it.

#### ***2. Choose the right answer:***

1) The basic idea of a computer is that we can make the machine do what we want by ... .

- a) outputting signals;
- b) outside signals;
- c) inputting signals.

2) Computers can be defined as devices which accept information in the form of ... .

- a) instructions;
- b) letters;
- c) figures.

3) Computers have ... for performing arithmetic operations.

- a) memory;
- b) circuits;
- c) brain.

4) The computer's ... reads the information into the computer.

- a) input device;
- b) output device;
- c) storage system.

- 5) For ... two common devices used are: a printer and a cathode-ray-tube display.
- storing information;
  - inputting information;
  - outputting information.
- 6) A computer can carry out great numbers of arithmetic-logical operations almost ... .
- instantaneously;
  - often;
  - seldom.

**3. Complete the sentences.**

1) A computer is a machine with ... . 2) The machine is capable of ... and ... numbers, letters, and characters (symbols). 3) The basic idea of a computer is ... . 4) The basic job of computers is ... . 5) Most computers, whether large or small, have ... basic capabilities. 6) Some of the most common methods of inputting information are ... . 7) . A computer cannot do anything unless ... .

**4. Answer the questions:**

1) What is a computer? 2) What are the two possible states of the switches? 3) What are the main functions of a computer? 4) In what way can we make the computer do what we want? 5) What is the basic task of a computer? 6) In what form does a computer accept information? 7) What is a program? 8) What are data? 9) What is memory? 10) What three basic capabilities have computers? 11) What are the ways of inputting information into the computer? 12) What is the function of an input device? 13) What devices are used for outputting information? 14) What decisions can the computer make? 15) What are the computer's achievements limited by?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- definitions of a computer
- methods of inputting information
- methods of outputting information

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Addition, subtraction, division, multiplication and exponentiation, have many remarkable powers, input device, a cathode-ray-tube, characters called data, perform mathematical operations, information in the form of instructions, an intricate network of electronic circuits, by inputting signals, possible states, to read the information, operate switches, switch off, storing numbers, switch

on, processing of information, supply results, provide the information needed, basic capabilities, a means of communicating with the user, a disk drive, outputting information, make thousands of logical decisions, to make decisions, find the solution to a problem.

## **2. Give English equivalents of the following.**

Складна сітка електронних ланцюгів; керувати (приводити в дію) перемикачами; можливі стани; зберігати (запам'ятовувати) числа; обробляти числа; за допомогою вводу сигналів; вмикати; вимикати; обробка інформації; інформація у вигляді команд; символи, які називають даними; виконувати математичні дії; видавати результати; забезпечувати необхідну інформацію; мати чудові можливості; основні властивості; додавання, віднімання, ділення, множення; піднесення до степеня; засоби для спілкування з користувачем; пристрій вводу; дисковод; зчитувати інформацію; вивід інформації; катодно-променева трубка; приймати рішення; виконувати тисячі логічних операцій; без втоми; знаходити вирішення завдання.

## **3. Match the words in A with their synonyms in B:**

A intricate	B command
to store	to decide
to manipulate	to turn on
to make decision	to turn off
to switch on	to conduct
to switch off	to handle
to operate	complex
instruction	to conserve

## **4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*instructions / to operate / storing / inputting / manipulating / outputting / input device / a cathode-ray-tube display / instantaneously*

1) The computer is capable of ... and ... numbers, letters, and characters. 2) We can make the machine do what we want by ... signals. 3) Computers can be defined as devices which accept information in the form of ... called a program. 4) The computer's disk drive or tape drive reads the information into the computer and is called ... . 5) For ... information two common devices used are: a printer and ... , which shows the results on a TV-like screen. 6) There are times when a computer seems ... like a mechanical brain. 7) A computer can carry out great numbers of arithmetic-logical operations almost ... .

## **5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Комп'ютер має здатність обробляти та зберігати дані. 2) Основним у роботі з комп'ютером є те, що ми можемо примусити його робити те, що ми хочемо, вводячи певні сигнали. 3) Ми визначаємо комп'ютер як машину зі складною системою електронних ланцюгів або як пристрій, який сприймає інформацію у формі команд. 4) Ця машина виконує математичні операції над інформацією і виводить результат цієї операції. 5) Комп'ютер має здатність утримувати інформацію у пам'яті. 6) Основні можливості цієї розумної машини – це виконання арифметичних операцій (додавання, віднімання, множення, ділення і піднесення до степеня), комунікація з користувачем (ввід та вивід інформації) та прийняття правильного рішення (наприклад, чи дане число більше чи менше за інше і т.п.).

**6. Read the text attentively, make the annotation of the text. To write annotation use clichés, given below.**

The text / article under review ...(gives us a sort of information about...)

The article deals with the problem ...

The subject of the text is ...

At the beginning (of the text) the author describes... (dwells on ...; explains...; touches upon ...; analyses...; comments ...; characterizes ...; underlines ...; reveals ...; gives account of...)

The article begins with the description of..., a review of... the analysis of...

The article opens with ...

Then (after that, further on, next) the author passes on to ..., gives a detailed (thorough) analysis (description), goes on to say that...

To finish with, the author describes ...

At the end of the article the author draws the conclusion that ...; the author sums it all up (by saying...)

In conclusion the author...

### ***Grammar in Use***

#### **The Future Continuous Tense**

##### ***1. Open the brackets using the Future Continuous Tense.***

1) The computer (to store) instructions the whole time tomorrow. 2) When I come the programmer (to write) a program at 12 o'clock tomorrow. 3) The use of laser printer (to become) widespread among telephone and electric utilities. 4) The attached keyboards (to use) these printing methods. 5) The information (to send) from the computer to the printer the whole morning tomorrow. 6) Automated designs and research (to introduce) expertise systems. 7) Colour video display (to become) more common.

##### ***2. Put the sentences of exercise 1 into negative form.***

##### ***3. Put the questions to the sentences of exercise 1.***

#### **4. Change the following into the Future Continuous Tense.**

1) There is no doubt that computers solve problems very quickly. 2) Instructions direct the operation of a computer. 3) Computers bring with them both economic and social changes. 4) It is well known that computers prepare laboratory tests. 5) They receive a subscription magazine once a month. 6) A computer solves a series of problems. 7) Electric pulses move at the speed of light.

#### **Additional Text (for individual work)**

***Read and translate the text.***

#### **Visions of Tomorrow**

First, safety. Radiation screens are available, and have been for some years. Most of them place an emissions barrier between you and the front of your display, while others encase the entire monitor, protecting you from side and rear emission as well. Many offices already have these screens available for their workers.

The paperless office is still a dream, but the basic tools are in place. We receive mail in two basic forms: on paper in an envelope, or electronically on our computers. Most of us have access to e-mail in one form or another. That's half the battle won. The other half is a bit more difficult, but it can be, and is being, done. All mail can be opened in the mail room and scanned into the computer using optical character recognition. Then a document-image-processing program takes over and lets you accomplish electronically what you would normally do with paper. Variable personal computer products are available for this purpose.

Computers are already much smaller than they used to be. When you start talking about laptops, notebooks, and palmtops, the question becomes, 'How small is too small?' FAX capabilities are already available on boards that you can plug into your computer. When you combine the technologies present in internal modems with voice recognition, the basics for having your computer replace your phone-voice line are in place.

Voice recognition is another technology that may appear limited in its present form, but it shows great promise for the future. Speaking to your computer will be a major factor in the office of the future. In some locations, it is already a major factor in the office of today. So you ask your computer a question, and it answers you - verbally.

Large display screens? You can get screens of up to 35 inches now, and between Barco and Mitsubishi competing for the honor of having the largest monitor, it is hard to predict just how big they will get in the future.

The real disaster that most of us still have to deal with is the traditional keyboard, which is the cause of much pain and suffering. New designs for strange-looking keyboards, *Star Trek* style, are moving from the drawing board to the factory. And the Internet already exists, with several of the research and educational facilities on its membership rolls.

1. *Divide the text into the logical parts and give a title to each one.*
2. *Put questions to the text.*
3. *Discuss it with your groupmates.*

## Unit 4

**Text Study: Application of Computers.**

**Additional Text: Computers in Education.**

**Grammar: Conjunctions. Impersonal Sentences.**

### Text Study

#### I. Pre-reading Exercises

**1. Repeat the words in chorus:**

To engage, commonplace, a research, an institute, widespread, quality, accounting, to withdrawal, current, guidance, environment, recognition, view, schedule, availability, sophisticated, a vehicle, to verify, an employee, society.

**2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remindf you:**

Communicating, service, manufacture, financial, terminal, million, operation, terminal, navigation, medicine, image, technician, tomography, scanner, transition, status.

**3. Pay attention to some grammatical points:**

1) At present a great deal of the work force of most countries **is engaged** in **creating, processing, storing, communicating** and just **working** with information. 2) Computer-controlled robots **are able to** improve the quality of manufactured products and to increase the productivity of industry. 3) Computers **can control** the work of power stations, plants and docks. 4) Without the terminals, records of deposits and withdrawals **would be** difficult to maintain, and it **would be** impossible to make inquiries about the current status of customer accounts. 5) Computers form a part of many military systems **including** communication and fire control. 6) They **are applied** for automatic piloting and automatic navigation. 7) The computer **has changed** the production of copy in the newspaper industry.

#### II. Reading

**Read the text and be ready to be ready to fill in the table:**

branch	application
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<i>medicine</i>	<i>valuable medical diagnostic tools</i>

### **Application of Computers**

At present a great deal of the work force of most countries is engaged in creating, processing, storing, communicating and just working with information. Computers have become commonplace in homes, offices, stores, schools, research institutes, plants. The use of computers in business, industry and communication services is widespread today.

Computer-controlled robots are able to improve the quality of manufactured products and to increase the productivity of industry. Computers can control the work of power stations, plants and docks.

They help in making different decisions and in management of economy. In business, computers are used for financial planning, accounting and specific calculations. The work of banks depends upon computer terminals for millions of daily operations. Without these terminals, records of deposits and withdrawals would be difficult to maintain, and it would be impossible to make inquiries about the current status of customer accounts.

Computers form a part of many military systems including communication and fire control. They are applied for automatic piloting and automatic navigation. Space exploration depends on computers for guidance, on-board environment and research.

For feather prediction macro computers are used to fully describe countless factors such as wind currents, solar effects and even planetary configuration must be calculated, correlated and simulated.

It is interesting to note that computers are widely used in medicine. They became valuable medical diagnostic tools. Computers are used for optical scanning and image processing, ranging from pattern recognition to image processing. Technicians can operate computer tomography scanners which combine x-rays with computer technology to give sectional views of the body of patients. The views then can be combined into a single image shown on the screen.

The computer has changed the production of copy in the newspaper industry. There are three steps involved in the process: input, correction, and output.

Railway companies use large computer systems to control ticket reservations and to give immediate information on the status of their trains. The computer system is connected by private telephone lines to terminals in major train stations, and ticket reservations for customers are made through these phone lines. Computers are used for a variety of other jobs including

train schedules, planning, freight and cargo loading, meal planning, personnel availability, accounting and stock control.

More and more police departments are now using sophisticated devices to help control the increasing crime rate. Some of these devices are: firstly, a computer terminal inside a police vehicle to answer an officer's questions, secondly, a computer-controlled display unit for displaying fingerprints, and thirdly, educational systems for police officers such as terminals, enabling them to verify changes in laws, rules, and regulations.

Almost every medium-sized or large company will use computers to help run the office. You will probably have to work with a computer in your day - to-day duties, so you will need to know something about computers and the way they are used. A computer really does make office life easier because it can so all sorts of different jobs. Computers are used to write letters and keep records of clients, suppliers and employees.

It should be noticed that learning on a computer can be fun. Students spend more time with computer-aided instruction performing the assigned task, as compared with conventional classroom.

At last air traffic control is impossible without computer application. It fully depends upon computer-generated information.

Many other uses of computers that we cannot imagine at present will become commonplace in the transition from an industrial to post industrial, or information society.

### *Vocabulary Notes*

**to engage in** – бути залученим у щось

**commonplace** – банальний, звичайний, неоригінальний

**widespread** – розповсюджений, широко поширений

**a research** [rɪ'sq:tʃ] – дослідження

**to improve** – покращувати

**to maintain records** – вести облік

**deposits** [dɪ'pɒzɪts] **and withdrawal** [wɪd'drɔ:(q)l] – вклади та вилучення

**an inquiry** [ɪn'kwɪrɪ] – довідка, запит

**guidance** ['gaɪd(q)ns] – управління; керівництво

**an environment** [ɪn'vaɪr(q)nment] – середовище

**freight** [freɪt] / **cargo** ['kɑ:gəʊ] – вантаж, вартість перевезення

**sophisticated** – мудрий

**an employee** [ˈemplɔɪ'ɪ] – робітник, службовець

**to assign** [q'saɪn] – назначати, встановлювати

**a society** [sq'saɪəti] – суспільство

**countless** [kauntlɪs] – багаточисленний, незчислений

**to verify** ['verɪfaɪ]– перевіряти, контролювати

### **Comprehension**

#### **1. Tell what sentences are true and what are false.**

1) Computers have become commonplace in homes, offices, stores, schools, research institutes, plants. 2) Computer-controlled robots are not able to improve the quality of manufactured products and to increase the productivity of industry. 3) Space exploration can not depend on computers for guidance, on-board environment and research. 4) The computer has changed the production of copy in the newspaper industry. There are ten steps involved in the process. 5) Almost every medium-sized or large company will use computers to help run the office.

#### **2. Choose the right answer:**

1) The use of computers in business, industry and communication services is ... today.

- a) seldom;
- b) widespread;
- c) interesting.

2) Computers ... control the work of power stations, plants and docks.

- a) can;
- b) can not;
- c) could.

3) In ... , computers are used for financial planning, accounting and specific calculations.

- a) home;
- b) farm;
- c) business.

4) ... are used to fully describe countless factors.

- a) macro computers;
- b) minicomputers;
- c) desk computers.

5) ... use large computer systems to control ticket reservations

- a) institutions;
- b) universities;
- c) railway companies.

6) ... is impossible without computer application.

- a) air traffic control;
- b) air control;
- c) water control.

#### **3. Complete the sentences.**

1) At present a great deal of the work force of most countries is engaged in ... . 2) Computers have become commonplace in ... . 3) The work of banks depends upon ... . 4) There are three steps involved in the process of copy in the newspaper industry: ... . 5) People use computers in different branches: .... 6) Students spend more time with ... .

**4. Answer the questions:**

1) Where have computers become commonplace? 2) How do computers help in business? 3) What does the work of banks depend upon? 4) Do computers form a part of many military systems? In what way? 5) How are computers used in medicine? 6) Why do Railway companies use a computer? 7) Can police departments work without using sophisticated devices? Why? 8) How do we use a computer in everyday life?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- application of a computer in medicine
- application of a computer in business
- application of a computer in day-to-day duties

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

A great deal of the work, to be engaged, research institutes, to improve the quality, to increase the productivity, making different decisions, deposits and withdrawals, to make inquiries, military systems, valuable medical diagnostic tools, to give immediate information, sophisticated devices, to verify changes, day - to-day duties, air traffic control, computer application, information society.

**2. Give English equivalents of the following.**

Інформаційне суспільство, велика кількість роботи, бути залученим, дослідницькі інститути, застосування комп'ютера, покращити якість, контроль повітряного транспорту, збільшувати продуктивність, приймати різного роду рішення, вклади та вилучення коштів, мудра машина, військова система, цінні медичні діагностичні інструменти, надавати негайну інформацію, контролювати зміни, наводити довідки.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
a research	wise
sophisticated	to control
to verify	to better
to improve	popular
widespread	to appoint



being executed. 6. Regardless of the nature of the I/O devices, I/O interfaces are required to convert the input data to the internal codes used by the computer and to convert internal codes to a format which is usable by the output devices. 7. The purpose of registers in the ALU is to hold the numbers and the results of the calculation until they can be transferred to the memory. 8. Since the computer deals with pulses, the input device is a way of converting numbers written on paper into pulses and sending them to the storage. 9. The principal characteristics of personal computers are that they are single-user system and are based on microprocessors. 10. However, although personal computers are designed as single-user systems, it is common to link them together to form a network.

**2. Translate complex sentences:**

**Remember following conjunctions: and, but, or, while, both ... and, as well as, not only ...but also, either ...or, neither ... nor.**

**A)** 1. The computer you told me about was constructed at a Russian plant. 2 We hope we'll buy the computer your friend spoke so much about. 3. This is the principle the electronic computer is based upon.

4. The teacher says we may ask any questions we like. 5. Elements integrated circuits are made of are electrically interconnected components. 6. The main tendencies of IC development scientists are working at are to increase the scale of integration and to improve reliability. 7. — Where are the computer games I gave you yesterday? — The computer games you are asking about are on the top shelf. 8. He was one of the greatest scientists the world had ever known.

**B)** 1. These devices can perform both the input and output functions. 2. Data are recorded on magnetic discs and tapes either by outputting the data from primary storage or by using a data recorder. 3. Neither the programmer nor the analyst could explain the cause of the computer errors. 4. Data as well as instructions must flow into and out of primary storage. 5. This grammar exercise is not only too long but also very difficult. 6. Printers may be either impact or nonimpact. 7. Character printers are used with all microcomputers as well as on computers of all sizes. 8. Both primary and secondary storage contain data and the instructions for processing the data. 9. The CPU functional units can be in one of two states: either “on” or “off”. 10. High-speed devices are both input and output devices that are used as secondary storage.

**Additional Text  
(for individual work)**

**Read and translate the text.**

## Computers in Education

Computers are used in education in the following technologies: CD-ROM, interactive video, computer-assisted learning, multimedia, distance learning (where students and their tutor connect their computers via modem and telephone lines), etc.

Computers could be used to teach such courses as programming, writing, mathematics, languages, etc. There may be computers available for students to use on their own, in the library or in a media center. Many libraries have computerized catalogues.

The term 'educational technology' covers many areas, including the use of computers and interactive video in education.

The word CALL stands for Computer Assisted Language Learning. CALL has certain advantages and disadvantages as a way of learning foreign languages. Its main advantages are the following: software often provides instant feedback, students can learn at their own place, students can control their progress, computers don't get tired, content can be customized to suit particular needs' gaining computer literacy is a desirable skill in today's world.

CALL's main disadvantages: the training can be impersonal, some students (and teachers) have difficulty adapting to machines, and computers cannot answer all the student's questions.

Is it possible that one day language teachers will be completely replaced by computers?

The answer is **NO** because computers are unlikely to be able to provide the same interactions as a human being can in terms of variety of responses, feedback on points that are not included in the software package, etc. A teacher will probably know more about language and how it is used than the programmed software available for computers. Teachers can intervene at any time to help students with any problem, no matter when it comes up.

Most educational software fails because it cannot easily adapt to the pace of the student and cannot adequately interact with the student in the way that a teacher can. If you could make educational software as absorbing as games software and teach at the same time, this would be ideal.

**1. Divide the text into the logical parts and give a title to each one.**

**2. Put questions to the text.**

**3. Discuss it with your groupmates.**

## Progress Check

**Choose the right answer:**

1) Ada Byron is considered the first ... .

- a) male computer programmer; b) female computer programmer; c) computer user; d) computer analyst; e) computer designer.
- 2) Konrad Zuse built the first ... .
- a) programmable computer; b) big computer; c) desk computer; d) laptop; e) word processor.
- 3) The thousands of ... of the first computers emitted large amounts of heat and burned out frequently.
- a) operations; b) functions; c) vacuum tubes; d) circuits; e) instructions.
- 4) Third generation computers used ... .
- a) silicon chips; b) petrol; c) light; d) transistors; e) fibre.
- 5) Bill Gates and Paul Allen founded Microsoft and wrote a BASIC compiler for the Altair in ... .
- a) 1965; b) 1975; c) 1955; d) 1964; e) 1954.
- 6) ... revolutionize the world of computers.
- a) disks; b) fibre elements; c) fibre optics and optical disks; d) desktop computers; e) circuits.
- 7) The output from analog computers is often in the form ... .
- a) figures; b) digits; c) of smooth graphs; d) characters; e) symbols.
- 8) A word processor is a special purpose computer used in ... .
- a) the production; b) the production of office documents; c) the maths d) industry; e) medicine.
- 9) There are ... according to their size.
- a) mainframes, minicomputers and microcomputers; b) large and huge computers; c) small computers; d) different computers; e) small and tiny computers.
- 10) Only large companies are likely to use a ... .
- a) microcomputer; b) mainframe computer; c) embedded computer; e) laptop; d) desk computer.
- 11) A single silicon chip is known as ... .
- a) a microprocessor; b) a processor; c) a microcomputer; d) a minicomputer; e) a mainframe.
- 12) The basic idea of a computer is that we can make the machine do what we want by ... .
- a) outputting signals; b) outside signals; c) inputting signals; d) controlling signals; e) storing signals.
- 13) Computers can be defined as devices which accept information in the form of ... .
- a) instructions; b) letters; c) figures; d) characters; e) symbols.
- 14) Computers have ... for performing arithmetic operations.
- a) memory; b) circuits; c) brain; d) keys; e) a mouse.

- 15) The computer's ... reads the information into the computer.  
 a) input device; b) output device; c) storage system; d) display; e) programs.
- 16) For ... two common devices used are: a printer and a cathode-ray-tube display.  
 a) storing information; b) inputting information; c) outputting information; d) processing information; e) reading information.
- 17) The use of computers in business, industry and communication services is ... today.  
 a) seldom; b) widespread; c) interesting; d) strange; e) interesting.
- 18) In ... , computers are used for financial planning, accounting and specific calculations.  
 a) home; b) farm; c) business; d) education; e) medicine.
- 19) ... use large computer systems to control ticket reservations  
 a) institutions; b) universities; c) railway companies; d) enterprises; e) schools.
- 20) ... is impossible without computer application.  
 a) air traffic control; b) air control; c) water control; d) snow control; e) rain control.

## Module III

### Computer System

#### Unit 1

**Text Study: Basic Elements of a Computer.**

**Additional Text: The Computer System.**

**Grammar: The Present Perfect Tense.**

#### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Acquainted, procedure, architectural, cause, particularly, certain, substituted.

##### *2. While reading the text you will come across a number of new words. Try to guess what Ukrainian words they remind you:*

Electronic, mechanical, documentation, data, analysis, to assist, specialists, programmer, inventory.

##### *3. Pay attention to some grammatical points:*

1) Not visible, the information in the form of data and programs is the software — the set of computer programs, procedures, and **associated documentation** that make possible the effective operation of the computer system. 2) They do not solve specific problems **they are written to assist** people in the use of the computer system by performing tasks such as

controlling all of the operations **required**. 3) The person who prepares systems software **is referred to as** a systems programmer. 4) For example, in an instance where cost is more important than performance, the computer system architect **might decide not to use special electronic circuits** (hardware) to multiply two numbers, but instead write instructions (software) **to cause the machine to accomplish the same function by repeated use of circuits** already designed to perform addition.

## *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What is the hardware?*
- *What is the software? What is the firmware?*

### **Basic Elements of a Computer**

As we know all computer systems perform the functions of inputting, storing, processing, controlling, and outputting. Now we'll get acquainted with the computer system units that perform these functions.

The electronic and mechanical parts that make up a computer system are called hardware. Thus, the input, storage, processing and control devices are **hardware**. Not visible, the information in the form of data and programs is the **software** — the set of computer programs, procedures, and associated documentation that make possible the effective operation of the computer system. Software programs are of two types: systems software and applications software.

*Systems software* are the programs designed to control the operation of a computer system. They do not solve specific problems they are written to assist people in the use of the computer system by performing tasks, such as controlling all of the operations required, to move data into and out of a computer all of the steps in executing an application program. The person who prepares systems software is referred to as a systems programmer. Systems programmers are highly trained specialists and important members of the architectural team.

*Applications software* are the programs written to solve specific problems (applications), such as payroll, inventory control, and investment analysis. The word program usually refers to an application program, and the word programmer is usually a person who prepares applications software.

Often programs, particularly systems software, are stored in an area of memory not used for applications software. These protected programs are stored in an area of memory called read-only memory (ROM), which can be read from but not written on.

**Firmware** is a term that is commonly used to describe certain programs that are stored in ROM. Firmware often refers to a sequence of instructions (software) that is substituted for hardware. For example, in an instance where cost is more important than performance, the computer system architect might decide not to use special electronic circuits (hardware) to multiply two numbers, but instead write instructions (software) to cause the machine to accomplish the same function by repeated use of circuits already designed to perform addition.

### *Vocabulary Notes*

**inputting** – введення (даних)

**storing** – зберігання (даних)

**processing** – обробка(даних)

**controlling** – керування, управління

**outputting** – вивід

**to get acquainted** [q' kweInt] – познайомитися

**procedure**[pɹɹq' sJdZq]– процес, алгоритм

**data** ['deItq] – дані, інформація

**hardware** – апаратне обладнання, «комп'ютерне залізо»

**software** – програмне забезпечення

**systems software** – системне програмне забезпечення

**application software** – прикладне програмне забезпечення

**specific problems=application** – специфічні (прикладні) задачі (завдання)

**to execute** ['eksIkjHt] – виконувати

**an application program** – прикладна програма

**a systems programmer** – системний програміст

**architectural** ['RkItেকCqɹqɹ]**team** – група розробників (проектувальників)

**payroll** – платіжна відомість

**inventory control** – переоблік

**investment analysis** – інвестиційний аналіз

**read-only memory (ROM)** – постійна пам'ять

**firmware** – вбудоване/мікропроцесорне програмне забезпечення, «захиті програми» в ROM

**computer system architect** ['R:kItেকt] – розробник архітектури комп'ютерної системи

### *Comprehension*

**1. Tell what sentences are true and what are false.**

1) All computer systems perform the functions of inputting, storing, processing, controlling, and outputting. 2) The electronic and mechanical parts that make up a computer system are called hardware.3) Visible, the

information in the form of data and programs is the software. 4) Software programs are of two types: systems software and applications software. 5) Applications software are the programs designed to control the operation of a computer system. 6) Systems software are the programs written to solve specific problems (applications). 7) The person who prepares systems software is referred to as a systems programmer. 8) Systems software are stored in an area of memory called read-only memory (ROM). 9) Firmware often refers to a sequence of instructions (software) that is substituted for software.

**2. Choose the right answer:**

- 1) All computer systems perform the functions of ... .
  - a) inputting, storing;
  - b) controlling and outputting;
  - c) inputting, storing, processing, controlling, and outputting.
- 2) ..., the information in the form of data and programs is the software
  - a) not visible;
  - b) visible;
  - c) however.
- 3) System software do not solve specific problems they are written to assist people in the use of the computer system by ... tasks.
  - a) outputting;
  - b) performing;
  - c) storing.
- 4) The person who prepares systems software is referred to as ... .
  - a) a systems programmer;
  - b) architect;
  - c) designer.
- 5) Often programs, particularly ... , are stored in an area of memory not used for applications software.
  - a) application;
  - b) systems software;
  - c) hardware.
- 6) Protected programs are stored in an area of memory called ... which can be read from but not written on.
  - a) computer;
  - b) random access memory(RAM);
  - c) read-only memory (ROM).
- 7) ... is a term that is commonly used to describe certain programs that are stored in ROM.
  - a) software;
  - b) hardware;

c) firmware.

### **3. Complete the sentences.**

1) The input, storage, processing and control devices are ... . 2) The set of computer programs, procedures, and associated documentation that make possible the effective operation of the computer system is called ... . 3) Systems software are the programs designed ... . 4) Applications software are the programs written ... . 5) Firmware often refers to ... .

### **4. Answer the questions:**

1) What functions do all computer systems perform? 2) What devices are hardware? 3) How many types are software programs? What are they? 4) What is the system software? 5) What is the application software? 6) What does the word program refer to? 7) Where are systems software stored? 8) When might the computer system architect decide not to use special electronic circuits (hardware) to multiply two numbers?

### **5. Find as quickly as possible and read out the sentences containing the following important information:**

- basic elements of the hardware
- basic elements of the software
- about system software
- about application software
- about firmware

### **\*6. Try to tell the gist of the text.**

#### **Word Study**

#### **1. Give Ukrainian equivalents of the following.**

The functions of inputting (storing, processing, controlling, and outputting), to get acquainted with the computer system units, storage, processing, control devices, hardware, the information in the form of data and programs, the set of computer programs and procedures, associated documentation, systems software, applications software, to control the operation of a computer system, to solve specific problems, to move data into and out of a computer, protected programs, a sequence of instructions that is substituted for hardware, in an instance, cost is more important than performance, instructions to cause the machine to accomplish the same function.

#### **2. Give English equivalents of the following.**

Команди, які заставляють комп'ютер виконувати ті ж самі функції; апаратне забезпечення; керувати операціями комп'ютерної системи; послідовність команд, які є замінами (замінниками) для апаратного забезпечення; познайомитися з елементами (блоками) комп'ютерної системи; набір комп'ютерних програм та алгоритмів; ціна є важливішою,

ніж якісні характеристики; захищені програми; функції вводу (зберігання, управління та виводу); пам'ять; прикладне програмне забезпечення; пристрій обробки інформації; розв'язувати специфічні задачі; пристрій (блок) управління; інформація у вигляді даних та програм; відповідна документація; у випадку; переміщати дані у комп'ютер та з комп'ютера.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
to execute	special
to get acquainted	to replace
a procedure	a case
data	a designer
to substitute	to accomplish
architect	a method
an instance	information
to cause	to meet
to assist	to make
specific	to help

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*To execute / hardware/software/ROM/input/output/application software/system software/*

1) Physical parts that make up a computer system is called ... . 2) Programs which can be used on a particular computer system is called ... . 3) The computer ... a sequential set of instructions. 4) By itself, a typical microprocessor IC does not contain the memories and ... and ... functions. 5) The purpose of ... ... is to get the computer operating. 6) The purpose ... ... is to get the computer to do a specific job. 7) Another kind of program that needs no work on your part is the kind that is built into your computer as ... .

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Базовими елементами комп'ютера є апаратне забезпечення, програмне забезпечення та вбудовані програми. 2) Комп'ютер виконує алгоритм завдяки системному та прикладному програмному забезпеченню. 3) Системний програміст є обов'язковим членом команди розробників. 4) На парі студенти познайомилися з основними функціями комп'ютера, а саме: вводу, виводу, обробки інформації, зберігання та управління. 5) Базовий мікрокомп'ютер потребує постійної пам'яті для зберігання програм та команд.

**Grammar in Use**

## **. The Present Perfect Tense**

### ***1. Put the Infinitive in brackets in the Present Perfect Tense.***

1) Recently the computer (to be) the greatest technological invention of the twentieth century. 2) A computer already (to solve) many problems electronically. 3) Many students already (to go on) to work as engineers. 4) Today's computers (to be) technologically far superior to those used a few years ago. 5) Lately an electronic pen (to be) an example of an input device. 6) Scientists (to produce) many mechanical calculating machines since Pascal, the French mathematician, made his in 1642, but the 1940s when the first electronic computer was made. 7) The history of the multi-billion dollar PC industry (to be) one of mistakes. 8) Most people already (to choose) an online service because of the price or the number of available files.

### ***2. Put these sentences into interrogative and negative form.***

1) The history of the multi-billion dollar PC industry has been one of mistakes. 2) Xerox Corporation has already funded the initial research on personal computers in their Palo Alto laboratory in California. 3) However, the company has failed to capitalize on this work 4) Digital Research have continued to develop their operating system, DR/DOS. 5) However, without an endorsement from IBM, it has become a minor player in the market. 6) Analog transmission has been in use for many years. 7) The computer has changed the production of copy in the newspaper industry.

### ***3. Replace the infinitive in brackets by the Present Perfect or the Past Indefinite.***

1) Babbage (to be) born in 1791. 2) He (to work) out plans for several calculating machines which he (to call) 'engines'. 3) But he never (to finish) any of them. 4) Recently, however, the Science Museum in London (to finish) building an engine based on one of Babbage's designs. 5) It (to take) for six years to complete and more than four thousand parts have been specially made. 6) Whether it (to work) or not, the machine (to be) on show at a special exhibition in the Science Museum to remind people of Babbage's work. 7) Computers certainly (to revolutionize) police work by providing access to millions of items of information with the least possible delay and speeding up the process of apprehending suspicious-looking characters. 8) Today the Unix operating system (to spread) beyond the university and laboratory to find a home in global corporations and small Internet serves. 9) The first computers (to take) up most of the building and (not to have) much more computing power than the first PCs.

**Additional Text  
(for individual work)**

**Read, translate the text and make up a list of words which can be joined under the headline “Computer System”.**

### **The Computer System**

The computer system consists of the *computer*, fitted with two *disk drives*, a *monitor*, and a *printer*. Switch on. The computer, disk drive and printer may all have separate switches. Find the program disk. Computers generally use 3,5 -inch disks which are protected by a square plastic pack. Make sure the disk goes in the right way. A couple of keys, or sometimes a simple typed instruction, will get the disk to load. From there on, the program takes over. In some cases, the computer may require two programs. The first of these is called the *operating system*. The operating systems have names like CP/M, UNIX and MS-DOS. The operating system is really just a program that tells the computer how to control the disk drive, printer, and whatever is attached. After the operating system is loaded, the main program, which may be on a separate disk, can go in.

Once the program starts up, the screen will tell you what to do. Word processing programs are generally easy to use, and the best way to get acquainted is to take an hour or two to find your way round. It is impossible to harm the computer by pressing the wrong keys. Sometimes microcomputers are linked together in what is called a network.

There are different input and output devices that can be connected to the computer. Such devices are known as computer *peripherals*. Disks come in a range of sizes. The disk is also called *diskette*, or *flexible disk*, or just ‘*floppy*’. The disk is protected by a square plastic sleeve which is not removed: there is a slot that lets the machine get at the disk’s surface. Disks of all kinds are delicate. DON’T touch the surface of the disk, bend it, or smoke while using it.

If you are using a computer with a printer in the office, or have a printer attached to the terminal you are using, then it is probably one of two types, a daisy wheel printer or a matrix printer.

The computer *keyboard* is similar in layout to a typewriter, but may have extra keys. Just as with typewriters, the layout differs from make to make. The most usual extra keys are *functional keys*. These are generally marked F1, F2, etc., and can be used for different purposes in different programs. The keyboard is generally connected to the computer by a flexible cable.

A *mouse* is a small plastic box on the desk in front of you. The mouse moves the *cursor* which is a flashing square or arrow that is used to point to something on the screen of the monitor. To move the cursor, you just move the mouse in the appropriate direction, across the desk, and the cursor follows. The mouse has one or two ‘*fire*’ buttons on its back.

1. *Divide the text into the logical parts and give a title to each one.*
2. *Put questions to the text.*
3. *Discuss it with your groupmates.*

## Unit 2

**Text Study. Data Processing Systems.**

**Additional Text. Information Explosion and Data Processing in Modern Society.**

**Grammar: The Past Perfect Tense.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Unorganized, series, resources, facilities, equipment, consumed, throughout, ancient, Egyptians, yields, Asia, characteristic, available, initial, hierarchy, successively.

##### *2. While reading the text you will come across a number of new words. Try to guess what Ukrainian words they remind you:*

Fact, operation, system, material, printer, special, phenomenon, recommendation, technology, component, arithmetic, symbol, element, collection, bank.

##### *3. Pay attention to some grammatical points:*

1) **The necessary data are processed** by a computer **to become** useful information. 2) We use the term data processing system **to include** the resources **that are used to accomplish** the processing of data. 3) Throughout history, and even prehistory, people **have found** it necessary to sort data into forms **that were easier to understand**. 4) Today computers convert data about land and water into recommendations to farmers **on crop planting**. 5) Storing is saving data or information **so that** they are available for initial or for additional processing. 6) Processing represents **performing** arithmetic or logical operations on data in order to convert them into useful information.

#### *II. Reading*

*Read the text and say how you understand the terms “data processing” and “data storage hierarchy”*

### **Data Processing Systems**

The necessary data are processed by a computer to become useful information. In fact this is the definition of data processing. Data are a collection of facts — unorganized but able to be organized into useful information. **Processing** is a series of actions or operations that convert inputs into outputs. When we speak of **data processing**, the input is data, and the

output is useful information. So, we can define data processing as a series of actions or operations that converts data into useful information.

We use the term **data processing system** to include the resources that are used to accomplish the processing of data. There are four types of resources: people, materials, facilities, and equipment. People provide input to computers, operate them, and use their output. Materials, such as boxes of paper and printer ribbons, are consumed in great quantity. Facilities are required to house the computer equipment, people and materials.

The need for converting facts into useful information is not a phenomenon of modern life. Throughout history, and even prehistory, people have found it necessary to sort data into forms that were easier to understand. For example, the ancient Egyptians recorded the ebb and flow of the Nile River and used this information to predict yearly crop yields. Today computers convert data about land and water into recommendations to farmers on crop planting. Mechanical aids to computation were developed and improved upon in Europe, Asia, and America throughout the seventeenth, eighteenth, and nineteenth centuries. Modern computers are marvels of an electronics technology that continues to produce smaller, cheaper, and more powerful components.

### **Basic data processing operations**

Five basic operations are characteristic of all data processing systems: inputting, storing, processing, outputting, and controlling. They are defined as follows.

*Inputting* is the process of entering data, which are collected facts, into a data processing system.

*Storing* is saving data or information so that they are available for initial or for additional processing.

*Processing* represents performing arithmetic or logical operations on data in order to convert them into useful information.

*Outputting* is the process of producing useful information, such as a printed report or visual display.

*Controlling* is directing the manner and sequence in which all of the above operations are performed.

### **Data storage hierarchy**

It is known that data, once entered, are organized and stored in successively more comprehensive groupings. Generally, these groupings are called a data storage hierarchy. The general groupings of any data storage hierarchy are as follows.

1) Characters, which are all written language symbols: letters, numbers, and special symbols.

2) Data elements, which are meaningful collections of related characters. Data elements are also called data items or fields.

3) Records, which are collections of related data elements.

4) Files, which are collections of related records. A set of related files is called a data base or a data bank.

### *Vocabulary Notes*

**data processing** — обробка інформації (даних)

**to convert** — перетворювати; переводити (в інші одиниці)

**to accomplish** — здійснювати, виконувати; завершувати, закінчувати;

**to house** — поміщати, розміщувати

**to improve** — покращити, вдосконалити

**to control** — управляти, регулювати; управління, регулювання

**to store** — зберігати, запам'ятовувати, заносити (розміщувати) в пам'яті

**storage** ['stLrIG]— запам'ятовуючий пристрій, пам'ять; зберігання

**resource** [rI'sLs]— ресурс; засіб;

**facilities** — апаратура, засоби

**equipment** [I'kwIpmqnt]— обладнання; прилади

**available** [q'veIlbl]— доступний; той, що є в наявності; можливий

**display** — дисплей; пристрій візуального зображення; показ

**manner** — спосіб, образ (дій)

**sequence** — послідовність, порядок

**successively** ['sJkwqns]— послідовно

**data storage hierarchy** ['haIqrRkI]— ієрархія (послідовність)

запам'ятовування інформації (даних)

**to enter** — входити; вводити (дані); заносити, записувати

**comprehensive groupings** — повні, обширні, універсальні угруповання

**meaningful** — той, що має зміст; значущий (про дані)

**item** ['aItqm] — елемент; складова частина

**record** — запис, реєстрація; записувати, реєструвати

**file** — файл; заносити (зберігати) в файл

**set** — набір; множина; сукупність; серія; група; система

**data base** — база даних

**related** — взаємопов'язаний; той, що відноситься до чогось

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) Data are a collection of facts — unorganized but able to be organized into useful information. 2) Processing is a series of actions or operations that records inputs into outputs. 3) We can define data processing as a series of actions or operations that converts data into useful information. 4) The need for converting facts into useful information is a phenomenon of modern life. 5)

The ancient Egyptians recorded the ebb and flow of the Nile River and used this information to predict the weather. 6) Data that once entered, organized and stored in successively more comprehensive groupings are called a data storage hierarchy.

**2. Complete the sentences.**

1) Data are ... 2) Processing is ... 3) Data processing is a series of ... 4) There are four types of resources: ... 5) There are five basic operations of all data processing systems: ... 6) The general groupings of any data storage hierarchy are as follows ...

**3. Choose the right answer:**

- 1) The necessary data are processed by a ... to become useful information.
  - a) computer;
  - b) storage;
  - c) calculator.
- 2) ... is a series of actions or operations that convert inputs into outputs.
  - a) processing;
  - b) inputting;
  - c) data.
- 3) We use the term data processing system to include the resources that are used ... the processing of data.
  - a) to enter;
  - b) to accomplish;
  - c) to store.
- 4) Materials, such as ... , are consumed in great quantity.
  - a) books;
  - b) records;
  - c) boxes of paper and printer ribbons.
- 5) Facilities are required ... the computer equipment, people and materials.
  - a) to house;
  - b) to convert;
  - c) to store.
- 6) ... is the process of entering data, which are collected facts, into a data processing system.
  - a) Controlling;
  - b) Storing;
  - c) Inputting.
- 7) ... is saving data or information so that they are available for initial or for additional processing.
  - a) Controlling;
  - b) Storing;

c) Inputting.

8) ... is the process of producing useful information, such as a printed report or visual display.

a) Controlling;

b) Storing;

c) Outputting.

9) ... is directing the manner and sequence in which all of the above operations are performed.

a) Controlling;

b) Storing;

c) Outputting.

10) Data elements are meaningful collections of ... .

a) related characters;

b) related records;

c) related data elements.

#### **4. Answer the questions to the text:**

1) What is processing? 2) What is data processing? 3) What does the term of data processing system mean? 4) How many types are there? 5) What do people provide? 6) What are consumed in great quantity? 7) What are required to house the equipment, people and materials? 8) What basic operations does a data processing system include? 9) What is inputting / storing / outputting / controlling? 10) How did ancient Egyptians convert facts into useful information? 11) When were mechanical aids for computation developed? 12) What does data storage hierarchy mean? 13) What are characters/data elements/records/files? 14) What is a data base?

#### **5. Find as quickly as possible and read out the sentences containing the following important information:**

- the resources that are used to accomplish the processing of data;
- five basic operations of data processing systems;
- the general groupings of any data storage hierarchy.

#### **\*6. Try to tell the gist of the text.**

##### **Word Study**

#### **1. Give Ukrainian equivalents of the following.**

Written language symbol, initial processing, additional processing, a phenomenon of modern life, the definition of data processing, to accomplish the processing of data, printer ribbons, to predict yearly crop yields, to convert data into useful information, to record the ebb and flow, data processing system, series of actions, to provide input to computer, data elements, inputting; storing, outputting, data base, a set of related files, field, to house

the computer equipment, to include the resources, prehistory, mechanical aids to computation, visual display, printed report.

**2. Give English equivalents of the following.**

Система обробки інформації; визначення (терміну) обробки даних; сукупність даних; послідовність дій; перетворення даних в корисну інформацію; включати ресурси; здійснювати обробку даних; забезпечувати введення інформації у комп'ютер; стрічки принтера; обладнання; явища сучасного життя; протягом доісторичного періоду; реєструвати відпливи та припливи; прогнозувати врожай зернових культур; механічні засоби обчислення; введення даних; збереження даних; початкова обробка даних; первинна обробка; додаткова обробка; видача інформації; група розрядів (поле); записані символи мови; елементи інформації; база даних; набір взаємопов'язаних файлів, візуальне відображення, надруковане повідомлення.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
to convert	to keep
to house	to carry out
to control	to input
to store	to locate
to enter	to direct
to accomplish	to change
related	series
sequence	connected
facilities	consecutively
successively	installation

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*To accomplish/to store/sequence/to convert/processing/facilities/controlling*

1) Motherboards usually contain one or more CPUs, main memory and ... for initial setup of the computer. 2) Large-scale computers are necessary to do the complex ... . 3) When a multiplicity of operations must be ... simultaneously the only answer is a macro computer. 4) Each instruction has a unique code specifying a particular operation and has been placed in specific ... by the computer programmer. 5) A basic microcomputer requires a read-only memory ... the computer program or instructions, a random-access memory ... temporary. 6) The electronic machine can also be used for ... automatic production. 7) A computer can also be used to make translation from one language into another by ... words into figures and vice versa.

## **5. Translate sentences into English using words and word combinations from the Vocabulary Notes**

1) Комп'ютер здійснює обробку даних. 2) Основною характеристикою системи обробки даних є її п'ять основних операцій, саме: введення, обробка, зберігання, виведення та управління. 3) Вся інформація зберігається згідно ієрархії запам'ятовування даних. 4) Виконання арифметико-логічних задач над даними відносимо до обробки даних. 5) Інформація може зберігатися як для первинної так і для вторинної обробки. 6) Банк даних – це набір взаємопов'язаних файлів.

### **Grammar in Use**

#### **The Past Perfect Tense**

##### **1. Make the following interrogative and negative.**

1) We had changed the configuration on the computer in order to read and write more quickly. 2) The web had become a broadcast medium. 3) Running a computer games business had become very popular. 4) The computer at first had failed to attain the necessary perfection in performance. 5) The machine had never attained the required power.

##### **2. Replace the infinitive in brackets by the Past Indefinite or the Past Perfect.**

1) Yesterday we (to play) computer games which we (to install) some days before. 2) When my groupmate (to enter) the classroom, I (to begin) to learn new operating system. 3) The students (to finish) typing by 7 p.m. 4) He (to tell) us many interesting things about new computer technologies that he (to see) in Kyiv. 5) Peter (to show) us a new computer his father (to buy) for him. 6) The programist (to make) a program by the time we (to come) to the office. 7) He said that he (to finish) his task. 8) In 1940s the first computers (to appear). 8) They (to repair) the printer before they (to come) back home.

##### **3. Change from direct into indirect speech.**

1) The student said, "I studied high-level computer languages at school." 2) The teacher said, "I saw some mistakes in your computer test." 3) My groupmate said, "I have already read about the fifth computer generation." 4) He said, "I did not recognize your handwriting." 5) The teacher stressed "The initial purpose of the Web was to use networked hypertext to facilitate communication among its members." 6) The scientist said, "In recent years, the use of the Web has now reached global proportions." 7) The teacher said, "Microsoft has evolved much in the same way as Apple Computer." 8) The student stressed, "Microsoft has thus created its own standards in a market."

#### **Additional Text**

**(for individual work)**

**Read and translate the text**

## **Information Explosion and Data Processing in Modern Society**

An outstanding characteristic of modern society is the powerful flow of knowledge and information in different fields of human activities.

Information is often called the lifeblood of modern civilization. It plays an ever increasing part in everyday life, management of business, etc.

The scientific activity, with all its technical and economic outcomes and consequences, is today passing through a period of particularly rapid development. For instance, over the past 150 years the range of human knowledge has been doubled every twelve to fifteen years.

The present-day information explosion must be properly dealt with. To handle the information flow properly and instantly, to help specialists find immediately of machines have been invented. They are now widely used for this purpose.

The computer, with its million fold increase in man's capacity to handle information, undoubtedly, holds the first place. Without the computer, data and information processing would be impossible, say, in space programs. It is the phenomenal speed of computers that makes them practically well suited to pursuing activities that require instant solution to complex dynamic problems. They are extensively used in the control and monitoring of space vehicles. Computers are ideal for high-volume computing tasks such as the computation and analysis of statistical and mathematical data as well as scientific and engineering calculations.

For example, before production can be started in the factory, raw materials and parts have to be procured. This involves the data processing system in the preparation of purchase orders. When supplies are received they have to be recorded on appropriate stock or job-records, which again involve data processing.

When production is due to begin materials and parts have to be issued to the production centers and suitability recorded on issue notes which are subsequently recorded on stock and job records. The issues are often priced and extended. These are also data processing operations.

In the industry, for instance, one of the new generations of press control combines a menu-driven press computer with a programmable press controller. The press control system monitors all vital functions of the stamping system. It provides an infinite for storing all your setup information.

Total system diagnostics are enhanced by the computer to provide on screen remedies for identifiable problems. Not only do you know why the press has stopped, but now you know where the problem is and how to remedy it.

On-line operating data are automatically recorded. You can now call up

a report to tell all about the job while it is running and how long to completion. The computerized control system has the flexibility to meet new requirements for more information.

Thus information and data processing is a special activity performed by the administrative organization for the business as a whole. It is concerned with the systematic recording, arranging, filing, processing and dissemination of facts relating to the physical events occurring in business.

From the above said it can be concluded that data processing systems provide information and information provides the basis for managerial control of business operations to achieve corporate objectives as effectively as possible. This means making the most suitable decisions based on the information provided.

A management information system therefore embraces the data processing systems control systems (using information provided by the data processing system), and decision-making based on the facts indicated by the control systems.

A data processing system in its simplest form consists of three primary elements: input, processing and output. These elements apply whether the system is manual, mechanical or electronic.

A computer system consists of five elements: input, processing, output, storage and control.

It is absolutely necessary for every active member of modern society to be able to use the computer system in data (information) processing and management.

## Unit 3

**Text Study: Operating System.**

**Additional Text: UNIX Operating System.**

**Grammar: The Future Perfect Tense.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Keyboard, purchase, successfully, occur, initialized, simultaneously, request, designed, circumstances, through, frequently.

##### *2. While reading the text you will come across a number of new words. Try to guess what Ukrainian words they remind you:*

Physically, package, series, chronological, termination, cables, initialization, resources, normally, functioning, concurrently, multiprogramming, potion.

##### *3. Pay attention to some grammatical points:*

1) You can think of these as the parts you **are able to** touch physically. 2) The operating system is the component that **on one side** manages and controls the hardware and **on the other** manages the applications. 3) Various pieces of hardware **need to be initialized**. 4) It is the **operating system's job** to manage execution of the application. 5) Some operating systems are adopted as "industry standards" and these are the **ones** which should be evaluated because they normally have a good software base. 6) The cost of software **is likely to be lower** in such circumstances as the development costs are spread over a greater number of users, **both** actual and potential.

## **II. Reading**

***Read the text and be ready to answer the following questions:***

- *What is an operating system?*
- *How does it work?*
- *What operating systems are there?*

### **Operating System**

An operating system is an important part of a computer system. A computer system is built from three general components: the hardware, the operating system, and the applications. The hardware includes pieces such as a central processing unit (CPU), a keyboard, a hard drive and a printer. You can think of these as the parts you are able to touch physically. Applications are why you use computers; they use the rest of the system to perform the desired task (for example, play a game, edit a memo, send electronic mail). The operating system is the component that on one side manages and controls the hardware and on the other manages the applications.

When you purchase a computer system, you must have at least hardware and an operating system. The hardware you purchase is able to use (or run) one or more different operating systems. You can purchase a computer package, which includes the hardware, the operating system, and possibly one or more applications. The operating system is necessary in order to manage the hardware and applications.

When you turn on your computer, the operating system performs a series of tasks, presented here in chronological order.

One of the first things you do, after successfully plugging together cables and components, is turn on your computer. The operating system takes care of all the starting functions that must occur to get your computer to a usable state. Various pieces of hardware need to be initialized. After the start-up procedure is complete, the operating system awaits further instructions. If you shut down the computer, the operating system also has a procedure that makes sure all the hardware is shut down correctly. Before turning your

computer of again, you might want to do something useful, which means that one or more applications are executed.

After the operating system completes hardware initialization, you can execute an application. The executing application is called a process. It is the operating system's job to manage execution of the application. When you execute a program, the operating system creates a new process. Many processes can exist simultaneously. This process is referred to as multitasking. When you exit your program (or it finishes executing) the process terminates, and the operating system manages the termination by reclaiming any resources that were being used. Most applications perform some tasks between the time the process is created and the time it terminates. To perform these tasks, the program makes requests to the operating system, and the operating system responds to the requests and allocates necessary resources to the program. When an executing process needs to use some hardware, the operating system provides access for the process.

To perform its task, a process may need to access hardware resources. The process may need to read or write a file, send data to a network card (to communicate with another computer), or send data to a printer. The operating system provides such services for the process. This is referred to as resource allocation. A piece of hardware is a resource, and the operating system allocates available resources to the different processes that are running.

All computers do not use the same operating systems. It is therefore important to assess the operating system used on a particular model before initial commitment because some software is only designed to run under the control of specific operating systems. Some operating systems are adopted as "industry standards" and these are the ones which should be evaluated because they normally have a good software base. The reason for this is that software houses are willing to expand resources on the development of application packages for machines functioning under the control of an operating system which is widely used. The cost of software is likely to be lower in such circumstances as the development costs are spread over a greater number of users, both actual and potential.

Mainframe computers usually process several application programs concurrently, switching from one to the other, for the purpose of increasing processing productivity. This is known as multiprogramming, which requires a powerful operating system. An operating system is stored on disk and has to be booted into the internal memory (RAM) where it must reside through processing so that commands are instantly available. The operating system commands may exceed the internal memory capacity of the computer in which

case only that portion of the operating system which is frequently used is retained internally, other modules being read in from disk as required.

### *Vocabulary Notes*

**to edit** – редагувати

**memo** – повідомлення, пам'ятка

**to manage**- керувати, управляти, організовувати процес (координувати)

**to occur** [ɔ' kʊ] – відбуватися, траплятися

**to complete** – завершувати, закінчувати

**simultaneously** [ˈsɪm(ə)l'teɪnslɪ] – одночасно

**multitasking** – виконання значної кількості завдань одночасно

**to terminate** - завершувати

**termination** – завершення

**to reclaim** – відновлення

**a request** [rɪ' kwɛst] – запит

**to allocate** – розміщувати

**allocation** - розміщення

**to access** [' xkses] – отримати (мати)доступ

**to assess** [' xses] – оцінювати

**initial commitment** – первинне встановлення

**to adopt** – приймати, переймати, засвоювати

**to evaluate** – оцінювати, обчислювати, визначати якість

**to will** – заставляти, примушувати

**to expand** – розширювати, розповсюджувати

**concurrently** [kən' kʌr(ə)ntlɪ] – одночасно

**boot** – початкове завантаження системи, самозавантаження

**instantly** – негайно

**to reside** [rɪ' zɑɪd] – постійно зберігатися

**to exceed** [ɪk' sɪd] – переполювати, перегружати

**to retain** – утримувати в пам'яті, акумулювати

### *Comprehension*

#### ***1. Tell what sentences are true and what are false.***

1) A computer system is built from three general components: the hardware, the software, and the applications. 2) When you purchase a computer system, you must have at least hardware. 3) When you turn on your computer, the operating system performs a series of tasks, presented here in chronological order. 4) Various pieces of hardware need to be deleted. 5) When an executing process needs to use some hardware, the operating system provides access for the process. 6) All computers use the same operating systems. 7) The cost of software is likely to be higher in such circumstances as the development costs are spread over a greater number of users, both actual

and potential. 8) An operating system is stored on disk and has to be booted into the internal memory (RAM) where it must reside through processing so that commands are instantly available.

**2. Choose the right answer:**

1) A computer system is built from such components:

- a) monitor and keyboard;
- b) the hardware, the operating system, and the applications;
- c) printer and scanner.

2) One of the first things you do, after successfully plugging together cables and components, is ... .

- a) turn on your computer;
- b) turn off your computer;
- c) house your computer.

3) After the start-up procedure is ... , the operating system awaits further instructions.

- a) began;
- b) running;
- c) complete.

4) After the operating system completes ... initialization, you can execute an application.

- a) software;
- b) hardware;
- c) firmware.

5) Many processes can exist simultaneously. This process is referred to as ... .

- a) multitasking;
- b) outputting;
- c) processing.

6) The operating system allocates available ... to the different processes that are running.

- a) records;
- b) resources;
- c) facilities.

7) ... requires a powerful operating system.

- a) PC;
- b) desktop computer;
- c) multiprogramming

**3. Complete the sentences.**

1) The hardware includes pieces such as ... . 2) The operating system is the component that on one side ... and ... and on the other ... . 3) The hardware you purchase is able to use (or run) one or ... . 4) The operating

system is necessary in order ... 5) The executing application is called ... 6) It is therefore important to assess the operating system used on a particular model before ... because some software is only designed to run under the control of ... 7) Mainframe computers usually process ...

**4. Answer the questions to the text:**

1) What is a computer system built from? 2) What pieces does the hardware include? 3) What use the rest of the system to perform the desired task? 4) What manages and controls the hardware on one side and manages the applications on the other? 5) What does a computer package include? 6) Why is the operating system necessary? 7) What need to be initialized? 8) When can you execute an application? 8) What is called a process? 9) What is referred to multitasking? 10) When does the OS manage the termination? 11) What makes requests to the operating system and why? Does the operating system respond to the requests? And what is the next step which the OS perform? 12) What is referred to resources allocation? 13) Why is it important to assess the OS used on a particular model before initial commitment? 14) Why should operating systems be evaluated? 15) What is multiprogramming? 16) Where is the OS stored?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- purchasing a computer system and package;
- executing application;

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

To manage and control the hardware, to manage the applications, to manage the termination, to purchase a computer system, presented in chronological order, successfully plugging together cables and components, to get a computer to a usable state, to complete hardware initialization, by reclaiming resources, to make requests to the operating system, to respond to the requests, to provide access for the process, to access hardware resources, resource allocation, to allocate available resources, to assess the operating system, initial commitment, software houses, to expand resources on the development of application packages, both actual and potential, to process several application programs concurrently, to reside through processing, to be instantly available, to exceed the internal memory capacity.

**2. Give English equivalents of the following.**

Управляти та контролювати апаратне обладнання; бути доступним негайно; управляти програмами; постійно зберігатися в процесі обробки; керувати завершенням; фірми, що розробляють та постачають програмне

забезпечення; купувати комп'ютерну систему; оцінювати операційну систему; представлені у хронологічному порядку; розміщувати доступні (необхідні) ресурси; привести комп'ютер у робочий стан; забезпечити доступ до процесу; як і реальні так і потенційні; завершити початкову установку апаратного обладнання; робити запити до операційної системи; успішне під'єднання кабелів та комплектуючих; відновленням ресурсів; реагувати (відповідати) на запит; мати доступ до ресурсів апаратного обладнання; обробляти декілька прикладних програм одночасно; розміщення ресурсів; розповсюджувати ресурси для подальшої розробки пакетів прикладних програм; первинна установка; переповнювати об'єм внутрішньої пам'яті.

### 3. Match the words in A with their synonyms in B:

A	B
to occur	to store
to edit	concurrently
to terminate	to exist in
to assess	to enlarge
to expand	to evaluate
to reside	to complete
to retain	to take place
simultaneously	to correct

### 4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.

*To terminate/ to expand/ to manage/ to occur/ multitasking/ simultaneously*

1) The memory capacity can be ... to 256 Mbytes or even several Gbytes in a workstation. 2) The speed at which computer transactions ... is often talked about in terms of billionths of a second. 3) Today's computer can give the appearance of doing many things ... . This is the concept of ... .4) From the time you turn on your computer until you turn it off, the operating system is ... the operations. 5) As applications execute, request, and receive resources, or ..., the operating system takes care of these action.

### 5. Translate sentences into English using words and word combinations from the Vocabulary Notes

1) Зараз всі операційні системи використовують деякі форми мультипрограмування. 2) Персональний комп'ютер може зберігати різні програми одночасно. 3) Операційна система керує всіма доступними ресурсами на комп'ютері. 4) Вам слід оцінити операційну системи перед тим, як встановити її . 5) Щоб привести ваш комп'ютер у робочий стан, спершу потрібно під'єднати кабелі та комплектуючі. 6) Операційна система встановлюється у внутрішню пам'ять.

## *Grammar in Use*

### **The Future Perfect Tense**

#### ***1. Turn the following into the Future Perfect.***

1) Railway companies had used large computer systems to control ticket reservations by the first of September. 2) A railway's computer system had got thousands of telephone calls about reservations, space on other railways, and requests for arrivals and departures by 2 p.m. 3) The computer memory had contained all kinds of information by the end of the next day. 4) Computers had certainly revolutionized police work by the end of the month. 5) Almost every medium-sized or large company had used computers to help run the office by that time. 6) You had used a computer in your day-to-day duties by the day of your wedding. 7) A computer really had made office life easier by that year.

#### ***2. Replace the infinitive in brackets by the Future Indefinite or the Future Perfect.***

1) I (to download) all the information I can find on the Internet about this subject tomorrow. 2) I (to find) the problem by that time tomorrow. 3) I (to type) the password and (to open) the file by midnight, I think. 4) The new version of this software (to appear) in July. 5) We (to dump) all the information onto the hard disk of the server by that time. 6) We (to search) the database next week. 7) We (to place) all the machines on the fourth floor by 3 p.m. 8) With this system we (to eliminate) all possibilities of error tomorrow.

#### ***3. Put questions to the underlined words.***

1) This system will have been easy to install **by 2 p.m. tomorrow**. 2) **The system** will have failed by the morning. 3) Jack will have been responsible **for maintaining the system** by the midday. 4) You will have finished **typing** before I see you. 5) I will have forgotten **the extreme game** by the next morning. 6) The students **will have finished** their thesis by the end of April.

### **Additional Text**

**(for individual work)**

***Read the text in order to give the description of UNIX OS.***

### **UNIX Operating System**

Unix started to be developed around 1969, with the first published description appearing in 1973. It was developed at an ATT research lab and was made freely available to universities, encouraging its widespread adoption. Unlike earlier operating systems which had been written in assembly language, the code for Unix was largely in C. The use of a high level language made the code much easier for programmers to understand and maintain. Further, the Unix OS was designed! The programmers who developed Unix

started with a clear idea of how their OS was to work and what services it was to provide. Unix was more limited in its aims than many other OSs of the time. It was intended solely to provide a good environment for timeshare style program development. Other OSs were attempting to do timesharing, and database transactions, and run large jobs, but such different uses of a computer tend to conflict resulting in poor performance in all areas. The design for Unix modelled the OS in terms of several layers (when describing the design, someone made an analogy with a nut or an onion and introduced terms like "kernel", "shell" etc - these names have stuck):

- the innermost layer (the "kernel") has the code for the i/o handling routines ("device drivers") etc;
- another layer contains the code for process management, file management, and memory management;
- further layers contain code for looking after wide area and local networks and so forth;
- the next layer out comprised large numbers of useful utility programs – programs for copying files, comparing files to find differences etc
- the outermost layer (the "shell") was the job control language interpreter, but this JCL interpreter was much more flexible than any that had been proposed previously.

Unix was originally written for a particular kind of computer (the "PDP11/20") manufactured by Digital Equipment Corporation (DEC). But, the relatively clean design of the system, and the use of a high level language, made it possible for the system to be adapted to other computers (only the "device drivers" and other really low level code had to be redone). Unix was moved to related but more powerful computer architectures (DEC's VAX series of computers) and to totally different computer architectures. During the 1980s, Unix was adapted to run on computers as diverse as the modern Cray supercomputers down to personal computers with Intel-80386 CPU chips. The US Department of Defence's Advanced Research Projects Agency (ARPA) sponsored development of Unix at the University of Berkeley. The Berkeley developers added features to support virtual memory and networking (both wide area and local networking). Late in the 1980s, many computer companies, ATT, Berkeley University, IEEE, etc got together and established standards for all Unix systems.

Unix thus has the advantage of being a system that is non-proprietary, is widely available, and is effective in its original role of supporting program development. Most students continuing with computing studies will eventually get to work with some Unix systems. Modern Unix systems have been expanded so as to handle tasks other than the "programmers' workbench" of

the original design. These extensions (to handle large databases, some transaction processing and so forth) were demanded by customers. In some respects, these extensions detract from Unix which no longer has a quite the simplicity and elegance of its early forms.

*UNIX*. This as, designed by Bell Laboratories for minicomputers and workstations, has been widely adopted by many corporate installations. From the very first, it was designed to be a multi-tasking system written in C language.

*LINUX (Linus Torvalds)*. Protected under the GNU general public license Linux is the open source, cooperatively-developed POSIX based, multi-tasking operating system. Linux is used as a high-value, fully-functional UNIX workstation for applications ranging from Internet Servers to reliable workgroup computing. Linux is available for Intel platforms.

## Unit 4

**Text Study: Microsoft Operating Systems.**

**Additional Text: Macintosh OS.**

**Grammar: Revision of the Module III.**

### Text Study

#### I. Pre-reading Exercises

**1. Repeat the words in chorus:**

Unique, significantly, scientific, previous, numerous, enhancements, reliability, major, wireless, awareness, suspicious.

**2. While reading the text you will come across a number of new words. Try to guess what Ukrainian words they remind you:**

Menu, dialog, calendar, calculator, card, graphics, strategic, mobile, computing, integrated, cafes, viruses, hackers, debut, music, video.

**3. Pay attention to some grammatical points:**

1) In 1990, Microsoft announces Windows 3.0, **followed shortly by** Windows 3.1 in 1992. 2) Windows software is installed with floppy discs **bought** in large boxes with heavy instruction manuals. 3) Upgrade versions are available for **both** floppy disk and CD-ROM formats. 4) Windows Me was the last Microsoft operating system **to be based** on the Windows 95 code base.

#### II. Reading

**Read the text in order to fill in the table:**

The name of OS	Distinctive Features

### Microsoft Operating Systems

*MS-DOS*. In 1980 Microsoft focuses on a new operating system—the

software that manages, or runs, the computer hardware and also serves to bridge the gap between the computer hardware and programs, such as a word processor. It's the foundation on which computer programs can run. They name their new operating system "MS-DOS." MS-DOS stands for Microsoft Disk Operating System.

In 1985 Windows ships Windows 1.0. It is unique software designed for the serious PC users. There are drop-down menus, scroll bars, icons, and dialog boxes that make programs easier to learn and use. Windows 1.0 ships with several programs, including MS-DOS file management, Paint, Windows Writer, Notepad, Calculator, and a calendar, card file, and clock to help you manage day-to-day activities.

In 1987 Microsoft releases Windows 2.0 with desktop icons and expanded memory. With improved graphics support, you can now overlap windows, control the screen layout, and use keyboard shortcuts to speed up your work. Windows 2.0 is designed for the Intel 286 processor.

In 1990, Microsoft announces Windows 3.0, followed shortly by Windows 3.1 in 1992. Windows now has significantly better performance, advanced graphics with 16 colors, and improved icons. Program Manager, File Manager, and Print Manager arrive in Windows 3.0. Windows software is installed with floppy discs bought in large boxes with heavy instruction manuals. The popularity of Windows 3.0 grows with the release of a new Windows software development kit (SDK), which helps software developers to focus more on writing programs and less on writing device drivers.

Unlike Windows 3.1, however, Windows NT 3.1 is a 32-bit operating system, which makes it a strategic business platform that supports high-end programs.

In 1995 Microsoft releases Windows 95. This is the era of fax/modems, e-mail, the new online world, and dazzling multimedia games and educational software. Windows 95 has built-in Internet support, dial-up networking, and new Plug and Play capabilities that make it easy to install hardware and software. The 32-bit operating system also offers enhanced multimedia capabilities, more powerful features for mobile computing, and integrated networking. Windows 95 is the upgrade to the previous Windows and MS-DOS operating systems. Upgrade versions are available for both floppy disk and CD-ROM formats. In the summer of 1995, the first version of Internet Explorer is released. The browser joins those already vying for space on the World Wide Web.

Released in 1998, Windows 98 is the first version of Windows designed specifically for consumers. PCs are common at work and home, and Internet cafes where you can get online are popping up. Other improvements include

the ability to open and close programs more quickly, and support for reading DVD discs and universal serial bus (USB) devices. Windows 98 is the last version based on MS-DOS.

Designed for home computer use, Windows Me offers numerous music, video, and home networking enhancements and reliability improvements compared to previous versions. Windows Me was the last Microsoft operating system to be based on the Windows 95 code base.

Windows 2000 Professional is designed to replace Windows 95, Windows 98, and Windows NT Workstation 4.0 on all business desktops and laptops. Built on top of the proven Windows NT Workstation 4.0 code base, Windows 2000 adds major improvements in reliability, ease of use, Internet compatibility, and support for mobile computing. Windows 2000 Professional simplifies hardware installation by adding support for a wide variety of new Plug and Play hardware, including advanced networking and wireless products, USB devices, IEEE 1394 devices, and infrared devices.

In 2001 Windows XP becomes one of the best-selling products in the coming years. It's both fast and stable. Awareness of computer viruses and hackers increases, but fears are to a certain extent calmed by the online delivery of security updates. Consumers begin to understand warnings about suspicious attachments and viruses. There's more emphasis on Help and Support. Windows XP Home Edition offers such enhancements as the Network Setup Wizard, Windows Media Player, Windows Movie Maker, and enhanced digital photo capabilities. With a fresh visual design, Windows XP Professional includes features for business and advanced home computing, including remote desktop support, an encrypting file system, and system restore and advanced networking features. Windows XP has several editions during these years: Windows XP 64-bit Edition (2001), Windows XP Media Center Edition, Windows XP Tablet PC Edition (2002).

Windows Vista is released in 2006 with the strongest security system yet. User Account Control helps to prevent potentially harmful software from making changes to your computer. Windows Vista also features enhancements to Windows Media Player. Here you can watch television, view and send photographs, and edit videos.

By the late 2000s, the wireless world has arrived. When Windows 7 is released in October 2009, laptops are outselling desktop PCs and it's common to get online at public wireless hotspots like coffee shops. Wireless networks can be created at the office or at home. Windows Touch makes its debut, enabling you to use your fingers to browse the web, flip through photos, and open files and folders. You can stream music, videos, and photos from your PC to a stereo or TV. Many laptops no longer have a slot for DVDs and some

have solid state drives rather than conventional hard disks. Most everything is streamed, saved on flash drives, or saved in the "Cloud"—an online space for sharing files and storage. Windows Live—free programs and services for photos, movies, instant messaging, e-mail, and social networking—is seamlessly integrated with Windows so that you can keep in touch from your PC, phone, or the web, extending Windows to the Cloud.

Meanwhile, work is underway for the next version of Windows.

### *Vocabulary Notes*

**to focus on** [ 'fʊkʊks ] – зосереджуватися на

**to bridge the gap between** – ліквідувати розрив між

**to ship** – вводити, добавляти

**to release** – випускати у світ

**to overlap** – суміщати

**significantly** – багатозначно

**software development kit (SDK)** – набір інструментальних засобів для розробки програмного забезпечення (включає бібліотеки, заголовочні файли, файли допомоги, документацію)

**built-in** – вбудований

**enhanced** [In 'hRnst]– вдосконалений, розширений

**enhancement** – модернізація, вдосконалення, розширення

**Plug and Play** - стандарт фірм Microsoft, Intel та ін., що мають на меті спрощення підключення комп'ютера: бере на себе розпізнавання та налаштування периферійного обладнання без подальшого встановлення параметрів користувачем.

**to vie** [vaɪ]- конкурувати

**the upgrade** – оновлена версія

**to pop up** – висвітлитися на екрані

**wireless** - безпроводниковий

**stable** – стійкий, постійний

**awareness** [ɑ'wɛrɪnəs]– компетентність, знання

**an encrypting file system** – закодована система файлів

**to restore** – відновлення

**to feature** – характеризуватися

**to stream** – відтворювати

**seamlessly** – прямо, безперервно

**to keep in touch from** - мати зв'язки, бути в контакті, не відриватися

**meanwhile** – тим часом

### *Comprehension*

*1. Tell what sentences are true and what are false.*

1) MS-DOS stands for Microsoft Disk Operating System. 2)

Windows 1.0. is unique software designed for the serious mainframe users. 3) In 1987 Microsoft releases Windows 2.0 with desktop icons and expanded memory. 4) Program Manager, File Manager, and Print Manager arrive in Windows 2.0. 5) Windows NT 3.1 is a 16-bit operating system. 6) Windows 95 has built-in Internet support, dial-up networking, and new Plug and Play capabilities that make it easy to install hardware and software. 7) Windows 98 is the first version of Windows designed specifically for computer programmers. 8) Windows Me offers numerous educational programs. 9) Windows 2000 Professional is designed to replace Windows 95, Windows 98, and Windows NT Workstation 4.0 on all business desktops and laptops. 10) In 2001 Windows XP becomes one of the worst-selling products in the coming years. 11) Windows Vista is released in 2006 with the weakest security system yet. 12) Windows Touch makes its debut, enabling you to use your fingers to browse the web, flip through photos, and open files and folders.

**2. Choose the right answer:**

- 1) ... is the foundation on which computer programs can run.
  - a) MS-DOS;
  - b) Internet Explorer;
  - c) Telnet.
- 2) ... is designed for the Intel 286 processor.
  - a) MS-DOS;
  - b) Windows 2.0;
  - c) Windows Vista.
- 3) The popularity of ... grows with the release of a new Windows software development kit (SDK).
  - a) MS-DOS;
  - b) Windows 2.0;
  - c) Windows 3.0.
- 4) ... is the upgrade to the previous Windows and MS-DOS operating systems.
  - a) Windows 95;
  - b) Windows 2.0;
  - c) Windows 3.0.
- 5) ... simplifies hardware installation by adding support for a wide variety of new Plug and Play hardware.
  - a) Windows 95;
  - b) Windows 2000 Professional;
  - c) Windows XP.
- 6) With a fresh visual design, ... includes features for business and advanced home computing.
  - a) Windows XP Professional;

- b) Windows 2000 Professional;
  - c) Windows 2000.
- 7) Using ... you can watch television, view and send photographs, and edit videos.
- a) Win RAR;
  - b) Windows Media Player;
  - c) Acrobat Reader.
- 8) ... can be created at the office or at home.
- a) Wireless networks;
  - b) Wireless beacon;
  - c) Wireless telegraphy.
- 9) ... is seamlessly integrated with Windows so that you can keep in touch from your PC, phone, or the web.
- a) Windows Live;
  - b) Win RAR;
  - c) Windows Media Player.

**3. Complete the sentences.**

- 1) In 1980 Microsoft focuses on a new operating system which they name ... . 2) Windows 1.0 ships with several programs, including ... . 3) With improved graphics support in Windows 2.0., you can ... . 4) Windows 3.1 has significantly better ... . 5) Windows NT 3.1 supports ... . 6) Windows 95 also offers ... . 7) Windows 98 is the last version ... . 8) Windows Me was the last Microsoft operating system to be based ... . 9) Windows 2000 adds major improvements in ... . 10) Windows XP Home Edition offers such enhancements as ... . 11) Windows Vista also features enhancements to ... . 12) Windows Live—free programs and services for ... .

**4. Answer the questions to the text:**

- 1) What serves to bridge the gap between the computer hardware and programs? 2) What are there in Windows 1.0.? 3) What can you overlap in Windows 2.0.? 4) What helps software developers to focus more on writing programs and less on writing device drivers? 5) What kind of OS is Windows NT 3.1.? 6) For what are upgrade versions available? 7) When is the first version of Internet Explore released? 8) Where are PC common in 1998? 9) What kind of awareness increases? And by what are fears calmed to a certain extent? 10) What does Windows XP Professional include? 11) What helps to prevent potentially harmful software from making changes to your computer? 12) What no longer have a slot? And what do they have?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- about MS-DOS

- Windows 1.0
- Windows 3.0
- Windows 95
- Windows Me
- Windows Touch

**\*6. Try to tell the gist of the text.**

### **Word Study**

**1. Give Ukrainian equivalents of the following.**

Drop-down menu, scroll bar, icon, desktop icon, dialog boxes, graphics support, advanced graphics, to control the screen layout, keyboard shortcuts, performance, Program Manager, File Manager, Print Manager, Windows Writer, Notepad, card file, heavy instruction manuals, high-end program, dial-up networking, Network Setup Wizard, Movie Maker, remote desktop support, user account, Windows Touch, to flip through photos.

**2. Give English equivalents of the following.**

"Випадаюче меню" (меню, яке висвітлюється при виборі користувачем певного пункту панелі меню); піктограма (значок); комутаційна мережа; значок робочого столу; управляти розміщенням зображення на екрані; покращена графіка; диспетчер файлів; диспетчер програм; адміністратор друку; редактор Windows; картотека; програма професійного класу (з повним набором функціональних можливостей); майстер налаштування мережі; дистанційна підтримка робочого столу; обліковий запис користувача (бюджет користувача); полистати фото; смуга прокрутки (зображення у вікні); діалогове вікно; робоча характеристика; клавіші швидкого набору команд; графічна підтримка; блокнот; складна технологічна інструкція; редактор фільмів; Windows з сенсорним управлінням.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
significantly	steady
built-in	improvement
enhancement	for the moment
to vie	to renovate
stable	extensively
awareness	fixed
to restore	to compete
meanwhile	knowledge

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*To focus/to overlap/ enhanced/ to vie/wireless/ awareness/ to restore/to pop up*

1) They had ... with their rivals. 2) The two versions obviously ... 3) The computer programmers ... on a new operating system. 4) This OS has ... Plug and Play. 5) ... communication is expended nowadays. 6) Network ... is ... on his computer. 7) Data base was ... at that moment.

### **5. Translate sentences into English using words and word combinations from the Vocabulary Notes**

1) Нова операційна система є оновлена та покращена. 2) Програміст розробив новий набір інструментальних засобів для розробки програмного забезпечення. 3) Операційні системи “Windows” конкурують з операційними системами компанії “Apple”. 4) Знання комп’ютерної системи допомагає у його роботі. 5) Завдяки без провідниковому зв’язку ви завжди в контакті з своїм комп’ютером, телефоном чи всесвітньою мережею. 6) Компанія “Microsoft” випустила у світ велику кількість операційних систем.

### **Grammar in Use**

#### **Revision of the Module III**

#### **1. Replace the infinitive in brackets by the Present Perfect, the Past Perfect, the Future Perfect or the Past Indefinite Tense.**

1) Microsoft already (to create) its own standards in a market. 2) Microsoft (to revolutionize) the PC computing world and it (to put) much effort in to application integration and interoperability. 3) They (to say) that Microsoft (to design) its products with necessary components. 4) This system (to give) the user an enormous amount of power by 3 p.m. tomorrow. 5) When I (to come) she (to enter) the password and (to begin) working. 6) He (to receive) the e-mail by tomorrow. 7) They (to repair) the computer before they (to begin) typing. 8) You ever (to make) up a computer program? – Yes, I (to create) some last year. 9) At last I (to understand) the purpose of the operating system; now I’ll have a rest. 10) By this time you (to take) your examination on Information Technologies.

#### **Additional Text (for individual work)**

**Read, translate the text and be ready to answer the following questions:**

- *Where were the important ideas in the Mac Os developed?*
- *What was the aim of Xerox PARC project?*
- *What system was the first system that could really deliver computer power to all users?*

#### **Macintosh OS**

The Macintosh OS (1984), and things like Windows 3 (late 1980s), represent more modern operating systems, having evolved in the ten to fifteen years after the start of Unix.

The important ideas in the Mac OS (and later systems meant to work in similar style) were developed at Xerox's Palo Alto Research Centre during the 1970s and early 1980s (Apple started the Mac OS by getting a licence to use Xerox's ideas). Starting around 1972, Xerox PARC had had a project that aimed to explore what the "office of the future" would be like. Obviously, the office workers were going to make heavy use of computers. The Xerox researchers realized that the old systems were inappropriate.

The old systems had the computer as sort of oracle, surrounded by priests (the system's programmers and system's administrators) and neophytes (the computer operators); even the newer Unix systems had to have "system's gurus" to attend them and keep users at bay. In an "office of the future", individual's would have their own computers, and these therefore would have to have operating systems that did not need priestly ministrations from gurus or others. Unlike other developers of that period, the Xerox group realized that the cost of CPU power was going to drop dramatically. Consequently, it wasn't going to be important to keep the CPU efficiently employed, what was going to be important was the efficient use of time of the office workers. So it was going to be worthwhile "wasting" CPU cycles with the computer doing extra work if this would simplify the tasks of the user. Given these premises, the Xerox group focussed on what they thought would be the needs of users; they identified factors such as:

- visual displays for "high-bandwidth" communication (show the user what programs and files are available for use etc);
- direct manipulation (use of mouse pointer, selection of object represented visually [as an "icon"], picking a command from a menu – the "point-and click"

interface rather than the "remember-and-type-command" interface of Unix and older systems);

- consistency (every program working in a similar manner);
- intercommunication (e.g. easy transfer of pictures, text and other data between programs).

Xerox developed a variety of experimental systems embodying the features that they felt would empower users and make computers more useful. However, Xerox never really brought these experimental systems to the level of practical, affordable products.

Steve Jobs and others at Apple in the early 1980s recognized the importance of the Xerox ideas and worked to make them practical. The Mac OS of 1984 was the first system that could really deliver computer power to all users.

## Progress Check

*Choose the right answer:*

- 1) All computer systems perform the functions of ...  
a) inputting, storing; b) controlling and outputting; c) inputting, storing, processing, controlling, and outputting; d) processing, and controlling; e) storing and processing.
- 2) System software do not solve specific problems they are written to assist people in the use of the computer system by ... tasks.  
a) outputting; b) performing; c) storing; d) processing; e) feeding.
- 3) The person who prepares systems software is referred to as ...  
a) a systems programmer; b) an architect; c) a designer; d) a computer system architect; e) a teacher.
- 4) Protected programs are stored in an area of memory called ... which can be read from but not written on.  
a) computer; b) random access memory(RAM); c) read-only memory (ROM); d) CPU; e) ALU.
- 5) ... is a term that is commonly used to describe certain programs that are stored in ROM.  
a) software; b) hardware; c) firmware; d) system software; application software.
- 6) The necessary data are processed by a ... to become useful information.  
a) computer; b) storage; c) calculator; d) device; e) machine.
- 7) ... is a series of actions or operations that convert inputs into outputs.  
a) processing; b) inputting; c) data; d) controlling; e) storing.
- 8) We use the term data processing system to include the resources that are used ... the processing of data.  
a) to enter; b) to accomplish; c) to store; d) to feed; e) to begin.
- 9) Facilities are required ... the computer equipment, people and materials.  
a) to house; b) to convert; c) to store; d) to see; e) to make.
- 10) ... is the process of entering data, which are collected facts, into a data processing system.  
a) controlling; b) storing; c) inputting; d) processing; e) outputting.
- 11) ... is saving data or information so that they are available for initial or for additional processing.  
a) controlling; b) storing; c) inputting; d) processing; e) outputting.
- 12) ... is the process of producing useful information, such as a printed report or visual display.  
a) controlling; b) storing; c) inputting; d) processing; e) outputting.
- 13) ... is directing the manner and sequence in which all of the above operations are performed.

- a) controlling; b) storing; c) inputting; d) processing; e) outputting.
- 14) Data elements are meaningful collections of ... .  
 a) related characters; b) related records; c) related data elements; d) related facts; e) related symbols.
- 15) A computer system is built from such components:  
 a) monitor and keyboard; b) the hardware, the operating system and the applications; c) a printer and a scanner; d) a mouse and a display; e) a computer system.
- 16) After the operating system completes ... initialization, you can execute an application.  
 a) software; b) hardware; c) firmware; d) instructions; e) specific data.
- 17) ... requires a powerful operating system.  
 a) PC; b) desktop computer; c) multiprogramming; d) an embedded computer; e) a home computer.
- 18) ... is designed for the Intel 286 processor.  
 a) MS-DOS; b) Windows 2.0; c) Windows Vista; d) Windows 2000 Professional; e) Windows 2000.
- 19) ... simplifies hardware installation by adding support for a wide variety of new Plug and Play hardware.  
 a) Windows 95; b) Windows 2000 Professional; c) Windows XP; d) Windows XP Professional; e) MS- DOS.
- 20) With a fresh visual design, ... includes features for business and advanced home computing.  
 a) Windows XP Professional; b) Windows 2000 Professional; c) Windows 2000; d) Windows 95; e) Windows 3.0.

## **Module IV**

### **Computer Hardware**

#### **Unit 1**

**Text Study: The Structure of a Computer.**

**Additional Text: The Bus.**

**Grammar: Types of Questions. Word Order.**

#### **Text Study**

##### *I. Pre-reading Exercises*

**1. Repeat the words in chorus:**

Central Processing Unit (CPU), circuit, multiplication, addition, to identify, to execute, to fetch, to load, route.

**2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:**

Data, calculation, electronic, arithmetic, program, instruction, peripheral, printer.

### **3. Pay attention to some grammatical points:**

1) All the other components work together **by transferring data over the bus**. 2) Sometimes, the CPU will arrange for data **be taken from** an input device, transfer through the controller, move over the bus and get **loaded** directly into the CPU. 3) Data **being output** follows the same route in reverse – **moving from the CPU**, over the bus, through a controller and out to a device. 4) In other cases, the CPU may get a device controller **to move** data directly into, or out of, main memory. 5) Instructions and data **are stored** in main memory.

## **II. Reading**

**Read the text and be ready to find in the text the answers to the following questions:**

- *What is the structure of a computer?*
- *What is the function of the CPU?*

### **The Structure of a Computer**

A computer contains several major subsystems such as the Central Processing Unit (CPU), memory, and peripheral device controllers. These components all plug into a "Bus". The bus is essentially a communications highway; all the other components work together by transferring data over the bus.

The active part of the computer, the part that does calculations and controls all the other parts is the "Central Processing Unit" (CPU). The Central Processing Unit (CPU) contains electronic clocks that control the timing of all operations; electronic circuits that carry out arithmetic operations like addition and multiplication; circuits that identify and execute the instructions that make up a program; and circuits that fetch the data from memory. Instructions and data are stored in main memory. The CPU fetches them as needed.

Peripheral device controllers look after input devices, like keyboards and mice, output devices, like printers and graphics displays, and storage devices like disks. The CPU and peripheral controllers work together to transfer information between the computer and its users. Sometimes, the CPU will arrange for data be taken from an input device, transfer through the controller, move over the bus and get loaded directly into the CPU.

Data being output follows the same route in reverse – moving from the CPU, over the bus, through a controller and out to a device. In other cases, the CPU may get a device controller to move data directly into, or out of, main memory.

## *Vocabulary Notes*

**subsystem** – підсистемна частина системи, компонент системи.

**a device** [dI'vaɪs] – прилад, механізм; апарат, машина

**to plug** – затискати, закупорювати, включати в сіть, вставляють вилку в розетку.

**the bus** – шина

**highway** ['haɪweɪ] – головна лінія зв'язку, основний шлях, магістраль

**to transfer** ['trɪnsfɜ:(:)] – переносити, переміщати

**to contain** – включати в себе.

**circuit** – 1) цикл, сукупність операцій; комплекс вправ 2) електр. схема, коло.

**to identify** [aɪ'dentɪfaɪ] – 1) встановлювати тотожність, вирізняти 2) розпізнавати; встановлювати особистість 3) співпадати.

**to execute** ['eksɪkjʊ:t] – виконувати, реалізовувати.

**to store** [stɔ:] – 1) зберігати 2) вміщувати, акумулювати.

**to fetch** – витягати, видобувати (дані), доставляти, приносити.

**input/output device** – пристрої вводу/виводу

**to arrange** [q'reɪndʒ] – 1) приводити в порядок, розміщати 2) класифікувати, систематизувати 3) організовувати, підготовлювати.

**to move** – 1) рухатись, пересуватися 2) переїжджати, переселятися.

**a route** [raʊt] – *комп.* траса, дорога; маршрут; тракт ( передачі інформації

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) A computer contains two major subsystems. 2) The main active part of a computer is CPU. 3) Instructions and data are stored in CPU. 4) Peripheral device controllers look after input devices, output devices and storage devices like disks. 5) The CPU and peripheral controllers work together to transfer information between the computer and its users.

#### *2. Choose the right answer:*

1) A computer contains several major subsystems such as:

- a) the CPU and peripheral device controllers;
- b) the Central Processing Unit, memory and peripheral device controllers;
- c) the Central Processing Unit and memory.

2) All the components of computer work together by transferring data over ...

- a) the CPU;
- b) the bus;
- c) the memory.

3) ... fetches instructions and data from the main memory as needed.

- a) the CPU;
- b) the peripheral controllers;

- c) the subsystems.  
 4) Peripheral device controllers look after input devices ...  
 a) like printers and graphics displays;  
 b) like keyboards and mice;  
 c) like disks.  
 5) To transfer information between the computer and its users we need  
 a) the CPU and peripheral controllers;  
 b) the CPU;  
 c) peripheral controllers.

**3. Complete the sentences:**

1) A computer contains several major subsystems such as ... 2) The bus is ... 3) Central Processing Unit is ... 4) The Central Processing Unit (CPU) contains ... 5) Instructions and data are stored (where?) ... 6) Peripheral device controllers look after (what?) ... 7) The CPU and peripheral controllers work together to transfer information between ...

**4. Answer the questions:**

1) What subsystems does a computer contain? 2) What is the bus? 3) What part does calculations and controls all the other parts? 4) What does the CPU contain? 5) Where are instructions and data stored? 6) What do controllers look after? 7) why do the CPU and peripheral controllers work together? 8) What will the CPU sometimes arrange for? 9) What route does data being output follow?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- the function of the bus
- the CPU and its components
- peripheral device controllers

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Major subsystems, the Central Processing Unit (CPU), memory, peripheral device controllers, communications highway, to do calculations, to transfer data, to contain electronic clock, electronic circuits, to carry out arithmetic operations, to identify and execute the instructions, to fetch the data from memory, to look after input devices, output devices, storage devices, to transfer information between the computer and its users, move over the bus, follows the same route in reverse.

**2. Give English equivalents of the following.**

Головні підсистеми, центральний процесор, пам'ять, периферійні пристрої управління, супермагістраль зв'язку, виконувати обчислення,

переносити дані, включати в себе електронний годинник, електронні схеми, виконувати арифметичні операції, виявляти і виконувати операції, витягувати дані з пам'яті, наглядати за пристроями вводу, пристрої виводу, пристрої пам'яті, обмінюватись інформацією між комп'ютером і користувачем, переміщатись над шиною, слідувати таким же маршрутом навпаки.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
device	way
transfer	mechanism
contain	conserve
circuit	organize
execute	transmit
store	include
arrange	area
route	make

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*input / to fetch / electronic circuits / the CPU / control / to transfer*

1) The part that does calculations and controls all the other parts is .... 2) Electronic clocks ... the timing of all operations. 3) ... carry out arithmetic operations like addition and multiplication. 4) There are circuits that ... the data from memory. 5) ... devices are keyboards and mice. 6) The CPU and peripheral controllers work together ... information between the computer and its users.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1. Комп'ютер складається з багатьох підсистем. 2. Центральний процесор допомагає виконувати обчислення і контролювати всі частини комп'ютера. 3. Центральний процесор вміщує електронну схему, яка виконує операції додавання і множення. 4. Крім центрального процесора комп'ютер складається з додаткових пристроїв управління. 5. Вони відповідають за пристрої вводу, виводу та запам'ятовування. 6. Центральний процесор і додаткові пристрої управління працюють разом для забезпечення взаємодії між комп'ютером і користувачем.

**Grammar in Use**

**Types of Questions. Word Order.**

**1. Transform the following sentences into general questions introducing the necessary changes.**

1) The Internet is a computer network made up of thousands of networks world wide. 2) No one knows how many computers are connected to the Internet. 3) There are organizations which develop technical aspects of this network. 4) The Internet backbone, through which Internet traffic flows, is owned by private companies. 5) All computers on the Internet communicate with one another using the Transmission Control Protocol/ Internet Protocol suite. 6) An Internet user has access to a wide variety of services.

**2. Put all types of questions to the following sentences.**

1) Printers provide information in a permanent, human-readable form. 2) Printers vary greatly in performance and design. 3) We will classify printers as character printers, line printers and page printers in order to identify three different approaches to printing, each with a different speed range. 4) Nonimpact printers do not hit or impact a ribbon to print. 5) A typewriter is an example of a character printer. 6) A letter-quality printer is a character printer which produces output of typewriter quality. 7) Letter-quality printers typically have speeds ranging from 10 to 50 characters per second. 8)The magnetic fields cause the ink to take the shape of a character as the ink approaches the paper. 9) Drum printers use a solid, cylindrical drum, rotating at a rapid speed. 10) Page printers are high-speed nonimpact printers.

**Additional Text  
(for individual work)**

***Read and translate the text.***

**Bus**

A computer's bus can be viewed as consisting of about one hundred parallel wires. Some of these wires carry timing signals, others will have control signals, another group will have a bit pattern code that identifies the component (CPU, memory, peripheral controller) that is to deal with the data, and other wires carry signals encoding the data. Signals are sent over the bus by setting voltages on the different wires (the voltages are small, like 0-volts and 1-volt). When a voltage is applied to a wire the effect propagates along that wire at close to the speed of light; since the bus is only a few inches long, the signals are detectable essentially instantaneously by all attached components. Transmission of information is controlled by clocks that put timing signals on some of the wires. Information signals are encoded on to the bus, held for a few clock ticks to give all components a chance to recognize and if appropriate take action, then the signals are cleared. The clock that controls the bus may be "ticking" at more than one hundred million ticks per second The "plugs" that attach components to the bus incorporate quite sophisticated circuits. These circuits interpret the patterns of 0/1 voltages set on the control and address lines – thus memory can recognize a signal as

"saying" something like "store the data at address xxx", while a disk control unit can recognize a message like "get ready to write to disk block identified by these data bits". In addition, these circuits deal with "bus arbitration". Sometimes, two or more components may want to put signals on the bus at exactly the same time – the bus arbitration circuitry resolves such conflicts giving one component precedence (the other component waits a few hundred millionths of a second and then gets the next chance to send its data).

1. *Divide the text into the logical parts and give a title to each one.*
2. *Put questions to the text.*
3. *Discuss it with your groupmates.*

## Unit 2

**Text Study: The Structure of CPU.**

**Additional Text: High Speed Register Storage.**

**Grammar: The Passive Voice.**

### Text Study

#### I. Pre-reading Exercises

##### 1. Repeat the words in chorus:

Implement, to engrave, interconnecting, wiring, supply, circuit, require, the arithmetic logic unit (ALU), addition, multiplication, comparison, current, values.

##### 2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:

Address, register, operation, silicon "chip", decode, logically, transistor, component, bit, result.

##### 3. Pay attention to some grammatical points:

1) The CPU of a modern small computer **is** physically **implemented** as single silicon "chip". 2) The CPU **is** logically **made up** from a number of subparts. 3) Other circuits will implement comparison operations **that** permit a program check **whether** one data value is **greater than or less than** some other value. 4) While most data **are kept** in memory, CPUs **are designed to hold** a small amount of data in "registers" (data stores) in the CPU itself. 5) A CPU register will hold **as many bits as** a "word" in the computer's memory. 6) Data values **have to be fetched** from memory and **stored** temporarily in CPU registers.

### II. Reading

*Read the text and be ready to find in the text the answers to the following questions:*

- *What circuits are the hearts of a computer?*
- *What is the function of the arithmetic logic unit?*

### The Structure of CPU

The CPU of a modern small computer is physically implemented as single silicon "chip". This chip will have engraved on it the million or more transistors and the interconnecting wiring that define the CPU's circuits. The chip will have one hundred or more pins around its rim. Some of these pins are connection points for the signal lines from the bus, others will be the points where electrical power is supplied to the chip. Although physically a single component, the CPU is logically made up from a number of subparts. The three most important, which will be present in every CPU.

The timing and control circuits are the heart of the system. A controlling circuit defines the computer's basic processing cycle: *repeat, fetch next instruction from memory, decode instruction (i.e. determine which data manipulation circuit is to be activated), fetch from memory any additional data that are needed, execute the instruction (feed the data to the appropriate manipulation circuit), until "halt" instruction has been executed.*

Along with the controlling "fetch-decode-execute" circuit, the timing and control component of the CPU contains the circuits for decoding instructions and decoding addresses (i.e. working out the location in memory of required data elements).

The arithmetic logic unit (ALU) contains the circuits that manipulate data. There will be circuits for arithmetic operations like addition and multiplication. Often there will be different versions of such circuits – one version for integer numbers and a second for real numbers. Other circuits will implement comparison operations that permit a program check whether one data value is greater than or less than some other value. There will also be "logic" circuits that directly manipulate bit pattern data.

While most data are kept in memory, CPUs are designed to hold a small amount of data in "registers" (data stores) in the CPU itself. It is normal for main memory to be large enough to hold millions of data values; the CPU may only have space for something like 16 values. A CPU register will hold as many bits as a "word" in the computer's memory. Most current CPUs have registers that each store 32 bits of data. The circuits in the ALU often are organized so that some or all of their inputs and outputs must come from, or go to, CPU registers. Data values have to be fetched from memory and stored temporarily in CPU registers. Only then they can be combined using an ALU circuit, with the result again going to a register. If the result is from the final step in a calculation, it gets stored back into main memory. While some of the CPU registers are used for data values that are being manipulated, others may be reserved for calculations that the CPU has to do when it is working out where in memory particular data values are to be stored. CPU designs vary

with respect to their use of registers. But, commonly, a CPU will have 8 or more "data" registers and another 8 "address" registers.

### *Vocabulary Notes*

**to implement** [ ' ImplImqnt ] – виконувати, забезпечувати виконання, здійснювати, утілюватись в життя.

**to engrave** [ In ' greIv ] – утримувати на собі, гравірувати

**wiring** [ ' waiqrIN ] – монтаж, проводка, монтажна схема

**pin** – штекер, вивід; контакт

**RIM** – read-in mode режим вводу

**supply** – постачати

**subpart** – підчастина

**to define** – давати визначення

**to determine** [ dI ' tWmIn ] – визначати, встановлювати

**to feed** – надавати інформацію

**manipulation** – маніпулювання, обробка

**to require** [ rI ' kwaiq ] – вимагати

**addition and multiplication** – додавання і множення

**comparison** [ kqm ' pxrIsn ] – порівняння

**to permit** [ ' pWmit ] – дозволяти

**values** [ ' vxljHs ] – величини

**current** [ ' kAr (q) nt ] – сучасний

**register** [ ' reGistq ] – реєстр

**calculation** – обчислення

**reserve** [ rI ' zWv ] – резерв, зберігати

### *Comprehension*

#### ***1. Tell what sentences are true and what are false.***

1) The CPU of a modern small computer is physically implemented as double silicon "chip". 2) The CPU's circuits are the million or more transistors and the interconnecting wiring. 3) The CPU is logically made up from a number of subparts, there are five most important, which will be present in every CPU. 4) The timing and control circuits are the heart of the system. 5) A controlling circuit defines the computer's basic processing cycle: repeat and fetch next instruction from memory. 6) The arithmetic logic unit contains the circuits that manipulate data. 7) Most current CPUs have registers that each store 32 bits of data. 8) Data values have to be fetched from the CPU and stored temporarily in CPU registers.

#### ***2. Choose the right answer:***

1) The chip will have ... .

a) one thousand or more pins;

b) one hundred or more pins around its rim;

- c) million pins.
- 2) ... circuits are the heart of the system.
  - a) the timing;
  - b) the control;
  - c) the timing and control.
- 3) The arithmetic logic unit contains the circuits that ... .
  - a) manipulate data;
  - b) hide data;
  - c) show data.
- 4) While most data are kept in memory, CPUs hold a ... amount of data in "registers" (data stores) in the CPU itself.
  - a) huge;
  - b) great;
  - c) small.
- 5) Data values have to be fetched from memory and stored temporarily in ... .
  - a) CPU registers;
  - b) the ALU;
  - c) controllers.

**3. Complete the sentences:**

- 1) A controlling circuit defines the computer's basic processing cycle: ...
- 2) Along with the controlling "fetch-decode-execute" circuit, the timing and control component of the CPU contains ... .
- 3) The arithmetic logic unit (ALU) contains different circuits for example ... .
- 4) A CPU register will hold as many bits as ... .
- 5) The circuits in the ALU often are organized so that ... .
- 6) Data values have to be fetched from memory and stored temporarily in ... .
- 7) Commonly the CPU will have ... "data" registers and another ... "address" registers.

**4. Answer the questions:**

- 1) How is the CPU of a modern small computer physically implemented?
- 2) What will this chip engrave on it?
- 3) Is the CPU logically made up from a number of subparts?
- 4) What basic processing cycle does a controlling circuit define?
- 5) What circuits does the timing and control component of the CPU contain?
- 6) What does the arithmetic logic unit contain?
- 7) How many bits will a CPU register hold?
- 8) What registers have current CPUs?
- 9) Do data values have to be fetched from memory and stored temporarily in CPU registers? Why?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- the computer's basic processing cycle
- the arithmetic logic unit

- current CPUs

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

A modern small computer, physically implemented, single silicon "chip", interconnecting wiring, electrical power, a number of subparts, the timing and control circuits, basic processing cycle, decode instruction, fetch from memory any additional data, the appropriate manipulation circuit, the arithmetic logic unit (ALU), manipulate data, addition and multiplication, to permit a program check whether... , data value, a small amount of data in "registers", the final step in a calculation, particular data values.

**2. Give English equivalents of the following.**

Певне числове значення, сучасний невеликий комп'ютер, єдиний силіконовий чіп, фізично втілюватись у життя, кінцевий крок в обчисленні, витягати з пам'яті будь-які додаткові дані, певна маніпуляцій на схема, мала кількість інформації в регістрі, електрична сила, з'єднувальна проводка, багато підчастин, інформаційна величина, схема синхронізації і контролю, дозволити програмі вибрати чи ..., додавання і множення, основний робочий цикл, декодувати інформацію, маніпулювати даними, арифметико-логічний пристрій.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
current	to save
to implement	computation
to engrave	modern
to supply	to carve
manipulation	to perform
to reserve	machination
calculation	to provide

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*subparts / register / wiring / addition and multiplication / to supply / the timing and control / to engrave / to manipulate*

1) A single silicon "chip" have ... on it the million or more transistors and the interconnecting ... . 2) Electrical power must be ... to the chip. 3) The CPU is made up from a number of ... . 4) The heart of a computer system is ... and ... circuits. 5) The arithmetic logic unit contains the circuits that ... data. 6) There are circuits for arithmetic operations like ... . 7) A CPU ... will hold as many bits as a "word" in the computer's memory.

**5. Translate sentences into English using words and word combinations**

*from the Vocabulary Notes.*

1) Центральний процесор вміщує три основних компоненти. 2) Витягнути інформацію з пам'яті, декодувати її, виконати дії над нею – це основний робочий цикл контролюючої схеми комп'ютера. 3) Маніпулювати інформацією (даними) – це робота арифметико-логічного пристрою. 4) Він вміщує спеціальні схеми для додавання і множення, порівняння, вибору величин. 5) Вся інформація зберігається в основній пам'яті комп'ютера. 6) Регістри центрального процесора вміщують невелику кількість інформації. 7) Регістр центрального процесора утримує стільки бітів інформації, скільки становить одне «слово» в пам'яті комп'ютера.

***Grammar in Use***  
**The Passive Voice**

***1. Read and translate the following sentences paying attention to the predicates in the Passive Voice:***

1) These digits are easily multiplied. 2) I was asked many questions about my work. 3) They were explained how to solve this problem on a computer. 4) The sequence of reasonable operations has been performed by the computer. 5) The new department of mathematics has just been opened. 6) Many books on computers' organization and architecture had been translated from Ukrainian into English by the end of last year. 7) The experiments on the new microcomputer were being I carried out during the whole month. 8) All the digits are recorded on the paper tape when addition is performed. 9) The new key adding machine was transferred into the next room; yesterday. 10) The sequence of reasonable operations is now being carried out by this microcomputer. 11) The conference was addressed by a well-known scientist. 12) The invention of computers was spoken of at the last lecture. 13) Modern I personal computers are always looked at with interest. 14) Many new branches of industry have been developed in your country since the beginning of XX century.

***2. Fill in the gaps in the following sentences using the appropriate form of the verb in brackets.***

1) Microsoft ... (found) by Bill Gates. 2) Computer language ... (develop) in the 1970s. 3) During that period enormous advances ... (make) in computer technology. 4) The following year, twice as many personal computers ... (sell). 5) The first digital computer ... (build) by the University of Pennsylvania in 1946. 6) Last year more software companies ... (launch) than ever before. 7) Intel (release) the first microprocessor. 8) They (perform) many data processing operations in nanoseconds, which (to be) billionths of seconds.

9) Fourth generation computers (become) smaller as more components (squeeze) onto microchips.

**3. Put the verbs in brackets in an appropriate tense form.**

Computers, as we know them today, (to appear) comparatively recently. Only in the mid-1940s the first working digital computer (to complete). Then computers (to evolve) tremendously. Vacuum tubes used in the first-generation computer (to replace) by transistors in the second-generation computer at the beginning of the early 1960s. By the end of the 1960s, transistors themselves (to replace) by tiny integrated circuit boards and a new generation of computers (to be) on the market. Fourth-generation computers (to be) now produced with circuits that (to be) much smaller than before and can be on a single chip. Even today, new technologies (to develop) to make even better machines.

**Additional Text  
(for individual work)**

*Read and translate the text.*

**High Speed Register Storage**

Programmers who write in low-level "assembly languages" will be aware of these data and address registers in the CPU. Assembly language code defines details such as how data should be moved to specific data registers and how addresses are to be calculated and saved temporarily in address registers. Generally, programmers working with high level languages don't have to be concerned about such details; but, when necessary, a programmer can find out how the CPU registers are used in their code.

In addition to the main data and address registers, the CPU contains many other registers. The ALU will contain numerous registers for holding temporary values that are generated as arithmetic operations are performed. The timing and control component contains a number of registers that hold control information.

The Program Counter (PC) holds the address of the memory location containing the next instruction to be executed. The Instruction Register (IR) holds the bit pattern that represents the current instruction; different parts of the bit pattern are used to encode the "operation code" and the address of any data required. Most CPUs have a "flags" register. The individual bits in this register record various status data. Typically, one bit is used to indicate whether the CPU is executing code from an ordinary program or code that forms part of the controlling Operating Systems (OS) program. (The OS code has privileges; it can do things, which ordinary programs can not do, like change settings of peripheral device controllers. When the OS-mode bit is not set, these privileged instructions can not be executed.) Commonly, another

group of bits in the flags register will be used to record the result of comparison instructions performed by the ALU. One bit in the flags register would be set if the comparator circuits found two values to be equal; a different bit would be set if the first of the two values was greater than the second.

*1. Divide the text into the logical parts and give a title to each one.*

*2. Put questions to the text.*

*3. Discuss it with your groupmates.*

## Unit 3

**Text Study: Memory.**

**Additional Text: "Cache" Memories.**

**Grammar: Sequence of Tenses.**

### Text Study

#### *I. Pre-reading Exercises*

*1. Repeat the words in chorus:*

Storage, internal, ongoing, a semiconductor, available, ROM – Read Only Memory, RAM - Read Write Memory, the acronym, to distinguish, to access, sequential, substantial, quoted, to require, mercury, a "flip-flop", to elaborate, available.

*2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Normal, the acronym, an origin, minimal, machines, graphics, displays, byte, bit, popular, technology, magnetic, a disk, gigabyte.

*3. Pay attention to some grammatical points:*

1) **There are** primary and secondary storage units. 2) Data as well as instructions **must** flow into and out of primary storage. 3) Therefore **slower, less expensive** storage units are available for computer systems. 4) These units **are called** secondary storage. 5) Data **are stored** in them in the same binary codes **as** in main storage and **are made** available to main storage as needed. 6) It **was used** to distinguish main memory from secondary storage like tapes. 7) Many different technologies **have been used**. 8) **Repeated** again and again, these **can be built up** into integrated circuits that hold millions of bytes. 9) Individual memory chips with **as much as** 4 million bytes of storage capacity **can now be purchased**.

#### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What is the main function of primary storage?*
- *What are two types of computer memory?*

### Memory

There are primary and secondary storage units. Both contain data and the instructions for processing the data. Data as well as instructions must flow into and out of primary storage.

*Primary storage* is also called main storage or internal storage. The specific functions of internal storage are to hold (store): 1) all data to be processed; 2) intermediate results of processing; 3) final results of processing; 4) all the instructions required for ongoing process.

Primary storage is expensive because each bit is represented by a high-speed device, such as a semiconductor. A million bytes (that is, 8 million bits) is a large amount of primary storage. Often it is necessary to store many millions, sometimes billions, of bytes of data. Therefore slower, less expensive storage units are available for computer systems. These units are called *secondary storage*. Data are stored in them in the same binary codes as in main storage and are made available to main storage as needed.

Computers have two types of memory: ROM – Read Only Memory, RAM - normal Read Write Memory. The acronym RAM instead of RWM is standard. It actually standards for "Random Access Memory". Its origin is very old, it was used to distinguish main memory (where data values can be accessed in any order – hence "randomly") from secondary storage like tapes (where data can only be accessed in sequential order). ROM memory is generally used to hold parts of the code of the computer's operating system. Some computers have small ROM memories that contain only a minimal amount of code just sufficient to load the operating system from a disk storage unit. Other machines have larger ROM memories that store substantial parts of the operating system code along with other code, such as code for generating graphics displays.

Most of the memory on a computer will be RAM. RAM memory is used to hold the rest of the code and data for the operating system, and the code and data for the program(s) being run on the computer.

Memory sizes may be quoted in bits, bytes, or words:

*Bit* a single 0 or 1 data value

*Byte* a group of 8 bits

*Word* the width of the primary data paths between memory and the CPU, maybe 16-bit (two byte), 32-bit (four byte) or larger.

Memory sizes are most commonly given in terms of bytes. (The other units are less useful for comparative purposes. Bits are too small units of storage. Word sizes vary between machines and on some machines aren't really defined.) The larger memory units like bytes and words are just made up from groups of bits.

All storage devices require simple two-state components to store individual bits. Many different technologies have been used. Some early computers distinguished 0 and 1 bit values by the presence or absence of a pulse of energy moving through a tube of mercury; external storage was provided using paper media like cards or tapes where the presence or absence of a punched hole distinguished the 0/1 bit setting. Later, the most popular technology for a computer's main memory used small loops of magnetic oxide ("cores") that could be set with differing North/South polarity to distinguish the 0/1 bit state. Disks (and tapes) still use magnetic encoding – 0/1 bit values are distinguished by the magnetic state of spots of oxide on the disk's surface. The main memories of modern computers are made from integrated circuits.

One basic circuit is a "flip-flop". This uses four transistors wired together; it can be set in an on or an off state and so can hold one bit. A more elaborate circuit, with eight flip-flops, can hold one byte. Repeated again and again, these can be built up into integrated circuits that hold millions of bytes. Individual memory chips with as much as 4 million bytes of storage capacity can now be purchased. A computer's memory will be made up out of several of these chips.

The amount of memory available on a computer has increased rapidly over the last few years. Most current personal computers now have around 8 million bytes of storage (8 megabyte, 8MB); more powerful workstations have from 32MB to 256MB and large time shared systems may have 1000 MB (or 1gigabyte).

### *Vocabulary Notes*

**to flow** – витікати, виходити з

**primary storage / internal storage** – первинний запам'ятовуючий пристрій

**intermediate** [ˈɪntɪˈmɪdiət] – проміжний, середній

**a semiconductor** – напівпровідник

**available** [əˈveɪləbəl] – доступний, наявний, корисний

**to distinguish** [dɪsˈtɪŋɡwɪʃ] – відрізняти, розглядати

**sequential** [sɪˈkwɛnsɪəl] – послідовний

**to load** – грузити, загрузати, вміщувати

**an external storage** – зовнішній запам'ятовуючий пристрій, зовнішня пам'ять

**a surface** ['sʌfɪs] – поверхня, зовнішність

**an integrated circuit** – інтегрована схема

**an elaborate circuit** – добре продумана схема

**to purchase** ['pʌtʃəs] – купувати

**to share** – ділитися, поділяти

**"flip-flop"** – тригер, тригерна схема

**mercury** ['mWkjʊrɪ] – ртуть, ртутний стовп

**punched hole** – перфораційний отвір

**a loop** – петля, цикл програми

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) There are primary and secondary storage units which contain data and the instructions for processing the data. 2) Primary storage is also called main storage or secondary storage. 3) Primary storage is cheap because each bit is represented by a low-speed device. 4) Slower, less expensive storage units are called secondary storage. 5) Data are stored in secondary storage in the same binary codes as in main storage. 6) Computers have three types of memory. The acronym RAM is Random Access Memory. 7) Its origin is not very old, it was used to distinguish main memory from secondary storage like tapes. 8) ROM memory is generally used to hold parts of the code of the computer's operating system. 9) Memory sizes are most commonly given in terms of bits. 10) The main memories of modern computers are made from integrated circuits.

#### *2. Choose the right answer:*

1) Primary and secondary storage units contain ... .

- a) data and the instructions for processing the data;
- b) the instructions for processing the data;
- c) only data.

2) The specific functions of internal storage are to hold: ... .

- a) all data and the instructions;
- b) intermediate and final results of processing;
- c) all data, intermediate results, final results of processing and the instructions.

3) ROM memory is generally used ... parts of the code of the computer's operating system.

- a) to drop;
- b) to hold;
- c) to show.

4) ... are too small a unit of storage.

- a) bits;
- b) bytes;
- c) megabyte.

5) One basic circuit is ... .

- a) complex;
- b) integrated;
- c) a "flip-flop".

### **3. Complete the sentences:**

1) Primary and secondary storage units contain ... and ... . 2) Primary storage is also called ... . 3) The specific functions of internal storage are to hold (store): ... . 4) A million bytes (that is, 8 million bits) is ... . 5) Secondary storage is ... . 6) Computers have two types of memory ... . 7) Most of the memory on a computer will be ... . 8) RAM memory is used to ... . 9) All storage devices require ... . 10) The main memories of modern computers are made from ... . 11) Most current personal computers now have around ... million bytes of storage.

### **4. Answer the questions:**

1) What does primary storage hold? 2) What is secondary storage? 3) What are types of memory? 4) Why is primary storage expensive? 5) What was "Random Access Memory" used to? 6) What was ROM used to? 7) Are memory sizes most commonly given in terms of bytes? Why? 8) What do all storage devices require? 9) What are the main memories of modern computers made from? 10) What is most current personal computers?

### **5. Find as quickly as possible and read out the sentences containing the following important information:**

- primary storage
- two types of memory
- all storage devices

### **\*6. Try to tell the gist of the text.**

#### **Word Study**

#### **1. Give Ukrainian equivalents of the following.**

Primary and secondary storage unit, to contain data and the instructions, processing the data, to flow into and out of primary storage unit, intermediate results, the instructions required, a high-speed device, available for computer, to be accessed, in sequential order, to load from a disk, to store substantial parts, memory sizes, a tube of mercury, a punched hole, magnetic oxide, the disk's surface, integrated circuits, current personal computers.

#### **2. Give English equivalents of the following.**

Включати інформацію і команди, входити і виходити з первинного запам'ятовуючого пристрою, первинний і вторинний запам'ятовуючі пристрої, сучасний персональний комп'ютер, проміжні результати, високошвидкісний пристрій, доступний для комп'ютера, оброблення даних, необхідні команди, бути доступним, послідовно, зберігати основні частини, загрузити з диска, трубка з ртуттю, розмір пам'яті, магнітний оксид, поверхня диска, інтегровані схеми, перфораційний отвір.

#### **3. Match the words in A with their synonyms in B:**

**A**

**B**

to flow	useful
available	to stream
to distinguish	to fill
to load	modern
a surface	to recognize
to purchase	appearance
current	to buy

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*to flow / a semiconductor / integrated circuits / primary and secondary / memory / ROM / RAM / available / to require / to distinguish*

1) ... storage units contain data and the instructions for processing the data. 2) Data as well as instructions must ... into and out of primary storage. 3) Each bit of a primary storage is represented by a high-speed device: ... . 4) Secondary storage is slower, less expensive unit which is ... for computer systems. 5) Some computers have small ... memories that contain only a minimal amount of code. 6) Most of the memory on a computer will be ... . 7) All storage devices ... simple two-state components to store individual bits. 8) Some early computers ... 0 and 1 bit values by the presence or absence of a pulse of energy moving through a tube of mercury. 9) The main memories of modern computers are made from ... . 10) The amount of ... available on a computer has increased rapidly over the last few years.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Первинний і вторинний запам'ятовуючі пристрої включають в себе інформацію та інструкції для обробки цієї інформації. 2) Основною функцією первинної пам'яті є утримувати всю оброблювальну інформацію, проміжні і кінцеві результати і команди. 3) Первинна пам'ять – дорога, а вторинна – дешевша. 4) Комп'ютер має два види пам'яті. 5) Основна пам'ять сучасних комп'ютерів складається з інтегрованих схем. 6) Комп'ютерна пам'ять складається з кількох чіпів.

***The Grammar in Use***

**Modals**

**1. Translate the following sentences paying attention to the Modal Verbs and their equivalents.**

1) The designer can always improve the operation of these receivers. 2) He could use any transmitter for this system. 3) The scientists are able to construct a new device by using semiconductors. 4) We have to increase the current strength by decreasing the resistance of the current. 5) After finishing the experiment scientists will have to discuss the results. 6) The students didn't

have to analyze these data. 7) We may say that photoelectric properties of transistor are largely used in TV sets. 8) In order to see certain stars we must use a telescope.

## **2. Put the modal verbs into the:**

### **a) Past Indefinite Tense**

### **b) Future Indefinite Tense**

1) Computers *can* replace people in dull routine work. 2) The program is the set of instructions that *may* also include data to be processed. 3) Computer-controlled robots *must* increase the productivity of industry. 4) They *can* help in making different decisions. 5) The pupils *may* work with computers at the lessons. 6) Electric pulses *can* move at the speed of light. 7) Storage devices *must* have capacities for the input, output data and programs and for intermediate results. 8) Business minicomputers *can* perform to 100 million operations per second. 9) In order to solve scientific problems researchers *must* deal with the language of science – mathematics. 10) Programmers *must* write application programs in a way that computers *can* understand.

## **3. Find sentences with modal verbs in the text**

### **Additional Text (for individual work)**

**Read and translate the text.**

### **"Cache" Memories**

"Cache" memories are increasingly common ("cache – a hiding place for provisions, treasures etc"). Cache memories are essentially hidden from the applications programmer; the cache belongs to the computer hardware and its controlling operating system. Currently, a typical cache memory would be up to 256 KB in size. The cache may form a part of the circuitry of the CPU chip itself, or may be a separate chip. Either way, the system will be designed so that information in the cache can be accessed much more quickly than information in main storage.

The OS and CPU hardware arrange to copy blocks of bytes ("pages") from main memory into the cache. The selected pages could be those with the instructions currently being executed. Most programs involve loops where particular sets of instructions are executed repeatedly. If the instructions forming a loop are in the cache, the CPU's instruction-fetch operation is greatly speeded up. Sometimes it is worth copying pages with data from main memory to the cache – then subsequent data accesses are faster (though data that get changed do have to be copied back to main memory eventually). The operations shifting pages, or individual data elements, between cache and memory are entirely the concern of the CPU hardware and the operating

system. The only way that a programmer should be able to detect a cache is by noticing increased system's performance.

All data manipulated by computers are represented by bit patterns. A byte, with 8 individual bits, can represent any of 256 different patterns.

*1. Divide the text into the logical parts and give a title to each one.*

*2. Put questions to the text.*

*3. Discuss it with your groupmates.*

## Unit 4

**Text Study: Input Devices.**

**Additional Text: "Seeking" for Tracks.**

**Grammar: Modals.**

### Text Study

#### *I. Pre-reading Exercises*

*1. Repeat the words in chorus:*

A keyboard, to coordinate, numerical, advanced, design representation, interface, to simplify, to require, double-click, to issue, application, quality.

*2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

A manipulator, popular, indicators, graphics, representation, display, to control, the cursor, orientation, to press, commands, vertical, horizontal, manuscript, special, photos.

*3. Pay attention to some grammatical points:*

1) **There are** several devices used for inputting information into the computer. 2) It enables **inputting** numerical and text data. 3) Later when the more advanced graphics **became** to develop, user **found** that a keyboard **did not** provide the design capabilities of graphics and text representation on the display. 4) There **appeared** manipulators, a mouse and a track ball. 5) The mouse provides the cursor control thus **simplifying** user's orientation on the display. 6) The mouse's primary functions are to help the user draw, point and select images on his computer display by **moving** the mouse across the screen. 6) When you move the mouse across a flat surface, the ball **located** on the bottom side of the mouse turns two rollers. 7) The quality of graphical plotting tables **is characterized** by **permitting** capacity. 8) Digital video cameras **have been spread** recently.

#### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What devices are there for inputting information?*
- *Where do graphical plotting tables find their application?*

### **Input Devices**

There are several devices used for inputting information into the computer: a keyboard, some coordinate input devices, such as manipulators (a mouse, a track ball), touch panels and graphical plotting tables, scanners, digital cameras, TV tuners, sound cards etc.

When personal computers first became popular, the most common device used to transfer information from the user to the computer was *the keyboard*. It enables inputting numerical and text data. A standard keyboard has 104 keys and three more ones informing about the operating mode of light indicators in the upper right corner.

Later when the more advanced graphics became to develop, user found that a keyboard did not provide the design capabilities of graphics and text representation on the display. There appeared manipulators, a mouse and a track ball, that are usually used while operating with graphical interface. Each software program uses these buttons differently.

*The mouse* is an optic-mechanical input device. The mouse has three or two buttons which control the cursor movement across the screen. The mouse provides the cursor control thus simplifying user's orientation on the display . The mouse's primary functions are to help the user draw, point and select images on his computer display by moving the mouse across the screen.

In general software programs require to press one or more buttons, sometimes keeping them depressed or double-click them to issue changes in commands and to draw or to erase images. When you move the mouse across a flat surface, the ball located on the bottom side of the mouse turns two rollers. One is tracking the mouse's vertical movements; the other is tracking horizontal movements. The rotating ball glides easily, giving the user good control over the textual and graphical images.

In portable computers *touch panels or touch pads* are used instead of manipulators. Moving a finger along the surface of the touch pad is transformed into the cursor movement across the screen.

*Graphical plotting tables (plotters)* find application in drawing and inputting manuscript texts. You can draw, add notes and signs to electronic documents by means of a special pen. The quality of graphical plotting tables is characterized by permitting capacity, that is the number of lines per inch, and their capability to respond to the force of pen pressing .

*Scanner* is used for optical inputting of images (photographies, pictures, slides) and texts and converting them into the computer form.

*Digital videocameras* have been spread recently. They enable getting videoimages and photographs directly in digital computer format. Digital cameras give possibility to get high quality photos.

*Sound cards* produce sound conversion from analog to digital form. They are able to synthesize sounds. Special game-ports and joysticks are widely used in computer games.

### *Vocabulary Notes*

**a keyboard** – клавіатура

**a key** – клавіша; кнопка; перемикач; ключовий, основний; головний; переключати; набирати на клавіатурі

**a manipulator** – маніпулятор; блок обробки

**a trackball** – трекбол

**a touch [tAC] panel** – сенсорна панель

**graphic plotting tables** – графічні планшети

**a sound card** – звукова карта (плата)

**to enable** – дозволяти; допускати; робити можливим

**an operating mode** – режим роботи

**to press a button** – натиснути на кнопку

**to keep buttons depressed** – утримувати кнопки натиснутими

**double-click** – подвійне натискання

**to erase images** – видалити, стерти зображення (об'єкт)

**a roller** – ролик

**track** – слідкувати; прослідковувати; проходити; слід; траєкторія; шлях; доріжка

**by means of** – за допомогою, за посередництвом

**to simplify** ['sɪmplɪfaɪ] – спрощувати

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) There are several devices used for inputting information into the computer: a keyboard and sound cards. 2) When personal computers first became popular, the most common device used to transfer information from the user to the computer was the mouse. 3) A standard keyboard has 104 keys. 4) The mouse is an optic-mechanical output device. 5) Software programs require to press one or more buttons, sometimes keeping them depressed or double-click. 6) Scanner is used for optical inputting of images and texts and converting them into the computer form. 7) Digital cameras enable to get low quality photos.

#### *2. Choose the right answer:*

1) The keyboard enables inputting ... .

a) numerical and text data;

b) the instructions for processing the data;

c) numerical data.

2) The mouse is an ... input device.

- a) optic;
  - b) optic-mechanical;
  - c) mechanical.
- 3) The mouse's ... functions are to help the user draw, point and select images on his computer display by moving the mouse across the screen.
- a) main;
  - b) secondary;
  - c) auxiliary.
- 4) In portable computers touch panels or touch pads are used instead of ... .
- a) keyboard;
  - b) mouse;
  - c) manipulators.
- 5) ... find application in drawing and inputting manuscript texts.
- a) scanner;
  - b) plotters;
  - c) digital video cameras.

**3. Complete the sentences:**

1) There are several devices used for inputting information into the computer: ... . 2) The keyboard enables ... . 3) The mouse is ... . 4) In portable computers touch panels or touch pads are used ... . 5) Scanner is used for ... . 6) Digital cameras give possibility to get ... . 7) Sound cards are able to ... .

**4. Answer the questions:**

1) What devices are used for inputting information into the computer? 2) What was the most common device in early personal computers? 3) What is the function of a keyboard? 4) Why do many users prefer manipulators to keyboard? 5) How does the mouse operate? 6) What is its function? 7) What role does the ball on the bottom of the mouse play? 8) What is used in portable computers instead of manipulators? 9) What is the touch pad's principle of operation? 10) Where do graphical plotting tables find application?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- keyboard
- graphical plotting tables
- sound cards

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

To input information, TV tuners, scanners, graphical interface, text representation on the display, software, an optic-mechanical input device, to

coordinate input devices, manipulators, a mouse, a flat surface, to rotate ball glides, a track ball, touch panels, graphical plotting tables, digital cameras, buttons, the cursor control, to simplify user's orientation on the display, to point and select images, on his computer display by moving the mouse across the screen, keeping buttons depressed, double-click, to erase images, easily, to glide easily, a portable computer, a manuscript text, by means of.

**2. Give English equivalents of the following.**

Введення інформації; координатні пристрої вводу; маніпулятори; миша; трекбол; сенсорна панель; графічні планшети; цифрові камери; сканери; ТВ тюнери; стандартна клавіатура; числова і текстова інформація; світлові індикатори; клавіші; режим роботи; презентація тексту на моніторі; графічний інтерфейс; програмні засоби; оптико-механічний пристрій вводу; керувати рухом курсору; спрощувати орієнтацію користувача на екрані; вказувати і вибирати зображення; утримувати кнопки натиснутими; подвійне натискання; стирати об'єкти; рівна поверхня; обертати ролики; слідкувати за вертикальним рухом; легко ковзати; портативний комп'ютер; рукописний текст; за посередництвом.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
key	a path
to enable	removable
to press	primary
to erase	to sanction
a roller	to delete
a track	to propel
portable	a cylinder

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*sound cards / inputting / software programs / keyboard / the mouse / to simplify / drawing*

1) There are several devices used for ... information into the computer. 2) A standard ... has 104 keys and three more ones informing about the operating mode of light indicators in the upper right corner. 3) ... has three or two buttons which control the cursor movement across the screen. 4) The mouse provides the cursor control thus ... user's orientation on the display. 5) In general ... require to press one or more buttons. 6) Plotters find application in ... and inputting manuscript texts. 7) ... produce sound conversion from analog to digital form.

**5. Translate sentences into English using words and word combinations**

### *from the Vocabulary Notes.*

1) Клавіатура, сенсорна панель, цифрові камери, сканери, телетюнери і т. п. – це все пристрої для введення інформації. 2) На перших етапах розвитку комп'ютера найосновнішим пристроєм вводу була клавіатура. 3) Стандартна клавіатура має 104 знаки. 4) Мишка допомагає контролювати рух курсору по екрані і спрощує орієнтацію користувача на дисплеї. 5) Основною функцією мишки є допомогти користувачеві малювати, вибирати та вказувати на образи на дисплеї комп'ютера. 6) Сканер – це оптичний пристрій вводу, який перетворює образи чи тексти згідно комп'ютерної форми. 7) Звукові карти мають здатність синтезувати звуки.

### ***The Grammar in Use*** **Modals**

#### ***1. Translate the following sentences paying attention to the Modal Verbs and their equivalents.***

1) The designer can always improve the operation of these receivers. 2) He could use any transmitter for this system. 3) The scientists are able to construct a new device by using semiconductors. 4) We have to increase the current strength by decreasing the resistance of the current. 5) After finishing the experiment scientists will have to discuss the results. 6) The students didn't have to analyze these data. 7) We may say that photoelectric properties of transistor are largely used in TV sets. 8) In order to see certain stars we must use a telescope.

#### ***2. Put the modal verbs into the:***

##### ***a) Past Indefinite Tense***

##### ***b) Future Indefinite Tense***

1) Computers *can* replace people in dull routine work. 2) The program is the set of instructions that *may* also include data to be processed. 3) Computer-controlled robots *must* increase the productivity of industry. 4) They *can* help in making different decisions. 5) The pupils *may* work with computers at the lessons. 6) Electric pulses *can* move at the speed of light. 7) Storage devices *must* have capacities for the input, output data and programs and for intermediate results. 8) Business minicomputers *can* perform to 100 million operations per second. 9) In order to solve scientific problems researchers *must* deal with the language of science – mathematics. 10) Programmers *must* write application programs in a way that computers *can* understand.

#### ***3. Find sentences with modal verbs in the text***

### **Additional Text** **(for individual work)**

*Read and translate the text.*

### **"Seeking" for Tracks**

Before data blocks can be read or written, the read/write head mechanism must be moved to the correct track. The read/write head contains the coil that detects or induces magnetism. It is moved by a stepping motor that can align it accurately over a specific track. Movements of the read/write heads are, in computer terms, relatively slow – it can take a hundredth of a second to adjust the position of the read/write heads. (The operation of moving the heads to the required track is called "seeking"; details of disk performance commonly include information on "average seek times".) Once the head is aligned above the required track, it is still necessary for the spinning disk to bring the required block under the read/write head (the disk controller reads its control information from the blocks as they pass under the head and so "knows" when the required block is arriving). When the block arrives under the read/write head, the recorded 0/1 bit values can be read and copied to wherever else they are needed.

The read circuitry in the disk reassembles the bits into bytes. These then get transferred over the bus to main memory (or, sometimes, into a CPU register). Disks may have their own private cache memories. Again, these are "hidden" stores where commonly accessed data can be kept for faster access. A disk may have cache storage sufficient to hold the contents of a few disk blocks (i.e. several thousand bytes). As well as being sent across the bus to memory, all the bytes of a block being read can be stored in the local disk cache. If a program asks the disk to read a block of data that is in the cache, the disk unit doesn't need to seek for the data. The required bytes can be read from the cache and sent to main memory. Commonly, hard disks have several disk platters mounted on a single central spindle. There are read/write heads for each disk platter. Data can be recorded on both sides of the disk platters (though often the topmost and bottommost surfaces are unused). The read/write heads are all mounted on the same stepping motor mechanism and move together between the disk platters.

- 1. Divide the text into the logical parts and give a title to each one.*
- 2. Put questions to the text.*
- 3. Discuss it with your groupmates.*

## Unit 5

**Text Study: Output Devices. Printers.**

**Additional Text: Disks and Tapes.**

**Grammar: Revision of the Module.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Permanent, human-readable, to identify, a ribbon, requirements, quality, an observer, variety, to create.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

A printer, a component, a design, electromechanical, a mechanism, typically, magnetic, a line, cylindrical, a minute, electrophotographic.

##### *3. Pay attention to some grammatical points:*

1) Printers **that** use electromechanical mechanisms **that** cause hammers to strike against a ribbon and the paper **are called** impact printers. 2) Character printers **are** the type **used** with literally all microcomputers **as well as** on computers of all sizes whenever the printing requirements are not large. 3) Character printers **may be** of several types. 4) It **sprays** small drops of ink onto paper to form printed characters. 5) Line printers **have been designed** to use many different types of printing mechanisms. 6) A variety of techniques **are used** in the design of page printers. 7) These techniques, **called electrophotographic techniques, have developed** from the paper copier technology.

#### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What types of printers are there??*
- *What are line printers?*

#### **Output Devices. Printer**

Printers provide information in a permanent, human-readable form. They are the most commonly used output devices and are components of almost all computer systems. Printers vary greatly in performance and design. We will classify printers as character printers, line printers and page printers in order to identify three different approaches to printing, each with a different speed range. In addition, printers can be described as either impact or nonimpact. Printers that use electromechanical mechanisms that cause hammers to strike against a ribbon and the paper are called impact printers. Nonimpact printers do not hit or impact a ribbon to print.

Character printers print only one character at a time. A typewriter is an example of a character printer. Character printers are the type used with literally all microcomputers as well as on computers of all sizes whenever the printing requirements are not large. Character printers may be of several types. A letter-quality printer is a character printer which produces output of typewriter quality. Letter-quality printers typically have speeds ranging from 10 to 50 characters per second. Dot-matrix printers form each character as a pattern of dots. These printers have a lower quality of type but are generally faster printers than the letter-quality printers — in the range of 50 to 200 characters per second. One of the newest types of character printer is the ink-jet printer. It sprays small drops of ink onto paper to form printed characters. The ink has high iron content, which is affected by magnetic fields of the printer. These magnetic fields cause the ink to take the shape of a character as the ink approaches the paper.

Line printers are electromechanical machines used for high-volume paper output on most computer systems. Their printing speeds are such that to an observer they appear to be printing a line at a time. They are impact printers. The speeds of line printers vary from 100 to 2500 lines per minute. Line printers have been designed to use many different types of printing mechanisms. Two of the most common print mechanisms are the drum and the chain. Drum printers use a solid, cylindrical drum, rotating at a rapid speed. Speeds of drum printers vary from 200 to over 2000 lines per minute. Chain printers have their character set on a rapidly rotating chain called a print chain. Speeds of chain printers range from 400 to 2400 lines per minute.

Page printers are high-speed nonimpact printers. Their printing rates are so high that output appears to emerge from the printer a page at a time. A variety of techniques are used in the design of page printers. These techniques, called electrophotographic techniques, have developed from the paper copier technology. Laser-beam printers use a combination of laser beam and electrophotographic techniques to create printer output at a rate equal to 18000 lines per minute.

#### *Vocabulary Notes*

**human-readable form** – зручна для читання форма

**performance** [pɜː'fɒmɑːns] – (робоча) характеристика; продуктивність; швидкість роботи; пропускна здатність

**a character printer** – пристрій друку символами

**a line printer** – пристрій друку рядками

**a page printer** – пристрій друку сторінками

**(non) impact printer** – (без)контактний принтер

**letter-quality** ['kwɒlɪtɪ] **printer** – принтер с топографічною якістю друку

**dot-matrix printer** – крапково-матричний принтер

**an ink-jet printer** – струйний принтер

**a laser-beam printer** – лазерний принтер

**an approach** [ə'prɒtʃ] – підхід; метод; принцип; наближення

**at a time** – за один раз; одночасно

**to cause** – викликати; змушувати; примушувати

**a typewriter** – пристрій для друкування

**to spray drops of ink** – розпилювати краплі чорнила

**to affect** – впливати; впливати; виявлятися

**a technique** [tek'nɪk] – метод; спосіб; техніка; методика; технологія

**printer output** – вивід для друку; дані, що роздруковуються

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) Printers provide information in a permanent, human-readable form.  
2) Printers are commonly used input devices. 3) We classify printers as character printers and line printers. 4) A typewriter is an example of a line printer. 5) One of the newest types of character printer is the ink-jet printer that sprays small drops of ink onto paper to form printed characters. 6) Line printers are electromechanical machines used for high-volume paper output on most computer systems. 7) Page printers are low-speed nonimpact printers because their printing rates are low.

#### *2. Choose the right answer:*

1) Printers are the most commonly used ... devices

a) input;

b) output;

c) storage.

2) Printers that use electromechanical mechanisms that cause hammers to strike against a ribbon and the paper are called ... .

a) impact printers;

b) nonimpact printers;

c) low-speed printers.

3) Character printers print only ... at a time.

a) three characters;

b) two characters;

c) one character.

4) Line printers are electromechanical machines used for ... output on most computer systems.

a) high-volume paper;

- b) low-volume paper;
  - c) mid-volume paper.
- 5) Page printers are high-speed ... printers.
- a) nonimpact;
  - b) impact;
  - c) line.

**3. Complete the sentences:**

- 1) There are several kinds of printers ... . 2) Printers vary greatly in ... .  
 3) The characteristic features of character printers are ... . 4) Character printers may be of several types: ... . 5) Line printers are ... . 6) Two of the most common print mechanisms are ... . 7) Drum printers use ... . 8) Speeds of drum printers vary from ... to over ... lines per minute. 9) Speeds of chain printers range from ... to ... lines per minute. 10) Page printers are ... .

**4. Answer the questions:**

- 1) What are the three types of printers? 2) What is a letter-quality printer? 3) What is a dot-matrix printer? 4) What type of printer is the most common with microcomputer systems? 5) What is the most common printer type used on large computer systems? 6) What is an impact printer? Give an example. 7) What is a nonimpact printer? Give examples. 8) What are the most widely used printers? 9) How do you distinguish between a letter-quality printer and a dot-matrix printer? 10) Which of these printers is slower? 11) What types of character printers do you know? 12) How are printed characters formed by means of an ink-jet printer? 13) What are the main types of a line printer? Which of them is faster? 14) What techniques are used in the operation of page printers?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- line printers
- character printer
- impact printers

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

To vary greatly in performance and design, high iron content, commonly used output devices, human-readable form, speed range, to print only one character, different approaches to printing, impact or nonimpact printers, almost all computers, printing requirements, as well as, ink-jet printer, typewriter quality, to spray small drops of ink, to take the shape of a character, magnetic fields, appear to be printing a line, a drum printer, a chain printer, lazer printer.

## 2. Give English equivalents of the following.

Зручна для людського сприйняття форма; найуживаніші засоби виводу інформації; відрізнятись робочими характеристиками і зовнішнім виглядом; різні методи друку; діапазон швидкості; контактні та безконтактні принтери; друкувати по одному символу; майже всі комп'ютери; а також; вимоги друку; принтер с топографічною якістю друку; струйні принтери; розпилювати краплі чорнила; високий вміст заліза; магнітні поля; набирати форму символу; здається, що друкують по рядочку; барабанний принтер; ланцюгові принтери; лазерний принтер.

## 3. Match the words in A with their synonyms in B:

A	B
human	execution
performance	person
an approach	a method
to cause	a way
to spray	to make
to affect	to sprinkle
technique	to influence

## 4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.

*a letter-quality / a typewriter / performance and design / to identify / human-readable / line / nonim pact*

1) Printers are machines that provide information in a permanent, ... form. 2) Printers vary greatly in ... . 3) We classify printers as character printers, line printers and page printers in order ... three different approaches to printing. 4) ... is an example of a character printer. 5) ... printer is a character printer which produces output of typewriter quality. 6) ... printers have been designed to use many different types of printing mechanisms. 7) Page printers are high-speed ... printers.

## 5. Translate sentences into English using words and word combinations from the Vocabulary Notes.

1) Принтери видають інформацію у доступній для людей, читабельній формі. 2) Принтери не всі однакові, так як відрізняються продуктивністю та будовою. 3) Такі принтери, що друкують лише один символ за одиницю часу називаються пристроями друку символами. Звичайно такими машинами великі об'єми інформації надрукувати важко. 4) Лінійні принтери були названі таким чином, бо їхня здається, що вони видрукують кожен рядок окремо. 5) Барабанний та ланцюгові принтери – найпоширеніші друкарські механізми. 6) Пристрій друку

сторінками – це високошвидкісні, контактні принтери, які характеризуються високою швидкістю друку.

***The Grammar in Use***  
**Revision of the Module IV**

**1. Fill in the gaps in the following sentences using the appropriate form of the verb in brackets.**

1) The part of the processor which controls data transfers between the various input and output devices ..... (call) the control unit. 2) The address bus ..... (use) to send address details between the memory and the address register. 3) An operating system ..... (store) on disk. 4) Instructions written in a high-level language ..... (transform) into machine code. 5) When a document arrives in the mail room, the envelope ..... (open) by a machine. 6) Instructions and data ..... (store) in main memory of the computer. 7) Arithmetic operations like addition and multiplication (carry out) by electronic circuits. 8) The part of the processor which controls data transfers between the various input and output devices ..... (call) the control unit. 9) The address bus ..... (use) to send address details between the memory and the address register. 10) An operating system ..... (store) on disk. 11) Instructions written in a high-level language ..... (transform) into machine code. 12) When a document arrives in the mail room, the envelope ..... (open) by a machine.

**2. Choose the right form of the verb from the brackets. Mind the rule of the sequence of tenses.**

1) We knew that many people today ... an opportunity to use computers. (to have) 2) He said that there ... no doubt that computers can solve problems very quickly. (to be) 3) Everybody knows that instructions ... the operation of a computer. (to direct) 4) We understood that computers already ... with them both economic and social changes. (to bring) 5) The teacher stressed that computing ... not only arithmetics, but also computer literacy. (to embrace) 6) It is well known that computers ... laboratory tests. (to prepare) 7) We knew that those persons ... computer literate and ... of buying a new computer. (to be, to be thinking) 8) they stressed that it ... years to produce a high-speed computer performing a lot of functions. (to take)

**3. Make the following interrogative and negative. Translate the following sentences.**

1) As with any computer, errors can occur and the information may be misused. 2) If you are doing work that cannot be replaced or requires a high level of security, you should take steps to ensure that your programs are protected from other using, modifying or even deleting them. 3) The matrix printer can also be used to do simple drawings. 4) You may want your own files kept separate from co-workers. 5) In an office, you can separate files by

putting them in a different filing cabinets: in effect creating different directories of information. 6) Any one directory can contain any reasonable number of files, and it may also contain other directories (referred to as subdirectories). 7) You should judge each service according to whether it is better or worse overall than the service you are currently using. 8) A typical hard disk is able to store much more data than a floppy disk. 9) The hardware you purchase is able to use (or run) one or more different operating systems. 10) You can purchase a computer package, which includes the hardware, the operating system, and possibly one or more applications.

**Additional Text**  
**(for individual work)**

*Read and translate the text.*

**Disks and Tapes**

There are two important groups of input/output (i/o) devices. There are devices that provide data storage, like disks and tapes, and there are devices that connect the computer system to the external world (keyboards, printers, displays, sensors).

Most personal computers have two or three different types of disk storage unit. There will be some form of permanently attached disk (the main "hard disk"), some form of exchangeable disk storage (a "floppy disk" or possibly some kind of cartridge-style hard disk), and there may be a CD-ROM drive for read-only CD disks.

*Optical disks.* CD disks encode 0 and 1 data bits as spots with different reflectivity. The data can be read by a laser beam that is either reflected or not reflected according to the setting of each bit of data; the reflected light gets converted into a voltage pulse and hence the recorded 0/1 data values gets back into the form needed in the computer circuits. Currently, optical storage is essentially read-only – once data have been recorded they can't be changed.

*Magnetic disks.* Most disks use magnetic recording. The disks themselves may be made of thin plastic sheets (floppy disks), or ceramics or steel (hard disks). Their surfaces are covered in a thin layer of magnetic oxide. Spots of this magnetic oxide can be magnetically polarized. If a suitably designed wire coil is moved across the surface, the polarized spots induce different currents in the coil – allowing data to be read back from the disk. New data can be written by moving a coil across the surface with a sufficiently strong current flowing to induce a new magnetic spot with a required polarity. There is no limit on the number of times that data can be rewritten on magnetic disks. The bits are recorded in "*tracks*" – these form concentric rings on the surface of the disk. Disks have hundreds of these tracks. Tracks are too large a unit of storage – they can hold tens of thousands of bits. Storage on a track is

normally broken down into "*blocks*" or *sectors*. Nowadays, the operating system program that controls most of the operations of a computer will mandate a particular block size. This is typically in the range 512 bytes to 4096 bytes (sometimes more). The *disk controller* may identify blocks by block number and track number.

*Files.* Data files on disk are made up out of blocks. The operating system is responsible for choosing the blocks used for each file, and for recording details for future reference. The data in the blocks form a table of entries with each entry specifying a file name, file size (in bytes actually used and complete blocks allocated), and some record of which blocks are allocated. The allocation scheme uses a group of contiguous blocks to make up each individual file. This makes it easy to record details of allocated blocks, the directory need only record the file size and the first block number.

*File directory.* In addition to the table of entries describing allocated files, the directory structure would contain a record of which blocks were allocated and which were free and therefore available for use if another file had to be created. One simple scheme uses a map with one bit for each block; the bit is set if the block is allocated.

*Tapes.* Tapes are now of minor importance as storage devices for users' files. Mostly they are used for "archival" storage – recording data that are no longer of active interest but may be required again later. All the processes using tapes, like skipping to file marks, sequential reads etc, are slow.

1. ***Divide the text into the logical parts and give a title to each one.***
2. ***Put questions to the text.***
3. ***Discuss it with your groupmates.***

## **Progress Check**

***Choose the right answer:***

- 1) A computer contains several major subsystems such as:  
a) the CPU and peripheral device controllers; b) the Central Processing Unit, memory and peripheral device controllers; c) the Central Processing Unit and memory; d) the CPU, memory and the ALU; e) the CPU, peripheral device controllers and the ALU.
- 2) All the components of computer work together by transferring data over ...  
a) the CPU; b) the bus; c) the memory; d) the ALU; e) memory.
- 3) ... fetches instructions and data from the main memory as needed.  
a) the CPU; b) the peripheral controllers; c) the subsystems; d) the ALU; e) ROM.
- 4) Peripheral device controllers look after input devices ... .

- a) like printers and graphics displays; b) like keyboards and mice; c) like disks; d) like scanners and displays; e) like letters.
- 5) ... circuits are the heart of the system.  
a) the timing; b) the control; c) the timing and control; d) memory; e) processing.
- 6) The arithmetic logic unit contains the circuits that ... .  
a) manipulate data; b) hide data; c) show data; d) process data; e) need data.
- 7) While most data are kept in memory, CPUs hold a ... amount of data in "registers" (data stores) in the CPU itself.  
a) huge; b) great; c) small; d) a little; e) some.
- 8) Data values have to be fetched from memory and stored temporarily in ... .  
a) CPU registers; b) the ALU; c) controllers; d) memory; e) files.
- 9) Primary and secondary storage units contain ... .  
a) data and the instructions for processing the data; b) the instructions for processing the data; c) only data; d) many instructions; e) a lot of information.
- 10) ROM memory is generally used ... parts of the code of the computer's operating system.  
a) to drop; b) to hold; c) to show; d) to take; e) to see.
- 11) ... are too small a unit of storage.  
a) bits; b) bytes; c) megabyte; d) gigabytes; e) gigabits.
- 12) One basic circuit is ... .  
a) complex; b) integrated; c) a "flip-flop"; d) complicated; e) huge.
- 13) The keyboard enables inputting ... .  
a) numerical and text data; b) characters; c) numerical data; d) letters; e) the instructions for processing the data.
- 14) The mouse is an ... input device.  
a) optic; b) optic-mechanical; c) electronic; d) small; e) mechanical.
- 15) The mouse's ... functions are to help the user draw, point and select images on his computer display by moving the mouse across the screen.  
a) main; b) secondary; c) partial; d) additional; e) auxiliary.
- 16) In portable computers touch panels or touch pads are used instead of ... .  
a) keys; b) a mouse; c) a display; d) a keyboard; e) manipulators.
- 17) Printers are the most commonly used ... devices  
a) input; b) processing; c) storage; d) controlling; e) output.
- 18) Character printers print only ... at a time.  
a) three characters; b) two characters; c) five characters; d) six characters; e) one character.
- 19) Line printers are electromechanical machines used for ... output on most computer systems.

- a) all kinds of paper; b) low-volume paper; c) mid-volume paper; d) grey paper; e) high-volume paper.  
20) Page printers are high-speed ... printers.  
a) nonimpact; b) impact; c) line; d) character; e) matrix.

## Module V

### Computer Software

#### Unit 1

**Text Study: Computer Programming.**

**Additional Text: Character Data.**

**Grammar: The Infinitive.**

#### Text Study

##### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

The essence, equations, errors, flowcharting, pictorial, representation, predefined, guide, a template, pseudocode, the burden, emphasizes, a sequence, decision.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Programming, the process, instructions, specific, algorithms, mathematical, terms, formulae, problem, a phase, a document, a plan, symbols, to illustrate, an operation, basic, structures.

##### *3. Pay attention to some grammatical points:*

1) Programming is the process of preparing a set of coded instructions **which enables** the computer **to solve** specific problems or **to perform** specific functions. 2) Any problem **must be** specially **processed** for the computer to understand it, that is - coded or programmed. 3) The phase **in which** the system's computer programs are written **is called** the development phase. 4) The instructions of the program **must be** complete and in the appropriate sequence. 5) **To guard** against these errors in logic and to document the program's logical approach, logic plans **should be** developed. 6) Pseudocode is **less time-consuming** for the professional programmer **than** is flowcharting. 7) It also **emphasizes** a top-down approach to program structure.

##### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What is programming?*
- *What are two common techniques for planning the logic of a program?*

## Computer Programming

Programming is the process of preparing a set of coded instructions which enables the computer to solve specific problems or to perform specific functions. The essence of computer programming is the encoding of the program for the computer by means of algorithms. The thing is that any problem is expressed in mathematical terms; it contains formulae, equations and calculations. But the computer cannot manipulate formulae, equations and calculations. Any problem must be specially processed for the computer to understand it, that is - coded or programmed.

The phase in which the system's computer programs are written is called the development phase. The programs are lists of instructions that will be followed by the control unit of the central processing unit (CPU). The instructions of the program must be complete and in the appropriate sequence, or else the wrong answers will result. To guard against these errors in logic and to document the program's logical approach, logic plans should be developed.

There are two common techniques for planning the logic of a program. The first technique is flowcharting. A flowchart is a plan in the form of a graphic or pictorial representation that uses predefined symbols to illustrate the program logic. It is, therefore, a "picture" of the logical steps to be performed by the computer. Each of the predefined symbol shapes stands for a general operation. The symbol shape communicates the nature of the general operation, and the specifics are written within the symbol. A plastic or metal guide called a template is used to make drawing the symbols easier.

The second technique for planning program logic is called pseudocode. Pseudocode is an imitation of actual program instructions. It allows a program-like structure without the burden of programming rules to follow. Pseudocode is less time-consuming for the professional programmer than is flowcharting. It also emphasizes a top-down approach to program structure.

Pseudocode has three basic structures: sequence, decision, and looping logic. With these three structures, any required logic can be expressed.

### *Vocabulary Notes*

**the essence** – суть, існування

**a formulae** [ ' fLmjulq ] – формула, формулювання

**equation** [ I ' kweIS (q) n ] – вирівнювання, рівність

**a calculation** – обчислення

**to guard** [ gRd ] – запобігати, охороняти, захищати, контролювати

**an error** – помилка

**flowcharting** [ ' flqVtSRtIN ] – складання блок-схем

**predefined symbols** – символи визначені наперед

**a template** ['tɛmpleɪt] – шаблон, трафарет, маска

**a pseudocode** ['sɪjhdɔv'kɔud] – псевдокод, символічний код

**a burden** ['bʊdn] – ноша, груз, тяжкість

**to emphasize** ['ɛmfɪsaɪz] – надавати особливого значення, акцентувати

**to perform** – виконувати

**to encode** [ɪn'kɔvd] – шифрувати, кодувати

**looping logic** – логічне введення циклів в програму

**a top-down approach** – низхідний (зверху вниз) напрямок

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) The essence of computer programming is the encoding of the program for the computer by means of instructions. 2) Any problem must be specially processed for the computer to understand it, that is - coded or programmed. 3) The programs are lists of words that will be followed by the control unit of the central processing unit. 4) There are several techniques for planning the logic of a program. 5) The first technique is flowcharting which is a plan in the form of a graphic or pictorial representation. 6) The second technique for planning program logic is called pseudocode which is an imitation of actual program instructions. 7) Pseudocode has two basic structures: sequence and looping logic.

#### *2. Choose the right answer:*

1) Programming is the process of preparing ... which enables the computer to solve specific problems or to perform specific functions.

- a) a set of algorithms;
- b) a set of coded letters;
- c) a set of coded instructions.

2) The phase in which the system's computer programs are written is called the ... .

- a) development phase;
- b) development action;
- c) development system.

3) The instructions of the program must be ... and in the appropriate sequence.

- a) understandable;
- b) complete;
- c) interesting;.

4) There are two common techniques for planning the logic of a program: ... .

- a) flowcharting and pseudocode;
- b) pseudocode and representation;
- c) flowcharting and programming..

5) Pseudocode has three basic structures: ... .

- a) sequence, decision and logic;
- b) sequence, decision and symbol;
- c) sequence, decision, and looping logic.

**3. Complete the sentences:**

1) Programming is ... . 2) The development phase is ... . 3) The programs are ... . 4) There are two common techniques for planning the logic of a program: ... 5) Pseudocode is ... . 6) Pseudocode has three basic structures: ... . 7) A flowchart is ... .

**4. Answer the questions:**

1) What is computer programming and its essence? 2) What is any problem expressed in? 3) What does it contain? 4) What is the development phase? What are the programs? 5) What are the techniques for planning the logic of a program? 6) What is a flowchart? 7) What is a pseudocode? 8) How many structures does pseudocode have?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- the essence of computer programming
- two common techniques for planning the logic of a program peripheral
- three basic structures of a pseudocode

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

A set of coded instructions, to solve specific problems, to perform specific functions, the encoding of the program for the computer, by means of algorithms, mathematical terms, to manipulate formulae, equations and calculations, the development phase, the appropriate sequence, the program's logical approach, two common techniques, a graphic or pictorial representation, to illustrate the program logic, less time-consuming, professional programmer, three basic structures.

**2. Give English equivalents of the following.**

Виконувати специфічні функції, три основних структури, за допомогою алгоритмів, порівняння та обчислення, набір закодованих команд, кодування програми для комп'ютера, професійний програміст, вирішувати специфічні проблеми, математичні терміни, маніпулювати формулами, належна послідовність, фаза розробки, логічний напрямок програми, ілюструвати логіку програми, графічне та ілюстративне представлення, два звичайних методи, менш затратна у часі.

**3. Match the words in A with their synonyms in B:**

**A**

**B**

essence	a way
formulae	to defend
to guard	slogan
burden	entity
to emphasize	load
an approach	to stress
to perform	to execute

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*A flowchart / sequence / program / formulae / to perform / equations / a template / a pseudocode / decision / looping logic*

1) Programming is the process of preparing a set of coded instructions to solve specific problems or ... specific functions. 2) Any problem is expressed in mathematical terms as it contains ... , ... and calculations. 3) ... are lists of instructions that will be followed by the control unit of the CPU. 4) ... is a plan in the form of a graphic or pictorial representation that uses predefined symbols to illustrate the program logic. 5) A plastic or metal guide called ... is used to make drawing the symbols easier. 6) ... is the second technique for planning program logic. 7) Pseudocode has three basic structures: ... , ... and ... .

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Закодовані інструкції дозволяють комп'ютеру розв'язувати різні завдання та виконувати специфічні функції. 2) Програма для комп'ютера шифрується у вигляді алгоритмів, щоб машина могла розуміти і виконувати різні дії. 3) Інструкції до програми повинні бути повними і розміщуватись в належній послідовності, щоб запобігти неправильному результату. 4) Для планування логіки програми є два загальноприйнятих методи: перший – складання блок-схем, а другий – символічний код. 5) Другий метод програмування – менш загайний у часі і в ньому акцентується увага на низхідному підході до структури програми.

***The Grammar in Use***

**The Infinitive**

**1. Translate the sentences and word-combinations, using Infinitive in the function of :**

**A. adverbial modifier**

1. Computers were designed to perform thousands of computations per second. 2. To make computers more reliable transistors were used. 3. They were applied to reduce computational time. 4. To integrate large numbers of circuit elements into a small chip, transistors should be reduced in size. 5. To

use integrated circuit technology new computers were built. 6. Analytical engine was invented to store data.

### ***B. attribute***

The problem to be solved; the work to be finished; the cards to be punched; calculations to be performed; the machine to be shown at the exhibition; the device to be provided with the necessary facts; computers to be used for data processing; efforts to increase reliability; electronics to connect systems and subsystems; the speed of response to depend on the size of transistor; computers to perform thousands of calculations per second; vacuum tubes to control and amplify electric signals; these are circuits to use a large number of transistors; operations to be performed.

### ***2. Analyze the forms of Infinitive and translate following sentences:***

1. A printer is an example of a device to produce output in a human-readable format.

2. The high-speed devices to be used as secondary storage are both input and output devices.

3. The progress of electronics to have resulted in the invention of electronic computers was a breakthrough of the second part of the 20th century.

4. Mendeleev's periodic law to have been accepted as a universal law of nature is of great importance nowadays.

5. When output is available, output interfaces must be designed to reverse the process and to adopt the output to the external environment.

6. The memory stores the instructions and the data to be quickly retrieved on demand by the CPU.

7. Computers to have been designed originally for arithmetic purposes are applicable for great variety of tasks at present.

8. The film to have been running for over a month this year attracts attention of many spectators.

9. The CPU of a computer to be arranged in a single or very small number of integrated circuits is called a microprocessor.

### ***3. Analyse the sentences containing constructions "for + Infinitive" and "Objective with the Infinitive". Translate the sentences into Ukrainian.***

1. It was not difficult *for the pupils to understand* the function of the mouse in computer operation.

2. There is no reason *for computer experts to use* computers of the first generation nowadays.

3. The mechanism is provided with special devices *for the whole system to function* automatically.

4. The text was very interesting but rather difficult *for the students to translate* it without a dictionary.
5. It is not easy *for me to learn* to speak English fluently.
6. We know *the machine to react* to a series of electrical impulses that can be represented in binary numbers.
7. Scientists considered *silicon to be* one of the best materials for the creation of an IC.
8. We know *all data to be translated* into binary code before being stored in main storage.
9. Engineers expect *these new devices to be tested* very soon.
10. They want *their son to become a computer operator* and to design new computer models.

**4. Translate sentences with Nominative with the Infinitive construction:**

1. *Printers* are known *to vary* greatly in performance and design.
2. *They* are expected *to be* the most commonly used devices.
3. *Magnetic fields* are supposed *to effect* a high iron content of the ink.
4. The *ink-jet printer* is stated *to be* one of the newest types of character printers.
5. *Electrophotographic techniques* proved *to have developed* from the paper copier technology.
6. An *impact printer* is considered *to produce* a printed character by impacting a character font against the paper.
7. *Dot-matrix printers* seem *to have* a lower quality of type.
8. *The most common printer type* used on larger systems *is sure to be the line printer*.
9. *A lot of techniques* are believed *to be used* in the design of printers.
10. A *laser* is certain *to be an acronym* for light amplification by stimulated emission of radiation.
11. During the late 1970s and early 1980s, *new models and competitive operating systems* seemed *to appear* daily.

**Additional Text  
(for individual work)**

***Read and translate the text.***

**Character Data**

A set of 256 patterns is large enough to have a different pattern for each letter of the alphabet, the digits, punctuation characters, and a whole variety of special characters. If a program has to work with textual data, composed of lots of individual characters, then each character can be encoded in a single byte. Of course there have to be conventions that assign a specific pattern to each different character. At one time, different computer manufacturers

specified their own character encoding schemes. Now, most use a standard character encoding scheme known as ASCII (for American Standard Code for Information Interchange). Although standardized, the assignments of patterns to characters is essentially Arbitrary.

This ASCII scheme is mandated by an international standard. It specifies the bit patterns that should be used to encode 128 different characters including all the letters of the Roman alphabet, digits, punctuation marks and a few special control characters like "Tab". The remaining 128 possible patterns are not assigned in the standard. Some computer systems may have these patterns assigned to additional characters like <sup>TM</sup>, ±, . Bit patterns can also be used to represent numbers. Computers work with integer numbers and "floating point" numbers. Floating point numbers are used to approximate the real numbers of mathematics.

A single byte can only be used to encode 256 different values. Obviously, arithmetic calculations are going to work with wider ranges – like -2,000,000,000 to +2,000,000,000. Many more bits are needed to represent all those different possible values. All integer values are represent using several bytes. Commonly, CPUs are designed to work efficiently with both two-byte integers and four-byte integers (the CPU will have two slightly different versions of each of the arithmetic instructions). Two-byte integers are sufficient if a program is working with numbers in the range from about minus thirty thousand to plus thirty thousand; the four-byte integers cover the range from minus to plus two thousand million.

The number representations have an obvious regular pattern. Unlike the case of character data, the patterns used to represent integers can not be arbitrary. They have to follow regular patterns in order to make it practical to design electronic circuitry that can combine patterns and achieve effects equivalent to arithmetic operations. The code scheme that provides the rules for representing numbers is known as "two's complement notation"; this scheme is covered in introductory courses on computer hardware.

There are other coding schemes for integers but "two's complement notation" is the most commonly used. The actual coding scheme used to represent integers, and the resulting bit patterns, is not often of interest to programmers. While a computer requires special bit patterns representations of numbers, strings of 0 and 1 characters are not appropriate for either output or input. Humans require numbers as sequences of digit characters. Every time a number is input to a program, or is printed by a program, some code has to be executed to translate between the binary computer representation and the digit string representation used by humans.

The electronic circuits in the CPU can process the binary patterns and correctly reproduce the effects of arithmetic operations. There is just one catch with integers – in the computer they are limited to fixed ranges. Two-bytes are sufficient to represent numbers from -32767 to +32768 – and it is an error if a program generates a value outside this range. Mistakes are possible. Consider for example a program that is specified as only having to work with values in the range 0 to 25000; a programmer might reasonably choose to use twobyte integers to represent such values. However, a calculation like "work out 85% of 24760" could cause problems, even though the result (21046) is in range. If the calculation is done by multiplying 85 and 24760, the intermediate result 2104600 is out of range.

Arithmetic operations that involve unrepresentable (out of range) numbers can be detected by the hardware – i.e. the circuits in the ALU. Such operations leave incorrect bit patterns in the result, but provide a warning by setting an "overflow" bit in the CPU's flags register. Commonly, computer systems are organized so that setting of the overflow bit will result in the operating system stopping the program with the error. The operating system will provide some error message. (The most common cause of "overflow" is division by zero – usually the result of a careless programming error or, sometimes, due to incorrect data entry.)

- 1. Divide the text into the logical parts and give a title to each one.*
- 2. Put questions to the text.*
- 3. Discuss it with your groupmates.*

## Unit 2

**Text Study: Programs and Instructions.**

**Additional Text: Languages and Extensions.**

**Grammar: The Participle.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Sequence, to specify, execution, repertoire, to identify, to require, implicit, explicit, current, content.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Location, instruction, arithmetic, logic, special, architectures, operation, code, control, component, actual, a result, a sum, data, a machine.

##### *3. Pay attention to some grammatical points:*

1) Ultimately, a program **has to be represented** as a sequence of instructions in memory. 2) Normally, instructions **are executed** in sequence

and the machine **is initialized** with the program counter holding the memory location of the first instruction from the program and then the fetch-decode-execute cycle **is started**. 3) Each architecture **will have** its own special instructions that are not present on the other. 4) If a CPU **uses** a fixed size opcode, decoding **is simple**. 5) Many instructions require **that data be specified**. 6) So sometimes the "operand description" part of an add instruction **will need to identify** the two CPU data registers **that are to be used**. 7) **Replacing** the contents of the PC changes the next instruction executed.

## **II. Reading**

**Read the text and be ready to find in the text the answers to the following questions:**

- *What is a sequence of instructions in memory?*
- *What do different instruction sets depend on?*

### **Programs and Instructions**

Ultimately, a program has to be represented as a sequence of instructions in memory. Each instruction specifies either one data manipulation step or a control action. Normally, instructions are executed in sequence. The machine is initialized with the program counter holding the memory location of the first instruction from the program and then the fetch-decode-execute cycle is started. The CPU sends a fetch request to memory specifying the location specified by the PC (program counter); it receives back the instruction and stores this in the Instruction Register (IR). The PC is then updated so that it holds the address of the next instruction in sequence. The instruction in the IR is then decoded and executed. Sometimes, execution of the instruction will change the contents of the PC. This can happen when one gets a "branch" instruction (these instructions allow a program to do things like skip over processing steps that aren't required for particular data, or go back to the start of some code that must be repeated many times).

A CPU is characterized by its instruction repertoire – the set of instructions that can be interpreted by the circuits in the timing and control unit and executed using the arithmetic logic unit. (Instructions are usually given short "mnemonic" names – names that have been chosen to remind one of the effect achieved by the instruction, like ADD and CLear.).

Different CPU architectures have different instruction sets. There will be lots of instructions that are common – ADD, SUB, etc. But each architecture will have its own special instructions that are not present on the other. Even when both architectures have similar instructions, e.g. the compare and conditional branch instructions, there may be differences in how these work. An instruction is represented by a set of bits. A few CPUs have fixed size instructions; on such machines, every instruction is 16-bits, or 32-bits or

whatever. Most CPUs allow for different sizes of instructions. An instruction will be at least 16-bits in size, but may have an additional 16, 32, or more bits.

The first few bits of an instruction form the "Op-code" (operation code). These bits identify the data manipulation or control operation required. Again CPUs vary; some use a fixed size op-code, most have several different layouts for instructions with differing numbers of bits allocated for the op-code. If a CPU uses a fixed size op-code, decoding is simple. The timing and control component will implement a form of multiway switch. The meaning of the remaining bits of an instruction depends on the actual instruction. Many instructions require that data be specified. Thus, an ADD instruction needs to identify which two values are to be summed, and must also specify a place where the result should be stored. Often some of this information can be implicit. An ADD instruction can be arranged so that the sum of the two specified values always replaces the first value wherever this was stored.

Although some data locations can be implicit, it is necessary to define either the source or destination locations for the other data. Sometimes a program will need to add numbers that are already held in data registers in the CPU; at other times, the program may need to fetch additional data from memory. So sometimes the "operand description" part of an add instruction will need to identify the two CPU data registers that are to be used; other times, the "operand description" will have to identify one CPU register and one memory location. Occasionally, the "operand description" part might be used to identify a CPU register and the *value* that is to be added to that register's existing contents. It is here that things get a bit complex. CPUs have many different ways of encoding information about the registers to be used, the addresses of memory locations, and the use of explicit data values. A particular machine architecture will have a set of "addressing modes" – each mode specifies a different way of using the bits of the operand description to encode details concerning the location of data values. Different architectures have quite different sets of addressing modes. Some instructions don't need any data. For example, the "Bcc" (conditional branch) group instructions use only information recorded in the CPU's Flags register. These instructions have different ways of using the operand bits of instruction word. Often, as with the Bcc instructions, the operand bits encode an address of an instruction that is to be used to replace the current contents of the program counter. Replacing the contents of the PC changes the next instruction executed.

#### *Vocabulary Notes*

**ultimately** ['Altimitlɪ]– в кінцевому рахунку, в кінці кінців

**to execute** – виконувати, реалізувати

**in sequence** – послідовно

**to skip over** – перескакувати  
**to implement** – виконувати, забезпечувати інструментами, постачати  
**architecture** [ˈRkItɛktʃ (ə)] – побудова, структура організації  
**to initialize** [ɪˈnɪʃlaɪz] – повертати в початковий стан  
**a fetch** – виборка, виклик (команди чи даних з пам'яті)  
**to fetch** – достати, приносити  
**request** [rɪˈkwest] – прохання, вимога, запит, заявка  
**instruction repertoire** [ˈɪnstrʊkʃən rɪˈpɔːtɔɪr] – система (набір) команд  
**to remind** – нагадувати  
**to achieve** [əˈtʃiːv] – досягати, доводити до кінця, виконувати  
**to compare** – порівнювати  
**a layout** – розміщення, схема розміщення, формат  
**multiway switch** – багатопозиційний перемикач, багатоканальний перемикач  
**implicit** [ɪmˈplɪsɪt] – не явно виражений, скритий  
**destination** – призначення  
**contents** – зміст, суть, значення  
**explicit** [ɪksˈplɪsɪt] – явний, відкритий, прямий  
**to specify** – точно визначати, встановлювати, детально викладати інформацію  
**Instruction Register** – реєстр команд  
**bit** – мінімальна одиниця інформації, подвійний розряд

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) Each instruction specifies one data manipulation step. 2) Normally, instructions are executed in sequence. 3) The instruction repertoire is the set of instructions. 4) Different CPU architectures have the same instruction sets. 5) An instruction is represented by a set of bytes. 6) Although some data locations can be implicit, it is necessary to define either the source or destination locations for the other data. 7) CPUs have one way of encoding information about the registers to be used. 8) Some instructions don't need any data.

#### *2. Choose the right answer:*

1) The machine is initialized with the program counter holding the memory location of the ... instruction from the program.

- a) final;
- b) first;
- c) second.

2) Sometimes, execution of the instruction will ... the contents of the PC.

- a) define;

- b) influence;
- c) change.
- 3) Instructions are usually given short "mnemonic" names – names that have been chosen ... one of the effect achieved by the instruction.
  - a) to remind;
  - b) to forget;
  - c) to recognize.
- 4) Each architecture will have its own special ... that are not present on the other.
  - a) names;
  - b) instructions;
  - c) programs.
- 5) The timing and control component will implement a form of ... .
  - a) multiway switch;
  - b) multiway choice;
  - c) computer word.
- 6) Although some data locations can be ... , it is necessary to define either the source or destination locations for the other data.
  - a) unknown;
  - b) explicit;
  - c) implicit.

**3. Complete the sentences:**

- 1) A program is ... . 2) Instructions are executed (in what way?)... . 3) Program counter receives back the instruction and stores this in the ... . 4) A CPU is characterized by its ... . 5) The first few bits of an instruction form the ... . 5) The timing and control component will implement a form of ... . 6) Different architectures have quite different ... .

**4. Answer the questions:**

- 1) What is program? 2) How are instructions executed in sequence? 3) What is a CPU characterized? 4) What are common instructions? 5) Why will each architecture have its own special instructions that are not present on the other? 6) What is an instruction represented by? 7) What do the first few bits of an instruction form? 8) What will the timing and control component implement? 9) Can some of this information be implicit? 10) What do different architectures have?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- instruction repertoire
- instruction sets
- data locations

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

To be represented, a sequence of instructions, to specify one data manipulation step, control action, to be executed in sequence, the fetch-decode-execute cycle, to receive back the instruction, the Instruction Register, to change the contents, to skip over processing steps, particular data, to be repeated many times, the instruction repertoire, fixed size instructions, to identify the data manipulation, to control operation required, several different layouts, to implement a form of multiway switch, to require the data, to identify two values, information can be implicit, to define the source or destination locations, to fetch additional data from memory, encoding information, explicit data values, addressing modes, to replace the contents.

**2. Give English equivalents of the following.**

Послідовність команд, змінити зміст, виявити маніпулювання даними, вимагати даних, регістр команд, особливі дані, цикл «взяти-розкодувати-виконати», встановити крок маніпулювання інформацією, взяти додаткові дані з пам'яті, контрольна дія, бути представленим, виконуватись послідовно, система команд, одержати команду назад, змінити зміст, декілька різних розміщень, перескочити певні кроки обробки, повторюватись багато раз, команди фіксованого розміру, контролювати необхідну інформацію, набувати форми багато позиційного перемикача, інформація може бути неясною, визначити дві величини, визначити джерело і місце розміщення, розкодування інформації, чіткі величини даних, спосіб адресування.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
ultimately	to perform
to execute	outspoken
request	unspoken
to remind	to reach
to achieve	to remember
to compare	to correspond
implicit	to correspond
explicit	demand

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*a sequence / implicit / bits / to remind / to identify / to be executed / layouts / the arithmetic logic unit / the instruction repertoire / to require / to implement / addressing modes*

1) A program is ... of instructions in memory. 2) Instructions ... in sequence. 3) ... means the set of instructions that can be interpreted by the circuits in the timing and control unit and executed using ... . 4) Instructions are usually given short "mnemonic" names ... one of the effect achieved by the instruction. 5) An instruction is represented by a set of ... . 6) The first few bits ... the data manipulation or control operation required. 7) Most CPUs have several different ... for instructions with differing numbers of bits allocated for the op-code. 8) The timing and control component ... a form of multiway switch. 9) Many instructions ... that data be specified. 10) Some data locations can be ... . 11) Different architectures have quite different sets of ... .

***5. Translate sentences into English using words and word combinations from the Vocabulary Notes.***

1) Кожна команда програми точно визначає крок маніпулювання даними або контрольну дію. 2) Команди дозволяють програмі виконувати різні дії, наприклад перескакувати певний крок обробки, якщо він не вимагається цими даними. 3) Кожен центральний процесор характеризується своєю системою команд, які мають короткі назви, щоб нагадувати про своє призначення. 4) Різна побудова центрального процесора має різні набори команд та особливі команди, які характерні тільки йому. 5) Команди представлені системою бітів, мінімальних одиниць інформації. 6) Деякі центральні процесори мають фіксований розмір команд. Це означає, що кожна команда становить 16 бітів чи наприклад 32 біти і т.п. 7) Кілька перших бітів команди утворюють операційний код. 8) Деякі команди не потребують жодних даних.

***Grammar in Use***  
***The Participle***

***1. Translate the sentences containing Participle I and Participle II in the function of adverbial modifier:***

1. When entering the Internet, I always find a lot of interesting information.

2. Though never built Babbage's analytical engine was the basis for designing today's computers.

3. When written in a symbolic language programs require the translation into the machine language.

4. While operating on the basis of analogy analog computers simulate physical systems.

5. When used voltage represents other physical quantities in analog computers.

6. Being discrete events commercial transactions are in a natural form for a digital computer.

7. As contrasted with the analyst, the computer system architect designs computers for many different applications.

8. While dealing with discrete quantities digital computers count rather than measure.

9. When using a microcomputer you are constantly making choice — to open a file, to close a file, and so on.

10. As known all computer systems perform the functions of inputting, storing, processing, controlling, and outputting.

**2. Open the brackets using Perfect Participle Active or Perfect Participle Passive. Translate sentences into Ukrainian.**

1. (to finish) the research the scientists made the analysis of the data obtained.

2. The designer left the office (to look through) all the documents.

3. (to discuss) the functions of storage units we passed on to the consideration of control processing unit.

4. (to limit) the information capacity of a single bit to two alternatives the computer designers expressed data by a combination of bits.

5. (to translate) the program into machine language the computer architect put the program into the machine.

6. (to be coded) the instruction was transmitted to the central processing unit.

7. (to be transmitted) to the central processing unit the instruction made arithmetic-logical unit perform some computations.

8. (to be regulated) by the operator the equipment operated well.

9. Data (to be entered) correctly into the computer component of a data processing system, the need for further manipulation by humans is eliminated.

10. (to be well prepared) for the examination the pupils could answer all the questions the teacher asked them.

11. Electromechanical memories depend upon (to move) mechanical parts for their operation.

12. The time (to require) for the computer to locate and transfer data to and from a storage medium is called the access time.

13. (to be) not visible software makes possible the effective operation of computer system.

14. (to invent) magnetic tapes the Germans used them as the secondary storage medium.

15. When properly (to program) computers don't make computational errors.

16. (to be introduced) in the early 1960s magnetic disc storage has replaced magnetic tape storage.

17. The control unit ( to interpret) instructions is one of the important parts of any computer system.

18. Data ( to record) in the form of magnetized dots can be arranged to represent coded patterns of bits.

19. As (to contrast) with magnetic tapes magnetic discs can perform both sequential and random processing.

20. While (to have) no moving mechanical parts electronic memories can transfer data at very high speed.

### **3. Translate sentences with Absolute Participle Complex:**

1. *Data being accessed randomly*, semiconductor memories are called random access memory (RAM).

2. *The Information capacity of a Single bit being limited to two alternatives*, codes are based on combination of bits.

3. *Primary storage having similarity to a function of the human brain*, the storage is also called memory.

4. *An electron leaving the surface*, the metal becomes positively charged.

5. *Computer System architecture being organized around the primary storage unit*, all instructions must pass through it.

6. Computer System architecture is organized around the primary storage unit, *all instructions passing through it*.

7. Electromechanical memories depend upon moving mechanical parts, *their data access time being longer than is that of electronic memories*.

8. For this reason most Computer Systems use electronic memory for primary storage, *electromechanical memory being used for secondary storage*.

9. Large capacity tape de-vices are used with large data processing systems, *cassettes and cartridges being applied with small systems*.

10. The CPU controls the Operation of the entire System, *commands being issued to other parts of the System*.

### **Additional Text (for individual work)**

**Read and translate the text.**

### **Languages and Extensions**

Now we will examine the relationship between languages and extensions. Traditionally, the term *language* refers (in the computer world) to some form of computer language, a set of common instructions that when properly assembled, create a program or application. Most users are well aware of at least one computer language: BASIC, Pascal, FORTRAN, C, and

so on. Such languages are traditionally understood to be *real* languages because one can cab construct a program with them that can thereafter run generally without need of external support from an interpreter.

Today, the climate is different. For example, the popularity of *shell* languages, which are used primarily on the UNIX platform, has greatly increased. They are written in a syntax that meets the requirements of the shell or command interpreter of the given platform. These languages cannot create entirely standalone programs that execute without a command interpreter, yet these languages have become vastly popular. A programmer who can proficiently program in such a language is almost guaranteed to land a job somewhere.

As such, these languages stretch the definition of language itself. For even these programs cannot run without assistance from the underlying system, they are indeed full-fledged programs that can and often do run various services and functions of the Internet.

Similarly, there are interpreted languages such as Perl that offer extreme power to the user. They can often interface not just with their own interpreter, but with various shell languages and system calls. They can even be nested within other language constructs. A typical example would be a Perl script nested within a TCL script or within a C program. These are languages that cross the barriers (or perhaps bridge the gaps) between one or more real languages.

Hypertext Markup Language (HTML) is a language, but it should be interpreted by a hypertext reader (Navigator, Internet Explorer, Grail, Arena, Lynx, Opera, Powerbrowser, Netcruiser, and so forth). JavaScript and VBScript are languages that stand between Perl and HTML. But they perform only a limited set of tasks. In order to create a fully functional and dynamic Web-page environment, one must use a combination of languages. So we can call a *language* any set of instructions that can perform more than simple display processes, dynamically and without user intervention (that is, any set of instructions that could potentially automate a task).

In contrast, an *extension* is any set of instructions, declarations, or statements that formulate one application of a particular language. Most commonly, the term *extension* refers to HTML extensions. For example, tables in HTML are extensions. They are statements that alter the face of a Web page. The use of tables is becoming more common because tables provide control of the Web page's appearance. Perhaps the easiest way to grasp the concept of extensions is to understand that they are statements that *extend* the originally intended implementation of HTML.

***1. Divide the text into the logical parts and give a title to each one.***

2. *Put questions to the text.*
3. *Discuss it with your groupmates.*

## Unit 3

**Text Study: Running and Testing the Computer Program.**  
**Additional Text: Programming Languages and Functions.**  
**Grammar: The Gerund.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

A manufacturer, a schedule, utility, executive, assemblers, compilers, interpreters, a linkage, a librarian, errors, responsibility, thoroughly, to verify, debugging.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

A monitor, functions, the service, centers, functions, an object, a catalog, a code, a processor, logic, planning, a test, a programmer, calculation.

##### *3. Pay attention to some grammatical points:*

1) These programs are called control programs, language programs and utility programs. 2) Examples of service programs include linkage editors **to prepare** object programs for execution, a librarian **to catalog** programs into a library area on magnetic disc, utility programs **to transfer** data from device to device, and sortmerge programs for **sorting** data on magnetic tape or disk. 3) As for **testing** of the computer program, **there are** two kinds of errors or bugs with which programmers must deal. 4) The first type is the **coding** error. 5) Such errors are syntax errors that prevent the language processor from successfully translating the source program **to object** program code. 6) The computer program can **be** successfully **translated**, but the program does not produce the **desired** results. 7) It is the programmer's responsibility to test thoroughly all of the program's functions, **in order to verify** that the program performs according to specifications.

#### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *How are programs called?*
- *What are there two kinds of errors or bugs with which programmers must deal?*

### **Running and Testing the Computer Program**

The operating system is a collection of programs provided by the computer's manufacturer that allows us to schedule jobs for the computer, to translate source programs into object programs, to sort data stored on

secondary storage devices, and to copy data from any input device to any output device. These programs are called control programs, language programs and utility programs.

The control program (often called the supervisor, monitor, or executive) is a main-storage-resident program. Its functions are to schedule jobs, schedule input and output for our programs and to monitor the execution of our programs.

The language processors are programs that translate source programs into object programs. There are three types of language processors: assemblers, compilers, and interpreters. Each language has its own language processor.

The service programs are programs that are commonly used in all data processing centers. They have functions that are required by everyone using a computer. Examples of service programs include linkage editors to prepare object programs for execution, a librarian to catalog programs into a library area on magnetic disc, utility programs to transfer data from device to device, and sort merge programs for sorting data on magnetic tape or disk.

As for testing of the computer program, there are two kinds of errors or bugs with which programmers must deal. The first type is the coding error. Such errors are syntax errors that prevent the language processor from successfully translating the source program to object program code. The language processor identifies the nature and the location of the error on the source program listing, so these errors are relatively easy to find and correct. The second type of bug is the logic error. The computer program can be successfully translated, but the program does not produce the desired results. These errors are generally much more difficult to find and to correct than are coding errors. Logic errors can be avoided through careful planning of the program logic, but it is the programmer's responsibility to test thoroughly all of the program's functions, in order to verify that the program performs according to specifications.

There are many tools provided to the programmer to help in debugging the program logic. These tools are called debug packages or tracing routines. They assist the programmer in following the logic by printing out calculation results and field values used in making logic decisions in the program. In a few cases it may be necessary to use a memory dump - a printout of the instructions and data held in the computer's memory - in order to find the cause of logic errors.

#### *Vocabulary Notes*

**a manufacturer** ["mɔxnju'fɛkts(ə)rɔ] – фабрикант, підприємець, виробник

**to schedule** ['SedʒHl] **jobs** – назначати (планувати роботу)  
**an utility** [ju(:)'tIlItI] **program** – програма, яка обслуговує  
**a source program** – початкова програма  
**an object program** – кінцева (об'єктна) програма  
**an assembler** [q'semblq] – асемблер ( програма, яка трансліює програму на мові асемблера в машинний код )  
**a compiler** [kqm'paIlq] – компілятор, компілярна програма  
**an interpreter** [in'tWprItq] – інтерпретатор, тлумач  
**bug** [bAg] – *n.* вірус; *v.* встановлювати таємно апаратуру для підслуховування  
**an error** – помилка  
**a desired result** – бажаний результат  
**to avoid** – запобігти, анулювати  
**responsibility** – відповідальність  
**thoroughly** ['TArqLI] – ретельно, досконало  
**to verify** ['verIfaI] – перевіряти, контролювати, підтверджувати  
**to debug** – налаштовувати (машину, програму), анулювати неполадки  
**a printout** – роздруківка, вивід даних через друкарський пристрій  
**a debug package** – пакет програм, який відповідає за несправності  
**sort/merge program** – програма (зовнішнього) сортування методом розбиття/злиття  
**to monitor** – контролювати, перевіряти якість програми; спостерігати, слідкувати  
**an editor** – редактор, програма редакування  
**specifications** ["spesqfI'keISns] – технічні умови

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) The operating system is a collection of programs provided by the computer's manufacturer. 2) The control program (often called the supervisor, monitor, or executive) is a secondary-storage-resident program. 3) The language processors are programs that translate source programs into object programs. 4) There are two types of language processors: assemblers and interpreters. 5) The service programs are programs that are commonly used in all data processing centers. 6) There are several kinds of errors or bugs with which programmers must deal. 7) Logic errors can be avoided through careful planning of the program logic.

#### *2. Choose the right answer:*

- 1) The programs of the operating system are called ... .  
 a) utility programs;

- b) control programs, language programs and utility programs;
- c) control programs and language programs.
- 2) The control program is a ... program.
  - a) main-storage-resident;
  - b) secondary-storage-resident;
  - c) resident.
- 3) The language processors are programs that translate ... .
  - a) programs;
  - b) source programs into subject programs;
  - c) source programs into object programs.
- 4) The service programs have functions that ... by everyone using a computer.
  - a) are required;
  - b) are not required;
  - c) are desired.
- 5) As for testing of the computer program , there are ... kinds of errors or bugs with which programmers must deal.
  - a) many;
  - b) three;
  - c) two.
- 6) The tools provided to the programmer to help in debugging the program logic are called ... .
  - a) debug packages or tracing routines;
  - b) debug packages;
  - c) tracing routines.

**3. Complete the sentences:**

- 1) The operating system is ... . The programs are called ... . 3) The control program is ... . 4) The language processors are ... . 5) There are three types of language processors: ... . 6) The service programs are ... . 7) There are two kinds of errors or bugs with which programmers must deal: ... . 8) Logic errors can be avoided through ... . 9) There are many tools provided to the programmer (why?)... . 10) These tools are called ... .

**4. Answer the questions:**

- 1) What does the operating system allow us? 2) How are the control program often called? 3) What is the function of the language processors? 4) What are types of language processors? 5) Does each language have its own language processor? 6) What are the functions of the service programs? 7) What types of errors or bugs with which programmers must deal are there? 8) How can logic errors be avoided? 9) Are there many tools provided to the programmer to help in debugging the program logic? 10) How are these tools called? 11) What do these tools do?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- the control program
- the service programs
- testing of the computer program

**\*6. Try to tell the gist of the text.**

### **Word Study**

**1. Give Ukrainian equivalents of the following.**

A collection of programs, the computer's manufacturer, to translate source programs into object programs, to sort data stored on secondary storage devices, to copy data from any input device, to monitor the execution of programs, to be commonly used, to transfer data from device to device, the coding error, syntax errors, to identify the nature and the location of the error, the logic error, the desired results, to be avoided through careful planning of the program logic, the programmer's responsibility, to test thoroughly all of the program's functions, to verify that the program performs according to specifications.

**2. Give English equivalents of the following.**

Відповідальність програміста, класифікувати дані, які збережені на вторинних зберігаючих пристроях, синтаксичні помилки, широко використовуватись, виробник команд, копіювати дані з будь-якого пристрою вводу, створювач програм, перетворити початкову програму в кінцеву (об'єкту), контролювати виконання програм, логічна помилка, переміщати дані з пристрою на пристрій, кодована помилка, визначати природу та місце розташування помилки, бажані результати, перешкоджатися через ретельне планування логіки програми, робити перевірку через усі функції програми, контролювати, що програма працює згідно всіх технічних умов

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
manufacturer	completely
interpreter	insect
bug	commentator
to verify	fault
to avoid	obligation
responsibility	to escape
thoroughly	to examine
error	factory-owner

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*object programs / errors / to monitor / logic / manufacturer / coding / to identify / responsibility / to avoid / debugging*

1) The operating system is a collection of programs provided by the computer's ... 2) The control program ... the execution of our programs. 3) The language processors are programs that translate source programs into ... . 4) There are two kinds of ... with which programmers must deal. They are the ... error and the ... error. 5) The language processor ... the nature and the location of the error on the source program listing. 6) Logic errors can ... through careful planning of the program logic. 7) It is the programmer's ... to test thoroughly all of the program's functions. 8) There are many tools provided to the programmer to help in ... the program logic.

***5. Translate sentences into English using words and word combinations from the Vocabulary Notes.***

1) Набір команд, який вкладає виробник називається операційною системою. 2) Контрольні програми – це основні програми, які контролюють роботу машини. 3) Знання функцій сервісних програм необхідні для кожного, хто користується комп'ютером. 4) Програмісти як правило борються з двома видами помилок. Це кодовані та логічні помилки. 5) Другий вид помилок є складніший і важче усувається.

***Grammar in Use***

***1. Translate into Ukrainian, paying attention to Gerund***

1) He is fond of playing computer games. 2) My computer needs repairing . 3) He read the message without answering. 4) My friend likes learning foreign languages by means of computer programs. 5) They went on chattering through Internet Relay Chat. 6) A lot of people like surfing the internet. 7) Telnet is worth of being installed in your computer. 8) Everybody enjoys exchanging comments and information on recreational topics.

***2. Paraphrase the following sentences using the gerund.***

*Model: She insisted that she should go to the computer class. – She insisted on going to the computer class.*

1) They insisted that they should help me with my computer setup. 2) After they passed their bachelor exams, they prepared to master exams. 3) She persisted that she should demonstrate practical competence in a range of current software systems. 4) Nick bought a note-book for Pete and he thanked him for it. 5) We looked forward that he graduated the university with honour. 6) His mother thinks that he concerns himself with the application of science and technology. 7) He objects that he is guided by the latest achievements of science and technology.

***3. Translate into English using Gerund***

1) Нарешті він почав користуватися програмою SCYPE. 2) Потрібно заборонити дітям гратися в комп'ютерні ігри більше однієї години. 3) Використання інтернет-ресурсів дуже економить час на підготовку рефератів. 4) Цього чоловіка звинувачують у зламі комп'ютерних файлів. 5) Ми займаємось розробкою нової комп'ютерної програми.

**4. Write out from the text all the sentences with Gerund.**

**Additional Text**  
**(for individual work)**

**Read and translate the text.**

**Programming Languages and Functions**

The use of existing and new programming languages have extended the capabilities of the Web. Here are a group of the more common languages and functions in use on the Web today.

**CGI, Active Server Pages: CGI (Common Gateway Interface)** refers to a specification by which programs can communicate with a Web server. A CGI program. Or script, is any program designed to accept and return data that conforms to the CGI specification. The program can be written in any programming language, including C, Perl, and Visual Basic Script. A common use for a CGI script is to process an interactive form on a Web page. For example, you might fill out a form ordering a book through Interlibrary Loan. The script processes your information and sends it to a designated e-mail address in the Interlibrary Loan department.

**Java/Java Applets:** Java is probably the most famous of the programming languages of the Web. Java is an object-oriented programming language similar to C++. Developed by Sun Microsystems, the aim of Java is to create programs that will be platform independent. The Java motto is "Write once, run anywhere". A perfect Java program should work equally on a PC, Macintosh, Unix, and so on without any additional programming. This goal has yet to be realized. Java can be used to write applications for both Web and non-Web use. Web-based applications are usually in the form of Java applets. These are small Java programs called from an HTML page that can be downloaded from a Web server and run on a Java-compatible Web browser. A few examples include live newsfeeds, moving images with sound, calculators, charts and spreadsheets, and interactive visual displays.

**JavaScript/JScript:** JavaScript is a programming language created by Netscape Communications. Small programs written in this language are embedded within an HTML page. Examples of JavaScript include moving tickers, drop-down menus, real-time calendars and clocks, and mouse-over

interactions. **JScript** is a similar language developed by Microsoft and works with the company's Internet Explorer browser.

**VRML:** (Virtual Reality Modeling Language) allows for the creation of three-dimensional worlds. These may be linked from Web pages and displayed with a VRML viewer. One of the most interesting aspects of VRML is the option to "enter" the world and control your movements within the world.

**XML:** (eXtensible Markup Language) is a Web page creation language that enables designers to create their own customized tags to provide functionality not available with HTML. XML is a language of data structure and exchange, and allows developers to separate form from content. At present, this language is little used as Web browser are only beginning to support it.

*1. Divide the text into the logical parts and give a title to each one.*

*2. Put questions to the text.*

*3. Discuss it with your groupmates.*

## Unit 4

**Text Study: Programming Languages.**

**Additional Text: SIMULA, SMALLTALK, AND EIFFEL.**

**Grammar: Revision of the Module V.**

### Text Study

#### *I. Pre-reading Exercises*

*1. Repeat the words in chorus:*

To compile, to interpret, an acronym, features, consequently, to support, suitable, compiler, efficient, considerable, power, responsibility, to revise, acceptable, errors, superficial, level, syntactically, ambiguous.

*2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

To transform, algebraic, formulae, phrases, commercial, algorithmic, portable, peripheral, to manipulate, specific, registers, a dialect, abstract, technique, natural, grammatical, information.

*3. Pay attention to some grammatical points:*

1) Computers can deal with different kinds of problems **if they are given** the right instructions for what to do. 2) Instructions are first written in one of the high-level languages, **e.g.** FORTRAN, COBOL, ALCOL, PL/I, PASCAL, BASIC, or C., **depending on** the type of problem **to be solved**. 3) A program **written in one of these languages** is often called a source program. 4) This language is used **for solving** scientific and mathematical problems. 5) C was designed **to be a language** that **would be suitable** for writing system's software, like the core parts of an operating system. 6) The code **generated by**

**the compiler had to be** very efficient **if** the language **was to be used** in this way. 7) Consequently, in some respects the language is **simpler than other Algol family languages** that **have retained** the relatively complex nested program structures. 8) Programming languages have grammatical rules that **need to be learnt**, just as natural languages do.

## *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What programming languages do you know?*
- *Why cannot we make jokes in computer languages ?*

### **Programming Languages**

Computers can deal with different kinds of problems if they are given the right instructions for what to do. Instructions are first written in one of the high-level languages, e.g. FORTRAN, COBOL, ALCOL, PL/I, PASCAL, BASIC, or C., depending on the type of problem to be solved. A program written in one of these languages is often called a source program, and it cannot be directly processed by the computer until it has been compiled, which means interpreted into machine code. Usually a single instruction written in a high-level language, when transformed into machine code, results in several instructions. Here is a brief description of some of the many high-level languages:

**FORTRAN** acronym for FORMula TRANslation. This language is used for solving scientific and mathematical problems. It consists of algebraic formulae and English phrases. It was first introduced in the United States in 1954.

**COBOL** acronym for Common Business-Oriented Language. This language is used for commercial purposes. COBOL deals with problems that do not involve a lot of mathematical calculations. It was first introduced in 1959.

**ALGOL** acronym for Algorithmic Language. Originally called IAL which means International Algebraic Language. It is used for mathematical and scientific purposes. ALGOL was first introduced in Europe in 1960.

**PL/I** Programming language I. Developed in 1964 to combine features of COBOL and ALGOL. Consequently, it is used for data processing as well as scientific applications.

**BASIC** acronym for Beginner's All-purpose Symbolic Instruction Code. Developed in 1965 at Dartmouth College in the United States for use by students who require a simple language to begin programming.

**C** developed in the 1970s to support the UNIX operating system. C is a highly portable general-purpose language. C was designed to be a language

that would be suitable for writing system's software, like the core parts of an operating system. The code generated by the compiler had to be very efficient if the language was to be used in this way. Anything a compiler would have difficulties with was dropped. Consequently, in some respects the language is simpler than other Algol family languages that have retained the relatively complex nested program structures. If C was to be used for writing things like "device driver code" (the code that actually interacts with the peripheral controllers), then it had to allow the programmer get down the hardware level and manipulate bits in specific registers and in particular memory addresses. This gives the programmer considerable power, and lots of responsibility.

C++ started as a dialect of C around about 1980, it has been revised twice since then. But they are still very similar languages (in fact, a correct C program should be acceptable to a C++ compiler). The C++ language aimed to achieve three things: to be a better C; to support "abstract data types"; to permit the use of a programming technique known as "object oriented programming" (OOP). C++ was designed to permit more compile time checking and also to offer alternatives to various features of C that were known to be common sources of programming errors.

Other such languages are **APL** (developed in 1962), **PASCAL** (named after Blaise Pascal and developed in 1971), and **LISP** and **PROLOG**, both of which are used for work in artificial intelligence. **LOGO** is a development of LISP which has been used to develop computer based training packages.

At a superficial level, programming languages and natural languages are similar. Programming languages have grammatical rules that need to be learnt, just as natural languages do. At the same level, computers can "understand" and "communicate with" humans through programming languages: superficial interaction is possible. However, programming languages are data-free and therefore contain no information in themselves. The information is contained in the data which is processed, but is independent of the language which is used to write the commands to proceed it. The sole purpose of a programming language is to give instructions to a computer, which - providing they are syntactically correct - will be executed. A syntactically correct statement in a programming language has only one interpretation. By definition, it cannot be ambiguous. You cannot make jokes in computer languages.

#### *Vocabulary Notes*

**a source program** – вхідна, початкова програма

**a purpose** – мета, ціль; **the sole purpose** – єдина мета

**to support** [sq'pLt] – підтримувати, допомагати

**a compiler** – компілятор, програма-компілятор; **compile time** – час компіляції, час роботи компілятора; **to compile** – вибирати інформацію, збирати матеріал, компілювати програму  
**to retain** – тримати, акумулювати, тримати в пам'яті  
**a peripheral controller** – периферійний контролер  
**considerable** – значний, важливий  
**to revise** – перевіряти, виправляти  
**acceptable** [qk 'septqbl]– допустимий  
**superficial** ['sju: pɔ 'fɪs (ə) l]– зовнішній, поверхневий  
**interaction** – взаємодія, взаємозв'язок  
**syntactically** [sɪn 'tɪktɪklɪ]– синтаксично  
**ambiguous** [xɪm 'bɪgju:əs] – двозначний, сумнівний  
**to make jokes** – шуткувати  
**to deal with** – мати справу з  
**to depend on** – залежити від  
**a source** – джерело  
**to process** ['preuses] – обробляти  
**brief** [brɪf] – короткий  
**a description** – опис  
**to introduce** – вводити, представляти  
**consequently** ['kɒnsɪkwəntli] – отже, отож  
**nested structure** ['strʌktʃə] – гніздова (вкладена структура)

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) Computers can deal with different kinds of problems even if they are not given the right instructions for what to do. 2) A program written in one of high-level languages is often called a source program, and it cannot be directly processed by the computer until it has been compiled. 3) A single instruction written in a high-level language, when transformed into machine code, results in one instruction. 4) FORTRAN is used for solving scientific and language problems. 5) Common Business-Oriented Language is used for commercial purposes and it does not involve a lot of mathematical calculations. 6) C is a highly portable general-purpose language and it was designed to be a language that would be suitable for writing system's software. 7) Programming languages and natural languages are different. 8) You cannot make jokes in computer languages.

#### *2. Choose the right answer:*

1) Instructions are first written in one of the ... , depending on the type of problem to be solved.

a) high-level languages;

- b) low-level languages;
- c) mid-level languages.
- 2) FORTRAN was first introduced ... in 1954.
  - a) in the Great Britain in 1954;
  - b) in the United States in 1994;
  - c) in the United States in 1954.
- 3) COBOL deals with problems that ... a lot of mathematical calculations.
  - a) involve;
  - b) do not involve;
  - c) does not involve.
- 4) Programming languages are ... and therefore contain no information in themselves.
  - a) free;
  - b) data-free;
  - c) busy.
- 5) A syntactically correct statement in a programming language has only one ... .
  - a) way;
  - b) meaning;
  - c) interpretation.
- 6) You ... make jokes in computer languages.
  - a) cannot;
  - b) can;
  - c) should.

**3. Complete the sentences:**

1) A source program is ... . 2) FORTRAN consists of ... . 3) COBOL is used for ... . 4) ALGOL was first introduced in ... . 5) PL/I Programming language is used for ... . 6) BASIC used by students ... . 7) C developed in the 1970s to (why?)... . 8) The C++ language aimed to (what?) ... . 9) Other such languages are APL, PASCAL, LISP and PROLOG are used (for what? )... . 10) LOGO has been used to (why?) ... . 11) Programming languages are data-free and therefore contain ... . 12) The information is contained in ... . 13) The sole purpose of a programming language is ... .

**4. Answer the questions:**

1) What can computers deal with? 2) What are instructions first written in? 3) What programming languages are there? 4) What do they depend on? 5) What is a source program? 6) What does FORTRAN consist of? 7) What is COBOL used for? 8) What is ALGOL used for? 9) What is PL/I Programming language used for? 10) What is BASIC? 11) Why did C develop? 12) What did C++ language aim? 13) Do programming languages have grammatical

rules that need to be learnt, just as natural languages do? Why? 14) What is the sole purpose of a programming language?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- FORTRAN
- C++ language
- programming languages and natural languages are similar.

**\*6. Try to tell the gist of the text.**

### **Word Study**

**1. Give Ukrainian equivalents of the following.**

To deal with different kinds of problems, the right instructions, the high-level languages, problem to be solved, a brief description, scientific and mathematical problems, commercial purposes, to be first introduced, to combine features, scientific applications, a general-purpose language, to be designed, to be suitable for smth, to retain the nested program structures, similar languages, to achieve three things, programming errors, artificial intelligence, a superficial level, to be data-free, to contain no information, the sole purpose of a programming language, to be executed, a syntactically correct statement, not to be ambiguous, to make jokes in computer languages.

**2. Give English equivalents of the following.**

Жартувати в комп'ютерній мові, правильні команди, проблеми, які слід розв'язати, мати справу з завданнями різного роду, мови високого рівня, єдина мета мови програмування, не бути двозначним, бути виконаним, синтаксично правильне речення, короткий опис, комерційні цілі, наукові та математичні завдання, наукові застосування, поєднувати риси, бути представленим уперше, бути створеним, бути придатним для чогось, універсальна мова програмування, підтримувати гніздову структуру програми, досягати трьох речей, схожі мови, програмні помилки, поверхневий рівень, не вмішувати жодної інформації, штучний інтелект, бути без даних.

**3. Match the words in A with their synonyms in B:**

A purpose	<b>B</b> to hold
ambiguous	aim
superficial	worthy
to revise	to pile up
to compile	to check
to retain	surface
considerable	doubtful

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*general-purpose / high-level / to aim / compiler / to support / source / to depend / to deal with / applications / purpose / data-free / superficial*

1) A computers ... different kinds of problems. 2) Instructions ... on the type of problem to be solved. 3) A program written in one of the ... languages is often called a ... program. 4) COBOL is used for commercial ... . 5) Programming language I is used for data processing as well as scientific ... . 6) C is a highly portable ... language. 7) The code generated by the ... had to be very efficient. 8) The C++ language ... to be better than C, ... "abstract data types", to permit the use of a programming technique. 9) At a ... level, programming languages and natural languages are similar. 10) Programming languages are ... and therefore contain no information in themselves.

***5. Translate sentences into English using words and word combinations from the Vocabulary Notes.***

1) Якщо комп'ютеру дати правильну команду, то він справиться з будь-яким завданням. 2) Відомо, що команди мусять бути написані в одній з мов високого рівня. 3) Мова залежить від завдання, яке потрібно вирішити. 4) Одні мови використовуються для вирішення наукових чи математичних завдань, а інші – з комерційними цілями. 5) Програмна мова № 1, наприклад, використовується, як для обробки даних, так і для наукових цілей. 6) Поверхнево мови програмування і звичайні мови є подібними, оскільки всі вони мають граматичні правила, які слід знати. 7) Але різниця у тому, що мови програмування не містять у собі жодної інформації, а вся інформація знаходиться у даних. 8) Єдиною метою мови програмування є подати правильні команди комп'ютеру.

***Grammar in Use***

***Revision of the Module V***

***1. Analyze following non-finite forms of the verb and translate the sentences:***

1. Data are processed to become useful information. 2. We use the term data processing to include the resources applied for processing of information. 3. Resources required for accomplishing the processing of data are called data processing system. 4. Processing is a series of operations converting inputs into outputs. 5. Facilities are required to house the computer equipment. 6. Egyptians used the information to predict crop yields. 7. Information to be put into the computer for processing should be coded into ones and zeroes. 8. Processing is operations on data to convert them into useful information. 9. The first machines designed to manipulate punched card data were widely used for business data processing. 10. Hollerith built one machine to punch the holes and the other to tabulate the collected data.

***2. Open the brackets, using correct non-finite form of the verb.***

1. Computing is a concept (embraced; embracing; for embracing) not only arithmetics, but also computer literacy.
2. We can make the computer do what we want (inputted; to input; by inputting) signals (turning; turned; without turning) switches on and off.
3. Computers have a means (by communicating; of communicating; communicated) with the user.
4. Computers work according to the instructions (giving; given; to give) to it by users.
5. The transistor (inventing; invented; for inventing) in 1948 completely changed the vacuum tubes.

**3. Find non-finite forms of the verb in the sentences and name them:**

**A. a) Gerund; b) Present Participle Active; c) Present Participle Passive; d) Past Participle Passive; e) Perfect Participle Active; f) Perfect Participle Passive.**

1. When keyed the data are held in a small memory called buffer. 2. Data keyed into the memory of a computer by typing on a keyboard are readable by humans. 3. Keyboard enables inputting numerical and text data. 4. The mouse provides the cursor control simplifying user's orientation on the display. 5. Having been constructed recently a new electronic device has important applications in space exploration. 6. Being supplied with a special appliance a television set may have a remote control. 7. The control unit operates by reading one instruction at a time. 8. Improved methods of obtaining three-dimensional television pictures have been worked on the basis of holography.

**B. a) Indefinite Infinitive Active; b) Indefinite Infinitive Passive; c) Continuous Infinitive Active; d) Perfect Infinitive Active; e) Perfect Infinitive Passive.**

1. Input devices are used to enter data into primary storage. 2. These data appeared to have been investigated long ago. 3. We are glad to have obtained such valuable results. 4. You should have known wonderful features of computers long ago. 5. The problem to be solved is of great importance to the development of this branch of industry. 6. The first amplifying semiconductor devices (transistors) are known to have been developed in the USA in 1948. 7. He ordered these devices to be repaired as soon as possible.

**Additional Text  
(for individual work)**

**Read and translate the text.**

**SIMULA, SMALLTALK, AND EIFFEL**

These are the principal specialized "Object Oriented" languages. Simula was developed in the mid-1960s as a language for simulations (simulations of

anything you wanted: modelling aircraft movements at an airport, modelling the spread of a disease in a population of individuals, modelling the activities in an automated car wash. Simula was based on Algol-60 but added a variety of constructs that were needed for simulation work. Essentially, it allowed the programmer to create in the computer a set of "objects" (each of which owned some resources and had specified behaviours) that modelled things in the real world. Once the objects had been created, the Simula run-time system could mimic the passage of time and could allow the programmer to track interactions among the objects.

The Smalltalk language was developed by the very innovative research group at Xerox's Palo Alto Research Centre (the same group as invented the prototype for the "Macintosh/Windows" OS and interface). Smalltalk offers a different way of thinking about programming problems. Usually, each problem is treated as if it were totally new. The problem gets analyzed, broken down into subtasks, and then new code is written to handle each of these subtasks. Smalltalk encourages an alternative view; instead of writing new special purpose code, try to find a way of building up a solution to a problem by combining reusable components. The reusable components are Smalltalk objects. A Smalltalk system provides hundreds of different kinds (classes) of "off the shelf " reusable components. Actually, Smalltalk is an interpretive system (a bit like Lisp) and the language is not strictly in the Algol family.

In some respects, Eiffel is the best programming language currently available. It takes advantage of the experience gained with earlier languages like Simula, Pascal, Smalltalk, ADA and others. It is a compiled language (so Eiffel programs are much more efficient than interpreted Smalltalk programs). The basic idea is the same as Smalltalk, i.e. the best way to construct programs is to build them out of reusable objects. Although in many respects very good, Eiffel is restrictive. It enforces the use of an Object Oriented (OO) style. You have to learn several styles, not just OO. For this reason, you are learning C++ because it supports conventional procedural style as well as OO.

***1. Divide the text into the logical parts and give a title to each one.***

***2. Put questions to the text.***

***3. Discuss it with your groupmates.***

## **Progress Check**

***Choose the right answer:***

1) Programming is the process of preparing ... which enables the computer to solve specific problems or to perform specific functions.

a) a set of algorithms; b) a set of coded letters; c) a set of coded letters; d) a set of characters; e) a set of coded instructions.

- 2) The phase in which the system's computer programs are written is called the ... .  
 a) development phrase; b) development action; c) development system; d) development fact; e) development phase.
- 3) The instructions of the program must be ... and in the appropriate sequence.  
 a) understandable; b) complete; c) interesting; d) truthful; e) complex.
- 4) There are two common techniques for planning the logic of a program: ... .  
 a) flowcharting and pseudocode; b) pseudocode and n; c) pseudocode and structure; d) flowcharting and programming; e) representation and presentation.
- 5) Pseudocode has three basic structures: ... .  
 a) sequence, decision and logic; b) sequence, decision and symbol; c) sequence, decision, and looping logic; d) sequence, logic and character; e) sequence, decision and letter.
- 6) The machine is initialized with the program counter holding the memory location of the ... instruction from the program.  
 a) final; b) first; c) intermediate; d) second; e) any.
- 7) Sometimes, execution of the instruction will ... the contents of the PC.  
 a) define; b) influence; c) change; d) show; e) foresee.
- 8) Instructions are usually given short "mnemonic" names – names that have been chosen ... one of the effect achieved by the instruction.  
 a) see; b) to forget; c) to recognize; d) to change; e) to remind.
- 9) Each architecture will have its own special ... that are not present on the other.  
 a) names; b) instructions; c) programs; d) places; e) duties.
- 10) Although some data locations can be ... , it is necessary to define either the source or destination locations for the other data.  
 a) unknown; b) explicit; c) implicit; d) visible; d) understandable.
- 11) The programs of the operating system are called ... .  
 a) utility programs; b) control programs, language programs and utility programs; c) control programs and language programs; d) complex problems; e) system programs.
- 12) The control program is a ... program.  
 a) main-storage-resident; b) secondary-storage-resident; c) resident; d) major; e) resident.
- 13) The language processors are programs that translate ... .  
 a) programs; b) source programs into subject programs; c) source programs into object programs; d) all kinds of programs; e) programs into object programs.

- 14) The service programs have functions that ... by everyone using a computer.  
 a) are required; b) are not required; c) are desired; d) are not desired; e) are shown.
- 15) As for testing of the computer program , there are ... kinds of errors or bugs with which programmers must deal.  
 a) many; b) three; c) two; d) four; e) five.
- 16) Instructions are first written in one of the ... , depending on the type of problem to be solved.  
 a) high-level languages; b) low-level languages; c) mid-level languages; d) coded languages; e) complex computer languages.
- 17) FORTRAN was first introduced ... in 1954.  
 a) in the Great Britain in 1954; b) in the United States in 1994; c) in the Great Britain in 1956; d) in the Great Britain in 1966; e) in the Great Britain in 1954.
- 18) COBOL deals with problems that ... a lot of mathematical calculations.  
 a) involve; b) do not involve; c) does not involve; d) did not involve; e) will not involve.
- 19) Programming languages are ... and therefore contain no information in themselves.  
 a) free; b) data-free; c) busy; d) complex; e) simple.
- 5) A syntactically correct statement in a programming language has only one ... .  
 a) way; b) meaning; c) interpretation; d) method; e) chance.

## Module VI

### Surfing the Net

#### Unit 1

**Text Study. Internet.**

**Additional Text. Communication and Media Technology.**

**Grammar: Conditionals.**

#### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Charge, governing, internet backbone, Transmission Control Protocol/Internet Protocol, TCP/IP, quantum mechanics, instantaneous, knowledge, broadband, withstanding, broadcasting, routers.

*2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Internet, million, organization, technical aspects, control, private company, client, architecture, machine, technology, program, result, e-mail, popular, information, problem, situation.

**3. Pay attention to some grammatical points:**

1) The Internet is a computer **network made up of** thousands of networks world wide. 2) Software **can be installed** on a client computer **to take advantage** of the latest access technology. 3) The Internet is very helpful, **because it's a huge database** of knowledge, from the pictures of family trips to an analysis of quantum mechanics. 4) Everyone **should have** the Internet **because of** it instantaneous communication and huge wealth of knowledge. 5) **If we want** to find some information in the Internet, **we are to type** address of this data in the browser we use. 6) The data **is constantly being directed** towards its destination by special computers called routers.

**II. Reading**

**Read the text and be ready to find in the text the answers to the following questions:**

- *How many computers are connected to the Internet?*
- *How do all computers on the Internet communicate with one another?*
- *What interface did web users use in the 70's?*

**Internet**

The Internet is a computer network made up of thousands of networks world wide. No one knows how many computers are connected to the Internet. It is certain, however, that there are millions of them. No one is in charge of the Internet. There are organizations which develop technical aspects of this network, but no governing body is in control. The Internet backbone, through which Internet traffic flows, is owned by private companies.

All computers on the Internet communicate with one another using the Transmission Control Protocol/ Internet Protocol suite, abbreviated to TCP/IP. Computers on the Internet use a client/server architecture. This means that the remote server machine provides files and services to the users' local client machine. Software can be installed on a client computer to take advantage of the latest access technology.

Public Internet began in the late 70's. In the 70's web users used an interface called Telnet, but now this program is mainly obsolete.

Telnet is most widely deployed in accessing college e-mail accounts. The Internet is very helpful, because it's a huge database of knowledge, from the pictures of family trips to an analysis of quantum mechanics. Everyone should have the Internet because of it instantaneous communication and huge wealth of knowledge. But how to go on the Internet and do a search for information we need? There are two ways to do it. The first is when you know

an internet address of data you need and the second one is when you try to find information you need by using a search program. In the beginning we have got to enter any browser you like. It could be an Internet Explorer, Netscape Navigator or Opera, etc. If we have a broadband connection, we connect to the Internet at once. If not - have to set up and connect to our dialup service. Finally, if we want to find some information in the Internet, we are to type address of this data in the browser we use or simply use the existing search-programs such as the Google search program, Rambler search program, Yandex search program or Yahoo search program. They are very simple and popular networks of sites. In these programs we can just type the word or name of thing, we would like to find and then press "Enter". A search program solves this problem. We get our results in the same window. After we get our results, we simply choose whatever site best matches our query or keep searching.

Besides data, one can get from the Internet; we can also send and receive e-mail or electronic mail. This internet service is cheaper than ordinary mail and much quicker. It is becoming popular day by day. We can find some news from the Internet, because there are many informational servers in the web.

An Internet user also has access to such services as file transfer, vast information resources, interest group membership, interactive collaboration, multimedia displays, real-time broadcasting, shopping opportunities, and much more.

However, there are some problems. The most important problem is security. When you send e-mail, your message can travel through many different networks and computers. The data is constantly being directed towards its destination by special computers called routers. Because of this, it is possible to get into any of the computers along the route, intercept and even change the data being sent over the internet. But there are many encoding programs available. Notwithstanding, these programs are not perfect and can easily be cracked.

Another big and serious problem of the net is control. Yes, there is no effective control in the Internet, because a huge amount of information circulating through the net. It is like a tremendous library and market together. In the future, the situation might change, but now we have what we have.

#### *Vocabulary Notes*

**in charge** — під доглядом, під опікою

**backbone** — основа, опора

**Transmission Control Protocol/ Internet Protocol** — протокол передачі даних в мережі інтернет (інтернет-протокол)

**remote server machine** — віддалений сервер

**obsolete** [ 'ObsqlJt ] — застарілий  
**deployed** [dI 'plOId] — розгорнутий, поширений  
**e-mail accounts** — обліковий запис користувача електронної пошти  
**instantaneous** [ "Instqn 'teInjqs ] — миттєвий, моментальний  
**search program** — пошукова програма  
**broadband connection** — широкосмуговий зв'язок  
**dialup service** [ 'daIqlAp 'sWvIs ] — послуга підключення до інтернету через телефонну лінію  
**query** [ 'kwIqrI ] — запит  
**file transfer** – передача файлів  
**collaboration** [kq "lxbq' reISqn] — співробітництво, співпраця  
**withstand** [wID 'stxnd] — чинити опір, протистояти

### ***Comprehension***

#### ***1. Tell what sentences are true and what are false.***

1) All the computers connected to the Internet can be easily counted. 2) All computers on the Internet communicate with one another using the dialup service. 3) The chosen browser provides files and services to the users' local client machine. 4) Nowadays web users used an interface called Telnet. 5) An Internet Explorer, Netscape Navigator or Opera, etc are the most popular search programs. 5) If we want to find some information in the Internet, we are to type address of this data in the browser we use or simply use the existing search-programs. 6) After we get our results, we simply choose whatever protocol best matches our query or keep searching. 7) The most important problem of the internet is its charge.

#### ***2. Choose the right answer:***

- 1) Who develops technical aspects of the Internet?  
a) government;  
b) private organizations;  
c) special computers.
- 2) What architecture do computers on the Internet use?  
a) a TCP/IP architecture;  
b) an input/output architecture;  
c) a client/server architecture.
- 3) When did public Internet start?  
a) in the late 70's;  
b) 25 years ago;  
c) in 1981?
- 4) How can you find information you need in the network?  
a) by using e-mail;  
b) by using a search program;

- c) by using special computers.
- 5) What is Rambler?
- a) a broadband connection;
  - b) dialup service;
  - c) a search program.
- 6) Why is e-mail service so popular?
- a) because no governing body is in control;
  - b) because it is cheaper than ordinary mail and much quicker;
  - c) because it's a huge database of knowledge.
- 7) What is the most important problem of e-mail service?
- a) security;
  - b) Internet traffic;
  - c) browser.
- 8) Why is there no effective control in the Internet?
- a) because of a broadband connection;
  - b) because of thousands of networks world wide;
  - c) because of a huge amount of information.

**3. Complete the sentences:**

1) The Internet is ... . 2) All computers on the Internet communicate with one another using ... . 3) Public Internet began in ... . 4) Everyone should have the Internet because ... . 5) If we have a broadband connection, we ... . 6) If we want to find some information in the Internet, we ... . 7) When you send e-mail, your message can travel ... . 8) It is possible to get into any of the computers along the route, ... . 9) There is no effective control in the Internet, because ... .

**4. Answer the questions:**

1) What is Internet? 2) When did the public Internet begin? 3) Why is Internet useful? 4) How can you go on the Internet and search there for information? 5) What data searching Internet programs do you know? 6) What are the advantages of e-mail over ordinary mail service? 7) What are the main problems of the Internet?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- two ways of searching information;
- the most popular networks of sites;
- the most popular Internet services.

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

governing body, Internet backbone, to be owned by private companies, remote server machine, users' local client machine, an interface, college e-mail accounts, a huge database of knowledge, instantaneous communication, a broadband connection, dialup service, vast information resources, interest group membership, real-time broadcasting, encoding program.

**2. Give English equivalents of the following.**

Комп'ютерна мережа, бути встановленим на комп'ютер клієнта, користувачі мережі, застаріла програма, фотографія сімейних подорожей, квантова механіка, миттєвий зв'язок, пошук інформації, пошукова програма, вирішувати проблему, обирати сайт, доступ до послуг, перехоплювати дані.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
many	photo
backbone	tremendous
organization	quantity
to mean	to fit
to install	to get
picture	company
huge	basis
to search	to mount
to match	to denote
to receive	to seek
amount	a lot

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*Modems / e-mail / network / path / browse / servers /*

1) The Internet is a huge .... of computers spanning our planet and now starting to bring in the surrounding area like space. 2) Some computers like .... share data , others just surf the web as clients downloading the data. 3) Invention of ....., special devices allowing your computer to sent the information through the telephone line , has opened doors to the Internet for millions of people. 4) Information sent over the Internet takes the shortest .... available from one computer to another. 5) Nowadays the most popular Internet service is .... . 6) Now, devices such as Web TV allow our television to .... the Web and use Electronic Mail.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Серед великого розмаїття пошукових програм ми обираємо ту, яка нам найбільше підходить. 2) За допомогою мережі Інтернет ми

можемо отримати безліч відповідей на наш запит. 3) Зараз послуга підключення до інтернету через телефонну лінію є застарілою і майже не використовується. 4) Тепер ми миттєво підключаємося до мережі за допомогою широкосмугового зв'язку. 5) Користувачі інтернету мають необмежений доступ до інформаційних ресурсів, інтерактивної співпраці та до передачі різних файлів. 6) Незважаючи на велику кількість програм, створених щоб протистояти зламу особистих файлів, проблема захисту особистої інформації в мережі інтернет все ще залишається невирішеною.

**6. Make up sentences from the following words and word-groups:**

**Model:** steps, manufacturing, development, several, had, in, automated, its. - Automated manufacturing had several steps in its development.

1) by, traffic, private, which, is owned, the Internet backbone, companies, Internet, flows, through. 2) be, to take, the latest, on, software can, advantage, a, computer, of, access, installed, client, technology. 3) e-mail, is, college, in, deployed, accessing, widely, most, Telnet accounts. 4) any, got, in, to enter, beginning, have, browser, you, the, like, we. 5) best, or, our, whatever, after, our, keep, choose, we, results, we, site, matches, simply, query, searching, get. 6) from, also, mail, data, can, can get, the Internet; we, one, and, receive, e-mail, besides, send, or, electronic. 7) can, networks, you, different, e-mail, travel, when, massage, through ,many your, and, send, computers.

### **Grammar in Use**

#### **Conditionals**

**1. Write down the following sentences using the II and III conditionals. Translate them.**

*Model: If my parents buy me a computer, I'll be pleased. – If my parents bought me a computer, I would be pleased. – If my parents had bought me a computer, I would have been pleased.*

1. If you use computers in the university, you will know about the Internet. 2. Unless you learn to use the Internet, you will not be able to send e-mails. 3. If you have a computer at home, you will use it to make new friends. 4. If you join an emailing list, you will be able to chat with people all over the world.

**2. Put the verbs in brackets into the correct form.**

1. If Bill Gates hadn't invented Windows software, he (may not to become) a millionaire. 2. If I (to live) in 1703, I shouldn't have had a computer. 3. If you wrote the computer program correctly, you (to get) an excellent mark. 4. If they (to use) computer for their computations, they would

have saved time. 5. If we don't have such interpreted languages as Perl, we (not to offer) extreme power to the user. 6. Computers can deal with different kinds of problems if they (to give) the right instructions for what to do. 7. If you (to press) the mouse button here, you can size the window. 8. If the user tries to pick up something, the computer (to make) the object follow the hand to give the illusion of carrying it. 9. If you clicked on the Minimize button, the window (to shrink) to an icon at the bottom of the screen. 10 If I were you, I (to buy) the modem. 11. If you could make educational software as absorbing as games software and teach at the same time, this (to be) ideal.

**Additional Text**  
**(for individual work)**

*Read and translate the text.*

**Communication and Media Technology**

The USA prides itself on its ability to improve and develop new modes of communication and information transfer (i. e. telephone, internet). By combining media and information, the world has indeed changed. For example, computer networks, telephone links, satellite transmission, and publishing have been integrated into what is commonly known as the internet. This combinations of technology, naturally enough, created a new wave of business. What was once the sole domain of telephone companies — simple phone lines — has now expanded to include mass information transfer and television. All of this requires fiber-optic lines. Likewise, television stations can now do more business for their customers. For example, a customer can select a movie or other interesting program from a viewers' menu and order that specific film for viewing.

Another example of mass information transfer and communication technology is the ability to offer entire university courses over the internet. The majority of American universities offer internet courses where you can read text materials, take exams, and actually watch a lecturing professor that has been recorded on video. Some of these lectures are also transmitted over the internet in what is called real time. What this means is live broadcast. Students can also send their questions about the course or lecture through e-mail or through real time interactive dialogues.

Today, if you are a computer user, you can buy a wealth of information/media software that include the entire work of Shakespeare, encyclopedias, dictionaries, language learning programs (known as CALL: Computer Assisted Language Learning), etc. Most of these products are contained on a single CD-ROM. Many American universities already use, or are in the process of establishing, CALL labs. Students can improve their pronunciation, grammar, vocabulary, and writing through interaction with a

computer. Likewise, other courses that include political science, literature, and marketing can be learned and/or facilitated through similar computer labs.

The widespread use of the internet grows even greater every day. It is impossible to determine exactly how many people use the internet, but it can be documented just how dependent America and other countries have become to the internet. In the year 2000, there was a problem, officially called Y2K, in data storage and retrieval. Computer intelligence did not know how to cope with two zeros in the last two digits of the year. Experts predicted that there may be mass computer crashes. The implications would have impact on hospitals, government agencies, university records, banking, flight reservations, and credit cards. The government had put official warnings out on both the internet and on television. One example of their precautions was to simply not use credit cards for payment from the time period beginning in December 1999 through February 2000, as the charges may be inaccurate.

Nevertheless, the growth of the internet, the media, and mass communication has indeed facilitated the global community. Ordinary citizens of different countries can now actually communicate with each other via the internet. The speed and efficiency of the computer age has displaced much older technology. For example, many people would rather do their business communications through e-mail rather than what has now been labeled "snail-mail".

- 1. Divide the text into the logical parts and give a title to each one.*
- 2. Put questions to the text.*
- 3. Discuss it with your groupmates.*

## **Unit 2**

**Text Study. Understanding the World Wide Web.**

**Additional Text. The Experience of the Web.**

**Grammar: Wish Sentences.**

### **Text Study**

#### ***1. Pre-reading Exercises***

##### ***1. Repeat the words in chorus:***

Tim Berners-Lee, Switzerland, CERN, accessible, to incorporate, hypertext, SMTP, FTP, NNTP, HTTP, VOIP, command-level

##### ***2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:***

Physics, graphics, video, global, proportion, protocol, electronic, command, text, client, telephone, system, programming, component.

##### ***3. Pay attention to some grammatical points:***

1) Almost every protocol type **available** on the Internet is **accessible** on the Web. 2) **To name just one example**, the Voice over Internet Protocol (VOIP) **allows** users **to place** a telephone call over the Web. 3) **It is** no longer necessary **to be conversant** in these protocols within separate, command-level environments. 4) **Because of** this feature, and **because of** the web's ability to work with multimedia and advanced programming languages, the World Wide Web is the fastest-growing component of the Internet.

## II. Reading

*Read the text and be ready to find in the text the answers to the following questions:*

- *What was the initial purpose of the Web?*
- *What are Internet protocols?*
- *Why is the World Wide Web the fastest-growing component of the Internet?*

### Understanding the World Wide Web

The World Wide Web was developed in 1989 by Tim Berners-Lee of the European Particle Physics Lab (CERN) in Switzerland. The initial purpose of the Web was to use networked hypertext to facilitate communication among its members, who were located in several countries. Word was soon spread beyond CERN, and a rapid growth in the number of both developers and users ensued. In addition to hypertext, the Web began to incorporate graphics, video, and sound. In recent years, the use of the Web has now reached global proportions. Almost every protocol type available on the Internet is accessible on the Web. *Internet protocols* are sets of rules that allow for intermachine communication on the Internet. The following major protocols are accessible on the Web:

**E-mail** (Simple Mail Transport Protocol or SMTP) distributes electronic messages and files to one or more electronic mailboxes.

**Telnet** (Telnet Protocol) facilitates login to the computer host to execute commands.

**FTP** (File Transfer Protocol) transfers text or binary files between an FTP server and client.

**Usenet** (Network News Transfer Protocol or NNTP) distributes Usenet news articles derived from topical discussions on newsgroups.

**HTTP** (Hyper Text Transfer Protocol) transmits hypertext over networks. This is the protocol of the WWW.

Many other protocols are available on the Web. To name just one example, the Voice over Internet Protocol (VOIP) allows users to place a telephone call over the Web.

The World Wide Web provides a single interface for accessing all these protocols. This creates a convenient environment. It is no longer necessary to be conversant in these protocols within separate, command-level environments. The web gathers together these protocols into a single system. Because of this feature, and because of the web's ability to work with multimedia and advanced programming languages, the World Wide Web is the fastest-growing component of the Internet.

#### *Vocabulary Notes*

**Hypertext** ['hɑɪpq"tFkst] — гіпертекст (текст для перегляду на комп'ютері, який містить зв'язки з іншими документами («гіперзв'язки» чи «гіперпосилання»))

**growth** [grquT] — зростання

**to ensue** [In'sjH] — виникати, відбуватися

**to incorporate** [In'kLpqrɛIt] — об'єднувати, приєднувати

**computer host** [hqust] — ведучий комп'ютер

**electronic** [ɪlek'trɒnɪk] **mailbox** — електронна поштова скринька

**to facilitate** [fɑ'sɪlɪteɪt] — полегшити

**to execute** ['eksɪkjHt] **commands** — виконувати команди

**binary** ['baɪnɪrɪ] **files** — бінарні файли

**Telnet Protocol** — мережевий протокол для реалізації текстового інтерфейсу по мережі

**Usenet (Network News Transfer Protocol or NNTP)** — протокол передачі новин у інтернет-мережі

**FTP (File Transfer Protocol)** — протокол передачі файлів

**E-mail (Simple Mail Transport Protocol (SMTP))** — протокол передачі електронної пошти

**HTTP (Hyper Text Transfer Protocol)** — протокол передачі гіпертексту

**Voice over Internet Protocol (- VOIP)** — голосовий інтернет-протокол

**to be conversant** [kɒn'vʌs(q)nt] — бути обізнаним, бути поінформованим

#### *Comprehension*

*1. Tell what sentences are true and what are false.*

1) The World Wide Web was developed in 1998 in Scotland. 2) The Web can incorporate graphics, video, and sound. 3) All types of protocols available on the Internet are accessible on the Web. 4) VOIP allows users to perform on-line communication over the Web. 5) The web divides all the protocols into several separate systems. 6) The World Wide Web is the fastest-growing component of a computer.

*2. Choose the right answer:*

1) Who developed the World Wide Web?

a) Bill Gates;

- b) J.Eckert and J.Maushly;
- c) Tim Berners-Lee.
- 2) Why do we use networked hypertext?
  - a) to facilitate surfing a net;
  - b) to facilitate communication;
  - c) to facilitate searching information.
- 3) What are Internet protocols?
  - a) sets of rules;
  - b) programming languages;
  - c) binary files.
- 4)What is the function of E-mail?
  - a) incorporation of graphics;
  - b) distribution of electronic messages;
  - c) intermachine communication.
- 5) What is Usenet?
  - a) Simple Mail Transport Protocol;
  - b) File Transfer Protocol;
  - c) Network News Transfer Protocol.
- 5)What does HTTP transmit?
  - a) Internet protocols;
  - b) hypertext;
  - c) mass communication.

**3. Complete the sentences:**

1) The World Wide Web was developed in ... . 2) Internet protocols are ... . 3) Simple Mail Transport Protocol distributes ... . 4) Telnet Protocol facilitates ... . 5) NNTP distributes ... . 6) Hyper Text Transfer Protocol transmits ... . 7) Voice over Internet Protocol allows ... . 8) The World Wide Web provides a single ... . 9) The World Wide Web is the fastest ... .

**4. Answer the questions:**

1) What are the abilities of the World Wide Web? 2) Why has the use of the Web now reached global proportions? 3) What are Internet protocols? 4) What protocols are accessible on the Web? 5) Why does The World Wide Web provide a single interface? 6) What is the fastest-growing component of the Internet and why?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- major protocols of the Web;
- a single interface of The World Wide Web.

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Particle Physics, to be spread, rapid growth, to be accessible, to facilitate login, computer host, topical discussions, convenient environment, programming languages, single interface, set of rules.

**2. Give English equivalents of the following.**

Початкова мета; використовувати гіпертекст; розповсюджуватись за межі; об'єднувати графіку, відео та звук; досягати глобальних пропорцій; електронне повідомлення; телефонний дзвінок; збирати разом.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
purpose	paper
country	quick
to begin	to permit
to incorporate	to make
every	aim
set	state
to allow	to start
article	each
to create	to unite
fast	kit

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*Network / transfer / hypertext / digital / FTP / servers / protocol*

1) Electronic mail, commonly called e-mail, is a method of exchanging .... messages from an author to one or more recipients. 2) Telnet is a network ..... used on the Internet or local area networks to provide a bidirectional interactive text-oriented communications facility using a virtual terminal connection. 3) File Transfer Protocol is a standard network protocol used to ... files from one host to another host over the Internet. 4) .... is built on a client-server architecture and utilizes separate control and data connections between the client and server. 5) Usenet is one of the oldest computer .... communications systems conceived in 1979 and publicly established in 1980 at the University of North Carolina. 6) The HTTP protocol is designed to permit intermediate network elements to improve or enable communications between clients and .... 7) One of the main features of the WWW documents is their .... structure.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Спочатку всесвітню мережу використовували для того, щоб полегшити спілкування між людьми в різних країнах. 2) Зараз інтернет-мережа об'єднує графіку, відео та звук. 3) Протокол передачі гіпертексту передає гіпертекст по мережі. 4) За допомогою голосового інтернет-протоколу ми можемо здійснювати дзвінки у мережі і безкоштовно спілкуватися з людьми з різних куточків світу. 5) Всесвітня мережа об'єднує всі інтернет-протоколи у єдину систему.

**6. Make up sentences from the following words and word-groups:**

**Model:** steps, manufacturing, development, several, had, in, automated, its. - Automated manufacturing had several steps in its development.

1) video, the, graphics, to, Web, and, incorporate, began, sound. 2) Web, now, recent, the, in, use, the, global, has, years, of, reached, proportions. 3) intermachine, sets, for, Internet, Internet, of, rules, that, allow, protocols, communication, on, are, the. 4) mailboxes, one, messages, electronic, and, files to, or, more, e-mail, distributes, electronic. 5) Protocol, an, files, Transfer, or, transfers, text, binary, between, File, server, client, and, FTP. 6) to, Web, users, place, a, VOIP, telephone, allows, over, the, call. 7) World, of, Web, the, web's, of, to, with, work, and, multimedia, programming, fastest-growing, languages, the, Wide, is, ability, the, component, advanced, the, because, Internet.

**Grammar in Use**  
**WISH Sentences**

**1. Read the following sentences. What wishes would you make corresponding to the words in bold?**

**Model:** *Your scanner has broken down so you have to type the text. – I wish I didn't have to type the text.*

1) You want to use the computer, but **you can't remember the password.** 2) You have got some graphical work to do but **there isn't a proper computer program installed in your computer.** 3) **You didn't save the file** and all the data were lost. 4) You wanted to send e-mail message but **you didn't remember the address.** 5) You can't connect to the Internet because **you don't have a broadband connection.**

**2. Complete the sentences with two to five words including the word in brackets.**

**Model:** *My friend regrets spending so much time playing computer games (had). – My friend wishes he hadn't spent so much time playing computer games.*

1) Why don't you stop spending your money on useless devices? (wish) I \_\_\_\_\_ spending your money on useless devices.

2) You should have the Internet at home because of its huge wealth of knowledge. (wish) I \_\_\_\_\_ have the Internet at home.

3) Why don't you install the newest antivirus program? (wish) I \_\_\_\_\_ install the newest antivirus program.

### **3. Correct the mistakes**

1) I wish I would get the access to these data now. 2) I wish you will help me with this software. 3) I wish I found this information yesterday. 4) I wish I will buy the newest desk-top in a month.

## **Additional Text (for individual work)**

***Read and translate the text.***

### **The Experience of the Web**

Today's World Wide Web presents an ever-diversified experience of multimedia, programming language, and real-time communication. It is a challenge to keep up with the rapid pace of developments.

Multimedia. The web has become a broadcast medium. It is possible to listen to audio and video over the web, both pre-recorded and live. For example, you can visit the site of various news organizations and view the same video shown on the nightly television news. Several plugins are available for viewing these videos. For example, Apple's Quick Time Player downloads files with the mov extension and displays these as "movies" in a small window on your computer screen. Quick Time files can be quite large, as it may take patience to wait for the entire movie to download into your computer before you can view it.

The problem of slow download times has been answered by a revolutionary development in multimedia capability: streaming media. In this case, audio or video files are played as they are downloading, or streaming, into your computer. Only a small wait, called buffering, is necessary before the file begins to play. The RealPlayer plug-in plays streaming audio and video files. Extensive files such as interviews, speeches and hearings work very well with RealPlayer. The RealPlayer is also ideal for the broadcast of real-time events. These may include press conferences, live radio and television broadcasts, concerts, etc.

Sound files, including music, may also be heard on the Web. It is not uncommon to visit a Web page and hear background music.

Live cams are another aspect of the multimedia experience available on the Web. Live cams are video cameras that send their data in real time to a Web server. These cams may appear in all kinds of locations, such as an office, on top of a building, a scenic locale, a special event, and so on. Text, audio and

video communication can occur in real time on the Web. This capability allows people to conference and collaborate in real time. In general, the faster the Internet connection, the more successful the experience

1. *Divide the text into the logical parts and give a title to each one.*
2. *Put questions to the text.*
3. *Discuss it with your groupmates.*

## Unit 3

**Text Study. Telnet, FTP, Usenet News, and Chat.**

**Additional Text. Analog Transmission.**

**Grammar: Direct and Indirect Speech.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

To require, resources, to launch, to be configured, to exchange, major, existence, recreational, frivolous, phenomenon.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Program, catalogs, services, address, method, option, personal, global, electronic, system, million, information, discussion, group, central, machine, forum, to organize, real, sponsor, channel, specific, phenomenon.

##### *3. Pay attention to some grammatical points:*

1) Some services require **you to connect** to a specific port on the computer. 2) A Telnet program **must be installed** on your local computer and **configured** to your Web browser in order to work. 3) This is **both** a program **and** the method used to transfer files between computers. 4) **While** many are academic in nature, numerous newsgroups are organized around recreational topics. 5) **While** many topics are frivolous, substantive conversations are also taking place.

#### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What must you know to Telnet to a computer?*
- *What is File Transfer Protocol?*
- *What is the difference between Usenet News and e-mail discussion groups?*

### **Telnet, FTP, Usenet News, and Chat**

**Telnet** is a program that allows you to log into computers on the Internet and use online databases, library catalogs, chat services, and more. To Telnet to a computer, you must know its address. This can consist of words or

numbers. Some services require you to connect to a specific port on the computer. In this case, type the port number after the Internet address.

Telnet is available on the World Wide Web. Probably the most common Web-based resources available through Telnet are library catalogs. A link to any Telnet resource looks like any other link, but it will launch a Telnet session to make the connection. A Telnet program must be installed on your local computer and configured to your Web browser in order to work.

**FTP** stands for File Transfer Protocol. This is both a program and the method used to transfer files between computers. Anonymous FTP is an option that allows users to transfer files from thousands of host computers on the Internet to their personal computer account. FT sites contain books, articles, software, games, images, sounds, multimedia, and others.

**Usenet News** is a global electronic bulletin board system in which millions of computer users exchange information on a vast range of topics. The major difference between Usenet News and e-mail discussion groups is the fact that Usenet messages are stored on central computers, and users must connect to these computers to read the messages posted to these groups. This is distinct from e-mail distribution, in which messages arrive in the electronic mailboxes of each list member. Usenet itself is a set of machines that exchanges messages or articles from Usenet discussion forums, called newsgroups. There are thousands of Usenet newsgroups in existence. While many are academic in nature, numerous newsgroups are organized around recreational topics.

**Chat** programs allow users on the Internet to communicate with each other by typing in real time. They are sometimes included as a feature of a Web site, where users can log into the “chat room” to exchange comments and information about the topics addressed on the site. Chat may take other, more wide-ranging forms. For example, America Online is well-known for sponsoring a number of topical chat rooms. **Internet Relay Chat (IRC)** is a service through which participants can communicate to each other on hundreds of channels. These channels are usually based on specific topics. While many topics are frivolous, substantive conversations are also taking place. A variation of chat is a phenomenon of instant messaging. With instant messaging, a user on the Web can contact another user currently logged in and type a conversation. Most famous is America Online’s Instant Messenger.

#### *Vocabulary Notes*

**to log** [lɔg] — вносити до реєстру

**port** — отвір, гніздо

**available** [q'veɪləbəl] — доступний, наявний

**to launch** [lɔnʃ] — запускати, вмикати

**to contain** [kɔn'teɪn] — містити

**image** ['ɪmɪdʒ] — зображення

**bulletin board** ['bʊlɪtɪnbɔːrd] — дошка оголошень

**distinct** [dɪs'tɪŋkt] — чіткий

**existence** [ɪg'zɪstəns] — існування

**academic** — науковий, навчальний, академічний

**recreational** ['rekrɪ'eɪʃənl] **topics** — розважальні (вільні) теми

**frivolous** ['frɪvələs] — легковажний, поверхневий, дріб'язковий

**substantive** ['sʌbstəntɪv] — реальний, дійсний

**to be currently logged** ['kʌrəntlɪ lɒgd] — внесений до реєстру в поточному порядку

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) WWW address consists of words or numbers. 2) Usenet News are the most common Web-based resources available through Telnet. 3) If you want to use online databases, library catalogs, chat services, and more you should install IRC program on your local computer. 4) Anonymous FTP is an option that allows users to exchange information on a vast range of topics with thousands of host computers on the. 5) Usenet itself is a set of machines that exchanges messages or articles from Usenet newsgroups. 6) Chat programs allow users on the Internet to connect to a specific port on the computer.

#### *2. Choose the right answer:*

1) What is necessary to do to Telnet to a computer?

- a) to connect to a specific port;
- b) to know its address;
- c) to transfer files.

2) Where is Telnet available?

- a) on the site;
- b) on the personal computer account;
- c) on the World Wide Web.

3) How do messages arrive in the electronic mailboxes of each list member?

- a) by means of e-mail distribution;
- b) by means of chat services;
- c) by means of IRC program.

4) How many Usenet newsgroups are there in existence?

- a) thousands of them;
- b) millions of them;
- c) a few of them.

5) Where are Usenet messages stored?

- a) in the "chat room";

- b) in the library catalogs;
  - c) on central computers.
- 6) What can Internet users do by means of Chat programs?
- a) to read books and articles, to play games, to use multimedia and others;
  - b) to transfer files from thousands of host computers to their personal computer account;
  - c) to communicate with each other by typing in real time.

**3. Complete the sentences:**

- 1) Telnet is available on ... . 2) File Transfer Protocol is both ....and ....  
 .3) FT sites contain ... . 4) Usenet itself is a set of .... . 5) The users can log into the “chat room” to exchange ... . 6) America Online is well-known for ... .  
 . 7) With instant messaging, a user on the Web can contact ... .

**4. Answer the questions:**

- 1) What is Telnet? 2) What does the computer address consist of? 3) How does a link to any Telnet resource look like? 4) What is File Transfer Protocol? 5) What is Anonymous FTP? 6) What is Usenet News? 7) What is the major difference between Usenet News and e-mail discussion groups? 8) What are Chat programs? 9) What is America Online known for? 10) What is IRC? 11) What is instant messaging?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- storage of Usenet messages;
- Usenet newsgroups;
- forms of a Chat.

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Online databases, Web-based resources, Telnet session, anonymous FTP, host computers, personal computer account, e-mail discussion groups, to log into the “chat room”, substantive conversations, phenomenon.

**2. Give English equivalents of the following.**

Використовувати бібліотечні каталоги, складатися зі слів та цифр, під'єднатися до, зв'язок з ресурсом, встановити на локальний комп'ютер, сайт передачі файлів, розважальні теми, друк в режимі реального часу, миттєва передача повідомлення.

**3. Match the words in A with their synonyms in B:**

- |          |          |
|----------|----------|
| <b>A</b> | <b>B</b> |
| to use   | theme    |
| must     | general  |

link	may
common	big
can	connection
to make	to have to...
vast	to utilize
topic	to produce

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*Chat / networks / available / Usenet / IRC /*

1) The WWW project is based on the principle of universal readership: "if information is .... , then any person should be able to access it from anywhere in the world". 2) .... is a protocol for real-time Internet text messaging (chat) or synchronous conferencing. 3) ... is mainly designed for group communication in discussion forums, called channels, but also allows one-to-one communication via private message. 4) Some have noted that .... seems an inefficient protocol in the era of abundant high-speed network access. 5) Usenet was designed for the times when .... were much slower, and not always available.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Ви можете використовувати бази даних, бібліотечні каталоги та багато іншого в режимі онлайн, якщо підключитесь до мережі Інтернет. 2) Інтернет адреса може складатись як із слів, так і з цифр. 3) Бібліотечні каталоги – це найзагальніші інтернет-ресурси, доступні через програму Телнет. 4) Мільйони користувачів обмінюються інформацією через глобальну електронну дошку оголошень, яка називається Usenet News. 5) Повідомлення на Usenet зберігаються на центральних комп'ютерах, до яких потрібно під'єднатись, щоб прочитати ці повідомлення. 6) За допомогою чатів користувачі спілкуються між собою, друкуючи повідомлення в режимі реального часу.

**6. Make up sentences from the following words and word-groups:**

Model: steps, manufacturing, development, several, had, in, automated, its. - Automated manufacturing had several steps in its development.

1) To, its, a, must, Telnet, address, to, you, computer, know. 2) Web, available, the, Wide, Telnet, World, is, on. 3) Transfer, FTP, Protocol, for, File, stands. 4) electronic, a, News, board, is, bulletin, Usenet, system, global. 5) in, of, newsgroups, are, existence, Usenet, there, thousands. 6) a, rooms, Online, for, is, sponsoring, number, topical, America, well-known, of, chat.

***Grammar in Use***

## **Direct and Indirect Speech**

### ***1. Transform indirect commands changing direct speech into indirect one.***

1) The teacher said to me: "Enter the Internet, please". 2) "Explain to me how to solve this problem," said my friend to me. "Don't forget to turn the computer off," said the teacher to students. 3) "Promise to come and repair my computer," said Pete to his friend. 4) "Don't be afraid of using new software" he said to me. 5) Jane said to us: "Please tell me all about programming languages."

### ***2. Transform sentences changing direct speech into indirect one.***

1) The teacher said to us: "When we write in a symbolic language programs require the translation into the machine language. " 2) He answered: "Analog computers simulate physical systems." 3) They asked: "What represents other physical quantities in analog computers?" 4) He asked: "Do digital computers count rather than measure?" 5) She asked: "Who designs computers for many different applications?" 6) We asked the teacher: "What functions do all computer systems perform?" 7) Oleg said to me: "Will you surf the net tomorrow?" 8) I said to Mike: "Have you bought the new hardware today?"

## **Additional Text (for individual work)**

***Read and translate the text.***

### **World Wide Web**

The World Wide Web (abbreviated as the Web or WWW) is a system of Internet servers that support hypertext to access several Internet protocols on a single interface. Almost every protocol type available on the Internet is accessible on the Web. This includes e-mail, FTP, Telnet, and Usenet News. In addition to these, the World Wide Web has its own protocol: Hyper Text Transfer Protocol, or HTTP. The World Wide Web provides a single interface for accessing all these protocols. This creates a convenient and user-friendly environment. The Web gathers together all protocols into a single system. Because of this feature, and because of the Web's ability to work with multimedia and advanced programming languages, the World Wide Web is the fastest-growing component of the Internet. The operation of the Web relies primarily on hypertext as its means of information retrieval. Hyper Text is a document containing words that connect to other documents. These words are called links and are selectable by the user. A single hypertext document can contain links to many documents. In the context of the Web, words or graphics may serve as links to other documents, images, video, and sounds. Producing hypertext for the web is accomplished by creating documents with a language called Hyper Text Markup Language, or HTML. The World Wide Web

consists of files, called pages or home pages, containing links to documents and resources throughout the Internet.

The Web provides a vast array of experiences including multimedia presentations, real-time collaboration, interactive pages, radio and television broadcasts, and the automatic “push” of information to a client computer. Programming languages such as Java, JavaScript and Visual Basic are extending the capabilities of the Web. An increasing amount of information on the Web is served dynamically from content stored in databases. The Web is therefore not a fixed entity, but one that is in a constant state of flux.

- 1. Divide the text into the logical parts and give a title to each one.*
- 2. Put questions to the text.*
- 3. Discuss it with your groupmates.*

## Unit 4

### Text Study. Online Services

**Additional Text. Microsoft Internet Explorer.**

**Grammar: Impersonal Sentences.**

### Text Study

#### *I. Pre-reading Exercises*

#### *1. Repeat the words in chorus:*

Particular, entirely, subjective, judgments, to judge, advantages, elsewhere, to be interlinked, circuit, multiplexor, incompatible.

#### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Files, absolute, individual, product, electrical, signal, code, telephone, microphone, modem, channel, control, protocols.

#### *3. Pay attention to some grammatical points:*

1) Still users **tend to be loyal** to their ‘home’ online service - which is usually the first online service they ever used. 2) Keep an open mind **when checking out** an online service. 3) **It takes** a couple of sessions **to shake** preconceived notions of what an online service ‘should’ be.

#### *II. Reading*

***Read the text and be ready to find in the text the answers to the following questions:***

- What is the best online service?*
- What online services do you know?*

### Online Services

Many people ask which online is ‘best’, but the answer is there is no best. Rating of a particular service over another is entirely subjective. Price is important to some people, while the number of files available for download is important to others. Because of these and so many other different judgments,

there can be no absolute. It all comes down to individual needs and preferences.

Still users tend to be loyal to their 'home' online service - which is usually the first online service they ever used. They tend to judge all other online services based on this first service - often preventing themselves from seeing the advantages of a specific service. There are many online services. Each offers one or more products or features that either do not exist elsewhere or are superior to the same features on other services.

So the real answer to the question is simple: the best online service is the service that has what you want and is easy for you to use. Keep an open mind when checking out an online service. Judge is based on what it offers and how it meets your needs - not in comparison to what you are used to using. It takes a couple of sessions to shake preconceived notions of what an online service 'should' be. Eventually, we are all going to be interlinked, no matter which service we use. Until then, most of us have to go to more than one service to find everything we need.

### **Data Transmission**

**An acoustic coupler** converts the electrical signals from the computer into a coded sound signal which is picked up by the telephone microphone. It then works as a modem.

**A modem** can convert a digital bit stream into an analog signal over an analog communication channel (telephone circuit). It then converts incoming analog signals back into digital signals.

**A cluster controller** may control several terminals in one location, connecting each of them to a modem. This connection is made on a shared line basis.

**A multiplexor** receives multiple signals from various terminals and combines them in dataframes for transmission on a single high-speed line to the computer. In the computer the dataframes are then separated again.

**A gateway** interconnects two or more networks, enabling data transfers to be made. It may act as a translator between incompatible networks, protocols, or software.

### *Vocabulary Notes*

**rating** ['reItIN] — оцінка

**subjective** [sqb'GekIv] — суб'єктивний

**judgment** ['GAGmqnt] — судження

**to come down** — зводити(сь), доходити до

**preferences** ['prqfqrqnsIz] — вподобання

**to tend to** — схилитися, мати тенденцію

**loyal** ['lOIql] — вірний, відданий

**to prevent** [prI'vent] — запобігати

**elsewhere** [ 'els'wFq ] — (десь) в іншому місті  
**superior to** [ sʃH'pIqrIq ] — перевершувати (щось)  
**in comparison to** [ kqm'pxrIsn ] — порівняно з  
**preconceived** [ 'prJkqn'sJvd ] — складений заздалегідь  
**eventually** [ I'venCqlI ] — в результаті, в кінцевому рахунку, зрештою  
**acoustic coupler** [ q'kHstIk 'kAplq ] — акустичний з'єднувач  
**modem** — модем  
**telephone circuit** [ 'sWkIt ] — телефонна мережа  
**cluster controller** [ 'klAstq 'kqn'trqulq ] — контролер кластера  
**multiplexor** [ 'mAltI"plFksq ] — мультиплексор (multiplexor, multiplexer, MUX) - прилад, який об'єднує кілька вузькосмугових (низькошвидкісних) комунікаційних каналів у широкосмуговий або високошвидкісний канал.  
**dataframe** — широкосмуговий канал  
**gateway** [ 'geItweI ] — міжмережовий шлюз (програмно-апаратний засіб, який реалізує трансляцію одного мережного протоколу в інший, що дозволяє об'єднати мережі з різними протоколами, і завдяки чому між ними стає можливий обмін даними).  
**incompatible** [ "Inkqm'pxtqbl ] — несумісний

### **Comprehension**

#### **1. Tell what sentences are true and what are false.**

1) Rating of a particular service over another is quite objective. 2) Users want to change their 'home' online service to more convenient one. 3) Very often users don't want to see the advantages of another service. 4) The service that has what you want and is easy for you to use, is considered to be the best one. 5) We needn't use more than one service to find everything we need. 6) A modem can convert incoming analog signals back into digital signals. 7) A cluster controller may act as a translator between incompatible networks, protocols, or software.

#### **2. Choose the right answer:**

- 1) What is the attitude of users to their 'home' online service?
  - a) they tend to change the best one;
  - b) they tend to be loyal;
  - c) they don't care.
- 2) What should be taken into consideration while choosing a service?
  - a) you should know what the service offers and how it meets your needs;
  - b) you should know which online is 'best';
  - c) you should know the advantages of a specific service.
- 3) Can one online service satisfy all our needs?
  - a) most of us have to be loyal to our 'home' online service;

- b) most of us have to prevent ourselves from seeing the advantages of a specific service;
- c) we should go to more than one service to find everything we need.
- 4) How does an acoustic coupler operate?
- a) it combines the electrical signals in dataframes for transmission on a single high-speed line;
- b) it converts the electrical signals from the computer into a coded sound signal;
- c) it converts a digital bit stream into an analog signal.
- 5) How does a cluster controller operate?
- a) it converts incoming analog signals back into digital signals.
- b) it operates as a translator between incompatible networks;
- c) it controls several terminals in one location, connecting each of them to a modem.
- 6) How does a gateway operate?
- a) it separates dataframes;
- b) it interconnects two or more networks;
- c) it works as a modem.

### **3. Complete the sentences:**

1) The users tend to judge ... . 2) Each online service offers ... . 3) The best online service is ... . 4) Keep an open mind when ... . 5) Most of us have to go to more than one service to ... . 6) A modem can ... . 7) A multiplexor receives ... .

### **4. Answer the questions:**

1) Why is the question about the 'best' online service rather debatable? 2) Why do users tend to be loyal to their 'home' online service? 3) What must you take into account when checking out an online service? 4) Why should we go to more than one service? 5) What devices of data transmission do you know? 6) How does a modem operate? 7) How does a multiplexor operate? What device may act as a translator between incompatible networks?

### **5. Find as quickly as possible and read out the sentences containing the following important information:**

- the best online service;
- Data Transmission.

### **\*6. Try to tell the gist of the text.**

#### **Word Study**

#### **1. Give Ukrainian equivalents of the following.**

Available for download, online service, to be superior, a couple of sessions, to convert electrical signals, to work as a modem, a digital bit stream,

telephone circuit, a cluster controller, terminals in one location, a shared line basis, multiple signals, to combine in dataframes, to enable data transfers.

**2. Give English equivalents of the following.**

Змінити на більш зручну (послугу), переваги послуги, особисті потреби і вподобання, різні судження, бути легким у використанні, бути взаємопов'язаним, передача даних, перетворювати електросигнали на закодовані звукові (сигнали), мікрофон телефону, аналоговий сигнал, перетворювати вхідні сигнали, отримувати множинні сигнали, високошвидкісна лінія, несумісне програмне забезпечення.

**3. Match the words in A with their synonyms in B:**

**A**

many  
people  
particular  
number  
individual  
usually  
to see  
each  
to offer  
to want  
interlinked

**B**

every  
personal  
interconnected  
a lot of  
men  
certain  
to desire  
quantity  
to watch  
as a rule  
to suggest

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*Dataframe / multiplexor / gateway / modem / telephone circuit / signal*

1) A modulator-demodulator, called a ....., is a device that modulates an analog carrier signal to encode digital information, and also demodulates such a carrier signal to decode the transmitted information. 2) The goal of a modem is to produce a .... that can be transmitted easily and decoded to reproduce the original digital data. 3) In telecommunications, a .... is a device that combines several input information signals into one output signal, which carries several communication channels, by means of some multiplex technique. 4) A single-user circuit on a telephone communication system is called a ... . 5) The activities of a .... are more complex than that of the router or switch as it communicates using more than one protocol and can operate at any network layer. 6) A .... may be used to drive the creation of new content, applications, or infrastructure enhancements.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Існує багато суджень щодо того, яка онлайн послуга є найкращою. 2) Люди часто не бачать переваг інших онлайн послуг. 3) Завжди пильнуйте, що пропонує вам певна онлайн послуга і як це відповідає вашим потребам. 4) більшість людей користується більш ніж однією онлайн послугою. 5) Прилад, який може об'єднувати кілька вузькосмугових комунікаційних каналів у широкосмуговий канал називається мультиплексором. 6) Міжмережевий шлюз – це засіб, який реалізує трансляцію одного мережного протоколу в інший, і дозволяє об'єднати мережі з різними протоколами.

**6. Make up sentences from the following words and word-groups:**

**Model:** steps, manufacturing, development, several, had, in, automated, its. - Automated manufacturing had several steps in its development.

1) 'home', to be, users, their, to, loyal, online, tend, service. 2) services, are, online, there, many. 3) what, the, is, service, you, the, service, online, that, has, want, best. 4) be, we, to, are, all, going, interlinked. 5) we, of, one, us, go, to, than, more, service, have to, to, most, find, need, everything. 6) a, digital, modem, incoming, analog, into, signals, converts, back, signals. 7) the, in, the are, dataframes, then, again, separated, computer. 8) or, may, networks, act, translator, a, between, incompatible, gateway, protocols, software.

**Grammar in Use**

**Impersonal Sentences**

**1. Translate impersonal sentences. Pay attention to their structure.**

1. *It* is well known that personal computers enjoy great popularity among experimenters and hobbyists.

2. *It* took years to produce a high-speed computer performing a lot of functions.

3. When making up the summary of the text *one* should put down the exact title of the article, the author's name and the date of the edition.

4. *It* is difficult to imagine modern life without a computer.

5. *It* is quite impossible to listen to your English pronunciation: you make bad mistakes while reading.

6. Concerning these substances *one* must say that they vary in their composition.

7. When working with these substances *one* should be very careful.

8. *It* was once a universal practice to manufacture each of the components separately and then assemble the complete device by wiring (монтаж) the components together with metallic conductors.

9. *It* was no good: the more components and interactions, the less reliable the system.

10. It should I first be made clear what the term "microelectronics" means.

**Additional Text**  
**(for individual work)**

*Read and translate the text.*

**Microsoft Internet Explorer**

Microsoft is well known for its ability to create attractive, eye-pleasing applications. Moreover, such products are designed for easy use to allow even the most intimidated individual to grasp the basic concepts within a few hours. In this respect, Microsoft has evolved much in the same way as Apple Computer. Consider, for example, the incredible standardization of design that is imposed on products for use in the Microsoft environment. In the Microsoft world, menus must be at least somewhat consistent with general Windows design. Thus, almost any application designed for Microsoft Windows will have a list of menus that can across the top of the program. Three menu choices that you will invariably see are File, Edit and Help (other menu choices that are still very popular but appear less frequently include View, Tools, Format, and so forth). In other words, if you know one Microsoft program, you know them all.

Microsoft has thus created its own standards in a market. Microsoft has revolutionized the PC computing world. Furthermore, because Microsoft products are so popular worldwide, programmers rush to complete applications for use on the Microsoft platform. Moreover, Microsoft has put much effort in to application integration and interoperability. That means an Excel spreadsheet will drop into a Word document, an Access database will interface with a Visual basic program, and so on. All Microsoft products work in an integrated fashion. Microsoft designed its products with components that meet certain criteria. Each of these applications contain building blocks that are recognizable by the remaining applications. Each can call its sister applications through a language that is common to them all. This system gives the user an enormous amount of power.

Unfortunately, however, it also makes for poor security. Internet Explorer was designed with this interoperability in mind. For example, Internet Explorer was more integrated with the Windows operating system than, say, Netscape's Navigator. Mr. Gates undoubtedly envisioned a browser that would bring the Internet to the user's desktop in the same manner as it would a local application. In other words, Internet Explorer was designed to bring the Internet to the user in a form that is easy to understand, navigate, control.

In a period of less than two weeks in early 1997, Internet Explorer was discovered to have three serious security bugs:

Students at a university in Maryland found that they could embed an icon on a Web page that would launch programs on the client user's computer. Microsoft posted a public advisory on its WWW site. In it, the company explained: If a hacker took advantage of this security problem, you could see an icon or a graphic in a Web page, which is, in fact, within a regular Window 95 folder of the Web site server or your computer. The hacker could shrink the frame around the icon or graphic so that you would think it was harmless, when in fact it allows you or anyone else to open, copy, or delete the file, or run a program that could, if the author has malicious intent, damage your computer. You can launch the program because the folder bypasses the Internet Explorer security mechanism.

Several sources determined that one could launch programs on the client's machine by pointing to either a URL or an LNK file.

Folks at A.L. Digital, a London-based firm, determined that Microsoft's Internet Explorer contained a bug that would allow a malicious Java applet to steal, corrupt, or otherwise alter files on the client's machine.

Dirk Balfanz and Edward Felten of Princeton University wrote in August 1996: "We have discovered a security flaw in Microsoft's Internet Explorer browser running under Windows 95. An attacker could exploit the flaw to run any DOS command on the machine of an Explorer user who visits the attacker's page. For example, the attacker could read, modify, or delete the victim's files, or insert a virus or backdoor entrance into the victim's machine".

The risk represented here is tremendous.

It is clear that, for the moment, Microsoft Internet Explorer is still cutting its teeth in terms of Internet security. What makes the problem especially serious is that only those users who are truly security aware receive such information as breaking news. The majority receive such information from third parties, long after holes have been discovered. This is of major concern because nearly all of the holes found in Internet Explorer have been Class A.

***1. Divide the text into the logical parts and give a title to each one.***

***2. Put questions to the text.***

***3. Discuss it with your groupmates.***

## **Progress Check**

***Choose the right answer:***

1) Who develops technical aspects of the Internet?

- a) government; b) private organizations; c) special computers; d) programmers; e) designers.
- 2) What architecture do computers on the Internet use?  
a) a TCP/IP architecture; b) an input/output architecture; c) a client/server architecture; d) different architecture; e) complex architecture.
- 3) When did public Internet start?  
a) in the late 70's; b) 25 years ago; c) in 1981; d) 30 years ago; e) in the late 80's.
- 4) How can you find information you need in the network?  
a) by using e-mail; b) by using a search program; c) by using special computers; d) by using word processor; e) by using special keys.
- 5) What is Rambler?  
a) a broadband connection; b) dialup service; c) a search program; d) a computer system; e) a computer language.
- 6) Why is e-mail service so popular?  
a) because no governing body is in control; b) because it is cheaper than ordinary mail and much quicker;  
c) because it's a huge database of knowledge; d) because people have not any other similar service; e) because it's very smart.
- 7) What is the most important problem of e-mail service?  
a) security; b) Internet traffic; c) browser; d) availability; e) variety.
- 8) Why do we use networked hypertext?  
a) to facilitate surfing a net; b) to facilitate communication; c) to facilitate searching information; d) to simplify our work; e) to work hard.
- 9) What are Internet protocols?  
a) sets of rules; b) programming languages; c) binary files; d) definitions; e) rules.
- 10) What is the function of E-mail?  
a) incorporation of graphics; b) distribution of electronic messages; c) intermachine communication; d) writing letters; e) receiving letters.
- 11) What is necessary to do to Telnet to a computer?  
a) to connect to a specific port; b) to know its address; c) to transfer files; d) to be computer literate; e) to have a computer.
- 12) Where is Telnet available?  
a) on the site; b) on the personal computer account; c) on the World Wide Web; d) on your e-mail; e) everything.
- 13) How many Usenet newsgroups are there in existence?  
a) thousands of them; b) millions of them; c) a few of them; d) only one; e) two of them.

14) Where are Usenet messages stored?

a) in the “chat room”; b) in the library catalogs; c) on central computers; d) at home computer; e) everywhere.

15) What is the attitude of users to their ‘home’ online service?

a) they tend to change the best one; b) they tend to be loyal; c) they don’t care; d) they dislike it; e) they hate it.

16) What should be taken into consideration while choosing a service?

a) what the service offers and how it meets your needs; b) you should know which online is ‘best’; c) you should know the advantages of a specific service; d) you should know high level computer languages; e) you should know low level computer languages;

17) Can one online service satisfy all our needs?

a) most of us have to be loyal to our ‘home’ online service; b) most of us have to prevent ourselves from seeing the advantages of a specific service; c) we should go to more than one service to find everything we need; d) we should know at least one of them; e) it isn’t necessary to use the online services.

18) How does an acoustic coupler operate?

a) it combines the electrical signals in dataframes for transmission on a single high-speed line; b) it converts the electrical signals from the computer into a coded sound signal; c) it converts a digital bit stream into an analog signal; d) it operate without any problems; e) it combines the electrical signals in dataframes for transmission on a single low-speed line.

19) How does a cluster controller operate?

a) it converts incoming analog signals back into digital signals; b) it operates as a translator between incompatible networks; c) it controls several terminals in one location, connecting each of them to a modem.; d) it converts incoming analog signals ahead to digital signals; e) it operates as a connector between incompatible networks.

20) How does a gateway operate?

a) it separates dataframes; b) it interconnects two or more networks; c) it works as a modem; d) it works as a printer; e) it operates as a display.

# Module VII

## Automation

### Unit 1

**Text Study. Automation.**

**Additional Text. At an Automatic Plant.**

**Grammar. Noun.**

#### Text Study

##### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Manufacturing, simplification, environment, dangerous, numerically, especially, signaling, agriculture, nevertheless, workpiece, feedback, computer-aided design, computer-aided manufacture.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Machine, operation, control, system, automobile, product, pilot, telephone, mechanization, robot, to manipulate, function, method, principle, thermostat, magnetic, microprocessor, computer, centre.

##### *3. Pay attention to some grammatical points:*

1) The simplification of work **made it possible to design** and build machines that resembled the motions of the worker. 2) Industrial **robots, originally designed only to perform simple tasks in environments dangerous to human workers**, are now widely used to transfer, manipulate, and position both light and heavy workpieces performing all the functions of a transfer machine. 3) **When using these systems** a designer draws a part and indicates its dimensions with the help of a mouse, light pen, or other input device. 4) **After the drawing has been completed** the computer automatically gives the instructions that direct a machining centre to machine the part.

#### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What were industrial robots originally designed?*
- *What principle is used in all automatic-control mechanisms?*
- *What enabled the development of computer-aided design and computer-aided manufacture technologies?*

#### **Automation**

Automation is performing certain tasks, previously done by people, by machines only. The sequences of operations are controlled automatically. The most familiar example of a highly automated system is an assembly plant for automobiles or other complex products.

The term automation is also used to describe nonmanufacturing systems in which automatic devices can operate independently of human control. Such devices as automatic pilots, automatic telephone equipment and automated control systems are used to perform various operations much faster and better than could be done by people.

Automated manufacturing had several steps in its development. Mechanization was the first step necessary in the development of automation. The simplification of work made it possible to design and build machines that resembled the motions of the worker. These specialized machines were motorized and they had better production efficiency.

Industrial robots, originally designed only to perform simple tasks in environments dangerous to human workers, are now widely used to transfer, manipulate, and position both light and heavy workpieces performing all the functions of a transfer machine.

In the 1920s the automobile industry for the first time used an integrated system of production. This method of production was adopted by most car manufacturers and became known as Detroit automation.

The feedback principle is used in all automatic-control mechanisms when machines have ability to correct themselves. The feedback principle has been used for centuries. An outstanding early example is the flyball governor, invented in 1788 by James Watt to control the speed of the steam engine. The common household thermostat is another example of a feedback device.

Using feedback devices, machines can start, stop, speed up, slow down, count, inspect, test, compare, and measure. These operations are commonly applied to a wide variety of production operations.

Computers have greatly facilitated the use of feedback in manufacturing processes. Computers gave rise to the development of numerically controlled machines. The motions of these machines are controlled by punched paper or magnetic tapes. In numerically controlled machining centres machine tools can perform several different machining operations.

More recently, the introduction of microprocessors and computers has made possible the development of computer-aided design and computer-aided manufacture (CAD and CAM) technologies. When using these systems a designer draws a part and indicates its dimensions with the help of a mouse, light pen, or other input device. After the drawing has been completed the computer automatically gives the instructions that direct a machining centre to machine the part.

Another development using automation are the flexible manufacturing systems (FMS). A computer in FMS can be used to monitor and control the operation of the whole factory.

Automation has also had an influence on the areas of the economy other than manufacturing.

Many industries are highly automated or use automation technology in some part of their operation. In communications and especially in the telephone industry dialing and transmission are all done automatically. Railways are also controlled by automatic signaling devices, which have sensors that detect carriages passing a particular point. In this way the movement and location of trains can be monitored.

#### *Vocabulary Notes*

**automation** [ˈLtq'meISqn] — автоматизація

**previously** [ˈprJvjqsI] — раніше, попередньо

**sequence** [ˈsJkwqns] — послідовність

**aid** [eId] — допомога

**handling** [ˈhxndIIN] — робота, обробка; переміщення, транспортування

**to substitute** [ˈsAbstItjHt] — замінювати

**to resemble** [rI'zembl] — бути схожим, нагадувати (когось/щось)

**simplification** [ˈsImplIfI'keISqn] — спрощення

**to monitor** [ˈmOnItq] — контролювати

**sensor** [ˈsensq] — датчик, сенсор

**assembly** [q'semblI] **plant** — складальний завод

**nonmanufacturing** [ˈnOnˈmxnju'fxkCqrIN] — невіробничий

**efficiency** [I'fISqnsI] — ефективність

**steam engine** — парова машина, паровий двигун

**household thermostat** [ˈTWmqstxt] — побутовий термостат

**facilitate** [fq'sIlIteIt] — сприяти, полегшувати

**punched** [pAnCqd] — перфорований

**feedback** — зворотний зв'язок, зворотне живлення

#### *Comprehension*

##### *1. Tell what sentences are true and what are false.*

1). An assembly plant for automobiles is a well-known example of a highly automated system. 2). The term automation denotes manufacturing systems where automatic devices are controlled by people. 3). Mechanization was followed by the development of automation. 4). At the beginning of the XX century the automobile industry used an integrated system of production which was known as Detroit automation. 5) Mechanization has greatly facilitated the use of feedback in manufacturing processes. 6). Lately the introduction of microprocessors and computers has made possible the development of CAD and CAM technologies. 7). A computer in FMS can be

used to calculate data and perform the operation of the whole factory. 8). Many factories are highly automated or apply automation technology in all manufacturing processes.

**2. Choose the right answer:**

1). What is automation?

- a) performing certain tasks by people only;
- b) performing certain tasks by machines only;
- c) performing certain tasks by special mechanical devices.

2). What are automatic devices used for?

- a) to perform various operations instead of people;
- b) to control human work;
- c) to compete with people.

3). What were industrial robots originally designed for?

- a) to teach people;
- b) to perform the most complicated operations in industry;
- c) to perform simple tasks in environments dangerous to human workers.

4) What principle is used in all automatic-control mechanisms?

- a) the flyball principle;
- b) Detroit automation;
- c) the feedback principle.

5). What has made possible the development of CAD and CAM technologies?

- a) the introduction of automated systems;
- b) the introduction of microprocessors;
- c) the introduction of computers.

6). What is a computer in FMS used for?

- a) to monitor and control the operation of the whole factory.
- b) to operate in dangerous environments;
- c) to give the instructions for people.

**3. Complete the sentences:**

1) Automated manufacturing had several .... 2). The simplification of work made it possible to ... 3). Industrial robots are now widely used to ... 4). The feedback principle is used in ... 5). Using feedback devices, machines can ... 6). Computers gave rise to the development of ... 7). Automation has also had an influence on the areas of ...

**4. Answer the questions:**

1) How is the term automation defined in the text? 2) What is the most familiar example of automation given in the text? 3) What was the first step in the development of automation? 4) What were the first robots originally designed for? 5) What was the first industry to adopt the new integrated system of production? 6) What is feedback principle? 7) What do the

abbreviations CAM and CAD stand for? 8) What is FMS? 9) What industries use automation technologies?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- steps of the development of automated manufacturing;
- the feedback principle;
- computer-aided design and computer-aided manufacture technologies.

**\*6. Try to tell the gist of the text.**

### **Word Study**

**1. Give Ukrainian equivalents of the following.**

An assembly plant, independently of human control, telephone equipment, much faster and better, simplification of work, the motions of the worker, both light and heavy workpieces, household thermostat, to indicate the dimensions, input device, to have an influence.

**2. Give English equivalents of the following.**

Автоматичні пристрої, автоматизоване виробництво, виконувати прості задачі, інтегрована система виробництва, принцип зворотного зв'язку, пристрій може розганятися і гальмувати, комп'ютер автоматично посилає команди, високоавтоматизована система, невиробнича система.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
To perform	to begin
Manufacturing	way
Work	to do
To design	to calculate
Method	production
To use	to construct
To start	job
To count	to apply

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*Aid / controllers / sequence / handling / resemble / automated / feedback / efficiency*

1) A completely general-purpose machine can carry out any .... of instruction, any program which can be expressed exactly and translated into its command code. 2) Not a single stage or a sequence of operations, but a whole plant is completely .... 3) Nature thoughtfully provided our earliest ancestors with a simple .... of computation — a digital computer in the strictest sense of the word — copies of which may be seen in active use in any school-room where the youngest generation is counting on its fingers. 4) A revolution in

data .... is taking place. 5) Sensors attached to the machines, materials handling systems and package equipment will send data to programmable .... or microprocessors. 6) The robots of our time .... humans very little. 7) In business the computer is a means increasing administrative .... , sales, etc. 8) In assembly operations, the microprocessor-controlled robot with sensory .... capability performs the complex part and tool-handling tasks.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1). Автоматизація широко використовується на заводах по складанню кузовів автомобілів. 2). Обробка важких деталей може виконуватись роботами. 3). Спрощення конструкції призвело до зниження вартості продукції. 4). Комп'ютери можна використовувати щоб контролювати роботу станків. 5). Гнучка автоматизація дозволяє перепрограмувати обладнання. 6). Прилади із зворотнім живленням використовуються у багатьох видах виробничих процесів.

**6. Make up sentences from the following words and word-groups:**

**Model: steps, manufacturing, development, several, had, in, automated, its. - Automated manufacturing had several steps in its development.**

1) in, step, mechanization, necessary, the, was, automation, of, first, the, development. 2). have, the, manufacturing, of, facilitated, computers, in, feedback, greatly, processes, use. 3). the, gives, direct, computer, to, instructions, automatically, the, that, machine, a, machining, part, centre, the. 4). automation, many, of, industries, their, use, some, technology, part, in, operation. 5). are, some, to, service, automate, difficult, industries. 6). own, concept, each, has, of, its, automation, industry. 7). application, manufacturing, most, for, area, is, automation, of, the, important, one, technology.

**Grammar in Use**

**Noun**

**1. Make the following nouns plural.**

A person, a machine, an operation, an example, the plant, the product, a system, the equipment, the work, a robot, a workpiece, the industry, a method, the manufacture, a century, an engine, a thermostat, a tool, a microprocessor, the technology, a mouse, a device.

**2. Transform the following sentences into plural.**

1) This operation is controlled automatically. 2) The most familiar example of a highly automated system is an assembly plant. 3) An automated control system is used to perform this operation much faster and better than could be done by a man. 4) This specialized machine was motorized and it had better production efficiency. 5) The automobile industry for the first time used

an integrated system of production. 6) The feedback principle is used in the automatic-control mechanism when a machine has ability to correct itself. 7) A computer in a flexible manufacturing system can be used to monitor and control the operation of the whole factory.

**Additional Text**  
**(for individual work)**

*Read and translate the text.*

**At an Automatic Plant**

The future plant may well be situated tight in the centre of the residential district. The walls will be of metal and glass; there will be no smoke, soot or dust.

In a huge, light and busy plant machines produce a slight humming. No workers moving about among machines, only in a small control room two men are on duty. But in the main the factory runs itself.

The factory is fashioning machine tools from raw steel ingots. Huge rollers set to exact thickness flatten the ingots into sheets. Three-dimensional sensing devices "read" patterns for parts, then transducers convert this information into electrical energy. Amplifiers build up that energy so that it can run machines to shape, drill, and fasten together the parts.

Thousands of different individual machining operations are all done mechanically, and supervised by machines. While amplifiers can sense and correct tiny changes in speed or voltage which could cause errors, photo tubes can convert light into signals which count, sort, check, detect and judge quality. All operations man did in the past machines do now automatically.

You may say, this has been done for a long time on assembly lines in many factories and most of the individual steps are familiar. That is true, but the new thing is the size and completeness of the system. Not a single stage or a sequence of operations, but a whole plant is completely automated. These systems are described by the term "a closed loop", where a completely automatic, controlling device replaces the operator, and the whole process is carried out without human intervention. The computers keep track of supplies on hand, use of parts, tell how much to produce and check the output. The final information closes the loop of automation, and the kind of control is called feed-back.

But still much research work is to be done to perfect the system. It is essential to improve the quality of automation equipment as well as the programmes of the computers. A major problem is to better automate inspection, quality control, information system. For solid parts and automatic three-dimensional recognition system (size, shape and colour) tie problem still remains of greatest concern. With the increase of automation the scientist must

solve the problem of complex interaction groups of sensors tied together by a single system of computer network. The development of new flexible technologies and sociological problems involved need, of course, a new approach too.

So in the ultimate automated factory there will be few, if any, operators or quality control inspectors. Instead, sensors attached to the machines, materials handling systems and package equipment will consider the conditions within their range and send data to programmable controllers, computers or self-contained microprocessors. These units will process the data and send commands back through the system — all without human intervention.

*1. Divide the text into the logical parts and give a title to each one.*

*2. Put questions to the text.*

*3. Discuss it with your groupmates.*

## Unit 2

**Text Study. Automation and Mechanization.**

**Additional Text. Numerical Control.**

**Grammar. Adjective. Adverb.**

### Text Study

#### *1. Pre-reading Exercises*

*1. Repeat the words in chorus:*

Semiautomatic, lathes, unloading, transfer-machine, except, extensive, major, manufacturing, technique, in whole, petrochemicals, especially, quality

*2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Automation, muscle, mechanical, process, mechanization, Industrial Revolution, machines, automatic, physical, operate, control, history, engineering, components.

*3. Pay attention to some grammatical points:*

1) The first machines were not automatic; they performed many physical tasks but they **had to be operated and controlled** by workers. 2) The machines **have widened** the range of operations that **can be performed** automatically and they **have mechanized** some loading and unloading of machines. 3) One of the factors for the industrial engineer **to consider is** whether each manufacturing process can be automated in whole or in part. 4) During the Middle Ages, windmills **had been made** to turn by taking advantage of changes in the wind **by means of** devices that worked automatically.

## ***II. Reading***

***Read the text and be ready to find in the text the answers to the following questions:***

- *What is 'mass production techniques'?*
- *What factors should the industrial engineer consider in the process of manufacturing?*

### **Automation and Mechanization**

In so far as automation replaces human muscle by mechanical power, it continues a process of mechanization which began before the Industrial Revolution two centuries ago. The first machines were not automatic; they performed many physical tasks but they had to be operated and controlled by workers. But semiautomatic machines were invented early in the history of mechanization; they were, for instance, the textile machines and, later on, the lathes widely employed in engineering. These machines performed automatically, once they were set and loaded, and they confined human operator to two kinds of work, the unskilled work of loading and unloading, and the skilled work of setting and maintaining machines. Since then technical development has been gradual and continuous. They have greatly widened the range of operations that can be performed automatically and they have mechanized some loading and unloading of machines. Perhaps the best and most recent example is the transfer-machine in engineering, it combines automatic machining with automatic transfer between operations, so that all loading and unloading is done mechanically except at the beginning and end of the line. There have also been extensive developments in the handling of materials and components between processes and in the mechanical assembly of simple components.

A major advance in twentieth century manufacturing was the development of mass production techniques. Mass production refers to manufacturing processes in which an assembly line, usually a conveyer belt moves the product to stations where each worker performs a limited number of operations. In the automobile assembly plant such systems have reached a highly-developed form.

One of the factors for the industrial engineer to consider is whether each manufacturing process can be automated in whole or in part. Automation is a word coined in the 1940s to describe processes by which machines do tasks previously performed by people. The word was new but the idea was not. We know of the advance in the development of steam engines that produced automatic valves. Long before that, during the Middle Ages, windmills had been made to turn by taking advantage of changes in the wind by means of devices that worked automatically.

Automation was first applied to industry in continuous-process manufacturing such as refining petroleum, making petrochemicals, and refining steel. A later development was computer-controlled automation of assembly line manufacturing, especially those in which quality control was an important factor.

### *Vocabulary Notes*

**replace** — замінювати

**semi-automatic** ['semI'Ltq'mxtIk] — напівавтоматичний;

**lathe** [leID] — токарний верстат; employ застосовувати, використовувати;

**load** — навантажувати;

confine [kqn'faIn] — обмежувати;

**skilled** [skIld] — кваліфікований;

**setting** — регулювання, вмикання, встановлення;

**maintaining** — обслуговування;

**transfer-machine** — автоматична складальна лінія;

**extensive** [Iks'tensIv] — обширний;

**industrial engineer** [In'dAstrIql'enGI'nIq] — інженер-технолог;

**manufacturing** ["mxnju'fxkCqrIN] — виробництво;

**assembly** [q'semblI] **line** — складальний конвеєр;

**conveyer** [kqn'veIq] **belt** — стрічка конвейера;

**increase** [In'krJs] — збільшувати;

**efficient** [I'fISqnt] — ефективний, продуктивний;

**coin** — утворювати нові слова;

**advance** [qd'vRns] — прогрес;

**valve** [vxlv] — клапан;

**refining** [rI'faInIN] — очищення, підвищення якості;

**chain-drive** — ланцюговий привід, передача.

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) In so far as automation replaces human muscle by mechanical power, it continues a process of mechanization which has begun just now. 2) Semiautomatic machines were invented at the beginning of the 21-st century. 3) The transfer-machine in engineering combines automatic machining with automatic transfer between operations, so that all loading and unloading is done by human muscles except at the beginning and end of the line. 4) Automation is a word coined in the 1940s to describe processes by which people do tasks previously performed by machines. 5) Windmills had been made to turn by taking advantage of changes in the water by means of devices that worked

automatically. 6) A later development was human-controlled automation of assembly line manufacturing, especially those in which quality control was an important factor. 7) Mass production refers to manufacturing processes in which an assembly line, usually a conveyer belt moves the product to stations where each worker performs an unlimited number of operations.

**2. Choose the right answer:**

- 1). How does automation replace human muscle?
  - a) by physical power;
  - b) by mechanical power;
  - c) by electrical power.
- 2). When were semiautomatic machines invented?
  - a) just now;
  - b) before the Industrial Revolution;
  - c) in the 1940s;
  - d) early in the history of mechanization.
- 3). What is the best and most recent example in engineering?
  - a) lathe;
  - b) valve;
  - c) transfer-machine;
  - d) conveyer belt.
- 4). When did the word automation coin?
  - a) in the Middle Ages;
  - b) in the 1940s;
  - c) in the twentieth century.
- 5). Where was automation first applied?
  - a) in continuous-process manufacturing;
  - b) in machine building;
  - c) in food industry.

**3. Complete the sentences:**

1) In so far as automation replaces human muscle by mechanical power ... . 2) Semiautomatic machines were, for instance, ... . 3) They have greatly widened the range of ... . 4) Perhaps the best and most recent example of automatic machines is ... . 5) Mass production refers to ... . 6) One of the factors for the industrial engineer to consider is ... . 7) Automation is a word ... . 8) During the Middle Ages, windmills had been made to ... . 9) A later development of automation was ... .

**4. Answer the questions:**

1) When did the process of mechanization begin? 2). Describe the first machines. 3). When were semi-automatic machines invented? How did they work? 4). How did technical development continue? 5). What machine

combines automatic machining with automatic transfer between operations?

6). In what spheres of mechanization do extensive developments take place?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- semiautomatic machines
- the word 'automation'
- application of automation

**\*6. Try to tell the gist of the text.**

### **Word Study**

**1. Give Ukrainian equivalents of the following.**

Human muscle; loading and unloading of machines; mechanical power; automatic transfer; physical tasks; to extensive developments; unskilled work; the range of operations, major advance; to do tasks; limited number of operations; performed by people; to increase productivity; automatic valves; industrial engineer; by means of devices; manufacturing process; making petrochemicals; computer-controlled automation.

**2. Give English equivalents of the following.**

Механічна сила, фізична робота, кваліфікована робота, напівавтоматичні машини, обмежувати, обслуговування машин, розширювати діапазон операцій, механізувати навантаження та розвантаження, автоматична складальна лінія, обробка матеріалів, механічне складання, стрічка конвеєра, в цілому чи частково, парові двигуни, автоматичні клапани, вітряк, за допомогою пристроїв, довготривале виробництво, очищення бензину, контроль якості.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
human	start
power	fulfill
begin	type
perform	qualified
for instance	as a rule
kind	person
skilled	force
usually	for example
great	idea
refining	extreme
thought	clearing

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*Assembly line/ to coin/ semiautomatic/ to confine/ manufacturing/ lathes/to perform*

1) Semiautomatic machines ... human operator to the unskilled work of loading and unloading, and the skilled work of setting and maintaining machines. 2) The ... were widely employed in engineering. 3) Mass production refers to manufacturing processes in which an ..., usually a conveyer belt moves the product to stations where each worker ... a limited number of operations. 4) ... machines were invented early in the history of mechanization. 5) Automation is a word ... in the 1940s to describe processes by which machines do tasks previously performed by people. 6) Automation was first applied to industry in continuous-process ... such as refining petroleum, making petrochemicals, and refining steel.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1. Перші машини не були автоматичними; вони виконували багато фізичних завдань, але робітникам треба було керувати ними і контролювати їх. 2. Напівавтоматичні машини було винайдено на початку ери механізації. 3. З того часу технічний розвиток був поступовим і тривалим. 4. Значно розширився діапазон операцій, які можна виконувати автоматично. 5. Слово "автоматизація" виникло в 1940 роки, щоб охарактеризувати процес виконання машинами завдань, які раніше виконували люди. 6. Автоматизацію вперше застосували у промисловості з безперервними процесами виробництва, такими як очищення нафти, виробництво нафтохімічних продуктів і підвищення якості сталі.

**Grammar in Use**  
**Adjective. Adverb.**

**1. Write Comparative and Superlative Degrees of the following adjectives and adverbs**

Far, many, early, late, wide, gradual, continuous, great, good, extensive, simple, high, new, important.

**2. Complete the table**

hard		
difficult		
	bigger	
	more effective	
		the most
		the cleverest
practical		
easy		

	more hazardous	
little		

### 3. Translate into English

1) Автоматизовані машини краще справляються з важкою та небезпечною роботою, ніж люди. 2) Подальший розвиток автоматизації відбувався протягом ХХ століття. 3) Повна автоматизація виробництва є такою ж важливою для промисловості, як і комп'ютеризація. 4) Найскладнішим завданням вчених є створення штучного інтелекту. 5) Розвиток механізації розпочався набагато раніше, ніж розвиток комп'ютерних наук. 6) Перші комп'ютери не були такими потужними, як сучасні і виконували набагато менше операцій.

#### **Additional Text (for individual work)**

*Read and translate the text.*

#### **Numerical Control**

Numerical control is a form of programmable automation in which a machine is controlled by numbers (and other symbols) that have been coded on punched paper tape or an alternative storage medium. The initial application of numerical control was in the machine tool industry, to control the position of a cutting tool relative to the work part being machined. The NC part program represents the set of machining instructions for the particular part. The coded numbers in the program specify x-y-z coordinates in a Cartesian axis system, defining the various positions of the cutting tool in relation to the work part. By sequencing these positions in the program, the machine tool is directed to accomplish the machining of the part. A position feedback control system is used in most NC machines to verify that the coded instructions have been correctly performed. Today a small computer is used as the controller in an NC machine tool. Since this form of numerical control is implemented by computer, it is called computer numerical control, or CNC. Another variation in the implementation of numerical control involves sending part programs over telecommunications lines from a central computer to individual machine tools in the factory. This form of numerical control is called direct numerical control, or DNC.

Many applications of numerical control have been developed since its initial use to control machine tools. Other machines using numerical control include component-insertion machines used in electronics assembly, drafting machines that prepare engineering drawings, coordinate measuring machines that perform accurate inspections of parts. In these applications coded numerical data are employed to control the position of a tool or workhead relative to some object. Such machines are used to position electronic components (e.g.,

semiconductor chip modules) onto a printed circuit board (PCB). It is basically an x-y positioning table that moves the printed circuit board relative to the part-insertion head, which then places the individual component into position on the board. A typical printed circuit board has dozens of individual components that must be placed on its surface; in many cases, the lead wires of the components must be inserted into small holes in the board, requiring great precision by the insertion machine. The program that controls the machine indicates which components are to be placed on the board and their locations. This information is contained in the product-design database and is typically communicated directly from the computer to the insertion machine.

1. *Divide the text into the logical parts and give a title to each one.*
2. *Put questions to the text.*
3. *Discuss it with your groupmates.*

## Unit 3

**Text Study. Automation and Labour.**

**Additional Text. Automated Production Lines.**

**Grammar. Conjunctions.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Knowledge, nowadays, scientific, to appear, throughout the world, qualitatively, to discharge, physiological, comprehensively, to lighten, designing, to require.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Principal, technological, progress, form, production, decade, control, publication, integrate, minimum, communication, radical, machine, function, mechanism, agent, regulation, intellectual, physiological, system, transport, organization, microprocessors.

##### *3. Pay attention to some grammatical points:*

1) Automatic control **was recognized to be** a new, progressive, independent branch of science and engineering. 2) Today **one cannot imagine** technical progress without automation. 3) **Emphasis should be made** that automation is not a mere extension of mechanization. 4) All the hydro-power plants in the country **have been** completely **automated**. 5) Modern means of automation **make it possible to** link up in a single complex the whole technological chain. 6) Needless to say, comprehensive automation **calls for** material inputs and time. 7) We consider **the FMS to be** the future of the automated factory.

## *II. Reading*

**Read the text and be ready to find in the text the answers to the following questions:**

- *What is "AUTOMATION"?*
- *What are the consequences of automation?*
- *What are the possibilities of modern means of automation?*

### **Automation and Labour**

It is a matter of common knowledge nowadays that the principal direction of the present-day scientific and technological progress consists in the revolution of mechanized forms of work through the automation of production.

Quite recently, only some decades ago, even the words "automation", "automatic control" seldom appeared on the pages of the press or scientific publications. In the early forties the position radically changed. Soon automatic control was recognized throughout the world to be a new, progressive, independent branch of science and engineering. Today one cannot imagine technical progress without automation.

Automation may be defined as "the accomplishment of a job by an integrated mechanism with a minimum assistance of any kind". In fact, automation is the integration of four independent compounds which have been linked together into a single process. These integral parts of automation are: transfer machining, automatic assembly, communication engineering and control engineering.

Emphasis should be made that automation is not a mere extension of mechanization, but a qualitatively new step in technological development. It brought about radical changes in the technological nature of the relationship between man and machine. In mechanization the function of the direct effect on the object of labour was transferred to the working mechanism. Here, man remained the principal agent of the technological process. He retained the functions of control, regulation, maintaining machines and direct intervention in production process. With the advent of automation these functions were transferred to the mechanical device. The automation of production enables man to operate machines with the help of other machines. Now machines discharge not only production but also intellectual, and in some cases even physiological functions.

Our country has many thousands of comprehensively mechanized and automated enterprises and workshops. The mechanized and automated production lines replace or lighten the work of a tremendous number of workers. All the hydro-power plants in the country have been completely automated. Annually hundreds of automated control systems go into operation

at industrial, agricultural, communication, trade and transport enterprises and organizations.

Modern means of automation make it possible to link up in a single complex the whole technological chain: machine designing, equipment and rigging, control of a technological process, control of the whole enterprise. This has been made possible due to the extensive development and mass production of new types of computer technology, from large computers to microprocessors.

Needless to say, comprehensive automation calls for material inputs and time. But the economic effect from the release of "living labour", the intensification of production, the higher quality of output and more flexible technology make up for the inputs, while, on the social plane, it gives opportunities for creative work by both the makers of this technology and its users.

Thus, now the main trend in automation is developing not merely automatic machines but entire technological processes and systems whose functioning excludes the direct involvement of men.

Such automated systems, called flexible manufacturing systems (FMS) are regarded by many experts as being the best way to meet the demands of industry. They consider the FMS to be the future of the automated factory, or at least the minimally manned factory.

The application of FMS requires advanced technical know-how.

#### *Vocabulary Notes*

**a matter of common knowledge** ['nOliG] — загальновідома справа;

**to consist in** — полягати (в чому-небудь)

**in the early** ['Wli] **forties** — на початку сорокових (років);

**emphasis** ['emfqsIs] **should be made** — необхідно наголосити (підкреслити);

**integral** ['IntIgrql] **part of automation** ["Ltq'meISqn] — невід'ємна частина автоматизації;

**with the advent** ['xdvent] **of automation** — з появою автоматизації;

**(machines) discharge** [dIs'CRG] **functions** — (машини) виконують функції;

**comprehensively mechanized** ["kOmprI'hensIvli 'mekqnaIzd] **and automated (enterprise)** — повністю механізоване та автоматизоване (підприємство);

**to go into operation** — починати діяти (працювати);

**needless to say...** — зайве казати, не кажучи;

**material input** — матеріальний внесок (витрати);

**flexible technology** ['fleksqbl tek'nOlqGI] — гнучка технологія;

**to make up (for)** — компенсувати, надолжувати (упущене);

**release** [rɪ'lɪʒs] **of "living labour"** ['leɪbɔ] — вивільнення робочої сили;

**flexible manufacturing systems (FMS)** — гнучкі автоматизовані системи

**advanced technical know-how** ['nɔvhaʊ] — високий технічний досвід.

### ***Comprehension***

#### ***1. Tell what sentences are true and what are false.***

1). Soon automatic assembly line was recognized throughout the world to be a new, progressive, independent branch of science and engineering. 2). In fact, automation is the integration of two mingled compounds which have been linked together into a single process. 3). Emphasis should be made that automation is a mere extension of mechanization. 4). With the advent of automation these functions were transferred to the mechanical device. 5). Now machines discharge only physiological functions. 6) The mechanized and automated production lines replace or lighten the work of a tremendous number of workers. 7) Modern means of automation make it possible to link up in a single complex the whole technological chain: machine manufacturing, equipment and rigging, organizing of a technological process, control of the whole production. 8) Thus, now the main trend in automation is developing merely automatic machines and automated processes and systems whose functioning includes the direct involvement of men. 9. They consider the FMS to be the future of the automated factory, or at least the minimally manned factory.

#### ***2. Choose the right answer:***

1) When did the words “automation”, “automatic control” appear on the pages of the press or scientific publications?

- a) yesterday;
- b) last year;
- c) some decades ago;
- d) in the Middle Ages.

2) Where did man remain the principal agent of the technological process?

- a) in automation;
- b) in science;
- c) in manufacturing;
- d) in mechanization.

3) What plants in the country have been completely automated?

- a) car-building plants;
- b) hydro-power plants;
- c) metallurgical plants;
- d) ship- building plants.

- 4) What makes it possible to link up in a single complex the whole technological chain?
- means of transportation;
  - means of engineering;
  - means of automation;
  - means of communication.
- 5) What does comprehensive automation call for?
- intensification of production;
  - technological process;
  - automated processes;
  - material inputs and time.

**3. Complete the sentences:**

1) The principal direction of the present-day scientific and technological progress consists in... . 2) Automation may be defined as ... . 3) The integral parts of automation are ... . 4) In mechanization the function of the direct effect on the object of labour was transferred to ... . 5) The automation of production enables man to ... . 6) The mechanized and automated production lines replace ... . 7) Modern means of automation make it possible to link up in a single complex ... . 8) Comprehensive automation calls for ... . 9) Now the main trend in automation is ... . 10) Flexible manufacturing systems (FMS) are regarded by many experts as ... .

**4. Answer the questions:**

1) What is the principal direction of the present-day scientific and technological progress? 2) Can one imagine technical progress today without automation? 3) What is automation? 4) Did the words "automation", "automatic control" appear recently or long ago? 5) What is the difference between mechanization and automation? 6) What are the integral parts of automation? 7) What does modern automation mean? 8) What is the basis of automation? 9) What is the economic effect of automation?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- automatic control;
- integral parts of automation;
- industrial application of automation;
- economic effect of automation.

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Nowadays, principal, direction, to consist, mechanized forms of work, some decades ago, throughout the world, branch of science, integration, parts

of automation, automatic assembly, extension, qualitatively new step, radical changes, the principal agent, maintaining, mechanical device, to enable, to lighten the work, tremendous, means of automation, output, creative work, demands of industry.

### **2. Give English equivalents of the following.**

Головний напрямок, технологічний прогрес, механізовані форми роботи, рідко, визнавати в усьому світі, незалежна галузь науки, єдиний процес, якісно новий крок, радикальні зміни, об'єкт праці, з появою автоматизації, психологічні функції, підприємство, механізовані та автоматизовані виробничі лінії, полегшувати роботу, щорічно, торгові та транспортні підприємства, засоби автоматизації, системи контролю, обладнання, вимагати, компенсувати витрати, творча робота, вимоги промисловості, застосування гнучких автоматизованих систем.

### **3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
Principal	work
Seldom	publications
Independent	rarely
Mechanism	comprehensively
tremendous number	to call for
articles	main
job	free
absolutely	device
to demand	great amount

### **4. Fill in the gaps with the words from the box in the appropriate form.**

*To lighten/automatic assembly/ FM/, automatic control/ to retain/ to demand*

1) ... is a progressive independent branch of science and engineering. 2) The integral parts of automation are: transfer machining, ..., communication engineering and control engineering. 3) The man ... the functions of control, regulation, maintaining machines and direct intervention in production process. 4) The mechanized and automated production lines ... the work of a tremendous number of workers. 5) The comprehensive automation ... material inputs and time. 6) The experts consider the ... to be the future of the automated factory.

### **5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Автоматизація — шлях до інтенсифікації виробництва. 2) У світі здійснюється широка програма автоматизації виробництва в різних галузях промисловості. 3) Сьогодні вже діє на основі ЕОМ багато тисяч автоматизованих і автоматичних систем управління (АСУ). 4) Сучасні

умови роботи в промисловості часто роблять неможливим ручне (неавтоматизоване) управління виробничими процесами. 5) АСУ керують різними технологічними процесами на промислових підприємствах, в установах. Вони також виконують завдання економічного забезпечення та контролю виробництва, здійснюють різні вимірювання та дослідження виготовленої продукції. 6) Автоматизація полегшує працю людини, створює умови для її творчості й всебічного гармонійного розвитку.

### *Grammar in Use*

#### **Conjunctions**

**1. Translate the following sentences paying attention to the meaning of the word “since”:**

*Note: since adj* – 1) оскільки; 2) з того часу як

*since prep* – з, після; *since adv* – з того часу, тому назад

1. **Since** the first rocket appeared many changes have taken place in this field of science. 2. The unit of measure for frequency is seconds **since** time is the only unit of measure. 3. **Since** the jet engine is a powerful source of energy, it is widely used for machines flying at supersonic speed 4. Many other discoveries have been made **since** radioactivity was discovered. 5. Oxygen has been known **since** the 18<sup>th</sup> century. 6. Copper is the metal commonly used as a conductor **since** it combines high conductivity with comparatively low cost. 6. Since the time of Galileo and Newton, knowledge concerning the universe has increased rapidly. 7. Now we can say what electricity is **since** modern development gave us the electron theory. 8. Large deposits of molybdenum were discovered in this country in 1934, its commercial development has been rapid **since**.

**2. State parts of speech the words in bold type belong to. Translate the sentences into Ukrainian taking into account different meanings of the word “provide”:**

*Note: provide v* – забезпечувати, давати

*to provide for* – передбачати

*provided (that) cj* – при умові, що; якщо тільки

*providing cj* - при умові, що; якщо тільки

1. This investigation **provided** new methods for creating new synthetic materials. 2. **Provided** this synthetic fibre is cheap, it will be widely used in the manufacture of many products. 3. When you are separating pure substance from a mixture you must **provide for** possible mistake. 4. **Provided** we are given all necessary instruments we will be able to continue our investigations. 5. Sometimes a graphical representation of data can **provide** you with a particularly valuable piece of information. 6. This laboratory **provided** with up-to-date equipment solves many important problems. 7. As

an outstanding advantage, polyesters **provide** a good combination of mechanical and electrical properties at relatively low cost. 8. **Provided** we use the necessary instruments, the measurements will always be correct.

**3. Complete the article. Use but, although or however.**

Bill Gates became interested in computers at school although in those days they weren't very common. When he left school, he went to Harvard University to study law. \_\_\_\_\_, he spent most of his time in the computer center. In 1975, he and his friend Paul Allen successfully wrote a software program for the first microcomputer, an Altair, \_\_\_\_\_ they didn't even have one. Gates was top of his class at Harvard, \_\_\_\_\_ he left without finishing degree. Then he and Allen started Microsoft. In 1990s, the US government wanted to break up a Microsoft because they said the company was a monopoly. Gates was able to stop them, \_\_\_\_\_. Today Gates is billionaire, \_\_\_\_\_ he also gives millions dollars for charity.

**Additional Text  
(for individual work)**

***Read and translate the text.***

**Automated Production Lines**

An automated production line consists of a series of workstations connected by a transfer system to move parts between the stations. This is an example of fixed automation, since these lines are set up for long production runs, making large number of product units and running for several years between changeovers. Each station is designed to perform a specific processing operation, so that the part or product is constructed stepwise as it progresses along the line. A raw work part enters at one end of the line, proceeds through each workstation and appears at the other end as a completed product. In the normal operation of the line, there is a work part being processed at each station, so that many parts are being processed simultaneously and a finished part is produced with each cycle of the line. The various operations, part transfers, and other activities taking place on an automated transfer line must all be sequenced and coordinated properly for the line to operate efficiently.

Modern automated lines are controlled by programmable logic controllers, which are special computers that can perform timing and sequencing functions required to operate such equipment. Automated production lines are utilized in many industries, mostly automobile, where they are used for processes such as machining and pressworking.

Machining is a manufacturing process in which metal is removed by a cutting or shaping tool, so that the remaining work part is the desired shape. Machinery and motor components are usually made by this process. In many

cases, multiple operations are required to completely shape the part. If the part is mass-produced, an automated transfer line is often the most economical method of production. Many separate operations are divided among the workstations.

Pressworking operations involve the cutting and forming of parts from sheet metal. Examples of such parts include automobile body panels, outer shells of laundry machines and metal furniture. More than one processing step is often required to complete a complicated part. Several presses are connected together in sequence by handling mechanisms that transfer the partially completed parts from one press to the next, thus creating an automated pressworking line.

1. *Divide the text into the logical parts and give a title to each one.*
2. *Put questions to the text.*
3. *Discuss it with your groupmates.*

## Unit 4

**Text Study. Automatic Control in Industry.**

**Additional Text. Types of Automation**

**Grammar. Revision of Grammar.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Muscle, roughly, drastic, pneumatic, alternative, deviation, technique, error, petroleum, overall, through, well-established, hydraulic, measurement.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Instrument, automation, control, check, muscle, operation, to organize, to correct, combination, to mark, part, to integrate, to select, alternative, action, routine, to base, logic, technique, correction, to coordinate, active, cement, textile, total.

##### *3. Pay attention to some grammatical points:*

1) The development in automatic operation **while extending their application**, were not revolutionary but part of a well-established trend. 2) The electronic devices **rapidly gained in importance and industrial enterprises** widely used them to plan and control the operations of machines. 3) Rapid technological advance **reduced the part** played by human labour **to** skilled supervision and maintenance.

## **II. Reading**

***Read the text and be ready to find in the text the answers to the following questions:***

- *What was mechanization limited to in the nineteenth century?*
- *What devices marked the new stage in the development of automatic control?*
- *What is modern automation based on?*

### **Automatic Control in Industry**

Any technical development that enables a machine or instrument to dispense with labour is a step toward automation. Wherever two or more automatic machines are tied together with overriding automatic control to create a self-feeding, self-initiating and self-checking process, an automated system is created. The real distinction is between automation that displaces muscle and automation that displaces brain, and it is roughly the same distinction as that between automatic operation and automatic control. The industrial development of the nineteenth century was a change towards automatic operation. But mechanization was limited to individual processes, and only in a few trades it was possible to provide automatic links between processes and organized production as a continuous flow. In the twentieth century the idea was widely applied of producing goods in a continuous flow rather than in batches. The control was obtained by a human operator who noted faults and deviations and corrected them either directly or through instruments. Control may be simply mechanical, electrical, electronic or a combination.

The development in automatic operation while extending their application, were not revolutionary but part of a well-established trend. Those in automatic control have been considerably more drastic, and arose largely from the recent and sudden application of electronic methods of control. Electromechanical, pneumatic and hydraulic devices also contributed, but the introduction of electronic computers marked the new stage in the development of automatic control. The electronic devices rapidly gained in importance and industrial enterprises widely used them to plan and control the operations of machines. These devices can detect faults in a processed part, communicate the error to the machine and adjust its operation so as to correct the fault. They can integrate the work of industrial machines and the more complex devices can select alternative courses of action according to the instructions fed into them, considerably extending the possibilities of remote control. Now electronic devices greatly reduced the amount of routine brainwork performed at factories. Rapid technological advance reduced the part played by human labour to skilled supervision and maintenance. Electronic computers have

shown that man can rely on them for the performance of operations based on formal logic.

Automatic systems take several forms and are based on several different techniques, but in each case the measurement and correction of errors are performed and coordinated by electronic devices and the human operator does not take an active part in it.

First of all automatic control was widely established in such industries as chemicals, petroleum, iron and steel, cement, paper, textile, printing, food and others. The overall trend now is toward a total automatic control in industry with the help of new generations of electronic devices with their rapidity, accurateness, reliability, flexibility, and compactness. The present day stage of automation is based on the revolution in computer technology, in computerization of the whole national economy.

#### *Vocabulary Notes*

**to dispense with (labour)** [dI 'spens] — обходитися без (робітника);  
**overriding automatic control** [ "qVvq 'raIdIN ] — головне (загальне) автоматичне управління;  
**self-feeding** — автоматична подача (завантаження);  
**self-checking** — самоконтроль, автоматичний контроль;  
**distribution** [ "dIstrI 'bjHS (q) n ] — розподілення;  
**automatic links** — автоматичні зв'язки;  
**continuous flow** [qn 'tInjVqs] — безперервний потік ;  
**in batches** [bxC] — циклічний (періодичний);  
**fault** — помилка;  
**through instruments** — за допомогою приладів;  
**developments** — події, розробки;  
**well-established trend** — стала тенденція;  
**to arise (from)** [q 'raIz] — походити, впливати (з);  
**processed part** — оброблювана (деталь);  
**to communicate an error to the machine** — передавати машині помилку;  
**to adjust** [q 'dZAst] — регулювати, пристосовувати, налагоджувати;  
**alternative courses of action** [lI 'tWnqtIv] — можлива послідовність дій;  
**to feed** — постачати, живити;  
**remote control** [I 'mqVt] — дистанційне управління;  
**routine brainwork** [ "rH 'tJn ] — нудна розумова робота;  
**maintenance** [ 'meInt (q) nqns ] — догляд, ремонт, обслуговування, експлуатація;  
**skilled** — кваліфікований;  
**to rely (on)** — покладатися (на).

## ***Comprehension***

### ***1. Tell what sentences are true and what are false.***

1). Mechanization was limited to individual processes, and in a lot of trades it was possible to provide automatic links between manufacturing and organized production as a continuous flow. 2). The control was obtained by an automatic operator which noted faults and deviations and corrected them either directly or through instruments. 3). Electronic devices can detect faults in a processed part, communicate the error to the machine and adjust its operation so as to correct the fault. 4). Now electronic devices minimalized the amount of routine brainwork performed at factories. 5). First of all human control was widely established in industries and manufacturies. 6). The present day stage of automation is based on the revolution in computer technology, in computerization of the whole national economy.

### ***2. Choose the right answer:***

- 1) What was the industrial development of the nineteenth century?
  - a) a change towards human labour;
  - b) a change towards automatic operation;
  - c) a change towards computerized work.
- 2) How was the industrial control obtained in the twentieth century?
  - a) by a human operator;
  - b) by an electric device;
  - c) by FMS.
- 3) What kind of work did electronic devices reduce at factories?
  - a) mechanized work;
  - b) self-checking work;
  - c) routine brainwork.
- 4) How are the measurement and correction of errors performed and coordinated?
  - a) by electronic devices;
  - b) by skilled workers;
  - c) by technical know-how.
- 5) What is the present day stage of automation based on?
  - a) on the overriding automatic control;
  - b) on the revolution in computer technology;
  - c) on the self-feeding automated system.

### ***3. Complete the sentences:***

1) Wherever two or more ... machines are tied together with ... automatic control to create a self-feeding, self-initiating and self-checking ..., an automated system is created. 2) But mechanization was limited to ... processes, and only in a few trades it was ... to provide automatic ... between

processes and ... production as a continuous ... . 3) Electromechanical, ... and ... devices also contributed, but the ... of electronic computers marked the new stage in the ... of automatic control. 4) Now electronic ... greatly reduced the ... of routine ... performed at factories. 5) Electronic ... have shown that man can ... on them for the ... of ... based on formal ... . 6) The present day ... of ... is based on the ... in computer technology, in ... of the whole ... economy.

**4. Answer the questions:**

1) What do you call a step toward automation? 2) What was the industrial development of the nineteenth century? 3) What was the role of a human operator while obtaining the control? 4) What marked the new stage in the development of automatic control? 5) What devices can detect faults in a processed part, communicate the error to the machine and adjust its operation so as to correct the fault? 6) What can these devices do? 7) What is the role of electronic devices nowadays? 8) Where was automatic control widely established? 9) What is stage of automation based on nowadays?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- Creation of the automated system;
- the development in automatic operation;
- introduction of electronic computers into industrial processes;
- the establishment of the automatic control at enterprises.

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Automatic control, suitable trade, continuous flow, human operator, electronic devices, processed part, alternative courses, routine brainwork, skilled supervision, different techniques, widely established, overall trend, computer technology.

**2. Give English equivalents of the following.**

Обходитися без робітника, забезпечувати автоматичні зв'язки, помічати помилки та відхилення, пневматичні та гідравлічні пристрої, промислове підприємство, регулювати роботу машини, швидкий технологічний прогрес, кваліфіковане обслуговування, покладатися на прилади, точність, комп'ютерні технології.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
to control	way
to create	to tie
the same	several

a few	thought
to link	to get
idea	equal
to obtain	to make
simply	to check
method	easily

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*Feedback / self-adjusting / rely / skilled / unskilled / feed*

1) Scientists believe that the future of electronic automation is in .... and self-teaching machines, since they will be able to adapt themselves to the changing conditions of production. 2) Perhaps the most important part of an automated system is sensing or .... . 3) In forge and press shops robots .... blanks, measuring their temperature in passing, if this is required by the technology. 4) Robots release workers from monotonous and very hard work, requiring no .... labour, in hot shops and in production with hazardous working conditions. 5) These machines performed automatically, once they were set and loaded, and they confined human operator to two kinds of work, the .... work of loading and unloading, and the skilled work of setting and maintaining machines. 6) Many business, scientific, and industrial computer applications .... on the combination of analog and digital devices.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1). Розвиток сучасного автоматизованого контролю дозволяє швидко виявляти та виправляти помилки на виробництві. 2). Контроль якості продукції здійснюється за допомогою спеціальних приладів. 3). Автоматичні системи контролю можуть базуватись на різних технологіях. 4). Сучасні тенденції розвитку підприємства спрямовані на абсолютний автоматичний контроль ліній виробництва. 5). Зараз автоматизація базується на новітніх комп'ютерних технологіях та повній комп'ютеризації національної економіки.

**6. Make up sentences from the following words and word-groups:**

**Model: take, forms, several, systems, automatic. - Automatic systems take several forms.**

1). the nineteenth, industrial, operation, of, century, the, development, automatic, change, was, a, towards. 2). to dispense, with, labour, any, development, technical, that enables, instrument, a machine, or, is, automation, toward, a step. 3). part of, trend, their, application, the development, operation, but, well-established, a, automatic, while, in, extending, were not, revolutionary. 4). in batches, in the twentieth, rather than, idea, century, flow, the,

continuous, in, of producing goods, widely, a, applied, was. 5). maintenance, rapid, and, technological, supervision, advance, skilled, reduced, to, the part, human labour, played by.

### ***Grammar in Use***

#### **Revision of Grammar**

**1. Write out from the text all the adjectives and adverbs in comparative and superlative degree.**

**2. Make up questions to which the underlined words are the answers:**

1). The control has been obtained by a human operator. 2) The operator has noted faults and deviations and corrected them by means of special instruments. 3). The development in automatic operation has been a part of a well-established trend. 4). The changes in automatic control have been considerably more drastic. 5). The devices have detected faults in a processed part. 6). Electronic computers have shown that man can rely on them.

**3. Fill in the gaps in the following sentences using the appropriate form of the verb in brackets.**

1) Manufacturing already (to become) one of the most important application area for automation technology. 2). Assembly operations (to be) lately performed manually, either at single assembly workstations or on assembly lines with multiple stations. 3). Programmable automation (to be) a form of automation for producing products in large quantities. 4) Loading and unloading operations (to carry) out on a special transfer sector. 5). The work modules recently (to be) designed and built with standard features for special machining operations.

**4. Translate the following sentences and define the tense-forms which are used in the next sentences.**

1) The Internet has already entered our ordinary life. 2) Because of this, any two computers on the net will be able to stay in touch with each other as long as there is a single route between them. 3) This technology was called packet switching. 4) The data is constantly being directed towards its destination by special computers along the route, intercept and even change the data being sent over the Internet.

#### **Additional Text**

**(for individual work)**

***Read and translate the text.***

#### **Types of Automation**

Manufacturing is one of the most important application area for automation technology. There are several types of automation in manufacturing. The examples of automated systems used in manufacturing are described below.

1. Fixed automation, sometimes called «hard automation» refers to automated machines in which the equipment configuration allows fixed sequence of processing operations. These machines are programmed by their design to make only certain processing operations. They are not easily changed over from one product style to another. This form of automation needs high initial investments and high production rates. That is why it is suitable for products that are made in large volumes. Examples of fixed automation are machining transfer lines found in the automobile industry, automatic assembly machines and certain chemical processes.

2. Programmable automation is a form of automation for producing products in large quantities, ranging from several dozen to several thousand units at a time. For each new product the production equipment must be reprogrammed and changed over. This reprogramming and changeover take a period of non-productive time. Production rates in programmable automation are generally lower than in fixed automation, because the equipment is designed to facilitate product changeover rather than for product specialization. A numerical-control machine-tool is a good example of programmable automation. The program is coded in computer memory for each different product style and the machine-tool is controlled by the computer programme.

3. Flexible automation is a kind of programmable automation. Programmable automation requires time to re-program and change over the production equipment for each series of new product. This is lost production time, which is expensive. In flexible automation the number of products is limited so that the changeover of the equipment can be done very quickly and automatically. The reprogramming of the equipment in flexible automation is done at a computer terminal without using the production equipment itself. Flexible automation allows a mixture of different products to be produced one right after another.

***1. Divide the text into the logical parts and give a title to each one.***

***2. Put questions to the text.***

***3. Discuss it with your groupmates.***

## **Progress Check**

***Choose the right answer:***

- 1). What are automatic devices used for?
  - a) to perform various operations instead of people;
  - b) to control human work;
  - c) to compete with people;
  - d) for entertaining;

- e). for teaching people.
- 2) What principle is used in all automatic-control mechanisms?
- the flyball principle;
  - Detroit automation;
  - the feedback principle;
  - the callback principle;
  - the numerical-control principle.
- 3). What is a computer in FMS used for?
- to monitor and control the operation of the whole factory;
  - to operate in dangerous environments;
  - to give the instructions for people;
  - to program the equipment;
  - to create automatic systems.
- 4). What is automation?
- performing certain tasks by people only;
  - performing certain tasks by machines only;
  - performing certain tasks by special mechanical devices;
  - performing certain tasks by a computer program;
  - performing certain tasks by assembly lines with multiple stations.
- 5). What were industrial robots originally designed for?
- to teach people;
  - to perform the most complicated operations in industry;
  - to perform simple tasks in environments dangerous to human workers;
  - to detect faults;
  - to direct data towards its destination.
- 6) How does automation replace human muscle?
- by physical power;
  - by mechanical power;
  - by electrical power;
  - by nuclear power;
  - by tidal power.
- 7). What is the best and most recent example of automation in engineering?
- lathe;
  - valve;
  - transfer-machine;
  - conveyor belt;
  - CPU.
- 8). Where was automation first applied?
- in continuous-process manufacturing;
  - in machine building;

- c) in food industry;
  - d) in light industry;
  - e). in steel foundry.
- 9). When were semiautomatic machines invented?
- a) just now;
  - b) before the Industrial Revolution;
  - c) in the 1940s;
  - d) early in the history of mechanization;
  - e). in the fifteenth century.
- 10). When did the word automation coin?
- a) in the Middle Ages;
  - b) in the 1940s;
  - c) in the twentieth century;
  - d) last year;
  - e) in 1995.
- 11) When did the words “automation”, “automatic control” appear on the pages of the press or scientific publications?
- a) yesterday;
  - b) last year;
  - c) some decades ago;
  - d) in the Middle Ages;
  - e). in 2000.
- 12) What plants in the country have been completely automated?
- a) car-building plants;
  - b) hydro-power plants;
  - c) metallurgical plants;
  - d) ship-building plants;
  - e). aircraft repair plants.
- 13) What does comprehensive automation call for?
- a) intensification of production;
  - b) technological process;
  - c) automated processes;
  - d) material inputs and time;
  - e). special qualification.
- 14) Where did man remain the principal agent of the technological process?
- a) in automation;
  - b) in science;
  - c) in manufacturing;
  - d) in mechanization;
  - e). in computer systems.

- 15) What makes it possible to link up in a single complex the whole technological chain?
- a) means of transportation;
  - b) means of engineering;
  - c) means of automation;
  - d) means of communication;
  - e). means of power supply.
- 16) What was the industrial development of the nineteenth century?
- a) a change towards human labour;
  - b) a change towards automatic operation;
  - c) a change towards computerized work;
  - d) a change towards mechanized work;
  - e). a change towards computer control.
- 17) How was the industrial control obtained in the twentieth century?
- a) by a human operator;
  - b) by an electric device;
  - c) by FMS;
  - d) by telecommunications;
  - e). by skilled workers.
- 18) What kind of work did electronic devices reduce at factories?
- a) mechanized work;
  - b) self-checking work;
  - c) routine brainwork;
  - d) individual work;
  - e). controlling work.
- 19) How are the measurement and correction of errors performed and coordinated?
- a) by electronic devices;
  - b) by skilled workers;
  - c) by technical know-how;
  - d) by special sensors;
  - e). manually.
- 20) What is the present day stage of automation based on?
- a) on the overriding automatic control;
  - b) on the revolution in computer technology;
  - c) on the self-feeding automated system;
  - d) on nano technologies;
  - e). on the satellite controlling programs.

# Module VIII

## Robotics

### Unit 1

**Text Study. Robots in Industry.**

**Additional Text. History and Definition of Robots.**

**Grammar. Types of Sentences.**

#### Text Study

##### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Manufacturing operations, material-handling, to require, arrangement, to utilize, to design, satisfactory, suitable, screw, to substitute, cycle, hazardous.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Robot, operation, category, inspection, machine, conveyor, geometry, to manipulate, automobile, typical, characteristics.

##### *3. Pay attention to some grammatical points:*

1) Material-transfer applications **require the robot to move** materials or work parts from one to another. 2) Machine loading and unloading operations **utilize a robot to load and unload** parts. 3) This requires **the robot to be equipped** with a gripper. 4) The use of robots in assembly **is expected to increase** because of the high cost of manual labour.

#### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What are the three applications of robots?*
- *What operations can robots perform instead of people?*

#### **Robots in Industry**

Today most robots are used in manufacturing operations. The applications of robots can be divided into three categories:

1. material handling
2. processing operations
3. assembly and inspection.

Material-handling is the transfer of material and loading and unloading of machines. Material-transfer applications require the robot to move materials or work parts from one to another. Many of these tasks are relatively simple: robots pick up parts from one conveyor and place them on another. Other transfer operations are more complex, such as placing parts in an arrangement that can be calculated by the robot. Machine loading and unloading operations utilize a robot to load and unload parts. This requires the robot to be equipped

with a gripper that can grasp parts. Usually the gripper must be designed specifically for the particular part geometry.

In processing operations robot manipulates a tool to perform a process on the work part. Examples of such applications include spot welding, continuous arc welding and spray painting. Spot welding of automobile bodies is one of the most common applications of industrial robots. The robot positions a spot welder against the automobile panels and frames to join them. Arc welding is a continuous process in which robot moves the welding rod along the welding seam. Spray painting is the manipulation of a spray-painting gun over the surface of the object to be coated. Other operations in this category include grinding and polishing in which a rotating spindle serves as the robot's tool.

The third application area of industrial robots is assembly and inspection. The use of robots in assembly is expected to increase because of the high cost of manual labour. But the design of the product is an important aspect of robotic assembly. Assembly methods that are satisfactory for humans are not always suitable for robots. Screws and nuts are widely used for fastening in manual assembly, but the same operations are extremely difficult for a one-armed robot.

Inspection is another area of factory operations in which the utilization of robots is growing. In a typical inspection job, the robot positions a sensor with respect to the work part and determines whether the part answers the quality specifications. In nearly all industrial robotic applications, the robot provides a substitute for human labour. There are certain characteristics of industrial jobs performed by humans that can be done by robots:

1. the operation is repetitive, involving the same basic work motions every cycle,
2. the operation is hazardous or uncomfortable for the human worker (for example: spray painting, spot welding, arc welding, and certain machine loading and unloading tasks),
3. the workpiece or tool are too heavy and difficult to handle,
4. the operation allows the robot to be used on two or three shifts.

*Vocabulary Notes*

**handling** ['hʌndlɪŋ] — переробка, обробка

**transfer** [træns'fɜː] — переміщення; переміщати

**parts** — деталі

**utilize** ['juːtɪlaɪz] — використовувати

**gripper** ['grɪpɪ] — затискач

**grasp** [græsp] — затискати

**spot welding** [spɒt 'weldɪŋ] — точечне зварювання

**arc welding** [ɑːk 'weldɪŋ] — дугове зварювання

**spray painting** — фарбування з пульверизатора, аерозольне фарбування  
**automobile body** — кузов автомобіля  
**frame** [freɪm] — пристосовувати, збирати, монтувати  
**welding rod** ['weldɪŋ rɒd] — зварювальний стрижень  
**welding seam** ['weldɪŋ si:m] — зварний шов  
**spray-painting gun** — пістолет-розпилювач (фарби)  
**coat** — покривати шаром (фарби)  
**grinding** [graɪndɪŋ] — шліфування  
**polishing** ['pɒlɪʃɪŋ] — полірування  
**spindle** ['spɪndl] — вісь, вал, шпindel  
**tool** — інструмент  
**screw** [skruː] — гвинт  
**nut** — гайка  
**fastening** ['fɑːsnɪŋ] — скріплення

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) The applications of robots can be restricted to thirty categories. 2) Material-handling applications require the robot to move work parts from one to another. 3) Placing parts in an arrangement is a rather complex operation performed by robots. 4) As a rule it's needless to design the gripper specifically for the particular part geometry. 5) Arc welding is a process in which a machine moves the welding rod along the welding seam. 6) The use of robots in assembly will decrease increase because of the excess of manual labour. 7) A robot can substitute human labour in almost all industrial applications.

#### *2. Choose the right answer:*

- 1) What do material-transfer applications require?
  - a) they require the robot to substitute human workers;
  - b) they require the robot to put the work parts on proper places;
  - c) they require the robot to move materials or work parts from one to another.
- 2) What do machine loading and unloading operations utilize a robot to do?
  - a) to transfer the work parts on proper places;
  - b) to load and unload parts;
  - c) to inspect the quality of the work parts.
- 3) What does robot do in processing operations?
  - a) it positions a sensor;
  - b) it manipulates a tool;
  - c) it elevates heavy loads.
- 4) What is arc welding?
  - a) a process in which robot moves the welding rod along the welding seam;

- b) a process in which robot covers the work parts with the paint spray;  
 c) a process in which robot performs grinding and polishing.  
 5) Why is the use of robots in assembly expected to increase?  
 a) because of increase of the number of robots in industry;  
 b) because of decrease of people in the world;  
 c) because of the high cost of manual labour.

**3. Complete the sentences:**

1) Most robots are used in ... . 2) Material-handling is ... . 3) Material-transfer requires ... . 4) In processing operations robot manipulates ... . 5) The use of robots in assembly is expected to ... . 6) In a typical inspection job, the robot ... .

**4. Answer the questions:**

1) What are the three applications of robots in manufacturing processes?  
 2) What is material-handling? 3) How does a robot perform processing operations? 4) How does a robot fulfill spot welding of automobile bodies? 5) How is arc welding performed by means of a robot? 6) What is spray painting?  
 7) What is an important aspect of robotic assembly? 8) What does the robot do in a typical inspection job? 9) What characteristics of industrial jobs performed by humans can be done by robots?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- material handling
- processing operations
- assembly and inspection.

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Manufacturing operations, assembly and inspection, transfer operations placing in arrangement, gripper, to manipulate a tool, spot welder, welding seam, spray painting, one-armed robot, industrial job.

**2. Give English equivalents of the following.**

Застосування роботів, відносно простий, операції по навантаженню та розвантаженню, бути обладнаним, бути розробленим для ..., операції по обробці, розпилювання фарби, ручна праця, висока вартість, методи складання, надзвичайно важкий, відповідати якісним показникам, небезпечна операція.

**3. Match the words in A with their synonyms in B:**

- |             |          |
|-------------|----------|
| <b>A</b>    | <b>B</b> |
| comfortable | easy     |
| hazardous   | vehicle  |

characteristics	difficult
work part	convenient
utilization	features
automobile	detail
perform	to demand
require	class
complex	application
simple	to do
category	dangerous

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*Transfer / spindle / handling / gripper / tools*

1) The standardization of work and .... modules allows different systems to be created by linking them together and, if necessary, extending existing systems. 2) Loading and unloading operations are carried out on a special .... sector from which the work-pieces, after having been identified, are introduced onto the main transfer line and then routed to the work stations. 3) All NC modules making up the system are single .... types with tool change-over, with the exception of a multi-spindle unit with automatic head change. 4) The factory is fashioning machine .... from raw steel ingots. 5) Typically, two or three of the robot's axes may be for a hand, .... or wrist type of mechanism and the others for what can be considered a shoulder and an arm.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Роботи використовуються для виконання важкої та небезпечної праці. 2) Деякі роботи обладнані спеціальними затискачами, щоб утримувати деталі машин. 3) На автомобільних підприємствах роботи фарбують кузови машин, покриваючи їх шаром фарби із пістолетів-розпилювачів. 4) На теперішній час не всі методи складання доступні роботам. 5) Через високу вартість людської праці кількість промислових робітників на підприємствах постійно зростає. 6) Роботи можуть виконувати дугове зварювання, рухаючи зварювальний стрижень вздовж зварювального шову.

**6. Make up sentences from the following words and word-groups:**

**Model: to use, operations, to be, in, robots, manufacturing. - Robots are used in manufacturing operations.**

1) to be, over, spray, the manipulation, of a spray-painting gun, of, painting the surface, the object, to be coated. 2). work parts, robot, or, to move, to another, materials, from one. 3). widely, for, assembly, screws, to be, in, manual, nuts, and, to use, fastening. 4). To place, conveyor, robots, one, to

pick up, on, them, parts, another, from, and. 5). operations, to load, machine, and, a robot, loading, parts, to utilize, unloading, and, to unload. 6). human, a substitute, the robot, for, to provide, labour. 7). a process, which, arc, to be, the welding rod, in, welding, continuous, robot, along, to move, the welding seam.

### ***Grammar in Use***

#### **Types of Sentences**

***1. Translate the following sentences paying attention to the meaning of "should" and "would":***

1. Cybernetics, computers and control systems should be introduced in hazardous industries. 2. All the data available should be led into the computer. 3. Should this new apparatus be tested, we could integrate it in our control system. 4. If automatic control had been used, many variable parameters would have been more reliable. 5. The automation of production would enable man to operate machines with the help of other machines. 6. The latest computers would perform several million operations in the space of just one second.

***2. Analyse the type of subordinate clauses and translate the sentences into Ukrainian:***

1. The automation and cybernetization of economy have given rise to unique problems which affect the very foundations of human life.  
2. The properly functioning automated production process does not need the direct participation of man, who is relieved of any forced technological connection with the machine.  
3. We are increasingly dependent on robots which contribute to our comfort, protect our safety, relieve us of hard and monotonous work.  
4. The design given below is described in some detail since much of it may be immediately applied to our automatic control system.  
5. Scientists believe that the future of electronic automation is in self-adjusting and self-teaching machines, since they will be able to adapt themselves to the changing conditions of production.

### **Additional Text**

**(for individual work)**

***Read and translate the text.***

#### **History and Definition of Robots**

Handling operations occur in practically all production processes. At first they were carried out manually, but then the development of hardware components made it possible to relieve people from the necessity of handling heavy loads.

From this standpoint the industrial robot is not something supernatural. It is only the most perfect form of the technique used in handling processes.

Their purpose is not only to substitute or imitate manual actions of human beings, but also to perform production processes more quickly and better than a man.

Robots fill the gap between special-purpose automation and human endeavour. They have demonstrated an ability to perform work that requires simple repetitive motions and, therefore, can relieve human operators from hazardous or monotonous tasks.

Terms like "teachable" and "programme-controlled" often are applied to robots. However, robots are best understood in terms of their real capabilities. Essentially, they are "off-the-shelf automation. It's the robot's ability to be easily taught or reprogrammed that distinguishes it from other types of automated handling equipment.

Robot is one of the very few Slav words (in this case Czech) borrowed in the different languages. It comes from the Old Slav word "robu", which means a servant. In modern Slav, the word "robotnik" means workman and is linked to the Russian word for work "robota".

**1. Divide the text into the logical parts and give a title to each one.**

**2. Look through the text again. Give the main points of each passage of the text: Use: "deals with" + word combinations given below.**

*E.g. The first (second, third, fourth ...) passage of the text deals with ...*

The robot's abilities, the terms applied to robots, the aim of the robot's application, the functions of the robot, the history of the word "robot".

**3. Discuss it with your groupmates.**

## Unit 2

**Text Study. Classification of Robots.**

**Additional Text: Man/Machine Interfax.**

**Grammar. Direct, Indirect Speech.**

### Text Study

#### *I. Pre-reading Exercises*

**1. Repeat the words in chorus:**

Configuration, continuous-path, pneumatic, manipulator, angular, moulding, microprocessor-controlled, tool-handling.

**2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:**

Electromechanical, number, position, to operate, typical, hydraulic, system, control, cylindrical, spherical, plastic, stamping, press, abrasive, sensor.

**3. Pay attention to some grammatical points:**

1) The "multi-point" PTP robot permits **the control to stop** each axis or manipulator at any point within its total range, rather than at only two, or a few,

points. 2) CP robots operate, in theory, in an infinite number of points in space, than, **when jointed**, describe a smooth compound curve. 3) The simplest of the above mentioned robots **are those operated by** pneumatics with fixed cycle control. 4) Industrial robots **are being used** for a wide variety of tasks in factories, shops and foundries around the world.

## ***II. Reading***

***Read the text and be ready to find in the text the answers to the following questions:***

- *What are the two basic types of industrial robots?*
- *What tasks can industrial robots perform at enterprises?*

### **Classification of Robots**

The number of types of electromechanical robots is continually increasing. The typical features of each type of an industrial robot are as follows: the type of drive and control system, the type of coordinate configuration system in which the manipulator works, the number of degrees of freedom, load capacity, repeatability, the number of manipulators, etc.

From the control standpoint there are two basic types of industrial robots: point-to-point (PTP) and continuous-path (CP). The simplest case of PTP robots is the "two-point" or cycle robot, where each axis of this robot can generally move to only two positions. The "multi-point" PTP robot permits the control to stop each axis or manipulator at any point within its total range, rather than at only two, or a few, points. CP robots operate, in theory, in an infinite number of points in space, than, when jointed, describe a smooth compound curve. "Multi-point" PTP robots and CP robots are also called "servo-controlled" robots.

Drive is a typical feature of robots. Robots can be driven by pneumatic, hydraulic and electro-mechanical drives. The simplest of the above mentioned robots are those operated by pneumatics with fixed cycle control. Most of them have electrical control systems but there are also examples of complete pneumatically controlled models.

Hydraulic robots occupy second place in industrial application. As a rule, these are universal robots with one manipulator, covering the load capacity of 20-40 kg and point-to-point or continuous-path control of operation. The number of types of electromechanical robots is increasing quickly. Some robots work in angular coordinate system. There are also robots working in the cylindrical, spherical and cartesian systems.

Industrial robots are being used for a wide variety of tasks in factories, shops and foundries around the world. Robots unload parts from die casting machines and plastic injection moulding machines. They load and unload parts at machine tools and stamping presses; transfer parts from die to die or from

press to press. In die casting and plastic injection moulding operations, robot may unload a single machine or as many as three machines. In machine tool loading and unloading, the robot may also tend more than one machine - loading and unloading each in turn, or on demand and transferring parts from machine to machine, as well as placing parts in gages for dimensional checking.

In forging operations, robots are used to transfer hot billets from furnaces to forging presses to transfer parts from die to die in successive forming operations and to handle hot and cold parts in trimming operations. Robots are also used in casting clean-up operations, handling cutting torches or abrasive cut-off wheels to remote gates and risers and for grinding flash from parting lines.

Continuous path servo-controlled robots are used for spraying a wide variety of parts and materials; for spot and arc welding. Robots are used for drilling and grinding, handling either the parts or a power tool.

In assembly operations, the microprocessor-controlled robot with sensory feedback capability performs the complex part and tool-handling tasks.

#### *Vocabulary Notes*

**drive** [draɪv] — привід

**the number of degrees of freedom** — число (кількість) ступенів вільності

**repeatability** [rɪˈpeɪtəbɪlɪtɪ] — повторюваність

**manipulator** [mæˈnɪpjʊleɪtə] — маніпулятор

**standpoint** [ˈstændpɔɪnt] — точка зору

**point-to-point control** — позиційне управління

**continuous-path control** — контурне управління

**two-point** — двоточковий

**multi-point** — багатоточковий

**rather ... that** — а не

**smooth** [smuːð] — плавний

**compound curve** [ˈkɒmpaʊnd kɜːv] — складна крива

**angular coordinate system** [ˈæŋɡjʊləɪ kɔːdɪneɪt sɪstəm] — кутова система координат

**cartesian coordinate system** [kɑːˈtɜːziən kɔːdɪneɪt sɪstəm] — декартова система координат

**foundry** [ˈfaʊndrɪ] — ливарний цех

**casting** [ˈkɑːstɪŋ] — лиття

**injection moulding** [ɪnˈdʒekʃ(ə)n ˈmɔːldɪŋ] — лиття під тиском пластмас

**die** [daɪ] — пресформа

**die casting** — лиття металів під тиском

**gage (gauge)** [gɛɪdʒ] — вимірювальний пристрій

**dimensional** [da'menʃ(ə)nəl] — що має вимір, просторовий

**forging** ['fɒdʒɪŋ] — кування

**handle** — керувати (машиною)

**trimming** ['trɪmɪŋ] — обрізка

**clean-up** — очистка виликів

**torch** [tɔːtʃ] — паяльна лампа

**cut-off-wheel** — відрізний круг

**gate** — живильник (в ливарній формі)

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) Load capacity is one of the typical features of any type of an industrial robot. 2) Each axis of a cycle robot can move to only one position. 3) PTP robots and CP robots are called "self-controlled" robots. 4) Robots can operate by means of electro-pneumatic drives. 5) Universal robots have one manipulator, load capacity of 20-40 kg and continuous-path control of operations. 6) In plastic injection moulding operations robots can unload as many as three machines. 7) In forging operations robots unload hot billets from furnaces and load them to forging presses. 8) Robots with sensory feedback capability fulfill the complex part and tool-handling tasks in assembly operations.

#### *2. Choose the right answer:*

1) How are "multi-point" PTP robots and CP robots called?

- a) "point-to-point" robots;
- b) "servo-controlled" robots;
- c) "continuous-path" robots.

2) What is a drive?

- a) a load capacity;
- b) a fixed cycle control;
- c) a typical feature of robots.

3) What is a role of hydraulic robots in industry?

- a) they occupy the second place in industrial application;
- b) they are of no use in industry;
- c) they operate, in theory, in an infinite number of points in space.

4) What system can some robots operate in?

- a) they can work in loading and unloading system;
- b) they can work in assembly operations system;
- c) they can work in angular coordinate system as well as in cylindrical, spherical and cartesian systems.

5) What are CP servo-controlled robots used for?

- a) they are used for trimming operations;
  - b) they are used for spot and arc welding;
  - c) they are used for dimensional checking.
- 6) What robot performs the complex part and tool-handling tasks in assembly operations?
- a) industrial robot;
  - b) "multi-point" PTP robot;
  - c) microprocessor-controlled robot with sensory feedback capability.

**3. Complete the sentences:**

- 1) The typical features of each type of an industrial robot are ... . 2) The simplest case of PTP robots is ... . 3) The "multi-point" PTP robot permits ... . 4) Robots can be driven by ... . 5) Hydraulic robots occupy ... . 6) Industrial robots are being used for ... . 7) Continuous path servo-controlled robots are used for ... .

**4. Complete the sentences (A) choosing the required words or word combinations from list (B). Read and translate them.**

- A**
- 1) The places where robots can be used are ...
  - 2) Job functions performed by the robot are ...
  - 3) There are various types of operations in which the robot performs different functions. They are ...

**B** shops, to unload parts, machine tools, grind, factories, to load parts, foundry, to transfer parts, to handle parts, trimming, to spray parts, stamping presses, to place parts in gages, forming, forging, casting clean-up, to drill, to weld, assembly.

**5. Answer the questions:**

- 1) What are the typical features of each type of an industrial robot? 2) What is the principle according to which industrial robots are subdivided into PTP and CP robots? 3) How can robots be usually driven? 4) What is the load capacity of hydraulic robots? 5) What kind of coordinate system can different robots work in? 6) What tasks can robots perform in factories, shops and foundries around the world? 7) What can robots do in forging operations? 8) How are robots used in casting clean-up operations? 9) What are continuous path servo-controlled robots used for? 10) What operations do microprocessor-controlled robots perform?

**6. Read the sentences from the text which illustrate the following statements:**

- 1). Robots are used in different places. 2). Robots are used for various operations. 3). Robots may perform different numbers of operations. 4). Robots are widely used in forging operations. 5). There are some types of robots which are used for spraying and assembly operations.

**\*7. Try to tell the gist of the text.**

## **Word Study**

### **1. Give Ukrainian equivalents of the following.**

Electromechanical robots, typical features, type of drive, number of degrees of freedom, number of manipulators, axis, infinite number of points, smooth compound curve, above mentioned, fixed cycle control, pneumatically controlled, industrial application, die casting machines, plastic injection moulding, hot billets, abrasive cut-off wheels.

### **2. Give English equivalents of the following.**

Повторюваність, з точки зору контролю, циклічний робот, пневматичний привід, гідравлічний привід, приводити в дію, електрична система контролю, пневматично контрольована модель, переміщати від пресу до пресу, розвантажувати до трьох машин, на вимогу, точкове та аркове зварювання, кувальні операції, складальні операції, можливість сенсорного живлення.

### **3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
Basic	little
Permit	do
Few	enterprise
Number	main
Industry	allow
Perform	quantity

### **4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*control points / point / standpoint / die / manipulators / casting*

1) As compared with the new sensational robots created by Japanese engineers, our .... may seem rather modest. 2) From the general .... of view computer viruses show by itself the programs, which have a capacity for the hidden reproduction in the environment of the operating system. 3) A floor-embedded wire can create a complex network of paths, turns, intersections and .... . 4) From this .... the industrial robot is not something supernatural. 5) Imagine the real working conditions for a human operator by, for example, transfer of a hot formed glass-tube, removal of hot metal .... castings or plastics injection. 6) In die .... and plastic injection moulding operations, robot may unload a single machine or as many as three machines.

### **5. Look through the text again. Describe the types of robots choosing the correct word. Complete the sentences if necessary.**

There are two (basic, basis) types of industrial robots from the control standpoint. They are ... . Some robots work in the (angle, angular) coordinate system. There are also robots working in the (cylinder, cylindrical), (sphere,

spherical) and cartesian systems. Drive is a (type, typical) feature of robots. Robots can be driven by (pneumatic, pneumatically, hydraulic) and (mechanics, electro-mechanical) drives.

#### **6. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Промислові роботи виконують велику кількість задач на підприємствах. 2) Роботи можуть завантажувати деталі на станки або на штампувальні преси. 3) Роботів з контурним сервоуправлінням можна використовувати для точкового та дугового зварювання. 4) Тип приводу та системи контролю, число ступенів вільності та координаційна система конфігурації є типовими рисами промислового робота. 5) Кожна вісь двоточкового робота може рухатись лише у двох положеннях. 6) Роботи з сенсорними зворотнім живленням використовують для складальних операцій.

#### **7. Make up sentences from the following words and word-groups:**

**Model: to use, operations, to be, in, robots, manufacturing. - Robots are used in manufacturing operations.**

1) The, PTP, simplest, robots, case, of, to be, the, robot, "two-point". 2) Two, there, industrial, to be, robots, of, types, basic. 3) Robots, of, drive, to be, feature, a, typical. 4) Control, to have, most, systems, of, electrical, robots. 5) Second, to occupy, in, hydraulic, application, robots, place, industrial. 6) Casting, robots, from, to unload, and, parts, injection, die, machines, moulding, machines, plastic. 7). Used, drilling, for, robots, to be, grinding, and.

### **Grammar in Use**

#### **Direct and Indirect Speech**

##### **1. Supply the correct form of the verb**

1) The teacher said that the word "robot" (to come) from the Old Slav word "robu", which (to mean) a servant. 2) We hope that robots (to fill) the gap between special-purpose automation and human endeavour. 3) She supposed that handling operations (to occur) in practically all production processes. 4) Everybody knows that a major advance in the twenty-first century manufacturing (to be) the development of mass production techniques. 5) People believe that each manufacturing process (to be) automated in the nearest future. 6) I always thought that automation (to be) first applied to industry in continuous-process manufacturing.

##### **2. Change direct speech into indirect**

1) I asked: "What is the major development in manufacturing in the twenty-first century?". 2) They said: "The present day stage of automation is based on the revolution in computer technology, in computerization of the whole national economy." 3) The scientists promised: "In the ultimate

automated factory there will be few, if any, operators or quality control inspectors.” 4) The students asked: “What was a later development in industrial automation?” 5) He concluded: “The necessity of some form of automated handling processes became obvious.” 6) They declared: “According to available data, our industry receives annually thousands of robots of different types and purposes.”

**Additional Text**  
**(for individual work)**

*Read and translate the text.*

**Man/Machine Interface**

Life in the automated factory is based on communications. Sensors gather data, computers send commands, PCs control machines and management. It makes decisions based of data from these devices. Sensors, computers, processors and man must all talk to each other.

There have been a number of recent developments in machine-to-machine interfaces. Networks, hardware and software that allow various processors to share and exchange data, are moving into the factory. These networks are connecting whole processors together, allowing more flexibility and control of manufacturing.

A major problem with networks, though, is interfacing processors that do not use the same language. Rules are being developed that will make it easier for these different processors to communicate.

Man-to-machine communications have seen dramatic developments. The computer is no longer an unyielding, unforgiving device that insists you conform to its method of working. The computer has become friendly, even inviting. Complex mnemonics and performing functions in a specific sequence have been replaced with graphic representations commands and cursor device know as a mouse. Now, getting a computer to perform a function is as easy as pointing your finger to the graphic representation of the function you want performed and pressing a button on the mouse. And programs exist for all types of business needs including teaching someone unfamiliar with computers how to run one.

A new technology that's also making it easier for man to interface with machines is speech recognition. Here, you enter information into a machine with your voice; a device in the machine translates the sounds into signals the computer or machine can work with. This method of entering data is faster and more accurate than using a keyboard to enter information.

- 1. Divide the text into the logical parts and give a title to each one.***
- 2. Put questions to the text.***
- 3. Discuss it with your groupmates.***

## Unit 3

**Text Study. Robots Move in.**

**Additional Text. What can Robots Do?**

**Grammar. Revision of Tense Forms.**

### Text Study

#### *I. Pre-reading Exercises*

##### *1. Repeat the words in chorus:*

Glass-tube, environmental, furnaces, exhausting, to be surrounded by, constructively, modifiable, to be reoriented.

##### *2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:*

Operator, metal, temperature, radiation, monotonous, toxic, material, scene, practically, giant, problem, social, economic.

##### *3. Pay attention to some grammatical points:*

1) You can find robots practically **anywhere you look**. 2) The experts themselves **are yet to clear up** many questions. 3) Robot must be constructively designed together with **the machine tools it is to operate** and must be logically incorporated within the system of machines, machine tools and other units.

#### *II. Reading*

*Read the text and be ready to find in the text the answers to the following questions:*

- *What kinds of robots are people surrounded now?*
- *How are specialized enterprises reoriented as to the production of robots?*

#### **Robots Move in**

Imagine the real working conditions for a human operator by, for example, transfer of a hot formed glass-tube, removal of hot metal die castings or plastics injection. The environmental temperature is above 50°C and the melting furnaces produce direct and reflexive heat radiation. This kind of job is very difficult, exhausting, monotonous and unpleasant. In the case of machining radioactive or toxic material the work becomes highly dangerous for a man's life.

The necessity of some form of automated handling processes became obvious. So robots appeared on the scene with their high safety and reliability level.

We are now surrounded by robots, big ones, little ones, and medium-sized ones. They serve us in thousands of ways every day.

You can find robots practically anywhere you look. In factories there are giant robots. They pick up great amounts of raw materials and pass them to

other, robots which press, stamp and shape the raw material into a wide variety of things. Robot usage has been expanding for industrial spraying, hot handling, assembly, welding, etc.

According to available data, our industry receives annually thousands of robots of different types and purposes. Today, robotic systems, lines and modules are already operating at the leading plants of the motor, electrical engineering, machine-tool industries.

Robotics is just beginning to make inroads in industrial production worldwide. It is not a simple process; the experts themselves are yet to clear up many questions. But everyone agrees even now that the robot by itself does nothing – it must be constructively designed together with the machine tools it is to operate and must be logically incorporated within the system of machines, machine tools and other units.

The problem is not to design individual robots but robotical complexes, flexible and automated production systems that are easily modifiable for the manufacture of ever new kinds of products. Single-handed, even the "cleverest" and most skilful robot is not yet a soldier in the field. Even many robots are not effective piecemeal, unless they are united into a technological chain. Specialized enterprises are reoriented from the production of industrial robots by piece, toward the manufacture of complete systems and robotized complex instruments with the assessment of their performance by the end result the quality and volume of the produce made with their assistance.

This task is presently being tackled by our industry and economy. As to robotization, the utmost economic and social effect will be brought about by systems capable of taking over all the routine stages of designing, design support and the production of output.

Robots release workers from monotonous and very hard work, requiring no skilled labour, in hot shops and in production with hazardous working conditions.

#### *Vocabulary Notes*

**working conditions** — умови праці

**human-operator** — людина-оператор

**environmental temperature** [In 'aIqrqnmqntl] — температура оточуючого середовища

**plastics injection** [In 'dZekS (q) n] — вдування пластмаси

**reliability level** [I "l aIqbIqtI] — рівень надійності

**to pick up** — підбирати

**a wide variety (of things)** — широка різноманітність (речей)

**industrial spraying** — промислове розпилення

**hot handling** — термообробка

**to make inroads (in)** ['InrɔVdz] — втручатися (в)

**to clear up** — з'ясувати

**robot by itself** ['rɔVbɛt] — робот сам по собі

**robotical complex** — роботизований комплекс

**flexible and automated production systems** — гнучкі та автоматизовані виробничі системи

**single-handed robot** — одноцільовий робот

**piecemeal = by piece** ['pɪsmɪl] — частинами, частково

**assessment of their performance** [ɔ'sesmənt] — оцінка їх роботи

**design support** — конструкторське забезпечення

**hazardous working conditions** ['hæzɔdʒs] — ризиковані (небезпечні) умови праці

**to bring about** — здійснювати

**to take over** — передавати (обов'язки, позиції тощо)

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) The necessity of robot construction appeared due to different hazardous enterprises. 2) Nowadays robot is a curiosity in our life. 3) It is very simple for robots to make inroads in industrial production worldwide. 4) The most important question is to design robotical complexes available for the manufacture of ever new kinds of products. 5) Single-handed robots are the "cleverest" and most skilful ones. 6) Robots cannot substitute men in unskilled and dangerous work.

#### *2. Complete the sentences:*

1) Robot usage has been expanding for ... . 2) Today, robotic systems, lines and modules are already operating at ... . 3) Robotics is just beginning to make ... . 4) The robot by itself does nothing – ... . 5) The problem is not to design individual robots but ... . 6) Even many robots are not effective piecemeal, unless ... . 7) As to robotization, the utmost economic and social effect will be brought about by ... .

#### *3. Choose the right answer:*

1) Why did the necessity of some form of automated handling processes become obvious?

a) because it is very cheap and convenient;

b) because at great amount of enterprises the work becomes highly dangerous for a man's life;

c) because it helps to protect environment.

2) Where are robotic systems, lines and modules operating today?

a) at light industry enterprises;

b) at different educational establishments;

c) at the leading plants of the motor, electrical engineering, machine-tool industries.

3) Why can the robot by itself do nothing?– it must be constructively designed together with the machine tools

a) because our industry receives annually thousands of robots of different types and purposes;

b) because individual robots are easily modifiable for the manufacture of ever new kinds of products;

c) because it must be logically incorporated within the system of machines, machine tools and other units.

4) What are specialized enterprises oriented to?

a) they are reoriented from the production of industrial robots by piece, toward the manufacture of complete systems and robotized complex instruments;

b) they are oriented to the production of new kinds of products;

c) they are oriented to the robots which press, stamp and shape the raw material into a wide variety of things.

5) How will the utmost economic and social effect be brought about?

a) by systems capable of taking over a technological chain;

b) by systems capable of taking over the hasardous working conditions for a human operator;

c) by systems capable of taking over all the routine stages of designing, design support and the production of output.

6) Why do robots release workers from monotonous and very hard work?

a) because this work requires unskilled labour in production with hazardous working conditions.

b) because because this work is very difficult and unpleasant;

c) because because this work requires new technologies.

#### **4. Answer the questions:**

1) What are the real working conditions for a human operator by removal of hot metal die castings or plastics injection? 2) How can you characterize this kind of job? 3) What is the necessity of industrial automated handling caused by? 4) What can robots do at big enterprises? 5) What is the main problem of the development of robotics in industry? 6) What are specialized enterprises reoriented toward? 7) What do robots release workers from?

#### **5. Find as quickly as possible and read out the sentences containing the following important information:**

- working conditions for robots
- robots of different types and purposes
- designing robotical complexes

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Glass-tube, heat radiation, automated handling processes, medium-sized robots, raw material, industrial spraying, machine-tool industries, robot by itself, easily modifiable, to be tackled by, routine stage, hazardous working conditions.

**2. Give English equivalents of the following.**

Умови роботи, температура оточуючого середовища, тепла радіація, виснажлива робота, обробка токсичного матеріалу, процес обробки, рівень надійності, провідні заводи, гнучкі виробничі системи, випуск готової продукції.

**3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
real	a lot of
human	big
for example	help
dangerous	true
level	project
giant	output
design	man
many	for instance
production	stage
assistance	hazardous

**4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*hot handling / single-handed / environmental temperature / to make inroads / assessment of their performance / wide variety of things / by piece / robot by itself*

1) The ... is above 50°C and the melting furnaces produce direct and reflexive heat radiation. 2) robots can press, stamp and shape the raw material into a ... . 3) Robot usage has been expanding for industrial spraying, ..., assembly, welding, etc. 4) Robotics is just beginning ... in industrial production worldwide. 5) The ... does nothing – it must be constructively designed together with the machine tools. 6) ... robot is not yet a soldier in the field. 7) Specialized enterprises are reoriented from the production of industrial robots ..., toward the manufacture of complete systems and robotized complex instruments with the ... by the end result the quality and volume of the produce made with their assistance.

**5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Людина-оператор не може замінити робота у небезпечних умовах роботи. 2) Температура оточуючого середовища для роботів може перевищувати 100°C. 3) Роботи є незамінними у таких виробничих процесах, як термообробка, промислове розпилення, зварювання, лиття тощо. 4) Робот сам по собі не відіграє великої ролі у виробництві, набагато важливішим є створення роботизованого виробничого комплексу. 5) Гнучкі та автоматизовані виробничі системи широко використовуються в автомобільній, електротехнічній та інших галузях виробництва. 6) Майже всі промислові підприємства використовують одноцільових роботів для полегшення людської праці.

**Grammar in Use**

**1. Fill in the gaps in the following sentences using the appropriate form of the verb in brackets.**

1). Some decades ago the words "automation", "automatic control" seldom (to appear) on the pages of the press or scientific publications. 2). The man (to remain) the principal agent of the technological process. 3) Last year a lot of automated control systems (to go) into operation at different enterprises and organizations. 4). In 1990s the main trend in automation (to develop) various technological processes and systems. 5). Flexible manufacturing systems (to be) the best way to meet the demands of industry

**2. Make up questions to which the underlined words are the answers:**

1) Automation replaces human muscle by mechanical power. 2) These machines confined human operator to two kinds of work. 3) Since then technical development has been gradual and continuous. 4) The transfer-machine combines automatic machining with automatic transfer between operations. 5) All loading and unloading is done mechanically. 6) During the Middle Ages, windmills had been made. 7) Automation was first applied to industry in continuous process manufacturing.

**3. Open the brackets using the appropriate form of the verb.**

1). Robots already (to demonstrate) an ability to perform work that (to require) simple repetitive motions and, therefore, can relieve human operators from hazardous or monotonous tasks. 2). The number of types of electromechanical robots continually (to increase). 3). In forging operations, robots (to be) used to transfer hot billets from furnaces to forging presses to transfer parts from die to die in successive forming operations. 4). For last decades many ways (to be) tried to increase productivity on assembly lines. 5). To test different kinds of acceleration couches, scientists (to build) robots that look and "feel" like men.

**Additional Text**  
**(for individual work)**

*Read and translate the text.*

**What can robots do?**

In addition to their many practical uses, robots are helping our research scientists answer many difficult questions. Robots help astronomers find and track new stars and lead the way to new and better rockets. They even help scholars figure out the meaning of documents written near the beginning of man's history.

Very few of the robots we have talked about up to now have looked like men. That's because robots are specialists.

There are some robots, however, that are made to look and react like men. That is their specialized task. They are the robots that researchers use to find out what will happen to a human body under a variety of situations.

One of the things that space researchers want to know is what kind of seat is the best for rocket passengers. The blast-off of a rocket will exert tremendous pressures on anyone riding in the rocket. Because of that, a rocket will have to have specially designed seats to protect its passengers. These seats are called "acceleration couches".

To test different kinds of acceleration couches, scientists have built dummies that look and "feel" like men. They have "bones" and "blood" and "flesh". Inside these robots are instruments that tell how much pressure and strain is exerted on each part of the body. These robots are placed on acceleration couches and subjected to pressures like those that would be present in an actual rocket take-off. The measuring devices inside the dummy tell the scientists whether or not the acceleration couch would prevent the blast-off pressure from injuring or killing a man.

*1. Divide the text into the logical parts and give a title to each one.*

*2. Put questions to the text.*

*3. Discuss it with your groupmates.*

**Unit 4**

**Text Study. The Technology within an Industrial Robot.**

**Additional Text. Definition of Robots.**

**Grammar: Revision of Grammar.**

**Text Study**

*I. Pre-reading Exercises*

*1. Repeat the words in chorus:*

Axes, typically, variable, however, considerably, to require, substituting, features, compressibility, perhaps, assigned, repeatedly.

**2. While reading the text you will come across a number of international words. Try to guess what Ukrainian words they remind you:**

Operation, mechanism, configuration, unique, product, term, to manipulate, standard, automated, machine, control, function, technology, minicomputer, programming, pneumatic, hydraulic, electric, system, radioactive, toxic, material, operation, fact, innovation, electronic, microcomputer.

**3. Pay attention to some grammatical points:**

1) An industrial robot may be defined as a device with five or more axes with servo-control, **capable of being programmed** for independent operation. 2) Some engineers insisted that every robot **must be like us**, people, and **be capable of doing** any job. 3) Pneumatic systems **are not** generally **capable of** very high accuracy of movement **due to** the compressibility of air, but they **are of low cost** and easy to maintain. 4) Gripper units **have been used** in the nuclear machining for many years for the remote machining of radioactive or toxic materials. 5) The innovation lies rather in the application of the technology of robots, and **it is here that** invention and novelty must be considered.

## **II. Reading**

**Read the text and be ready to find in the text the answers to the following questions:**

- *How is the term "robot" defined?*
- *What are the methods of servo-drives for the axes ?*

### **The Technology within an Industrial Robot**

An industrial robot may be defined as a device with five or more axes with servo-control, capable of being programmed for independent operation. Typically, two or three of these axes may be for a hand, gripper or wrist type of mechanism and the others for what can be considered a shoulder and arm, giving variable extension, rotation and elevation. However, there are no hard and fast rules as to what form an industrial robot must take, and their mechanical configurations differ considerably depending on makers.

Even now robots are unique products for all mechanical engineers across the world. Therefore the term "robot" itself requires clarification. Some engineers insisted even until recently that every robot must by all means be like us, people, and be capable of doing any job. Others were inclined to regard any manipulating device as a robot. The standard adopted in many countries defines an industrial robot as automated machine combining a manipulator and programmable control device designed to perform movement and control functions substituting for similar functions of man.

The technology within a robot is really well established from other branches of engineering. It is the detailed application of such technology to a robot that is different. Many features of NC machine tools, for example, can be compared directly with similar features of an industrial robot. The servo-systems for controlling the axes, the minicomputer controller, and memory of tape programming are all established features of existing machine-tool technology, and often the machine tool itself has adopted the technology from other previous developments. There is, therefore, plenty of application experience for robot control designers to draw upon.

The servo-drives for the axes may be pneumatic, hydraulic, or electric, or any combination of these methods. Pneumatic systems are not generally capable of very high accuracy of movement due to the compressibility of air, but they are of low cost and easy to maintain. Hydraulic drives have the capability of providing high forces and good control of speed and positioning. Electrically stepping motors or dc drive can be used.

The detailed mechanical design of an industrial robot is somewhat different from a machine tool. Industrial robots usually have a hand or wrist incorporating some form of gripper unit. Gripper units have been used in the nuclear machining for many years for the remote machining of radioactive or toxic materials. Such units were designed to perform a range of tasks, not just one simple handling operation. Simple gripper units have been developed for handling tooling as part of automatic tool changers. There exist many types of gripper units and transfer mechanisms.

From these examples, it can be seen that there is little new in the technology of industrial robots, and the high levels of reliability obtained in the practical application of robots perhaps reflects this fact. The innovation lies rather in the application of the technology of robots, and it is here that invention and novelty must be considered.

What makes a robot different from an ordinary machine is its electronic brain - a microcomputer that can be programmed to do an assigned task repeatedly, at the same pace and with the same accuracy. It is expected that in the nearest future industrial robots will be able to change their own parts.

#### *Vocabulary Notes*

**Axis** [ 'xksIs ] — вісь

**shoulder** [ 'Sqvldq ] — плече

**maintain** [ meIn 'ten ] — утримувати, обслуговувати, ремонтувати

**detailed** — детальний

**servo-control** [ 'sWvqv kqn 'trqv ] — сервоуправління

**pneumatic** [ njn 'mxtIk ] — пневматичний

**extension** [ Ik 'stens (q) n ] — розширення

**elevation** [ˈeɪlɪˈveɪs (ɑn)] — піднесення

**programmable control device** — керувальний пристрій, якому можна задавати програму

**NC machine tool** — верстат з числовим програмним управлінням, (ЧПУ)

**servo-drive** — сервопривід

**to draw upon** — черпати, брати

**positioning** — позиціонування

**dc (direct current) drive** — привід постійного струму

**stepping motor** [stɛpɪn ˈmɑːvɪtɔː] — крокуючий двигун

**gripper-unit** — затискуючий привід

**nuclear machining** [ˈnjuːklɪɑː] — механічна обробка радіоактивних матеріалів

**remote machining** [rɪˈmɑːvɪt] — механічна обробка за допомогою дистанційного управління

**automatic tool changer** — пристрій для автоматичної зміни інструменту

### *Comprehension*

#### *1. Tell what sentences are true and what are false.*

1) A device that has a lot of axes with servo-control, capable of being programmed for independent operation is called an industrial robot. 2) The form of an industrial robot is strictly defined. 3) The mechanical configurations of a robot depend upon the tasks it performs. 4) The term "robot" itself is rather clear and distinct. 5) According to the international standards an industrial robot is an automated machine with a manipulator and programmable control device for substituting similar human functions. 6) The machine tool itself cannot adopt the technology from other previous developments. 7) Pneumatic systems are characterised by very high accuracy of movement and very high cost. 8) Hydraulic drives provide high forces and good control of speed and positioning. 9) Gripper units have been used in the nuclear machining lately for distant machining dangerous materials. 10) The high levels of reliability obtained in the practical application of robots proves that the technology of industrial robots has changed greatly. 11) The electronic brain of a robot differs it from an ordinary machine. 12) A microcomputer can't be programmed to do an assigned task repeatedly, with definite pace and accuracy.

#### *2. Complete the sentences:*

1) An industrial robot may be defined as ... . 2) Robots are unique products for ... . 3) Some engineers insisted that every robot must... . 4) Many features of NC machine tools can be compared directly with ... . 5) The minicomputer controller, and memory of tape programming are all established features of ... . 6) The servo-drives for the axes may be ... . 7) Gripper units

were designed to ... . 8) Simple gripper units have been developed for ... . 9) In the nearest future industrial robots will be able to ... .

**3. Choose the right answer:**

1) What is an industrial robot?

- a) a device with two axes, capable to perform loading and unloading operations;
- b) a device, capable to substitute similar human functions;
- c) a device with five or more axes with servo-control, capable of being programmed for independent operation.

2) What is the standard of an industrial robot adopted in many countries?

- a) it is an automated machine capable of doing any job;
- b) it is an automated machine combining a manipulator and programmable control device;
- c) it is an automated machine characterized by very high accuracy of movement and very high cost.

3) What is programmable control device designed to?

- a) it is designed to perform movement and control functions;
- b) it is designed to substitute similar functions of mechanical tools;
- c) it is designed to adopt the existing technology from other previous developments.

4) What are the established features of existing machine-tool technology?

- a) they are: pneumatic, hydraulic, or electric servo-drives for the axes;
- b) they are the features of NC machine tools;
- c) they are: the servo-systems for controlling the axes, the minicomputer controller, and memory of tape programming.

5) What are the possible servo-drives for the axes?

- a) they may be developed for handling tooling as part of automatic tool changers;
- b) they may be like people, and be capable of doing any job;
- c) they may be pneumatic, hydraulic, or electric, or any combination of these methods.

6) What is the difference between the design of an industrial robot and a machine tool?

- a) industrial robots usually have a hand or wrist incorporating some form of gripper unit;
- b) industrial robots usually have memory of tape programming;
- c) industrial robots usually have definite mechanical configurations.

7) What are gripper units used for in the nuclear machining?

- a) for controlling the axes;
- b) for independent operation;

- c) for the remote machining of radioactive or toxic materials.  
 8) What is the electronic brain of an industrial robot?  
 a) it is a microcomputer that can be programmed to do an assigned task repeatedly, at the same pace and with the same accuracy;  
 b) it is a hand or wrist incorporating some form of gripper unit;  
 c) it is a manipulating device of a robot.

**4. Answer the questions:**

1) How many axes has an industrial robot got? 2) What functions do these axes perform? 3) What form must an industrial robot take? 4) What do the mechanical configurations of a robot depend on? 5) What is the problem of the definition of the term "ROBOT"? 6) How is an industrial robot defined in many countries? 7) What are the established features of existing machine-tool technology? 8) What are simple gripper units developed for? 9) What operations do gripper units perform in the nuclear industry? 10) What makes a robot different from an ordinary machine?

**5. Find as quickly as possible and read out the sentences containing the following important information:**

- the term "robot"
- servo-drives for the robot axes
- gripper units

**\*6. Try to tell the gist of the text.**

**Word Study**

**1. Give Ukrainian equivalents of the following.**

Axes, servo-control, independent operation, wrist type of mechanism, extension, rotation, elevation, mechanical configurations, unique product, clarification, manipulating device, programmable control device, servo-systems, machine-tool technology, compressibility of air, electrically stepping motor, gripper unit, transfer mechanism.

**2. Give English equivalents of the following.**

Верстат з числовим програмним управлінням, сервопривід, привід постійного струму, механічна обробка радіоактивних матеріалів, механічна обробка за допомогою дистанційного управління, пристрій для автоматичної зміни інструменту, наполягати, замінювати подібні функції людини, радіоактивні та токсичні матеріали, пневмосистема, гідравлічний привід, висока точність руху, контроль швидкості та позиціонування, виконувати ряд задач, високий рівень надійності, застосування робототехнологій, новизна, та сама швидкість, найближче майбутнє.

### **3. Match the words in A with their synonyms in B:**

<b>A</b>	<b>B</b>
Operation	state
Elevation	progress
Fast	lift
Do	speed
Country	quick
Application	construction
Development	action
Design	perform
Pace	use

### **4. Fill in the gaps with the words from Vocabulary Notes in the appropriate form.**

*automatic tool changers / dc drive / remote machining / servo-drives / gripper unit / axes*

1) The ... for the ... may be of different types. 2) Electrically stepping motors or ... can be used. 3) Industrial robots usually have a hand or wrist incorporating some form of ... . 4) Gripper units have been used in the nuclear industry for the ... of radioactive or toxic materials. 5) Simple gripper units have been developed for handling tooling as part of ... .

### **5. Translate sentences into English using words and word combinations from the Vocabulary Notes.**

1) Сучасні промислові роботи здатні самі себе обслуговувати та вдосконалювати. 2) Вісь промислового робота може використовуватись як плече або рука для різноманітних операцій. 3) Сервопривід роботів може бути як гідравлічним, так і пневматичним. 4) З механічної точки зору верстати з числовим програмним управлінням (ЧПУ) та промислові роботи мають багато спільних рис. 5) У ядерній промисловості роботи з затискаючим приводом використовують для механічної обробки радіоактивних матеріалів за допомогою дистанційного управління.

### **Grammar in Use**

#### **1. Read and translate the following sentences paying attention to the function of Participle in the sentences:**

1) "Multi-point" PTP robots and CP robots are also called "servo-controlled" robots. 2) The simplest of the above mentioned robots are those operated by pneumatics with fixed cycle control. 3) Most of them have electrical control systems but there are also examples of complete pneumatically controlled models. 4) The number of types of electromechanical robots is increasing quickly. 5) There are also robots working in the

cylindrical, spherical and cartesian systems. 6) Industrial robots are being used for a wide variety of tasks.

**2. Make up questions to which the underlined words are the answers:**

1) Industrial robots are widely used to transfer, manipulate, and position both light and heavy workpieces. 2) The feedback principle is used in automatic-control mechanisms. 3) The motions of the machines are controlled by punched paper or magnetic tapes. 4) A computer in FMS can be used to monitor and control the operation of the whole factory. 5) Railways are also controlled by automatic signaling devices. 6) In the telephone industry dialing and transmission are done automatically.

**3. Open the brackets using Passive Voice**

1) The automation technology in manufacturing and assembly (to use) in car and other consumer product industries. 2) Some machines (to program) by their design to make only certain processing operations. 3) For each new product the production equipment must (to reprogram) and (to change) over. 4) The program (to code) in computer memory for each different product style and the machine-tool (to control) by the computer programme. 5) In flexible automation the number of products (to limit). 6) The reprogramming of the equipment in flexible automation (to do) at a computer terminal without using the production equipment itself.

**Additional Text  
(for individual work)**

*Read and translate the text.*

**Definition of Robots**

One of the difficulties in dealing with the word "robot" is the wide variety of definitions. No two are exactly alike. Robots come in all shapes and sizes, but only in the most abstract sense do they resemble the mechanical men portrayed in science fiction. Some definitions permit the idea that robotic processes allow for some human intervention. This explains in part why the Japanese statistics show Japan to be so far ahead in the manufacture and use of robots. Most American definitions consider robots to be entirely automatic. Essentially all would agree that a single industrial robot, in addition to a power unit, has a computerized controller and some form of manipulator. The father of Unimation, George Devol, gives a straightforward definition of a robot as a standalone, digitally controlled piece of equipment that can pick up and position almost anything in any direction and in almost any plane and that uses information from computers and gives information to computers.

Another definition states that basically, robots are microprocessor-controlled mechanical devices that perform functions or provide an intelligent interface between machines and processes. They can be intelligent enough to

make on-the-spot manufacturing decisions. They can duplicate human manipulative skills with accuracy and precision.

The Robot Institute of America has coined a definition commonly accepted by many writers. It states that a robot is a reprogrammable, multifunctional manipulator designed to move materials, parts, or specialized devices through variable programmed motions for the performance of a variety of tasks without human intervention. Today's commercially available robots, in addition to being programmed to follow a complex sequence of instructions, can also be modified through electromechanical means without changing hardware.

Robots are of several types. Distinctions are often made between low, medium, and high technology, but basically it is the manner in which robots are controlled that serves as the basic distinction. There are the non-servo controlled robots programmed by setting up a sequence of moves or mechanical stops.

These are the familiar "pick-and-place" robots, simple to operate and easy to program and maintain. The servo-controlled robots are more complicated. The programmed moves are recorded in a memory. They have greater flexibility and can store more than one program. When linked together with electronic controls, a series of operations can be connected in a manufacturing sequence - computers linked to computers. They are even capable of replacing worn-out or broken drill bits and other implements. Managers will find an excellent glossary of terms provided by Obrzut. The newer robots are capable of imitating the human sense of sight, hearing and touch.

***1. Divide the text into the logical parts and give a title to each one.***

***2. Put questions to the text.***

***3. Discuss it with your groupmates.***

## Progress Check

*Choose the right answer:*

- 1) What do material-transfer applications require?
  - a) they require the robot to substitute human workers;
  - b) they require the robot to put the work parts on proper places;
  - c) they require the robot to move materials or work parts from one to another;
  - d) they require the robot to be equipped with a gripper;
  - e) they require the robot to be used on two or three shifts.
- 2) What do machine loading and unloading operations utilize a robot to perform?
  - a) to transfer the work parts on proper places;
  - b) to load and unload parts;
  - c) to check the quality of the work parts;
  - d) to provide control of speed and positioning;
  - e) to perform movement functions..
- 3) What does robot do in processing operations?
  - a) it positions a sensor;
  - b) it manipulates a tool;
  - c) it elevates heavy loads;
  - d) it monitos and controls the operation of the whole factory;
  - e) it substitutes similar human functions.
- 4) What is robotized arc welding?
  - a) a process in which robot moves the welding rod along the welding seam;
  - b) a process in which robot covers the work parts with the paint spray;
  - c) a process in which robot performs grinding and polishing;
  - d) a process in which robot uses information from computers and gives information to computers;
  - e) a process in which robot transfers, manipulates, and positions both light and heavy workpieces.
- 5) Why is the use of robots in assembly expected to increase?
  - a) because of increase of the number of robots in industry;
  - b) because of decrease of people in the world;
  - c) because of the high cost of manual labour;
  - d) because they are simple to operate and easy to program and maintain;
  - e) because they are entirely automatic.
- 6) What is a drive?
  - a) a load capacity;
  - b) a fixed cycle control;
  - c) a typical feature of robots;
  - d) a memory;

e) a sequence of moves.

7) What is a role of hydraulic robots in industry?

a) they occupy the second place in industrial application;

b) they are of no use in industry;

c) they operate, in theory, in an infinite number of points in space;

d) they can replace worn-out or broken drill bits and other implements;

e) they have greater flexibility and can store more than one program.

8) What system can industrial robots operate in?

a) they can work in loading and unloading system;

b) they can work in assembly operations system;

c) they can work in angular coordinate system as well as in cylindrical, spherical and cartesian systems;

d) they can work in flexible manufacturing systems;

e) they can work in servo-systems.

9) What are CP servo-controlled robots used for?

a) they are used for trimming operations;

b) they are used for spot and arc welding;

c) they are used for dimensional checking;

d) they are used for moving materials, parts, or specialized devices;

e) they are used for providing an intelligent interface between machines and processes.

10) What robot performs the complex part and tool-handling tasks in assembly operations?

a) industrial robot;

b) "multi-point" PTP robot;

c) microprocessor-controlled robot with sensory feedback capability;

d) "pick-and-place" robot.

e) servo controlled robot.

11) Where are robotic systems, lines and modules operating today?

a) in light industry enterprises;

b) in different educational establishments;

c) in the leading plants of the motor, electrical engineering, machine-tool industries;

d) in power stations;

e) in correlated plants.

12) Why can the robot by itself do nothing?

a) because our industry receives annually thousands of robots of different types and purposes;

b) because individual robots are easily modifiable for the manufacture of ever new kinds of products;

- c) because they must be logically incorporated within the system of machines, machine tools and other units;
- d) because they are linked together with electronic controls.
- e) because they must be constructively designed together with the machine tools.

13) What are specialized enterprises oriented to?

- a) they are reoriented from the production of industrial robots by piece, toward the manufacture of complete systems and robotized complex instruments;
- b) they are oriented to the production of new kinds of products;
- c) they are oriented to the robots which press, stamp and shape the raw material into a wide variety of things;
- d) they are oriented to robots working in the cylindrical, spherical and cartesian systems;
- e) they are oriented to robots, simple to operate and easy to program and maintain.

14) How will the utmost economic and social effect be brought about?

- a) by systems capable of taking over a technological chain;
- b) by systems capable of taking over the hazardous working conditions for a human operator;
- c) by systems capable of taking over all the routine stages of designing, design support and the production of output;
- d) by systems capable to imitate the human sense of sight, hearing and touch;
- e) by systems capable to duplicate human manipulative skills with accuracy and precision.

15) Why do robots release workers from monotonous and very hard work?

- a) because this work requires unskilled labour in production with hazardous working conditions.
- b) because because this work is very difficult and unpleasant;
- c) because because this work requires new technologies;
- d) because because this work requires much attention and accuracy;
- e) because because this work requires high forces and good control of speed and positioning.

16) What are the established features of existing machine-tool technology?

- a) they are: pneumatic, hydraulic, or electric servo-drives for the axes;
- b) they are the features of NC machine tools;
- c) they are: the servo-systems for controlling the axes, the minicomputer controller, and memory of tape programming;
- d) they are devices with five or more axes
- e) they are unique products for all mechanical engineers across the world.

17) What are the possible servo-drives for the axes?

- a) they may be developed for handling tooling as part of automatic tool changers;
- b) they may be like people, and be capable of doing any job;
- c) they may be pneumatic, hydraulic, or electric, or any combination of these methods;
- d) they may be non-servo controlled;
- e) they may be modified through electromechanical means without changing hardware.

18) What is the difference between the design of an industrial robot and a machine tool?

- a) industrial robots usually have a hand or wrist incorporating some form of gripper unit;
- b) industrial robots usually have memory of tape programming;
- c) industrial robots usually have definite mechanical configurations;
- d) industrial robots usually have a computerized controller;
- e) industrial robots usually have greater flexibility.

19) What are gripper units used for in the nuclear machining?

- a) for controlling the axes;
- b) for independent operation;
- c) for the remote machining of radioactive or toxic materials;
- d) for making on-the-spot manufacturing decisions;
- e) for a wide variety of tasks.

20) What is the electronic brain of an industrial robot?

- a) it is a microcomputer that can be programmed to do an assigned task repeatedly, at the same pace and with the same accuracy;
- b) it is a hand or wrist incorporating some form of gripper unit;
- c) it is a manipulating device of a robot;
- d) it is a servo controlled robot;
- e) it is a multifunctional manipulator.

## **Revision Modules I-VIII**

### **Choose the right variant**

1. The early foundations of what \_\_\_\_\_ computer science predate the invention of the modern digital computer.

- a) would become
- b) should became
- c) ought become

2. Machines for calculating fixed numerical tasks, such as the abacus, \_\_\_\_\_ since antiquity.
- a) have existed
  - b) have been existed
  - c) had existed
3. Wilhelm Schickard \_\_\_\_\_ the first mechanical calculator in 1623.
- a) was built
  - b) built
  - c) have built
4. Charles Babbage \_\_\_\_\_ a different engine in Victorian times (between 1837 and 1901) helped by Ada Lovelace.
- a) would designed
  - b) has been designed
  - c) designed
5. In 1900, the IBM corporation \_\_\_\_\_ punch-card machines.
- a) sell
  - b) sold
  - c) is selling
6. During the 1940s, as newer and more powerful computing machines \_\_\_\_\_.
- a) was developed
  - b) has developed
  - c) were developed
7. Computers could \_\_\_\_\_ for more than just mathematical calculations, the field of computer science broadened to study computation in general.
- a) be used
  - b) are used
  - c) is used
8. Computer science \_\_\_\_\_ to be established as a distinct academic discipline in the 1960s, with the creation of the first computer science departments and degree programs.
- a) began
  - b) begun
  - c) begin
9. Since practical computers became available, many applications of computing \_\_\_\_\_ distinct areas of study in their own right.

- a) becoming
- b) have become
- c) is becoming

10. Many initially believed it impossible that «computers themselves \_\_\_\_\_ actually be a scientific field of study», though it was in the «late fifties» that it gradually became accepted among the greater academic population.

- a) may
- b) can
- c) could

11. It is the now well-known IBM brand that \_\_\_\_\_ part of the computer science revolution during this time.

- a) formed
- b) was formed
- c) were formed

12. IBM (short for International Business Machines) released the IBM 704 and later the IBM 709 computers, which widely \_\_\_\_\_ during the exploration period of such devices.

- a) were used
- b) have been used
- c) had been used

13. If you misplace as much as one letter in one instruction, the program \_\_\_\_\_ and you would have to start the whole process over again.

- a) would crash
- b) crash
- c) will crash

14. During the late 1950s, the computer science discipline a) / b) very much in its developmental stages, and such issues were commonplace.

- a) have been
- b) was
- c) has been

15. Modern society has seen a significant shift from computers \_\_\_\_\_ solely by experts or professionals to more and more widespread user base.

- a) being used
- b) been used
- c) is using

16. The first working digital computer \_\_\_\_\_ until the mid 40s.
- was completed
  - wasn't completed
  - is completed
17. Vacuum tubes \_\_\_\_\_ by transistors in the first generation computers.
- was replaced
  - weren't replace
  - were replaced
18. New technologies \_\_\_\_\_ to make smaller and faster machines.
- is being development
  - are been development
  - are being developed
19. Computers \_\_\_\_\_ through five generations.
- have gone
  - has gone
  - have been gone
20. The first analog computer \_\_\_\_\_ in the early 1900s.
- have been built
  - was built
  - has been built
21. Computer technology \_\_\_\_\_ now.
- has being grown
  - is growing
  - will be grown
22. Punched cards were used \_\_\_\_\_ the first digital computer.
- to produce
  - is producing
  - to have produced
23. Mechanical processes were combined with punch cards techniques \_\_\_\_\_ an electromechanical computers.
- developed
  - developing
  - to develop
24. The first electronic computer used electronic tubes \_\_\_\_\_ calculations.

- a) to make and store
  - b) to make and to store
  - c) make and store
25. Nowadays it became possible to produce equipment \_\_\_\_\_ minimal space.
- a) to require
  - b) required
  - c) requiring
26. It is necessary \_\_\_\_\_ data to the computer in its electronic impulse-based form.
- a) to present
  - b) will be presented
  - c) presented
27. Application packages are suites of programs \_\_\_\_\_ for a particular type of problem.
- a) using
  - b) to use
  - c) used
28. Our point is demonstrated well by the home computer \_\_\_\_\_ for \_\_\_\_\_ games.
- a) used; playing
  - b) to use; to play
  - c) using; played
29. It is relatively easy to the user \_\_\_\_\_ from one program to another.
- a) change
  - b) to change
  - c) changing
30. Electricity is needed for computer \_\_\_\_\_.
- a) working
  - b) worked
  - c) to work
31. The basic job of computer is the \_\_\_\_\_ of information.
- a) to process
  - b) processing
  - c) process
32. Pragma is the computer program which enables you \_\_\_\_\_ texts.

- a) translate
  - b) to translate
  - c) have translated
33. This device was used \_\_\_\_\_ perform calculations.
- a) to help to
  - b) help
  - c) helped.
34. In 1946 two engineers at the University of Pennsylvania built the first digital computer \_\_\_\_\_ parts called vacuum tubes.
- a) using
  - b) use
  - c) used
35. Thousands of individual circuit elements necessary \_\_\_\_\_ all the functions of the computer are manufactured as a single chip.
- a) performing
  - b) to perform
  - c) performed
36. An ancient instrument for calculations: \_\_\_\_\_.
- a) a chip
  - b) an abacus
  - c) an Analytical Engine
37. An electronic device that can receive a set of instructions called program and then carry them out: \_\_\_\_\_.
- a) DVD-player
  - b) computer
  - c) calculus
38. A huge network of computers spanning our planet: \_\_\_\_\_.
- a) Netscape Navigator
  - b) Opera
  - c) Internet
39. A small semiconductor which operates as an amplifier: \_\_\_\_\_.
- a) a chip
  - b) a transistor
  - c) a vacuum tube
40. Input, output, memory, CPU- \_\_\_\_\_
- a) auxiliary components of a computer

b) basic components of a computer  
c) arithmetic-logic components of a computer  
41. Practical optic-mechanical aid with rolling ball for facilitating work with your computer\_\_\_\_\_.

- a) output device
  - b) mouse
  - c) interrupt handler
42. Output device-

- 
- a) machine by which information is sent to the computer;
  - b) terminal for the output on an electronically device;
  - c) device used for conveying data out of another device.

43. Input device-

- 
- a) machine by which information is sent to the computer
  - b) device used for conveying data out of another device
  - c) terminal for an electrical input

44. Output:\_\_\_\_\_.

- a) printer, monitor
  - b) mouse, keyboard
  - c) chip, microprocessor
45. Who found Microsoft?

- a) Bill Gates
- b) Blaise Pascal
- c) Charles Babbage

46. The first fully electronic computer was developed at the\_\_\_\_\_.

- a) University of Pennsylvania
- b) University of Oxford
- c) University of New York

47. What is the most common type of semiconductor memory?

- a) ROM
- b) DVD
- c) RAM

48. Input devices are\_\_\_\_\_:

- a) Mouse, keyboard
- b) Monitor, cooler

c) Hard disk, CD

49. What \_\_\_\_\_ the mouse especially useful for?

a) do

b) makes

c) is

50. Output device: \_\_\_\_\_ .

a) mouse

b) monitor

c) case

51. The monitor \_\_\_\_\_ controlled by a separate circuit board, known as the display adaptor which plugs into the motherboard of the computer. Different boards drive different types of displays.

a) is

b) are

c) was

52. Input device:

a) speakers

b) ROM

c) keyboard

53. Hard disks \_\_\_\_\_ important advantages over floppy disks: they spin at a higher speed, so you can store and retrieve information much faster than with floppies.

a) does

b) is

c) have

54. When \_\_\_\_\_ a hard disk you should consider the kinds of drive mechanisms and products available.

a) buying

b) buy

c) bought

55. Optical disks \_\_\_\_\_ information at much higher densities than magnetic disks.

a) can store

b) is storing

c) are stored

56. A lot of institutions \_\_\_\_\_ that CD-ROM is the most economical way of sharing information.

- a) have discovered
  - b) was discovering
  - c) has been discovered
57. Magneto-optical (MO) drivers\_\_\_\_\_ both a laser and an electromagnet to record information.
- a) using
  - b) use
  - c) are used
58. The characters and pictures that we see on the screen\_\_\_\_\_of dots.
- a) make up
  - b) are made up;
  - c) is making
59. Information is given into the computer in the form of \_\_\_\_\_ .
- a) ideas
  - b) characters
  - c) rules
60. The basic function of a computer is\_\_\_\_\_information.
- a) to switch
  - b) to keep
  - c) to process
61. The data needed for solving problems are kept in the \_\_\_\_\_ .
- a) memory
  - b) input device
  - c) output device
62. Inputting information into the computer is realized by means of\_\_\_\_\_.
- a) a printer
  - b) letters
  - c) a monitor
63. A computer can carry out arithmetic-logical operations \_\_\_\_\_ .
- a) quickly
  - b) instantaneously
  - c) during some minutes
64. Space\_\_\_\_\_uses computers widely.
- a) information
  - b) production
  - c) exploration

65. Transistors have many \_\_\_\_\_ over vacuum tubes.
- a) patterns
  - b) advantages
  - c) scales
66. Transistors \_\_\_\_\_ very little power.
- a) consume
  - b) generate
  - c) embrace
67. Modern \_\_\_\_\_ began in the early 20<sup>th</sup> century with the invention of electronic tubes.
- a) miniaturization
  - b) electronics
  - c) microelectronics
68. John Fleming was the \_\_\_\_\_ of the first two-electrode vacuum tube.
- a) generator
  - b) receiver
  - c) inventor
69. One of the transistor advantages was lower power \_\_\_\_\_ in comparison with vacuum tubes.
- a) consumption
  - b) reception
  - c) transmission
70. Microelectronics greatly extended man's intellectual \_\_\_\_\_ .
- a) subsystems
  - b) capabilities
  - c) dimensions
71. Electronic devices \_\_\_\_\_ people discover new phenomena of nature.
- a) help
  - b) are helped
  - c) was helped
72. The transistor \_\_\_\_\_ by vacuum tubes thanks to its numerous advantages.
- a) replaced
  - b) was replaced
  - c) has replaced

73. Due to transistors all circuit functions \_\_\_\_\_ inside semiconductors.
- a) carried out
  - b) were carried out
  - c) is carried out
74. Electronic devices \_\_\_\_\_ in scientific research.
- a) used
  - b) use
  - c) are used
75. Before the invention of the transistor its function \_\_\_\_\_ by vacuum tubes.
- a) performed
  - b) was performed
  - c) has performed
76. The reliability of electronic systems \_\_\_\_\_ with the number of discrete components.
- a) connect
  - b) connected
  - c) is connected
77. Semiconductor integrated circuits \_\_\_\_\_ to increase reliability of devices.
- a) helped
  - b) were helped
  - c) helping
78. New types of integrated circuits \_\_\_\_\_ lately.
- a) have developed
  - b) have been developed
  - c) has developed
79. Mark I was the first \_\_\_\_\_ computer that could solve mathematical problems.
- a) analog
  - b) digital
  - c) mechanical
80. J. von Neumann simplified his computer by storing information in a \_\_\_\_\_ code.
- a) analytical
  - b) numerical

- c) binary
81. Vacuum tubes could control and \_\_\_\_\_ electric signals.
- a) calculate
  - b) amplify
  - c) generate
82. The first generation computers were \_\_\_\_\_ and often burned out.
- a) uncomfortable
  - b) uncommunicative
  - c) unreliable
83. Due to \_\_\_\_\_ the development of the fourth generation computers became possible.
- a) microelectronics
  - b) miniaturization
  - c) microminiaturization
84. Computer data \_\_\_\_\_ system frees humans from routine error-prone tasks.
- a) counting
  - b) computing
  - c) processing
85. The entered data can be transmitted by \_\_\_\_\_ networks.
- a) communications
  - b) conversions
  - c) procession
86. The possibility of \_\_\_\_\_ is reduced if data were correctly put into the data processing system.
- a) character
  - b) access
  - c) error
87. Computer data processing systems can \_\_\_\_\_ at a fraction of a second.
- a) receive
  - b) respond
  - c) retrieve
88. Computer systems are vulnerable to the entry of \_\_\_\_\_ data.
- a) invalid
  - b) invariable
  - c) invisible
89. The amount of data stored on magnetic discs is constantly \_\_\_\_\_ .

- a) decreasing
- b) increasing
- c) eliminating

90. Computers and their \_\_\_\_\_ equipment are designed by a computer system architect.

- a) engineering
- b) accessory
- c) specific

91. Digital computers use numbers instead of analogous physical \_\_\_\_\_.

- a) symbols
- b) equipment
- c) quantities

92. Systems \_\_\_\_\_ are usually stored in read-only memory.

- a) hardware
- b) software
- c) firmware

93. In modern electronic computers the \_\_\_\_\_ is the device that acts as a switch.

- a) integrated circuit
- b) diode
- c) transistor

94. A number of actions that convert data into useful information is defined as \_\_\_\_\_.

- a) data
- b) processing
- c) data processing

95. Computers can store, organize and retrieve great amounts of information, far beyond the \_\_\_\_\_ of humans.

- a) capacities
- b) capabilities
- c) accuracy

96. The analyst uses a computer for solving problems, while the computer system architect \_\_\_\_\_ computers.

- a) requires
- b) designs
- c) uses

97. The use of \_\_\_\_\_ computers will continue to increase with the growth in applications of microprocessors and minicomputers.
- a) analog
  - b) digital
  - c) hybrid
98. Computing is a concept \_\_\_\_\_ not only arithmetics, but also computer literacy.
- a) embraced
  - b) emhracing
  - c) for embracing
99. We can make the computer do what we want \_\_\_\_\_ signals turning switches on and off.
- a) inputted
  - b) to input
  - c) by inputting
100. Computers have a means \_\_\_\_\_ with the user.
- a) by communicating
  - b) of communicating
  - c) communicated
101. Computers work according to the instructions \_\_\_\_\_ to it by users.
- a) giving
  - b) given
  - c) to give
102. The transistor \_\_\_\_\_ in 1948 completely changed the vacuum tubes.
- a) inventing
  - b) invented
  - c) for inventing
103. Computers \_\_\_\_\_ for automatic piloting and automatic navigation.
- a) applied
  - b) are applied
  - c) are applying
104. The programs \_\_\_\_\_ to help people in the use of the computer system.
- a) write
  - b) have written

c) are written

105. As digital computers \_\_\_\_\_ quickly, they are used in business data processing.

a) count

b) counted

c) are counted

106. Once data have been entered correctly into the data processing system, the possibility of error \_\_\_\_\_.

a) reduced

b) is reduced

c) are reduced

107. It is known that an analyst \_\_\_\_\_ a computer to solve specific problems.

a) use

b) uses

c) is used

108. Instructions and data are fed through the \_\_\_\_\_ equipment to the memory.

a) output

b) control

c) input

109. The main units of the computer communicate with each other \_\_\_\_\_ a machine language.

a) in spite of

b) because of

c) by means of

110. A computer can solve very complex numerical \_\_\_\_\_.

a) communication

b) computations

c) instructions

111. Numbers and instructions forming the program are \_\_\_\_\_ in the memory.

a) solved

b) stored

c) simulated

112. The function of memory is to store \_\_\_\_\_ the original input data \_\_\_\_\_ the partial results.

a) not only ... but also

b) either ... or

c) no sooner ... than

113. The \_\_\_\_\_ includes the control and arithmetic-logical units.

a) flip-flop

b) digital computer

c) central processor

114. The simplest digital device is any device which \_\_\_\_\_ count.

a) can

b) could

c) must

115. In ancient days man \_\_\_\_\_ to substitute beads for fingers to help him count.

a) learns

b) learned

c) has learned

116. The ancient Chinese simplified the \_\_\_\_\_ board into abacus.

a) counted

b) to count

c) counting

117. The Japanese improved the abacus making it \_\_\_\_\_ .

a) more efficient

b) much efficient

c) efficienter

118. The tremendous speeds of computers and the flexibility built into them \_\_\_\_\_ the logical control make modern computers more powerful than mechanical calculators.

a) because of

b) according to

c) due to

119. The big problem in understanding digital computers is the logic which relates the logical elements into a unit \_\_\_\_\_ arithmetic and logical operations.

a) performed

b) performing

c) having performed

120. Arithmetic operations \_\_\_\_\_ into a sequence of simple logical operations.

- a) converted
- b) are converted
- c) was converted

121. Any digital calculation is usually \_\_\_\_\_ down into a sequence of elementary operations.

- a) breaking
- b) broken
- c) being broken

122. A computer is a device \_\_\_\_\_ a set of instructions and to execute them in the appropriate sequence.

- a) to accept
- b) has accepted
- c) accepts

123. The flip-flop \_\_\_\_\_ a storage cell with two inputs and two outputs.

- a) is
- b) was
- c) has been

124. The time required for the computer to locate and transfer data in the storage device is called the data \_\_\_\_\_ time.

- a) sequence
- b) access
- c) value

125. \_\_\_\_\_ memories have no moving parts.

- a) electronic
- b) mechanical
- c) electromechanical

126. Data are stored in \_\_\_\_\_ codes in primary as well as in secondary storage.

- a) digital
- b) binary
- c) numerical

127. Data access time is \_\_\_\_\_ in electronic memories than that in electromechanical memories.

- a) longer

b) much longer

c) shorter

128. Electronic memories have \_\_\_\_\_ capacities for data storage.

a) more

b) larger

c) less

129. The control unit \_\_\_\_\_ instructions from the program.

a) sends

b) changes

c) obtains

130. The instruction to be \_\_\_\_\_ in control unit is read out from primary storage into the storage register.

a) calculated

b) executed

c) read out

131. Input-output devices allow the computer to \_\_\_\_\_ with its external environment.

a) compute

b) command

c) communicate

132. The \_\_\_\_\_ devices allow the computer to communicate with its external environment.

a) high-speed

b) medium-speed

c) low-speed

133. Data are entered from a \_\_\_\_\_ in a manner similar to typing.

a) keyboard

b) digitizer

c) printer

134. A remote banking terminal is an example of a \_\_\_\_\_ input environment.

a) human-dependent

b) human-independent

c) human-related

135. A personal computer is a small relatively inexpensive device designed for an individual \_\_\_\_\_.

a) person

b) producer

c) user

136. One of the first and most popular personal computer was \_\_\_\_\_ in 1977.

a) interpreted

b) introduced

c) integrated

137. All personal computers are based on \_\_\_\_\_ technology, its CPU being called MPU.

a) microscopy

b) microprocessor

c) microelement

138. Very soon a microcomputer was \_\_\_\_\_ from a calculator into a PC for everyone.

a) transformed

b) transferred

c) transported

139. Input in PC is usually performed by means of a \_\_\_\_\_.

a) mouse

b) scanner

c) keyboard

140. A personal computer uses \_\_\_\_\_ disks as input and output media.

a) hard

b) fixed

c) floppy

141. Personal computers have a lot of \_\_\_\_\_, scientific, engineering, educational being among them.

a) multiplication

b) application

c) investigation

142. Personal computers have a great \_\_\_\_\_ on pupils, educators, accountants, stock brokers and who not.

a) influence

b) information

c) environment

143. A word processing program called application \_\_\_\_\_ enables you to modify any document in a manner you wish.

- a) hardware
- b) software
- c) firmware

144. Using a display you can \_\_\_\_\_ mistakes, delete words and replace sentences.

- a) delete
- b) dial
- c) correct

145. I/O \_\_\_\_\_ match the physical and electrical characteristics of input-output devices.

- a) interchanges
- b) interfaces
- c) interpretations

146. The most common device used to transfer information from the user to the computer is the\_\_\_\_\_.

- a) keyboard
- b) printer
- c) modem

148. Input-output units link the computer to its external \_\_\_\_\_ .

- a) requirement
- b) development
- c) environment

149. I/O devices can be classified according to their \_\_\_\_\_.

- a) speed
- b) data
- c) processor

150. An I/O interface is a special \_\_\_\_\_ that converts input data to the internal codes.

- a) register
- b) processor
- c) plotter

# English-Ukrainian Dictionary

## A

- abacus** [ 'xbqkqs ] — рахівниця
- ability** [ q 'bIlItI ] — здатність, можливість
- abolish** [ q 'bPlIS ] — скасовувати, виключати acceptable - прийнятний
- access** [ 'xkses ] — доступ, звернення; звертатися, мати доступ  
~ **time** — час доступу  
**database** ~ — доступ до бази даних  
**sequential** [ sI 'kwenSql ] ~ — послідовний доступ
- accessible** [ qk 'sesqbl ] — доступний
- accessories** [ qk 'sesqrIz ] — реквізити
- accessory equipment** — допоміжні пристрої
- accomplish** [ q 'kAmpIIS ] — завершувати, закінчувати
- accomplishment** — завершення; виконання
- according** — відповідний  
~ **to** — відповідно до
- accordingly** — відповідно, відповідним чином
- account** [ q 'kaunt ] — розрахунок, підрахунок, рахунок (банківський); враховувати  
**take into** ~ — брати до уваги, враховувати
- accumulate** [ qk jHmjuleIt ] — накопичувати (ся), підсумовувати, збирати
- accumulator** — суматор; накопичуючий регістр; пристрій підсумовування
- accuracy** [ 'xkjurqsI ] — точність, правильність; чіткість
- accurate** [ 'xkjurIt ] — точний, правильний
- achieve** [ q 'CJv ] — досягати, завершувати
- achievement** [ q 'CJvmt ] — досягнення, завершення
- acquire** [ q 'kwaIq ] — придбавати, отримувати
- acquisition** — придбання, отримання
- act** — діяти, працювати
- action** — дія, робота, операція  
**put into** ~ — приводити в дію
- activity** — діяльність
- adapt** [ q 'dxpt ] — адаптувати (ся), відрегулювати (ся); пристосовувати (ся)
- adapter** — адаптор
- add** [ xd ] — додавання, підсумовування
- added** — доданий, додатковий

**adder** — суматор, пристрій (блок) підсумовування  
**addition** [q' dISn] — додавання, підсумовування, додаток  
    **in ~ to** — на додаток до; крім того, до того ж  
**address** — адреса; адресувати; стосуватися; зачіпати  
**adequate** [ 'x dIkwIt ] — адекватний; відповідний; достатній;  
**adjacent** [q' GeISqnt] — суміжний; сусідній; примикає  
**adjust** [q' GAsT] — регулювати, відрегулювати  
**adjuster** — регулятор  
**adjustment** — регулювання; настройка; коригування; підгонка; поправка  
**advance** [qd' vRns] — просуватися (ся);  
    **in ~** — заздалегідь  
**advanced** — покращений; вдосконалений; ефективніший  
**advancement** — просування, поліпшення, удосконалення  
**advantage** [qd' vRntIG] — перевага; вигода  
**advice** [qd' vaIs] — 1. порада; рекомендація  
**advise** [qd' vaIz] — 2. радити; рекомендувати; консультувати  
**adviser** — консультант; довідник  
**affect** [q' fekt] — впливати; впливати  
**agree** [q' grJ] — відповідати; погоджувати (ся)  
**agreement** — угода  
**aid** [eId] — допомога, сприяння  
**aids** — кошти; засоби  
**aim** [eIm] — мета; націлювати, направляти  
**algorithm** [ 'xlgqrIDm ] — алгоритм  
**align** [q' laIn] — вирівнювати, вибудовувати в лінію  
**allocate** [ 'x lqkeIt ] — розподіляти; розміщувати; надавати (доступ)  
**allocation** [ "x lq' keISn ] — розподіл; призначення; надання  
**allow** [q' lau] — допускати; дозволяти  
    **~ for** — враховувати; брати до уваги  
**allowable** — допустимий  
**alter** [ 'Lltq ] — (з) міняти (ся)  
**alteration** [ "Lltq' reISn ] — зміна; зміна  
**amend** [q' mend] — виправляти; покращувати  
**amendment** — поправка; виправлення  
**amount** [q' maunt] — кількість; величина; розмір; об'єм; складати;  
    **~ of damage** [ 'dxmIG ] — ступінь пошкодження  
    **~ of memory** — об'єм пам'яті  
    **~ of time** — інтервал часу  
    **proper ~** — необхідна кількість

**amplification** [ˈxmplɪfɪˈkeɪʃn] — посилення  
**amplifier** [ˈxmplɪfaɪq] — підсилювач  
**amplify** [ˈxmplɪfaɪ] — посилювати (ся)  
**analog** — аналог; аналоговий  
**analog-digital** — аналого-цифровий  
**analyst** [ˈxnqlɪst] — аналітик; (системний) розробник  
**appear** [qˈpɪq] — з'являтися; виникати  
**appearance** [qˈpɪqrns] — поява; вигляд  
**appliance** [qˈplaɪqns] — пристрій; прилад  
**application** [ˈxplɪˈkeɪʃn] — додаток, застосування, вживання;  
**applied** [qˈplaɪd] — прикладний  
**apply** [qˈplaɪ] — застосовувати (ся); використовувати;  
**approach** [qˈprouʃ] — наближення; підхід; метод; наближитися, підходить

**top-down** ~ — принцип спадної розробки  
**comprehensive** [ˈkɒmprɪˈhensɪv] ~ — комплексний підхід  
**educational** [ˈedʒuˈkeɪʃnəl] ~ — метод навчання  
**general** ~ — загальний підхід  
**graphic** [ˈdʒenɪqrɪkəl] ~ — графічний метод  
**self-study** ~ — метод самонавчання  
**step-by-step** ~ — метод поетапного вирішення  
**training** ~ — метод навчання  
**trial-and-error** [ˈtraɪəl] ~ — метод проб і помилок, метод

підбору

**appropriate** [qˈprouprɪqt] — підходящий; відповідний; властивий;  
**architect** [ˈRkɪtekt] — розробник архітектури  
**architecture** [ˈRkɪtektʃ] — архітектура; структура

**communications** [kəˈmjʊnɪˈkeɪʃn] ~ — архітектура засобів

зв'язку

**computer** ~ — архітектура комп'ютера  
**disk** ~ — структура диска  
**instruction set** ~ — структура системи команд  
**network** ~ — мережева архітектура  
**security** [sɪˈkjuqrɪtɪ] ~ — архітектура системи захисту  
**software** [ˈsɒftwɛr] ~ — структура програмного забезпечення

**arrange** [qˈreɪnɪŋ] — розміщувати; розташовувати; встановлювати; монтувати

~ **icons** [ˈaɪkɒnz] — вибудувати значки

**arrangement** — розміщення, розташування; упорядкування;

**array** [q' reI] — матриця; грати; масив; упорядковувати, розміщувати в масиві  
**assemble** [q' sembl] — збирати; об'єднувати; монтувати;  
**assembler** — асемблер  
**assembly** [q' semblI] — складання; монтаж; вузол; блок; сукупність; система  
**associate** [q' souSIIt] — з'єднувати; об'єднувати; пов'язувати  
**associated** — (при) з'єднаний; об'єднаний; пов'язаний;  
~ **documentation** — відповідна документація  
**association** [q' souSI'eISn] — об'єднання; взаємозв'язок; сукупність  
**assurance** [q' Suqrqns] — гарантія, забезпечення  
**assure** [q' Suq] — гарантувати; забезпечувати  
**attach** [q' txC] — приєднувати (ся); підключати (ся); докласти (ся)  
**attachment** — під'єднання; підключення;  
**attain** [q' teIn] — досягати  
**attempt** [q' tempt] — спроба; намагатися  
**attitude** ['xtItjHd] — положення; орієнтація; ставлення  
**avail** [q' veIl] — користь; вигода; бути корисним; допомагати  
**availability** [q'veIlq'bIlItI] — готовність; доступність, наявність  
**available** [q'veIlqbl] - доступний; наявний (в наявності); має місце  
    **have** ~ — мати в наявності, мати в розпорядженні  
    **when** ~ — при наявності  
    **widely** ~ — загальнодоступний  
**average** ['xvqrIG] — середній  
**avoid** [q' vOId] — уникати; виключати; усувати; запобігати  
**aware** [q' wFq] — обізнаний; інформований  
**awareness** [q' wFqnIs] — поінформованість; інформованість

## В

**background** — фон; передумова, основа; підготовка; кваліфікація; навички (роботи)  
**bar** [bR] — стрижень; смуга; рядок  
**base** [beIs] — база; основа, адже основа;  
    **data** ~ — база даних  
    **information** ~ — сукупність інформації  
    **knowledge** ['nOlIG] ~ — база знань  
    **user** ~ — коло користувачів  
**based** — заснований  
**batch** [bxC] — пакет; пакетний файл  
    ~ **processing** — пакетна обробка

**benefit** ['benIfIt] — вигода; користь; перевагу; допомагати;  
**bias** ['baIqs] — зміщувати; зміщення  
**binary** ['baInqrI] — двійковий  
~ **coded** — в двійковому поданні  
**bit** — біт; двійковий розряд  
**board** — панель; пульт; плата  
  **chip** ~ — плата з мікросхемами  
  **circuit** ['sWkqt] ~ — монтажна плата  
  **key** [kJ] ~ — клавіатура  
  **switch** [swIC] ~ — панель перемикання  
**bootstrapping** — початкове завантаження  
**branch** [brRnC] — галузь; розділ; відділення; розгалужуватися;  
переходити  
**break** — розрив; переривання; пауза; переривати; порушувати;  
відмовляти (про програму)  
  ~ **into** — впроваджуватися, проникати (в систему)  
**breakdown** — руйнування; поломка  
**brief** [brJf] — короткий; стиснений  
  **in** ~ — коротко; стисло  
**bring** — (на)давати; давати  
  ~ **into** — вводити; заносити в пам'ять  
  ~ **into action** — приводити в дію  
  ~ **out** — показувати; демонструвати  
**browse** [brauz] — переглядати  
**browsing** — перегляд  
**buffer** ['bAfq] — буфер; заносити в буфер  
**bug** [bAg] — помилка; дефект; недоробка  
  **data** ~ — помилка в даних  
  **loop** [lHp] ~ — помилка в циклі  
  **security** [sI'kjuqrItI] ~ — недоробка системи захисту  
**bug-free** — не містить помилок  
**bug-test** — перевіряти на наявність помилок  
**builder** — розробник; виробник; творець  
**building** — розробка; побудова; формування, створення  
**burden** ['bWdn] — витрати, видатки; обов'язки;  
**bus** — шина; канал; лінія (передачі даних); з'єднувати шиною  
  **control** ~ — шина управління  
  **data** ~ — шина даних  
  **input** ~ — вхідна шина

**input-output** ~ — шина вводу-виводу

**memory** ~ — шина (доступу) до пам'яті

**button** — кнопка; кнопковий

**browse** [brauz] ~ — кнопка перегляду

**cancel** ['kxnsɪ] ~ — кнопка скасування

**emergency** [I'mWɢnsɪ] ~ — аварійна кнопка

**exit** ['eksɪt] ~ — кнопка виходу

**reset** ['rɪʃ'set] ~ — кнопка скидання

**start** ~ — кнопка запуску

**byte** — байт; розміром в байт

## С

**cache** [kxS] — кеш; файл для зберігання (даних); зберігати

**calculate** ['kxlkjuleɪt] — обчислювати; розраховувати

**calculating device** [dɪ'vaɪs] — обчислювальний пристрій

**calibrate** ['kxlɪbreɪt] — градуювати; вивіряти, відрегулювати

**call** — виклик; звернення; викликати; звертатися; називати

**call for** — вимагати; передбачати

**cancel** ['kxnsɪ] — скасовувати; анулювати; скасування; анулювання

**capability** ["keɪpə'bɪlɪtɪ] — здатність; можливість

**capacitor** [kə'pæksɪtə] — конденсатор

**capacity** [kə'pæksɪtɪ] — ємність; об'єм; продуктивність;

**media** ~ — ємність носія

**capture** ['kæpʃə] — збирати (дані); переносити; записувати (у пам'ять)

**card** — плата; карта; картка

**cardfile** — картотека

**carrier** ['kæriə] — носій; тримач; мережу передачі даних

**carry** — нести; переносити

~ **out** — виконувати (команду)

**cartridge** ['kætrɪdʒ] — касета; картридж

**cathode-ray tube** ['kæθədeɪtʃeɪtʃeɪb] — електроннопроменева трубка

**cause** [kɔːz] — змушувати; змушувати; бути причиною;

**cell** [sel] — комірка; елемент

**chain** [Ceɪn] — ланцюг; ланцюжок; послідовність

**challenge** ['ʃæɪlɪŋdʒ] — труднощі; перешкоду; представляти труднощі

**change** [ʃeɪnʒ] — зміна; заміна; змінювати(ся)

**character** ['kæriktə] — символ; знак; буква

~ **map** — таблиця символів

**chart** [ʃɑːt] — діаграма; графік; схема; таблиця; будувати графік;

зображати

**bar** ~ — столбикова діаграма  
**dot** ~ — точкова діаграма  
**line** ~ — графік  
**pie** ~ — кругова/секторна діаграма

**check** — контроль; перевірка; перевіряти

**checkout** — перевірка; налагодження; налагодження

**chip** — кристал; мікросхема

**choose** — вибирати

**circuit** ['sWkIt] — ланцюг; контур; електрична схема

**circuitry** ['sWkqtRi] — (електронні) схеми

**clear** [klIq] — чистий; стертий; віддалений; очищати; видаляти

**code** — код; кодувати; програмувати; система команд

**coding** — програмування

**column** ['kOlqm] — стовпець; колонка; графа

**communicate** [kq'mjHnIkeIt] — повідомляти(ся); пов'язувати

**communication** [kq'mjHnI'keISqn] — зв'язок; повідомлення;

взаємодія

**comparative** [kqm'pxrqtIv] — порівняльний

**compare** [kqm'pFq] — порівняння; порівнювати; співвідноситися

**comparer/comparator** — компаратор; пристрій порівняння

**compatibility** [kqm'pxtq'bIlItI] — сумісність

**compiler** [kqm'paIlq] — компілятор

**complete** [kqm'plJt] — повний; цілий; завершений; завершувати;

закінчувати

**completely** [kqm'plJtI] — повністю; цілком

**computation** [kOmpjH'teISqn] — обчислення; розрахунок

**compute** [kqm'pjHt] — обчислювати; розраховувати

**computer** — комп'ютер; обчислювальна машина

**advanced** [qd'vRnst] ~ — сучасний комп'ютер

**all-purpose** ['pWpqs] ~ — універсальний комп'ютер

**analog** ~ — аналоговий комп'ютер

**digital** ['dIGItl] ~ — цифровий комп'ютер

**first-generation** [Genq'reISn] ~ — комп'ютер першого

покоління

**general-purpose** ~ — універсальний комп'ютер

**handheld** ~ — кишеньковий комп'ютер

**IBM-compatible** [kqm'pxtqbl] ~ — ІБМ-сумісний комп'ютер

**mobile** ~ — портативний/переносний комп'ютер

**notebook** ~ — блокнотний комп'ютер

**personal** ~ [PC] — персональний комп'ютер  
**portable** ['pɒltəbəl] ~ — портативний комп'ютер  
~ **mail** — електронна пошта

**concept** ['kɒnsept] — поняття; принцип; концепція  
**condition** [kən'dɪʃən] — умова, стан; режим  
**confirm** [kən'fɪm] — підтверджувати  
**confirmation** [ˈkɒnfɪ'meɪʃən] — підтвердження  
    **delivery** [dɪ'lvɪəri] ~ — підтвердження прийому  
**connect** — з'єднувати; підключати; пов'язувати  
**connection** — підключення, встановлення зв'язку; з'єднання;  
**consider** [kən'sɪdɪ] — розглядати; враховувати; вважати; вважати  
**considerable** [kən'sɪdɪrəbəl] — значний; істотний  
**considerably** — значно  
**consume** [kən'sju:m] — споживати; витратити  
**consumer** — споживач; абонент  
**consumption** [kən'sʌmpʃən] — споживання; витрата  
    **power** ~ — витрата енергії  
**content** ['kɒntent] — зміст; сенс  
**contrast** ['kɒntrɒst] — контраст; протилежність  
    **as ~ ed with** — на відміну  
    **in** ~ — навпаки; навпаки  
**contribute** [kən'trɪbjʊt] — сприяти, сприяти; вносити вклад  
**contribution** [ˈkɒntrɪ'bju:ʃən] — вклад; сприяння  
**control** — управління, регулювання; управляти; регулювати  
    **access** ['ækses] ~ — керування доступом  
    **device** [dɪ'vaɪs] ~ — керування пристроєм  
    **distance** [ˈdɪstəns] ~ — дистанційне керування  
    **error** ['erɔ] ~ — контроль за помилками  
    **inventory** [ˈɪnvɒntɪrɪ] ~ — інвентаризація; переоблік  
    ~ **panel** ['pænl] — панель управління  
    ~ **unit** ['ju:nɪt] — блок управління  
**convenience** [kən'vɛnjəns] — зручність; придатність  
**convenient** [kən'vɛnjənt] — зручний; придатний  
**conversion** [kən'vɜ:ʃən] — перетворення  
**convert** [kən'vɜ:t] — перетворювати  
**converter** — перетворювач; конвертор  
**convey** [kən'veɪ] — передавати; повідомляти  
**conveying** — передача (інформації)  
**copy** — копія; примірник; копіювати

**core** [kL] — ядро; оперативна пам'ять ; суть; основна частина  
**correct** [kq' rekt] — вірний; правильний; потрібний; необхідний; виправляти  
**correction** [kq' rekSqN] — виправлення; усунення (несправності)  
**corrective** [kq' rektIv] — коригуючий  
**corrector** — коректор; блок або програма коригування  
**corrupt** [kq' rApt] — руйнувати; псувати; спотворювати; спотворений  
**corrupted** — спотворений;  
**corruption** [kq' rApSqN] — руйнування; спотворення; псування; пошкодження  
**data** ['deItq] ~ — спотворення даних  
**cost** — вартість; ціна  
**cost-effective** [I' fektIv] — економічний; економічно виправданий  
**count** [kaunt] — рахунок; підрахунок; відлік; вважати; підраховувати  
**counter** — лічильник;  
**binary** ['baInqrI] ~ — двійковий лічильник  
**character** ['kxrIktq] ~ — лічильник символів  
**data** ['deItq] ~ — лічильник (елементів) даних  
**instruction** ~ — лічильник команд  
**pulse** [pAls] ~ — лічильник імпульсів  
**sequence** ['sJkwqns] ~ — лічильник команд  
**software** ['sOftwFq] ~ — програмний лічильник  
**storage** ['stLrIG] ~ — накопичувальний лічильник  
**time-out** ~ — лічильник часу очікування  
**create** [krI'eIt] — творити; формувати  
**creation** [krI'eISqN] — створення, формування  
**curriculum** [kq' rIkjulqm] — навчальна програма  
**cycle** ['saIkl] — цикл; період; такт; етап

## D

**damage** ['dxmIG] — ушкодження, руйнування  
**data** ['deItq] — дані; інформація  
**application** ["xpLI'keIS] ~ — дані прикладної програми  
**approximate** [q'prOksImIt] ~ — наближені дані  
**available** [q'veIlqbl] ~ — наявні дані  
**bad** ~ — невірні (спотворені) дані  
**calculation** ["kxlkju'leISqN] ~ — розрахункові дані  
**check** ~ — контрольні дані  
**help** ~ — довідкові дані

**missing** ~ — відсутні (відсутні) дані  
**source** [sLs] ~ — вихідні дані  
**database** ['deItqbeIs] — база даних; заносити в базу даних  
**deal** [dJl] — мати справу; працювати  
**dealer** — посередник; постачальник  
**debug** ['dJ'bAg] — налагоджувати (програму)  
**debugger** — відладчик  
**debugging** — налагодження  
**decide** [dI'saId] — вирішувати, приймати рішення  
**decision** [dI'sIZqn] — рішення  
**decode** ['dJkqud] — декодувати  
**decoder** — дешифратор  
**decrease** ['dJkrJs] — зменшення, зниження; зменшувати; знижувати  
**default** [dI'fLlt] — по замовчуванню; (той) що мається на увазі; замовчування  
**deficiency** [dI'fISqnsI] — недолік; брак, відсутність  
**define** [dI'faIn] — визначати; задавати  
**definition** ["defI'nISqn] — визначення; завдання  
**degree** [dI'grJ] — ступінь; міра;  
     ~ **of compatibility** [kqm'pxtq'bIlItI] — ступінь сумісності  
     ~ **of protection** [prq'tekSqns] — ступінь захисту  
     ~ **of security** [sI'kjuqrItI] — ступінь безпеки  
**delay** [dI'leI] — затримка; запізнювання; затримувати; відкладати  
**delete** [dI'lJt] — видаляти; прати; очищати  
**deleter** — програма видалення  
**deletion** [dI'lJSqn] — видалення; стирання  
**delivery** [dI'lIvqrI] — подача; доставка; поставка  
**demagnetize** ['dJ'mxgnItaIz] — розмагнічує  
**demand** [dI'mRnd] — вимога; запит; вимагати; запитувати  
**density** ['densItI] — щільність  
     **data** ~ — щільність запису даних  
     **drive** ~ — щільність дисководу  
     **packing** ~ — щільність упаковки  
     **storage** ['stLrIG] ~ — щільність заповнення пам'яті  
**depend** [dI'pend] — залежати від (чого-небудь)  
**dependence** [dI'pendqns] — залежність  
**dependent** [dI'pendqnt] — залежний; залежить  
**depending** — залежно від

**deposit** [dI'pOzIt] — поміщати; розміщувати  
**depository** [dI'pOzItqrI] — склад; сховище  
**design** [dI'zaIn] — проектування; конструювання; розробка  
**detail** ['dJteIl] — деталь; подробиця  
    **in** ~ — докладно; детально  
**detect** [dI'tekt] — виявляти; виявляти  
**detection** [dI'teksqn] — виявлення, виявлення  
    **error** ['erq] ~ — виявлення помилок  
    **failure** ['feIljq] ~ — виявлення несправностей, виявлення

ПОМИЛОК

**detector** — детектор; засіб виявлення; датчик  
**device** [dI'vaIs] 1. — пристрій; прилад; апарат; пристосування  
    **accounting** [q'kauntIN] ~ — рахункове пристрій  
    **alarm** [q'lRm] ~ — сигнальний пристрій  
    **clock** ~ — датчик часу; таймер  
    **computing** ~ — обчислювальний пристрій; спосіб обчислень  
    **control** ~ — пристрій керування  
    **drawing** ~ — креслярське пристрій  
    **encoding** ~ — кодучий пристрій  
    **incompatible** ["Inkqm'pxtqbl] ~ — несумісний пристрій  
    **measuring** ['mezqrI] ~ — вимірювальний пристрій  
    **pen** ~ — креслярський пристрій; світлове перо  
    **plotting** ~ — креслярський пристрій  
    **printing** ~ — друкувальний пристрій,  
    **recording** ~ — записуючий пристрій  
    **sensing** ~ — датчик; детектор  
    **switching** ~ — перемикач

**devise** [dI'vaIz] 2. — розробляти; винаходити  
**digit** ['dIGIt] — цифра; розряд (числа); знак  
    **binary** ['baInqrI] ~ — двійкова цифра  
    **binary-coded** ~ — цифра двійкового коду  
    **check** ~ — контрольний розряд  
    **information** ~ — інформаційний розряд  
    **input** ~ — цифра що вводиться  
    **significant** [sIg'nIfIkqnt] ~ — значуща цифра

**digital** ['dIGItl] — цифровий  
**digitally** — в цифровому представленні  
**digit-by (to)-digit** — порозрядний  
**digitize** ['dIGItaIz] — перетворювати до цифрового ряду

**digitizer** — аналого-цифровий перетворювач; графічний планшет; сканер  
**dimension** [dI'menʃn] — розмір; вимір  
**direct** [dI'rekt] — направляти; управляти, керувати; вказувати  
**direction** [dI'rekʃn] — напрямок; керівництво; вказівку  
    **backward** ['bɜkwɔd] ~ — зворотний напрямок  
    **clockwise** ['klɔkwaɪz] ~ — напрям за годинниковою стрілкою  
    **counterclockwise** ['kauntq'klɔkweɪz] ~ — напрямок проти годинникової стрілки  
    **data** ['deɪtɔ] ~ — напрямок передачі даних  
    **forward** ['flwɔd] ~ — пряме напрям  
    **inverse / reverse** ['ɪn'veʊs, rɪ'veʊs] ~ — зворотний напрямок  
    **printing** ~ — напрям друку  
    **transmission** [trɜnz'mɪʃn] ~ — напрям передачі  
**directory** [dI'rektɔrɪ] — каталог; довідник; перелік (даних); керівництво  
**disadvantage** ["dɪsqd'veʊnɪdʒ] — недолік; незручність  
**disagreement** ["dɪsq'grɪmɒnt] — невідповідність; розбіжність; протиріччя  
**disappear** ["dɪsq'pɪɔ] — зникати; пропадати  
**discharge** [dɪs'CRG] — розвантаження; розвантажувати, звільняти (систему)  
**disclose** [dɪs'klɔz] — розкривати; виявляти  
**disconnect** ['dɪskɔ'nekt] — роз'єднувати; відключати; '  
**discount** ['dɪskaunt] — не враховувати; не взяти до уваги; знижка  
**discover** [dɪs'kɔvɔ] — виявляти; виявляти  
**discovery** — виявлення, виявлення  
**discrete** [dɪs'krɪt] — дискретний; окремий  
**disintegrate** [dɪs'ɪntɪgreɪt] — розділяти(ся); розпадатися на складові частини  
**disk** — диск  
    **blank** [blɜNk] ~ — порожній диск  
    **flexible** ['fleksɔbl] ~ — гнучкий диск  
    **floppy** ['flɔpɪ] — гнучкий, флоппі-диск  
    **hard** ~ — жорсткий диск  
    ~ **capacity** [kɔ'pɜsɪtɪ] — ємність диска  
**displace** [dɪs'pleɪs] — переміщати; зміщувати  
**display** [dɪs'pleɪ] — дисплей, будова (візуального) відображення  
**distortion** [dɪs'tɪʃn] — спотворення

**distribute** [dɪs'trɪbjʊt] — розподіляти; поширювати  
**distributed** — розподілений; розосереджений  
**distribution** [dɪs'trɪbjʊnsɪn] — розподіл; поширення  
**distributor** — розповсюджувач; розподільник  
**diversity** [daɪ'vɜːsɪtɪ] — різноманітність; відмінність  
**dot** — точка; ставити крапку  
**download** — завантажувати; зчитувати; зчитування (файлів) з сервера  
**drive** — привід; дисковод; запам'ятовуючий пристрій  
    **disk** ~ — дисковод  
    **magnetic-tape** [mæɡ'netɪk teɪp] ~ — запам'ятовуючий  
пристрій на магнітній стрічці  
**driver** — драйвер  
    **print** ~ — драйвер друку  
    **software** ['sɒftweɪ] ~ — програмний драйвер  
**due** [dʒu] **to** — завдяки, з-за; внаслідок  
**dump** [dʌmp] — розвантаження; дамп; висновок; розвантажувати  
скидати; виводити  
**duplication** ["dʒʌplɪ'keɪnsɪn] — дублювання; копіювання  
**duplicator** - копіювальний пристрій

## Е

**edit** ['edɪt] — редагувати;  
**editor** — редактор; програма редагування  
**effect** [ɪ'fekt] — діяти; впливати; вплив; ефект  
**efficiency** [ɪ'fɪsɪnsɪ] — ефективність, коефіцієнт корисної дії  
**effort** ['efɔrt] — зусилля, робота  
**eject** [ɪ'gekt] — викидати; виштовхувати; видавати (дані); викид;  
видача  
**elaborate** [ɪ'ləbeɪreɪt] — розробляти; розвивати  
**elaboration** [ɪ'ləbeɪ'reɪnsɪn] — розвиток; розробка  
**eliminate** [ɪ'lɪmɪneɪt] — усувати; видаляти; скасовувати;  
ліквідувати  
**elimination** [ɪ'lɪmɪneɪnsɪn] — усунення; скасування  
**e-mail** — електронна пошта  
**e-mailing** — відправка (повідомлень) по електронній пошті  
**embrace** [ɪm'breɪs] — охоплювати; містити  
**emergency** [ɪ'mɛdʒɪnsɪ] — аварія; надзвичайна ситуація; аварійний  
**emit** [ɪ'mɪt] — випускати; випромінювати; видавати; генерувати (дані)  
**emphasize** ['emfæsaɪz] — виділяти; підкреслювати

**enable** [I'neIbl] — дозволяти; дозволяти; робити можливим; допускати  
**encapsulate** — герметизувати; ізолювати; поміщати (у пакет)  
**encoder** [In'kqudq] — шифратор; кодує пристрій; шифрувальник  
**engine** ['enGIŋ] — механізм, пристрій  
**ensure** [In'Suq] — забезпечувати; гарантувати  
**enter** — входити; вводити; заносити  
**entire** [In'taIq] — цілий; повний; весь  
**entirely** [In'taIqlI] — цілком; повністю  
**entry** ['entrI] — ввід; занесення; вхід  
**enumerate** [I'njHmqreIt] — перераховувати  
**enumeration** [I'njHmq'reISqn] — перерахування; перелік  
**environment** [In'vaIqrqnmqnt] — середовище; оточення; умови (експлуатації)

**application** ["xplI'keISn] ~ — прикладне середовище

**communications** [kq"mjHnI'keISqnz] ~ — комунікаційне середовище

**computing** ~ — обчислювальна середа

**execution** ["eksI'kjHSn] — середовище виконання програми

**external** [eks'tWnl] ~ — зовнішнє середовище

**hardware** ['hRdwFq] ~ — апаратне середовище

**management** ['mXnIGmqnt] ~ — середовище/засоби управління

**network** ~ — мережеве середовище

**processing** ~ — умови обробки

**security** [sI'kjuqrItI] ~ — умови захисту; режим безпеки

**software** ['sOftwFq] ~ — програмне середовище

**user** ~ — операційне середовище

**equal** ['Jkwql] — рівний; однаковий

**equality** [i'kwOlItI] - рівність

**equation** [I'kweIZqn] — рівняння;

**equip** [I'kwIp] — обладнати; оснащувати

**equipment** [I'kwIpmqnt] — обладнання; прилади; апаратура; (апаратні) засоби

**erase** [I'reIz] — стирати; видаляти

**erasing** — стирання; видалення; очищення

**error** ['erq] — помилка; похибка

**access** ['xkses] ~ — помилка доступу

**coding** ~ — програмна помилка

**common** ~ — типова помилка

**connection** [kq'nekSn] ~ — неправильне з'єднання  
**operating** ~ — помилка через порушення правил експлуатації  
**outstanding** [aut'stxndIN] ~ — не виправлена помилка  
**permissible** [pq'mIsqbl] ~ — допустима помилка  
**processing** ~ — помилка при обробці даних  
**startup** ~ — помилка при початковому завантаженні  
**time-out** ~ — помилка через неготовність пристрою до роботи  
**unrecoverable** ~ — непоправна помилка  
~ **handling** ['hxndlIN] — обробка помилок  
~ **trapping** ['trxpIN] — пастка для помилок

**error-free** — не містить помилок

**error-prone** [proun] — схильний до помилок

**essential** [I'senSql] — суттєвий; значний; невід'ємний

**event** [I'vent] — подія; випадок; результат

**examination** — дослідження; розгляд; перегляд; перевірка

**examine** [Ig'zxmIn] — дослідити; перевіряти

**except** [Ik'sept] **for** — за винятком

**exchange** [Iks'CeInG] — обмін; заміна

**execute** ['eksIkjHt] — виконувати; виконувати

**execution** ["eksI'kjHSqn] — виконання

**executive** [Ig'zekjutIv] — диспетчер; керуюча програма; операційна система

**exit** ['eksIt] — вихід; виходити

**expand** [Iks'pxnd] — розширювати (ся); збільшувати; нарощувати (можливості)

**expansion** [Iks'pxnSqn] — розширення, збільшення;

**experience** [Iks'pIqrIqns] — досвід; кваліфікація; випробувати (труднощі)

**exponentiation** ["ekspq'nenSIeiSn] — підводити до ступеня

**extend** [Iks'tend] — розширювати; подовжувати

**extension** [Iks'tenSqn] — розширення; доповнення; подовження; продовження

**extract** [Iks'trxkt] — виділяти; витягувати

**extraction** [Iks'trxkSqn] — вилучення; вибірка; виділення

**extremely** [Iks'trJmlI] — надзвичайно; вкрай; дуже

## Г

**fabricate** ['fxbrIkeIt] — виготовляти

**fabrication** ["fxbrI'keISqn] — виготовлення

**facility** [fə' sɪlɪtɪ] — пристрій; засіб; зручність  
**facilities** — обладнання; пристосування; можливості; середовища  
**communication** [kə'mjʊnɪ'keɪʃən] ~ — засоби зв'язку  
**database** ~ — кошти (пошуку) бази даних  
**display** [dɪs'pleɪ] ~ — кошти (візуального)  
 відображення/виводу на екран  
**management** ['mænɪdʒmənt] ~ — засоби управління  
**fail** [feɪl] — збій, відмова; пошкодження; виходити з ладу;  
 відмовляти, не вдаватися  
**failure** ['feɪlɪʃ] — відмова; пошкодження; дефект; збій; помилка;  
 невдача  
**fault** [fɔlt] — несправність; дефект; відмова; збій; давати збій  
**assembly** [ə'sembli] ~ — дефект збірки  
**data** ['deɪtə] ~ — помилка в даних  
**design** [dɪ'zaɪn] ~ — проектна недоробка  
**device** [dɪ'vaɪs] ~ — несправність пристрою  
**latent** ['leɪtənt] ~ — прихований дефект  
**random** ['rændəm] ~ — випадковий збій/помилка  
**feasibility** [ˈfiːzə'bɪlətɪ] — можливість; здійсненність  
**feasible** [ˈfiːzəbəl] — можливий; здійснений  
**feature** [ˈfi:tʃə] — властивість; ознака; особливість; характерна риса  
**feed** [fiːd] — подавати; жити; заправляти (папір); вводити (дані)  
**feedback** — зворотній зв'язок  
**field** [fiːld] — поле; область; зона; сфера (діяльності)  
**figure** [ˈfɪɡə] — цифра; число; обчислювати;  
**figure out** — обчислювати; визначати  
**file** — файл; заносити в файл  
**batch** [bætʃ] ~ — пакетний файл  
**common** ~ — загальний файл  
**data** ['deɪtə] ~ — файл/картотека даних  
**help** ~ — файл підказок  
**input** ~ — вхідний файл  
**output** ~ — вихідний файл  
**user** ~ — файл користувача  
 ~ **recovery** [rɪ'kʌvərɪ] — відновлення файлу  
**firmware** — вбудоване програмне забезпечення  
**flexibility** — гнучкість; адаптованість; настроюваність  
**flexible** [ˈfleksəbəl] — гнучкий; змінюваний  
**floppy** [ˈflɒpi] — гнучкий диск; дискета

**flow** [fləʊ] — хід виконання (програми); послідовність  
**flowcharting** ['fləʊVCRtɪn] — побудова блок-схеми  
**font** [fɒnt] — шрифт; набір символів  
     **alpha-numeric** ['xɪlfə nɪv'merɪk] ~ — текстовий шрифт  
     **default** [dɪ'fɔlt] ~ — шрифт, обраний за замовчуванням;  
 стандартний шрифт  
     **plotter** ['plɒtə] ~ — креслярський шрифт  
     **print/type** ~ — друкарський шрифт  
**force** [fɔrs] — сила; зусилля; змушувати; змушувати; вводити,  
 вставляти (з силою)  
**fraction** ['frʌkʃən] — дріб; частка; частина  
**frame** [freɪm] — блок (даних); структура; система; корпус  
**framework** — структура, система; схема; основа; підстави; принципи  
**fraud** [frɔd] — шахрайство; обман  
**frequency** ['frɪkwənsɪ] — частота  
**fulfill** [ful'fɪl] — виконувати; здійснювати; завершувати  
**fulfillment** [ful'fɪlmənt] — виконання, здійснення; завершення  
**fundamental** ['fʌndə'mentl] — основний; істотний;  
 фундаментальний;  
**furnish** ['fɜnɪʃ] — постачати; постачати

## G

**gadget** ['gædʒɪt] — пристосування; допоміжний пристрій  
**gain** [geɪn] — досягати; отримувати користь; вигравати; вигода  
**gather** ['gæθə] — збирати(ся)  
**general** ['dʒenərəl] — загальний; універсальний;  
**generate** ['dʒenəreɪt] — генерувати; створювати; виробляти  
**generation** ['dʒenə'reɪʃən] — створення, формування, освіту;  
 покоління  
**give back** — повертатися  
**give out** — видавати; надавати  
**give up** — відмовляти (про пристрій); не справлятися; відмовлятися  
**grade** [greɪd] — ступінь; ранг; клас; сорт; впорядковувати;  
 розміщувати за рангом  
**grading** — класифікація; упорядкування; вирівнювання  
**grapher** — самописець  
**graphic(al)** ['græfɪk(əl)] — графічний  
 ~ **plotting tables** — графічні планшети  
**graphics** — графіка  
**groundwork** — основа, аде основа

**guard** [gRd] — захист; захищати; охороняти  
**guidance** ['gaIdqns] — управління; наведення (на ціль); керівництво  
**guide** [gaId] — керівництво; інструкція; довідник  
**installation** ["Instq'leISn] ~ — інструкції з установки (системи)  
**on-line** ~ — електронний довідник  
**programming** ~ — керівництво з програмування  
**reference** ['refrqns] ~ — довідкове керівництво  
**software** [sOfwFq] ~ — керівництво по програмному забезпеченню  
**troubleshooting** ['trAb'l'ShtIN] ~ — основні принципи пошуку несправностей  
**user's** ~ — керівництво для користувача

## Н

**habit** ['hxbIt] — навичка; звичка; властивість  
**computing** ~ **s** — навички роботи з комп'ютером  
**handling** ['hxn'dlIN] — обробка; управління, регулювання  
**data** ['deItq] ~ — робота з даними  
**fault** ['fLlt] /**error** ['erq] ~ — обробка помилок  
**hand-operated** — керований вручну  
**hand-printed** — машинописний  
**hang** [hXN] (**up**) — «зависати»; блокувати  
**hardware** ['hRdwFq] — апаратура, обладнання; апаратне забезпечення/засоби  
**by** ~ — апаратними засобами  
**computer** ~ — апаратне забезпечення комп'ютера  
**device** [dI'vaIs] ~ — апаратна частина пристрою  
**display** [dIs'pleI] ~ — апаратні засоби виведення на екран  
**expansion** [Iks'pxnSn] ~ — додаткове апаратне забезпечення  
**support** [sq'pLt] ~ — допоміжне апаратне забезпечення  
**harm** [hRm] — шкода; збиток; пошкодження  
**harmful** ['hRmful] — шкідливий  
**harmless** ['hRmlIs] — нешкідливий (про вірус)  
**heading** ['hedIN] — заголовок  
**healthy** ['helTI] — справний; працездатний (про систему)  
**help** — підказка; довідка; допомога  
**hereafter** [hIq'Rftq] — далі; надалі  
**hereby** ['hIq'baI] — таким чином, тим самим  
**hierarchy** ['haIqrRkI] — ієрархія

**high-capacity** [kq'pxsItI] — з великою ємністю  
**high-density** ['densItI] — з високою щільністю  
**high-fidelity** [fI'delItI] (**Hi-fi**) — з високою точністю відтворення  
**high-frequency** ['frJkwqnsI] — високочастотний  
**high-level** — високорівневий  
**high-quality** ['kwOlItI] — високоякісний  
**high-reliable** [rI'laIqbl] — високонадійний  
**hold** — зберігати; утримувати (дані)  
**hole** [hqul] — отвір; гніздо; вікно  
    **access** ['xkses] ~ — вікно доступу  
    **connector** [kq'nektq] ~ — гніздо роз'єму

**home** — початок; вихідна позиція

**hook** [huk] — важіль

**hook-up** — підключати; приєднувати (пристрій)

**human-oriented** ['hjHmqn 'LrIentId] — орієнтований на користувача

**hurt** [hWt] — пошкодження; шкода; збиток; пошкоджувати; шкодити

**hypertext** ['haIpq"tekst] — гіпертекст

## I

**icon** ['aIkOn] — умовний символ; піктограма; зобразити умовно

**identifier** [aI'dentIfaIq] — ідентифікатор, ім'я; позначення

**identify** [aI'dentIfaI] — ідентифікувати; розпізнавати; виявляти (помилку)

**ignorance** ['Ignqrqns] — незнання

**ignorant** ['Ignqrqnt] — недосвідчена особа; (особа) що не знає

**imbed** [Im'bed] — вбудовувати; впроваджувати; включати

**immunity** [I'mjHnItI] — несприйнятливість; нечутливість

**implement** ['ImplImqnt] — виконувати; здійснювати

**implementation** ["ImplImen'teISqn] — реалізація; здійснення; розробка

**implementor** — конструктор; розробник

**improper** [Im'prOpq] — непридатний; неприпустимий; неправильний

**improve** [Im'prHv] — поліпшувати; уточнювати (дані)

**improvement** [Im'prHvmqnt] — поліпшення; удосконалення; уточнення (данних)

**inaccurate** [In'xkjurIt] — неточний; помилковий

**inadequate** [In'xdIkwIt] — невідповідний; непридатний; неприйнятний

**incapable** [In'keIpqbl] — нездатний; неспроможний  
**include** [In'klHd] — охоплювати; містити; включати в себе  
**incompatible** ["Inkqm'pxtqbl] — несумісний  
**inconsiderable** ["Inkqn'sIdqrqbl] — незначний  
**incorporate** [In'kLpqrEIt] — включати; містити; вбудовувати; впроваджувати  
**increase** [In'krJs] — збільшувати; зростати; збільшення; підвищення  
**independent** ["IndI'pendqnt] — незалежний  
**inferior** [In'fIqrIq] — нижчий; гірший (за якістю)  
**influence** ['Influqns] — вплив; впливати  
**initial** [I'nISqL] — початковий; вихідний  
**initially** [I'nISqLI] — спочатку; в початковому стані  
**inject** [In'Gekt] — вносити; вводити  
**injection** [In'GekSqN] — внесення, запровадження  
**injury** ['InGqrI] — пошкодження; псування  
**ink-jet** — струменевий (про принтер)  
**innovate** ['InquveIt] — вводити нововведення; вдосконалити  
**innovation** — нововведення; удосконалення  
**innovative** ["Inqu'veISqN] — новаторський; інноваційний  
**input** ['Input] — введення; вхідний пристрій; вводити; подавати на вхід  
**character** ['kxrIktq] ~ — посимвольне введення  
**command** [kq'mRNd] ~ — введення команди  
**data** ['deItq] ~ — введення даних; пристрій вводу даних  
**disk** ~ — введення (даних) з диска  
**keyboard** ['kJbLd] ~ — введення з клавіатури  
**system** ['sIstIm] ~ — введення по запити системи  
**input/output** ['autput] — пристрій вводу-виводу  
**inquiry** [In'kwaIqrI] — запит; опитування  
**install** [In'stLl] — встановлювати; монтувати  
**installation** ["Instq'leISqN] — установка; розміщення; монтаж; вставка; настройка  
**interface** — інтерфейс; сполучення; місце стику; сполучати(ся)  
**common** [kOmqn] ~ — стандартний інтерфейс  
**data** ['deItq] ~ — інформаційний інтерфейс  
**database** ~ — інтерфейс (програми) з базою даних  
**external** [eks'tWnl] ~ — зовнішнє сполучення  
**flexible** ['fleksqbl] ~ — гнучкий інтерфейс

**floppy-disk** [flOpI] ~ — інтерфейс гнучкого диска

**general-purpose** ['Genqrql 'pWpqs] ~ — універсальний  
інтерфейс

**software** ['sOftwFq] / **hardware** ['hRdwFq] ~ — інтерфейс  
вводу-виводу

**interpret** [In'tWprIt] — інтерпретувати; тлумачити

**interpreter** — інтерпретатор; перекладач

**interrupt** ["Intq'rApt] — переривання; перериватися

**intricate** ['IntrIkIt] — складний; заплутаний

**invade** [In'veId] — вторгтися; проникати

**invalid** [In'vxlId] — невірний; неприпустимий; недійсний

**invalidate** [In'vxlIdeIt] — анулювати; скасовувати

**invalidity** ["Invq'lIdItI] — невірність; неприпустимість;  
необґрунтованість

**invasion** [In'veIZqn] — вторгнення, проникнення

**investigate** [In'vestIgeIt] — дослідити; розслідувати

**investigation** [In'vestI'geISqn] — дослідження

**invisible** [In'vIzqbl] — невидимий; невиразні

**involve** [In'vOlV] — включати; залучати

**irregular** [I'regjuLq] — неправильний; непостійний; нестандартний

**irrelative** [I'relqtIv] — не пов'язаний; несуттєвий, що не  
відноситься до справи

**irreplaceable** ["IrI'pleIsqbl] — що не підлягає заміні; незмінний

**issue** ['ISH] — висновок; видача; виводити; видавати (повідомлення);  
посилати

**item** ['aItqm] — елемент; складова частина

## Ж

**jack** [Gxk] — гніздо

**jam**[Gxm] — заїдання; заклинювання

**job** [GPb] — робота; завдання; працювати

**join** [GOIn] — з'єднання; з'єднувати

**joystick** ['GOIstIk] — джойстик (важільний пристрій)

**junction** ['GANks (q) n] — з'єднання; стик

**justification** ["GAsIfI'keIS (q) n] — вирівнювання (даних);  
обґрунтування

**justify** ["GAsIfaI] — вирівнювати; обґрунтовувати; доводити;  
виправдовувати

## К

**key** [kɯ] — клавіша; кнопка; перемикач  
**break** ~ — клавіша переривання  
**control** <Ctrl> ~ [kɔn 'trɔvɪ] — управляюча клавіша  
**delete** ~ [dɪ 'lɪt] — клавіша видалення  
**end** ~ — клавіша переходу в кінець  
**enter** ~ — клавіша введення  
**erase** ~ [ɪ 'reɪz] —клавіша видалення  
**escape** ~ [ɪs 'keɪp] — клавіша виходу  
**home** ~ — клавіша переходу в початок  
**insert** ~ — клавіша вставки  
**page-down** ~ — клавіша перегортання вперед  
**page up** ~ — клавіша перегортання назад  
**pause** ~ [pɒz] — клавіша паузи  
**reset** ~ ['rɪ 'set] — кнопка скидання  
**shift** ~ — клавіша перемикання регістрів  
**keyboard** [ 'kɯbɪd] — клавіатура; клавішний  
**kind** — вид, різновид  
**know-how** — технологія; методика; знання; прийоми; *жарг.* ноу-хау  
**knowledge** [ 'nɒlɪdʒ] — знання; обізнаність  
**be common** ~ — бути загальновідомим  
**programming** ~ — знання в області програмування  
**knowledgeable** — обізнаний; компетентний

## L

**lack** [læk] — відсутність, вада  
**lagging** [ 'læɡɪŋ] — відставання; запізнювання  
**language** [ 'læŋɡwɪdʒ] — мова  
**all-purpose / general-purpose** ~ — універсальна мова  
**artificial** ~ [ 'ɑːtɪʃɪəl] —штучна мову  
**assembler** ~[æ 'sɛmblɪŋ] — мова асемблера  
**business-oriented** ~ — мова для (програмування)  
**compiler** ~ — мова компілятора  
**data** ~ — інформаційна мова  
**database** ~ — мова для роботи з базою даних  
**high-level** ~ — мова високого рівня  
**low-level** ~ — мова низького рівня  
**modelling / simulation** ~ — мова моделювання  
**programming / development** ~ — мова програмування  
**launch** [lɒnʃ] — запускати (програму); вводити в дію  
**layout** [ 'leɪt] — розміщення, розподіл

**lead** [led] — свинець

**learn-on-line** — навчатися за допомогою комп'ютера

**letter** ['letə] — буква, символ

**level** — рівень; вирівнювати

- access** ~ — рівень доступу
- data** ~ — інформаційний рівень
- device** ~ — рівень пристроїв
- error** ~ — рівень помилки
- hardware** ~ — апаратний рівень
- input** ~ — рівень вхідного сигналу
- output** ~ — вихідний рівень
- performance** ~ [pə'fɔ:məns] — ступінь швидкодії
- presentation** ~ ["prezən'teɪʃn] — рівень представлення
- protection/security** ~ — рівень/ступінь захисту
- software** ~ — програмний рівень
- transmission** ~ [trænz'mɪʃn] — рівень переданого сигналу

**lifetime** — термін служби

**line** — рядок; лінія; шина; канал

**link** — зв'язок; з'єднання; пов'язувати; з'єднувати

**list** — список; перелік; таблиця

**listing** ['lɪstɪŋ] — роздруківка; перелік; подання у вигляді списку

**literacy** ['lɪtəri] — грамотність

**literate** ['lɪtərɪt] — грамотний

**load** — завантажувати; заправляти (стрічку)

**loading** — завантаження; заправка;

**locate** [lə'keɪt] — розмішувати; розташовувати

**location** — місце розташування; позиція

**logic** ['lɒdʒɪk] — логіка; логічна послідовність; логічний блок

- processing** ~ — логічна послідовність обробки
- program** ~ — логічна послідовність виконання програми

**loop** [lu:p] — цикл; петля; виток; контур

**looping logic** — логічна схема виконання (операцій) в циклі

**loss** — втрата; витрати

- ~ **of performance** — зниження швидкодії/пропускнуої здатності
- ~ **of productivity** — зниження продуктивності праці
- data** ~ — втрата даних

**lower** — знижувати; зменшувати

- ~ **manufacturing** — зниження продуктивності

## M

**magnetize** ['mæɡnɪtaɪz] — намагнічувати

**mail** — (електронна) пошта  
**main** — головний; основний  
**maintain** [meɪn 'teɪn] — підтримувати; зберігати; експлуатувати  
**malfunction** [mɔl 'fɪkʃ(ə)n] — збій, відмова; несправність; відмовляти; давати збій  
**manage** ['mænɪdʒ] — управляти, організувати  
**management** — управління, регулювання, організація  
    **data** ~ — робота з даними  
    **database** ~ — управління базою даних  
    **error** ~ — керування обробкою помилок  
    **software** ~ — розробка та супровід програмного забезпечення  
    **task** ~ — керування ходом виконання завдань  
**manipulate** [mæ 'nɪpjʊleɪt] — управляти; маніпулювати; обробляти  
**manipulation** — управління; робота; обробка; перетворення  
**manipulator** — блок обробки  
**manual** — керівництво; довідник; інструкція; опис  
    **help** ~ — довідкове керівництво  
    **operation** ~ — керівництво користувача  
**manufacture** ['mænjʊ 'fæktʃə] — виготовляти; виробляти; розробляти  
**manufacturer** — виробник; розробник  
**mark** — ознака; мітка; знак; позначати; виділяти  
**match** — зіставляти; порівнювати; узгоджувати; відповідати  
**mean** [mi:n] — означати; мати на увазі  
**meaning** — значення; сенс  
**means** — кошти; спосіб  
**measure** ['meɪʒə] — вимірювати; міра; критерій  
**measurement** — вимірювання; розмір  
**medium** (*pl media*) ['mi:diə] — середовище; носій; засіб; спосіб; середній  
    **data** ~ — носій даних  
    **input** ~ — носій для вхідних даних; спосіб введення (даних)  
    **output** ~ — носій для вихідних даних; спосіб виведення  
    **portable / removable** ~ — знімний носій  
**meet** — відповідати (умовам)  
    ~ **the demands / requirements** — задовольняти потреби  
**memory** — пам'ять; запам'ятовуючий пристрій  
    **additional** ~ — додаткова пам'ять  
    **core** ~ — оперативна пам'ять  
    **extended** ~ [ɪk 'stendɪd] — додаткова пам'ять  
    **external** ~ [ɪk 'stɜ:nl] — зовнішня пам'ять

**high-capacity** ~ [kq'pɪsɪtɪ] — пам'ять великої ємності  
**internal** ~ [ɪn'tɹnəl] — внутрішня пам'ять  
**main** ~ — основна пам'ять  
**random-access** ~ (RAM) — оперативний запам'ятовуючий (ОЗУ)  
**read-only** ~ (ROM) — постійний запам'ятовуючий пристрій (ПЗУ)  
**secondary** ~ — вторинна пам'ять

**merge** [mɹg] — злиття, об'єднання; зливати(ся); об'єднувати(ся)  
**message** ['mesɪdʒ] — повідомлення; запит; посилати повідомлення  
**meter** ['mɪtɹ] — розмір; датчик; лічильник  
**metering** — вимірювання  
**mode** [mɔʊd] — спосіб, метод; режим  
    **free-running** ~ — режим вільного доступу  
    **operating** ~ — робочий режим  
    **programming** ~ — режим програмування  
    **read-only** ~ — режим доступу до даних без можливості їхньої

зміни

**modification** [ˈmɒdɪfɪˈkeɪʃ(ə)n] — модифікація; зміна; варіант; версія  
**modify** — модифікувати; змінювати; перетворювати  
**monitor** ['mɒnɪtɹ] — монітор; дисплей; спостерігати; контролювати  
**monitoring** — моніторинг; спостереження; контроль  
**mostly** [ˈmɔʊstli] — головним чином; здебільшого; переважно  
**mouse** [maʊs] — миша  
**movable** ['mɒvəb(ə)l] — рухомий; рухливий; знімний  
**move** — рухати; переміщати; пересувати; переходити  
**movement** — рух; переміщення  
**multiple** ['mʌltɪpl] — множинний; багатокomпонентний; складовий  
**multiplication** [mʌltɪplɪˈkeɪʃ(ə)n] — множення; посилення  
**multiply** ['mʌltɪplaɪ] — множити; посилювати; збільшувати  
**mutual** ['mjuːtʃʊəl] — взаємний; загальний; спільний

## N

**need** [niːd] — потреба; необхідність; вимагати(ся); бути необхідним  
**network** — мережа; схема; контур  
    ~ **drive** — мережевий накопичувач  
**noncomparable** — незрівняний  
**noncompatible** — несумісний  
**noncomputable** — незчислювальний  
**noncontrollable** — некерований  
**notation** — запис; подання; позначення

**binary** ~ — двійкова система  
**notepad** — блокнот  
**number** — число; кількість; цифра  
**numeric** — числовий; цифровий  
**numerous** ['nʃnɪm(ə)rəs] — численний

## О

**objective** [əb'ʃektɪv] — мета; цільова функція; вимога  
**observation** [əb'zɜːv(ə)ʃ(ə)n] — спостереження; відстеження  
**observe** — спостерігати; стежити; дотримуватись (правил)  
**obtain** — отримувати; досягати  
**occur** [ə'kʊə] — відбуватися; траплятися  
**on-board** — розташований на платі; вбудований; бортовий  
**ongoing** — постійний; безперервний  
**on-line** — неавтономний; підключений до комп'ютера  
**onset** — початок; введення в дію  
**open** — відкривати; починати; розмикати  
**operand** ['ɒpərɒnd] — операнд  
    **address** ~ — адресний операнд  
**operate** — працювати; діяти; функціонувати  
**operation** — робота, дія  
    **basic** ~ — основний режим роботи  
    **cancel** ~ — операція скасування  
    **computer** ~ — робота комп'ютера  
    **debugging** ~ — робота в режимі налагодження  
    **error-free** ~ — безвідмовна робота  
    **exchange** ~ — операція обміну  
    **input / output** ~ **s** — операції вводу-виводу  
**opportunity** [əp'ɔːtʃənɪtɪ] — можливість  
**option** — вибір; варіант; засіб; можливість  
**optionally** — необов'язково; на розсуд; при бажанні  
**order** ['ɔːdər] — команда; порядок; послідовність  
    ~ **of execution** ["ɛksɪ'kʃ(ə)n] — послідовність виконання  
    ~ **of use** — черговість використання  
    **put in** ~ — приводити в порядок  
**outline** — контур; обрис; схема; план; короткий виклад  
**out-of order** — несправний  
**output** — висновок; вихід (продукції); пристрій виводу; виводити  
    **hard-copy** ~ — роздруківка; дані, виведені на друк  
    **soft-copy** ~ — дані, виведені на екран

## P

- package** [ 'pʌkɪdʒ ] — пакет; блок; модуль  
**application** ~ [ "xplɪ 'keɪs (ɔ) n ] — прикладний пакет  
**data** ~ — пакет даних
- packaged software** — готове програмне забезпечення
- password** [ 'pɑswɔd ] — пароль
- pattern** [ 'pʌtn ] — шаблон; зразок; форма  
 ~ **recognition** [ "rekɔg 'neɪs (ɔ) n ] — розпізнавання зразків
- pen** — перо  
**graphic / light** ~ — світлове перо
- perform** [ pɜ 'fɔ:m ] — виконувати; здійснювати; працювати; діяти
- performance** — (робоча) характеристика; продуктивність; режим роботи  
**application** ~ — швидкість роботи прикладної програми  
**computer** ~ — швидкість роботи комп'ютера  
**device** ~ — швидкість роботи пристрою  
**error** ~ — швидкість виправлення помилок  
**execution** ~ [ "eksɪ 'kʃns (ɔ) n ] — швидкість виконання  
 (програми)  
**memory** ~ — швидкість доступу до пам'яті; швидкість вибірки  
**network** ~ — пропускна здатність
- processor** [ 'prɔʃesɔ ] — швидкодія процесора
- permit** [ pɜ 'mɪt ] — дозволяти; допускати
- permitted** — допустимий; дозволений
- pervade** [ pɜ 'veɪd ] — поширювати; охоплювати
- photocell** — фотоелемент
- pick** — вибирати; витягувати
- plug** — штепсель; вилка; штекер; підключати; приєднувати
- point** — точка; місце; вузол; суть; вказувати; відзначати  
**in ~ of** — щодо  
 ~ **out** — вказувати; відзначати
- pointer** [ 'pɔɪntɔ ] — покажчик; стрілка
- potent** [ 'pɔvnt (ɔ) nt ] — могутній; потужний; переконливий
- power** — потужність; енергія; харчування  
 ~ **supply** — джерело живлення
- predefined symbols** — заздалегідь задані символи
- predict** [ prɪ 'dɪkt ] — пророкувати; прогнозувати
- predominant** [ pr 'dɪmɪnənt ] — переважаючий
- predominate** — переважати; домінувати
- prepare** [ prɪ 'pɛə ] — готувати; складати

**pressure** ['preʃə] — тиск  
**prevent** [prɪ'vent] — запобігати; охороняти; перешкоджати  
**prevention** — запобігання; попередження  
**primarily** ['praɪm(ə)rɪəlɪ] — головним чином; переважно; в основному  
**print** — друкувати; виводити на екран  
~ **engine** — механізм друку  
~ **head** — голівка друку  
**printer** — принтер; друкувальний пристрій  
**character** ~ — символний принтер  
**dot-matrix** ~ — точково-матричний принтер  
**graphical** / **image** ~ — графічний принтер  
**impact** ~ ['ɪmpækt] — контактний принтер  
**ink-jet** ~ — струменевий принтер  
**laser** ~ — лазерний принтер  
**letter-quality** ~ — принтер з друкарським якістю друку  
**line (at-a-time)** ~ — принтер з порядковою печаткою  
**page (at-a-time)** ~ — принтер з посторінковою печаткою  
**print out** — роздруківка; висновок на друк або екран  
**procedure** [prə'sɪdʒə] — процедура; процес; метод; алгоритм  
**accounting** ~ — процедура обліку  
**computational** ~ — алгоритм обчислень  
**control** ~ — метод управління  
**error-correcting** ~ — процедура / алгоритм виправлення помилок  
**formatting** ~ — процедура / процес форматування  
**installation** ~ — процедура / процес установки (системи)  
**solution** ~ — алгоритм рішення  
**process** ['prɒsɪs] — процес, обробка  
**processing** — обробка (даних)  
**processor** — процесор; програма обробки  
**control** ~ — керуючий процесор  
**data** ~ — програма обробки даних  
**error** ~ — блок обробки помилок  
**general-purpose** ~ — універсальний процесор  
**image** ~ — графічний процесор  
**mail** ~ — програма обробки повідомлень електронної пошти  
**message** ~ — програма обробки повідомлень  
**numeric** ~ — числовий процесор  
**special purpose** ~ — спеціалізований процесор  
**text / word** ~ — текстовий процесор

**program** [ˈprɔvɔrɪxm] — програма; план; програмувати  
**access** ~ [ˈɪksɛs] — програма доступу  
**application** ~ — прикладна програма  
**archived** ~ [ˈRkɑɪvd] — заархівована програма  
**binary** ~ — програма в двійковому коді  
**common** ~ — часто використовувана, поширена програма  
**compatible** ~ [kɔmˈpɪtəbl] — сумісна програма  
**debugging** ~ — програма налагодження  
**educational** ~ — навчальна програма  
**free** ~ — безкоштовна програма  
**general-purpose** ~ — універсальна програма  
**high-performance** ~ — програма, яка виконується з великою

швидкістю

**incompatible** ~ — несумісна програма  
**machine language** ~ — програма в машинному коді  
**off-line** ~ — немережева програма  
**on-line** ~ — мережева програма  
**processing** ~ — програма обробки  
**protected-mode** ~ — програма, яка виконується в захищеному

режимі

**remote** ~ — дистанційна програма  
**running** ~ — виконувана програма  
**self-loading** ~ — самозавантажувальних програма  
**simulation** ~ — програма моделювання  
**support** ~ — допоміжна програма  
**utility** ~ — сервісна програма  
**watch-dog** ~ — вартова програма

**programmable** — програмований

**programmer** — програміст

**programming** — програмування

~ **environment** — середовище програмування

~ **language** — мова програмування

**prompt** [prɒpt] — підказка; запит

**proof-read** [ˈpru:fˈrɛd] — зчитувати з метою перевірки (правильності запису)

**proof-reader** — коректор

**properly** [ˈprɒpərlɪ] — правильно; як слід

**property** [ˈprɒpərtɪ] — властивість; якість

**propose** [prɒˈpɒz] — пропонувати; припускати

**protect** [prɒˈtekt] — захищати

**protection** — захист; система/засоби захисту  
**protector** — захисний пристрій; запобіжник  
**provide** [prɒ'vaɪd] — доставляти; забезпечувати; постачати  
**provided** — за умови, що; в тому випадку, якщо; тільки якщо  
**provider** — постачальник; провайдер  
**provision** [prɒ'vɪz(ə)n] — забезпечення; постачання  
**pulse** [pʌls] — імпульс  
**punch** [pʌnʃ] — пробивати (отвори)  
**punched card** — перфокарта  
**purpose** ['pʊpəs] — мета; призначення  
**push** — натискати; штовхати  
**push-button** — кнопка

## Q

**quality** ['kwɒlɪtɪ] — якість; властивість; характеристика  
**image** ~ — якість зображення  
**running** ~ — робоча характеристика  
**quantity** ['kwɒntɪtɪ] — кількість; число; величина; значення  
**absolute** ~ ['æbsəljʊt] — абсолютна величина  
**alternating** ~ ['ɹltɛɪtɪnɪŋ] — змінна величина  
**continuous** ~ [kən'tɪnjuəs] — безперервна величина  
**digital** ~ — числове значення  
**discrete** ~ [dɪs'krɪt] — дискретна величина  
**input** ~ — вхідна/введена величина  
**unknown** ~ — невідома величина  
**variable** ~ ['veɪəriəb(ə)l] — змінна величина  
**quit** [kwɪt] — вихід (з програми); виходити (з програми)  
**quitting** — вихід (з програми)

## R

**raise** [reɪz] — піднімати; підвищувати; збільшувати; підйом; підвищення  
**random** ['rændəm] — випадковий; довільний  
**random-access** — з довільним доступом  
~ **memory (RAM)** — пам'ять з довільним доступом  
**range** [reɪŋdʒ] — діапазон; область; інтервал  
**rate** [reɪt] — ступінь; швидкість; швидкість  
~ **of change** [seɪŋdʒ] — швидкість зміни  
~ **of exchange** [ɪks' seɪŋdʒ] — швидкість обміну  
~ **of response** [rɪs' pɒns] — швидкість реакції  
**reader** — пристрій зчитування

**bar-code** ~ — пристрій зчитування штрих-коду  
**character** ~ — пристрій зчитування/розпізнавання знаків  
**reading** — читання; зчитування  
**read-only** — працює лише в режимі читання  
**reason** ['rJz (q) n] — причина, основа; довід; обгрунтовувати  
**reasonable** — розумний; допустимий  
**receive** [rI 'sJv] — приймати; отримувати  
**receiver** — приймальний пристрій  
**record** ['rekLd] — запис; реєстрація; записувати; реєструвати  
**recorder** — пристрій/програма реєстрації; самописець  
**data** ~ — пристрій реєстрації даних  
**tape** ~ — запис на (магніт.) стрічку; магнітофон  
**reduce** [rI 'dʒHs] — зменшувати; скорочувати; знижувати; стискати  
**reduction** [rI 'dAkS (q) n] — зменшення; скорочення; пониження  
**reel** [rJl] — катушка; бобіна  
**reference** ['ref (q) rɒns] — посилання; виноска; довідник; керівництво  
**computer** ~ — керівництво по роботі з комп'ютером  
**hardware** ~ ['hRdwFq] — документація з апаратного  
забезпечення  
**for** ~ — для довідки  
**in ~ to** — по відношенню до  
**make** ~ — посилатися; згадувати  
**user** ~ — керівництво для користувача  
**without ~ to** — незалежно від  
**referenced** — вказаний; (той), на який посилаються  
**regardless** [rI 'gRdlIs] — незважаючи на; незалежно від  
**register** ['reGIstq] — реєстр, пристрій реєстрації; лічильник; датчик  
**address** ~ [q 'dres] — адресний реєстр  
**base** ~ — базовий реєстр  
**cash** ~ [kxS] — касовий апарат  
**clock** ~ — лічильник часу; таймер  
**command/instruction** ~ — реєстр команд  
**counter** ~ ['kaVntq] — реєстр лічильника  
**general-purpose** ~ — реєстр загального призначення  
**memory/storage** ~ — реєстр пам'яті  
**operand** ~ ['Ppqrɒnd] — реєстр операнда  
**special purpose** ~ — реєстр спеціального призначення  
**relate** [rI 'leIt] — зв'язувати; мати відношення  
**relation** — відношення; співвідношення; залежність; зв'язок

**relative** [ 'relqtIv ] — відносний  
**relatively** — відносно  
**reliability** [rI "laIq 'bIlqtI] — надійність  
**reliable** — надійний  
**reload** [ "rI 'lqVd ] — перезавантажувати; перезавантажити  
**rely** — покладати(ся)  
**remote** [rI 'mqVt] — дистанційний  
     ~ **control program** — програма дистанційного управління  
     ~ **management** — дистанційне керування  
**remove** [rI 'mHv] — видаляти; усувати; прибирати  
**rename** — перейменовувати  
**replace** — замінювати; замінювати  
**replacement** [rI 'pleIsmqnt] — заміна; заміщення; зміна; підстановка  
**represent** — представляти  
**representation** — представлення  
     **pictorial/picture** ~ [pIk 'tLrIql] — графічне представлення  
**require** [rI 'kwaIq] — вимагати  
**requirement** — вимога; необхідна умова; потреба  
**research** [rI 'sWC] — дослідження; вивчення; досліджувати  
**reset** — скидання; відновлення; повернення в початковий стан;  
 скидати; відновлювати  
     ~ **button** — кнопка скидання  
     ~ **computer** — перезавантажувати комп'ютер  
**resource** [rI 'sLs] — ресурс; засіб; можливість  
     **data** ~ — інформаційний ресурс  
     **printer** ~ — засіб виведення на друк  
     **security** ~ [sI 'kjV (q) rII] — засіб захисту  
     **software** ~ — програмний ресурс  
     **storage** ~ — ресурс пам'яті  
**respect** [rIs 'pekt] — відношення; враховувати; брати до уваги  
**respond** [rIs 'pQnd] — відповідати; реагувати  
**response** [rIs 'pQns] — відгук; реакція; відповідь  
     ~ **time** — час реакції  
**responsibility** — відповідальність  
**responsible** — відповідальний  
**restore** — відновлювати; повертати (до попереднього стану)  
**retain** [rI 'teIn] — зберігати; утримувати  
**retrieve** [rI 'trJv] — відшукувати; витягати, вибирати (дані);  
 відновлювати (файл)

**retry** — виконувати повторно; повторювати  
**reusable** [rJ'jHzqbl] — що багаторазово використовується  
**reverse** [rI'vWs] — повертати; рухати у зворотному напрямку; зворотний хід  
**reversibility** — оборотність; можливість змінити напрямок на протилежний  
**reversible** — оборотний; реверсивний  
**reversion** — повернення; повернення  
**ribbon** ['rIbqn] — стрічка  
**roller** ['rqVlq] — ролик; валик  
**rotate** [rqV'teIt] — обертати (ся); чергувати (ся)  
**rotation** — обертання; чергування; зміна  
**routine** ["rH'tJn] — (стандартна) програма/операція; (сталий) порядок  
**ruggedness** — міцність  
**rule** — правило; управляти, керувати  
**ruler** — (масштабна) лінійка  
**run** — виконувати, запускати (програму); працювати; запуск; виконання  
**running** — запуск; виконання; робота  
**run-time version** ['vWS(q)n] — виконувана версія

## S

**safe** [seIf] — безпечний; надійний  
**safety** ['seIftI] — безпека; надійність  
**save** [seIv] — зберігати; зберігати  
**scale** [skeIl] — шкала; масштаб  
**scaling** [skeIlIN] — масштабування  
**scan** [skxn] — перегляд; сканування; розгортка; переглядати  
**scanner** — сканер, пристрій оптичного зчитування  
**bar-code** ~ — пристрій зчитування штрих-коду  
**color** ~ — кольоровий сканер  
**hand/manual** ~ — ручний сканер  
**laser** ~ ['leIzq] — лазерний сканер  
**optical/visual** ~ — оптичний сканер  
**scanning** — перегляд; пошук; зчитування; сканування  
**schedule** ['SedjHl] — план; розклад; графік  
**scheduling** — складання розкладу чи графіка; планування  
**science** ['sIqns] — наука, теорія  
**scientific** ["saIqn'tIfIk] — науковий  
**scientist** — учений  
**computer** ~ — фахівець з обчислювальної техніки і інформатики

**screen** [skrJn] — екран; відобразити на екрані  
**screening** — виведення на екран  
**search** [sWC] — пошук; шукати; переглядати  
**security** [sI 'jVrII] — безпека; збереження  
**seek** [sJk] — шукати; пошук  
**select** — вибирати; виділяти (на екрані)  
**selection** — вибір; виділення  
     **color** ~ — вибір кольору  
     **directory** ~ [daI 'rekt (q) rI] — вибір каталогу  
     **drive** ~ — вибір дисководу/привода  
     **function** ~ — вибір функції  
     **keyboard** ~ — вибір клавіатури  
     **security** ~ [sI (kjV (q) rItI] — вибір способу захисту  
**selectivity** [sI "lFk 'tivItI] — вибірковість  
**semiconductor** ["semIkqn 'dAktq] — напівпровідник  
**sensibility** ["senI 'bIIItI] — чутливість  
**sensitive** ['sensItIv] — чутливий  
**sensor** ['sensq] — датчик  
**separate** ['sep (q) rqt] — відокремлювати (ся); окремий; ізолюваний  
**separation** — поділ; відділення  
**sequence** ['sJkwqns] — послідовність  
     **alphabetic** ~ ["xlSq 'betIk] — алфавітний порядок  
     **arithmetic** ~ [q' rITmqTik] — послідовність арифметичних  
 операцій  
     **binary** ~ ['baInqrI] — подвійна послідовність  
     **character/string** ~ — порядок проходження символів  
     **code** ~ — послідовність кодів  
     **command/instruction** ~ — порядок виконання команд  
     **data** ~ — порядок розміщення даних  
     **digital** ~ — цифрова послідовність  
     **historical** ~ — хронологічна послідовність  
     **increasing** ~ [In 'krJ sIN] — зростаюча послідовність  
     **in** ~ — послідовно; по порядку  
     **out of** ~ — не по порядку  
**serve** [sWv] — обслуговувати; служити  
**server** ['sWvq] — сервер; обслуговує / сервісна програма  
**service** ['sWvIs] — обслуговування, послуга, сервіс  
     **data** ~ — інформаційна послуга  
     **debugging** ~ [dJ 'bAgIN] — засіб налагодження

**installation** ~ [ˈɪnstɑːleɪʃ(ə)n] — (сервісна) програма початкової установки

**memory** ~ — програма забезпечення доступу у пам'яті

**running** ~ — сервісна програма що виконується

**security** ~ [sɪˈkjʊr(ə)rɪtɪ] — служба безпеки; засіб захисту

**set** — набір; сукупність; серія

- ~ **of actions** — сукупність дій
- ~ **of guidelines** — набір рекомендацій
- ~ **of keys** — група клавіш
- ~ **of rules** — набір правил
- ~ **of utilities** — набір сервісних програм
- ~ **off** — відключати
- ~ **on** — вмикати

**shape** — форма; надавати форму

**share** — спільно використовувати; ділитися (інформацією); частина; частка

**sharing** — спільне використання; колективний доступ

**shift** — зрушувати; переміщати; зрушення; зсув; зміна регістру

**shortcoming** [ˈʃɒrtkʌmɪŋ] — недолік; вада; дефект

**sign** — знак, символ

**significance** [sɪgˈnɪfɪkəns] — значимість; важливість; значущість;

**silicon** [ˈsɪlɪkən] — кремній

**similar** [ˈsɪmələ] — подібний; аналогічний

**similarity** — подібність; подобу

**similarly** — подібним чином; так само

**simple-to-use** — простий у використанні

**simplicity** — простота

**simplify** — спрощувати (ся)

**simulate** [ˈsɪmjʊleɪt] — моделювати; імітувати

**simulation** — моделювання; імітація

**simulator** — імітатор; тренажер; програма моделювання імітації

**skip** — пропускати; переходити

**slide** — ковзати; зсовувати; зміщувати

- ~ **rule** — логарифмічна лінійка

**slot** — гніздо; роз'єм; щілина; ніша

- bus** ~ — гніздо для підключення до шини
- expansion** ~ [ɪksˈpænz(ə)n] — роз'єм для модуля розширення

**small-dimensional** — малогабаритний

**soft** — програмний; програмований; електронний

**software** [ˈsɒftweɪə] — програмне забезпечення; програмні засоби

~ **compatibility** — програмна сумісність  
 ~ **engineering** — технологія проектування програмного забезпечення  
 ~ **package** ['pʌkɪdʒ] — програмний пакет  
 ~ **program** — прикладна програма  
**application** ~ — прикладне програмне забезпечення  
**database** ~ — програмне забезпечення для роботи з базою даних  
**educational** ~ — програмні засоби забезпечення  
**management** ~ — керуючі програми  
**simulation** ~ ["sɪmjʊ'leɪʃ(ə)n] — програмні засоби моделювання  
**solid body** — тверде тіло; кристал; напівпровідник  
**solution** [sə'lju:ʃ(ə)n] — рішення  
**solve** ['sɒlv] — вирішувати (проблему)  
**sound** — звук; звуковий сигнал  
 ~ **board** — звукова плата  
 ~ **card** — звукова плата  
**source** [sɔ:s] — джерело; вихідне пристрій; вихідна програма  
 ~ **code** — вихідний код  
**light** ~ — джерело освітлення  
**space** — простір; область  
 ~ **exploration** ["eksplə'reɪʃ(ə)n] — дослідження космосу  
**specific** [spɪ'sɪfɪk] — особливий; певний; конкретний  
**specifications** — (технічні) характеристики, вимоги  
**specifics** — характерні особливості  
**specify** ['spesɪfaɪ] — визначати; вказувати; специфікувати  
**speed** — швидкість; поспішати; прискорювати  
 ~ **of operation** — швидкість дії  
 ~ **of response** — швидкість реакції  
**spray** — розпорошувати; розбризкувати  
**spread** [spred] — розкид (значень); протяжність  
 ~ **out** — розширювати (ся); поширювати (ся)  
**network** ~ — протяжність мережі  
**stand for** — означати  
**stand-alone** — автономний  
**start** — запуск; початок; запускати  
**state** — стан; режим; повідомляти; стверджувати; констатувати  
**active** ~ — робочий стан  
**control** ~ — режим управління  
**default** ~ — стандартний режим

**emergency** ~ [I 'mWɛ(ɔ)nsI] — аварійний стан

**read-only** ~ — режим читання без (можливості) записи

**step** — крок; етап; стадія; щабель

**one ~ at a time** — поетапно, поступово

~ **down** — знижувати, зменшувати

~ **out** — виходити (з вікна, циклу)

~ **up** — підвищувати; збільшувати

**conversion** ~ [kɔn 'vʊsn] — етап перетворення даних

**program** ~ — крок програми

**programming** ~ — етап програмування

**step by step** — покроковий; поетапний

**stock** — запас; постачати

**storage** [ 'stɔrɪdʒ ] — запам'ятовуючий пристрій; пам'ять; зберігання

**archival** ~ [R 'kaɪv (ɔ) l ] — архівна пам'ять

**available** ~ [q 'veɪləbəl ] — доступна пам'ять

**buffer** ~ — буферна пам'ять

**computer** ~ — запам'ятовуючий пристрій / пам'ять комп'ютера

**data** ~ — зберігання даних

**input** ~ — зберігання вхідних даних

**intermediate** ~ — проміжне запам'ятовуючий пристрій

**internal** ~ — внутрішня пам'ять

**magnetic-disk** ~ — запам'ятовуючий пристрій на магнітних  
дисках

**magnetic-tape** ~ — запам'ятовуючий пристрій на магнітних  
лентах

**main** ~ — основна пам'ять; оперативне запам'ятовуючий пристрій  
(ОЗУ)

**off-line** ~ — автономне запам'ятовуючий пристрій; автономне  
зберігання

**on-line** ~ — оперативно доступна пам'ять

**sequential-access** ~ [sɪ 'kwɛns (ɔ) l ] — запам'ятовуючий  
пристрій з послідовним доступом

**variable** ~ — пам'ять для зберігання змінних

**store** — зберігати; запам'ятовувати; заносити/розміщувати в пам'яті

**string** — рядок; послідовність

~ **of characters** — послідовність символів

**subsequent** [ 'sʌbsɪkwɔnt ] — наступний; подальший

**subsequently** — надалі; потім, згодом

**substitute** [ 'sʌbstɪtjʊt ] — замінювати; заміщати

**substitution** — заміна; підстановка

**subtract** [sqb'trxkt] — віднімати  
**subtraction** — віднімання  
**success** [sqk'ses] — успіх  
**successful** — успішний  
**succession** — послідовність  
**successor** — наступний член (послідовності); наступна версія  
**suit** [sht] — походити; відповідати  
**suitable** підходящий; відповідний  
**suite** [swjt] — набір; комплект; група; серія  
     **protocol** ~ — набір протоколів  
     **software** ~ — комплект програмних засобів  
**supply** [sq'plaI] — подача; харчування; введення; подавати; вводити; постачати  
     **data** ~ — введення даних  
     **paper** ~ — подача паперу  
     **power** ~ — джерело живлення  
**support** [sq'pLt] — підтримка, забезпечення; підтримувати; забезпечувати  
**surround** [sq'raVnd] — оточувати  
**surrounding** — оточуючий  
**switch** [swIC] — перемикаєти; переставляти; перемикач; комутатор  
     ~ **between programs** — переходити до виконання іншої програми  
     ~ **between windows** — переходити від одного вікна до іншого  
     ~ **in/on** — включати; запускати  
     ~ **off** — вимикати; відключати  
     ~ **over** — перемикаєти  
     **binary** ~ — двійковий перемикач  
     **button** ~ — кнопковий перемикач  
     **reset** ~ — кнопка скидання  
**system** - система; установка, будову; спосіб; принцип  
     **artificial-intelligence** ~ система штучного інтелекту  
     **assistance/help** ~ довідкова система  
     **basic input/output** ~ базова система введення-виведення  
     **closed** ~ замкнута система  
     **common** ~ поширена система  
     **disk operating** ~ дискова операційна система  
     **executive/operating** ~ операційна система  
     **general-purpose** ~ універсальна система  
     **healthy** ~ справна система  
     **incompatible** ~ несумісна система

**monitoring** ~ система контролю  
**reference** ~ довідкова/інформаційна система  
**support** ~ система підтримки, система супроводу  
**tutorial** ~ навчальна система

## T

**table** — таблиця

**tabulate** [ 'tɒbjʌleɪt ] — табулювати; заносити в таблицю

**tabulation** — занесення в таблицю

**take** — брати; вибирати (команду); приймати (вид, значення)

~ **advantage of** — скористатися

~ **care** — вживати заходів; простежити

~ **into account / consideration** — враховувати; брати до уваги

~ **notes** — записувати; реєструвати

**tape** — магнітна стрічка

~ **backup unit** — пристрій одержання резервних копій на магнітній стрічці

~ **drive** — накопичувач на магнітній стрічці

**technique** [tek 'nɪk] — метод; спосіб; техніка, технічні прийоми; методика

**advanced** ~ — вдосконалена методика; сучасна технологій

**computing** ~ — обчислювальна техніка

**display / video** ~ — техніка відображення; спосіб виведення на екран

**formatting** ~ — спосіб форматування

**hardware** ~ — метод апаратного рішення

**measuring** ~ — вимірювальна техніка

**numerical** ~ — метод числових обчислень

**programming** ~ — методика програмування

**software** ~ — метод програмного рішення

**technology** — технологія; техніка; методика; методи, способи

**template** [ 'templeɪt ] — шаблон; маска; зразок; форма

**temporarily** — тимчасово

**terminal** — термінал; затискач; висновок; кінець

**alphanumeric** ~ [ "xl fqnjH 'mFrIk ] — текстовий термінал

**character** ~ — текстовий термінал

**point-of-sale** ~ — касовий термінал

**remote** ~ — віддалений термінал

**security** ~ [sɪ 'kjV (q) rɪtɪ ] — захищений термінал

~ **adapter** — термінальний адаптер

~ **mode** — термінальний режим

**thin-film magnetic medium** — тонкоплівковий магнітний пристрій

**thorough** [ 'tʌrɔː ] — ретельний; детальний  
**thoroughly** — ретельно; як слід  
**timing** [ 'taɪmɪŋ ] — узгодження в часі; розрахунок часу  
**tiny** — надмалий; крихітний  
**title** [ 'taɪtl ] — заголовок; назва  
**toggle** [ 'tɒɡ (ɔ) l ] — тумблер; перемикач  
**tool** — засіб; інструмент  
**total** — загальний; сумарний; сукупний; підсумковий; весь; цілий  
**touch pad** — сенсорна панель  
**tracing** [ 'treɪsɪŋ ] — спостереження; пошук, виявлення, визначення; трасування  
**fault** ~ — пошук несправностей  
**track** — слід; траєкторія; шлях; стежити; прокласти шлях  
**trackball** — трекбол  
**transaction** [ træn'zækʃ (ə) n ] — транзакція; група операцій  
**transfer** [ træn'sfɜː ] — передача; пересилання; перехід; передавати; пересилати; переносити  
~ **rate** — швидкість пересилання  
**transform** — перетворювати; перетворювати; трансформувати  
**transformation** — перетворення, трансформація  
**transformational, transformative** — трансформаційний; пов'язаний з перетворенням  
**transformer** — перетворювач; пристрій перетворення; трансформатор  
**transition** — перехід; перетворення; модифікація  
**translate** [ træn'sleɪt ] — транслювати; перетворювати; перекладати  
**translator** — транслятор; перетворювач  
**transmission** [ træn'zɪʃ (ə) n ] — передача; пересилання; поширення  
**transmit** — передавати; посилати; пропускати  
**transmitter** — передавач; датчик; перетворювач  
**transparent** [ træn'spærənt ] — прозорий; непомітний  
**transparently** — з дотриманням прозорості; непомітно  
**trapping** [ 'træpɪŋ ] — виловлювання; перехоплення  
**error** ~ — пошук помилок  
**trigger** — пускова кнопка  
**trouble** — несправність; порушення; неполадки; труднощі  
**troubleshoot** [ 'trʌb (ə) l "ʃhɪt ] — шукати несправності; діагностувати  
**tuner** [ 'tjuːnɜː ] — ручка настройки; програма налаштування (параметрів)  
**tuning** — налаштування, регулювання

**turn** — поворот, оборот; виток; обертати; повертати

~ **off** — вимикати; відключати

~ **on** — включати; запускати

**tutorial** — навчальна програма; засіб навчання; навчальний посібник

**type** — тип; вид, різновид; спосіб; шрифт; друкувати; виводити на друк

~ **in** — вводити з клавіатури

~ **out** — виводити на друк; роздруковувати

**heavy** ~ — жирний шрифт

**italic** [I' tɪlɪk] — курсив

**typewriter** — машинописний шрифт

**typewriter** — друкувальний пристрій

## U

**unable** [An' eɪb (ə) l] — нездатний

**unacknowledged** [ˈʌnək' nɒlɪdʒd] — невідтверджений (про прийом повідомлень)

**unaided eye** [An' eɪdɪd] — неозброєне око

**unattached** [ˈʌnək' tʃɛt] — невід'єднаний

**unbelievable** — неймовірний; неправдоподібний

**unchanged** [An' ʃeɪndʒ] — незмінний; незмінений

**uncontrollable** — некерований; нерегульований

**underline** — підкреслювати

**undertake** — робити

**undo** — скасовувати, скасування

**unit** — пристрій; модуль; механізм; вузол; блок; елемент

~ **of data** — блок даних

~ **of language** — елемент мови

~ **of measurement** — одиниця виміру

~ **of memory** — блок пам'яті

**arithmetic** ~ — арифметичний пристрій

**arithmetic and logical** ~ — арифметико-логічний пристрій

**central processing** ~ — центральний процесор

**computing** ~ — обчислювальний пристрій

**control** ~ — пристрій керування

**input** ~ — пристрій введення

**input / output** ~ — блок вводу-виводу

**operational** ~ — працюючий пристрій

**output** ~ — пристрій виводу

**power (supply)** ~ — блок живлення

**processing** ~ — пристрій обробки; процесор

**programming** ~ — пристрій програмування; програматор  
**reader** ~ — зчитувальний пристрій  
**recording** ~ — записуючий пристрій  
**storage** ~ — запам'ятовуючий пристрій  
**unload** - вивантажувати; видаляти з пам'яті  
**unplug** [An 'plAg] — виймати (роз'єм з гнізда); від'єднувати; відключати  
**unplugging** — від'єднання; відключення  
**unsuitable** [An 's(j)Htqb(q)l] — невідповідний; непридатний  
**usage** — використання, застосування; експлуатація  
**use** — користь; використовувати; застосовувати  
     **in** ~ — використовуваний; задіяний  
     **of** ~ — корисний  
     **of general** ~ — загальнозживаний  
     **of no** ~ — даремний  
     **make ~ of** — застосовувати; використовувати  
**used** — використовуваний; застосовуваний  
**useful** — корисний; придатний  
**useless** — даремний  
**user** — користувач; абонент  
     advanced / expert ~ — кваліфікований користувач  
**utility** [jV 'tIlqtI] — корисність; придатність; (сервісна) програма  
**up-to-date** — сама остання версія програми  
**utilize** ['jHtIlalIz] — використовувати

## V

**valid** — правильний; допустимий  
**validity** [vq 'lIdtI] — правильність; адекватність; допустимість  
**valuable** — цінний; корисний  
**value** ['vxljH] — значення; величина; значимість  
     **acceptable** ~ — допустиме значення  
     **additional** ~ — додаткове значення  
     **binary** ~ — подвійне значення  
     **byte** ~ — значення у вигляді байта  
     **character** ~ — значення коду символу  
     **check** ~ — контрольне значення  
     **correct** ~ — правильне значення  
     **data** ~ — інформаційне значення  
     **invalid** ~ — невірне, неприпустиме значення  
     **numeric** ~ — числове значення  
     **output** ~ — виведене / вихідне значення  
     **valid** ~ — вірне / допустиме значення

**variable** [ 've (q) rIq b (q) l ] — змінна (величина)  
**variety** — різноманітність; різновид; ряд, безліч  
**velocity** [vI 'lOsItI] — швидкість  
**verification** [ "verIfI 'keIS (q) n ] — перевірка; контроль  
**verifier** — пристрій / програма перевірки  
**verify** — перевіряти; контролювати  
**versatile** [ 'vWsqtaIl ] — різнобічний; багатофункціональний  
**versatility** - різнобічність; багатофункціональність; універсальність  
**version** — версія; варіант  
     **common** ~ — поширена версія  
     **data** ~ [ 'deItq ] — варіант даних  
     **electronic** ~ — електронна версія  
     **executable** ~ [ Ig 'zekjVtqbl ] — виконавча версія  
     **original** ~ — початковий варіант  
**view** — вид; подання; перегляд  
**viewpoint** — точка зору  
**viewport** — вікно перегляду / виводу  
**virtual** [ 'vWCvq1 ] — віртуальний; нереальний; неіснуючий  
**voltage** [ 'vqVltIdZ ] — (електричне) напруга  
**volume** — об'єм; величина; кількість  
     **sound** ~ — гучність звуку  
**vulnerability** [ "vAln (q) rq 'bIlItI ] — вразливість; чутливість;  
 схильність  
**vulnerable** — чутливий; уразливий; схильний

## W

**wafer** [ 'weIfq ] — пластина; підкладка  
**wait** — очікування; чекати, чекати  
**want** — недолік; брак; потребу; бракувати)  
**wanted** — потрібний; необхідний  
**warning** [ 'wLnIN ] — попередження  
**watchdog** [ 'wPCdPg ] — сторожова програма  
**waveguide** [ 'weIvgaId ] — хвилевід  
**wavelength** [ 'weIvleNT ] — довжина хвилі  
**way** — шлях; спосіб; засіб; можливість  
     **in a** ~ — в певному відношенні; до певної міри  
     **in any** ~ — будь-яким способом; як завгодно  
     **in different** ~ **s** — різними способами; по-різному  
     **in no** ~ — жодною мірою; ніяк  
     **in the same** ~ — так само; в той самий спосіб

**web** — (інформаційна) мережа  
**information** ~ — інформаційна мережа (сайтів на серверах мережі Internet)

**World-Wide** ~ — всесвітня інформаційна мережа

**wide area network** — глобальна мережа

**width** — ширина; розрядність (шини, пам'яті)

**withdraw** [wID 'drL] — видаляти; прибирати; виймати

**withdrawal** [wID 'drLq1] — видалення; виймання; вилучення

**word** — слово; текстовий

~ **processing** ['proVsqsIN] — редагування текстів

~ **processing program** — текстовий редактор

~ **wrap** ['rxp] — перенесення слів

**worksheet** ['wWk"St] — електронна таблиця

**world wide** — глобальний; всесвітній

**worm** — (комп'ютерний) черв'як

**writer** — записуючий пристрій; програма запису; автор; розробник

## X

**xerocopy** — ксерокопія

**xerox** ['zIqrPks] — ксерокопіювати

**X-ray** — рентгенівський (про випромінювання монітора)

## Y

**yet** — проте, все ж, ще

**yield** [jJld] — вихід (результатів); видача; видавати; отримувати (значення)

## Z

**zero** ['zI (q) rqv] — нуль; нульовий; обнуляти

**of** ~ — рівний нулю

**to** ~ **out** — обнуляти

**time** ~ — початок відліку часу

**zone** [zqvN] — зона; область; полоса

**buffer** ~ — буферна область

**storage** ~ — область пам'яті

## ABBREVIATIONS

### A

ABC - Atanasoff Berry Computer - комп'ютер Атанасоф  
ADC - analog-to-digital converter - аналого-цифровий перетворювач

ADP - automated data processing - автоматизована обробка даних

ALU - arithmetic-logical unit - арифметико-логічний пристрій (блок центрального процесора, який виконує всі дії мікропроцесора на основі математичних і логічних операцій)

API - Application programming interface - інтерфейс прикладного управління

APL - A Programmable language - високорівнева мова програмування

ASM - Association for System Management - асоціація по системному управлінню

AU - arithmetic unit - арифметичний пристрій

a. v.c. - Automatic volume control - автоматичне регулювання гучності

## **В**

BASIC - (скор. від Beginner's All-purpose Symbolic Instruction Code) - простий у використанні мова програмування високого рівня, розроблений в 1964 р.

BDOS - basic disk operating system - базова дискова операційна система

BIOS - basic input / output system - базова система введення-виводу

b. o.p.s. - Billion operations per second - мільярд операцій в секунду (одиниця вимірювання швидкодії системи)

bpi - Bits per inch - число біт на дюйм

b.p.s. - Bits per second - число біт в секунду (одиниця вимірювання щільності запису на носії)

## **С**

CAD - computer-aided design - комп'ютерне проектування

CAI - computer-aided instruction - комп'ютерне навчання

CAN - cancel - символ скасування

CAT - computer-aided testing - комп'ютерний контроль (тести  $\rightarrow$  вання)

CD - compact-disk - компакт-диск

CDD - compact-disk drive - дисковод для компакт-дисків

CD-DA - compact disk-digital audio - цифровий аудіо компакт-диск

CD-ROM - compact disk, read only memory – непереписуваним компакт диск

CGA - color graphics adapter - кольоровий графічний адаптер

CMI - computer-managed instruction - команди, що подаються комп'ютером

CMOS - complementary metal-oxide-semiconductor - комплементарна структура метал-оксид-напівпровідник (носій КМОП-пам'яті)

COBOL - Common Business Oriented Language - мова програмування високого рівня

cps - characters per second - число символів в секунду (одиниця вимірювання швидкості друку принтера)

CPU - central processing unit - центральний процесор (ЦП)  
CRT - cathode-ray tube - електроннопроменева трубка (дисплея)  
CU - control unit - пристрій керування

## **D**

DB - database - база даних  
DEL - delete - символ видалення  
DMA - direct memory access - прямий доступ до пам'яті  
DOS - disk operating system - дискова операційна система  
DS - double-sided - двосторонній  
DVD - digital video disk - цифровий відеодиск

## **E**

ECC - error-correction code - код з виправленням помилок  
EDI - Electronic Data Interchange - електронний обмін даними  
ENIAC - Electronic Numerical Integrator and Calculator - електронно-числовий інтегратор і калькулятор  
EDP - electronic data processing - електронна обробка даних  
EPROM - erasable programmable read-only memory - стираєми програмований постійний запам'ятовуючий пристрій (ППЗУ)  
ETB - end of transmission block - кінець блоку передачі (символ)

## **F**

FCB - file control block - блок управління файлами  
FD - floppy disk - гнучкий диск  
FDD - floppy-disk drive - дисковод для гнучких дисків  
FORTRAN - скор. від fourth generation programming language - Фортран (мова програмування високого рівня, орієнтований на вирішення завдань математичного характеру)  
FTR - File Transfer Protocol - протокол передачі файлів

## **G**

GB, Gb - gigabyte - гігабайт Gc - gigacycle - гігацікл  
GP - general purpose - загального призначення  
GUI - Graphical User Interface - графічний інтерфейс користувача

## **H**

HD - high density - висока щільність  
HDD - hard-disk drive - дисковод для жорсткого диска  
Hi-Fi - high fidelity - високонадійний; з високою точністю відтворення  
HF - high frequency - високочастотний  
HW, hw - hardware - апаратура, обладнання; апаратні засоби

## **I**

IAB - Internet Activities Board - Керуючий рада з питань діяльності Internet

IBM - International Business Machine - фірма з виробництва комп'ютерів  
IC - integrated circuit - інтегральна схема  
I / O-input / output - пристрій вводу-виводу  
Intel - найбільша у світі корпорація з виробництва мікропроцесорів (США)  
Internet - Intercontinental Network - система з'єднаних комп'ютерних мереж світового масштабу  
IP - Internet Protocol - протокол маршрутизації  
ISOC - Internet Society - Суспільство Internet  
IT - information technology - інформаційна техніка / технологія

## **К**

KB, Kbyte - кілобайт  
K / B, KBD, kbd - keyboard - клавіатура  
Kc - kilocycle - кілоциклів  
KHz - kilohertz - КГц, кілогерц

## **L**

LAN - local-area network - локальна мережа  
LCD - liquid-crystal display - рідкокристалічний дисплей  
LSI - large-scale integration - високий рівень інтеграції

## **M**

MB, Mb - megabyte - мегабайт  
M / B - motherboard - материнська плата  
MCB - memory control block - блок управління пам'яттю  
MIS - management information system - управлінська інформаційна система  
MMCD - Multimedia Compact Disk - мультимедійний компакт-диск  
MP - microprocessor - мікропроцесор  
MPU - microprocessor unit - мікропроцесорний пристрій  
MS DOS - Microsoft Disk Operational System - стандартна операційна система для IBM і IBM-сумісних комп'ютерів, розрахована на одного користувача  
MSI - medium-scale integrated circuit - середня інтегральна схема

## **N**

NAK - negative acknowledgement - невідтвердження прийому (символ)  
NetBIOS - Network Basic Input / Output System - базова система вводу-виводу мережі

## **O**

OCR - optical character reader - оптичний пристрій читання (розпізнавання) знаків  
OMR - optical mark reader - оптичний пристрій зчитування знаків

OR - АБО (логічна операція)

OS - operating system - операційна система

## **P**

PC - personal computer - персональний комп'ютер PFM - pulse-frequency modulation - частотно-імпульсна модуляція

PIF - program information file - інформаційний файл програми

PILOT - скор. від Programmed Inquiry Learning Or Teaching -

авторизованний мова для машинного навчання, розроблений Дж.

Старквезером (John Starkweather) в Каліфорнійському Університеті в 1968 р.

PL - Programming Language - мова програмування

PROLOG - PROgramming in LOGic - мова програмування високого рівня, який використовується в дослідженнях, пов'язаних зі штучним інтелектом

PROM - programmable read-only memory - програмоване постійне запам'ятовуючий пристрій

## **R**

RAM - random-access memory - оперативний запам'ятовуючий пристрій  
r.c. - Remote control - дистанційне керування r.mt.

Reverse motion - зворотний рух ROM - read-only memory – постійний запам'ятовуючий пристрій

R / W - read / write - читання - запис

## **S**

SATAN - Security Administrator Tool for Analysing Networks - програма, призначена для оцінки стану безпечності комп'ютера або локальної мережі, підключеного до Internet

SCSI - Small Computer System Interface - Інтерфейс малих комп'ютерних систем

SNOBOL - String-Oriented Symbolic Language - мова програмування високого рівня, орієнтований на обробку символічних послідовностей

SOM - start of message - початок повідомлення

SP - space character - символ пробілу

SSI - small-scale integration - інтеграція малого рівня

## **T**

TCP - Transmission Control Protocol - транспортний протокол TF - time factor - коефіцієнт часу Turbo Pascal - швидкокодіючий компілятор для мови Pascal (1984 р.)

## **U**

ULSI - ultralarge-scale integration - інтеграція ультрависокої рівня

UNIVAC - UNIVersal Automatic Computer - універсальний комп'ютер

UNIX - операційна система, яка використовується в багатьох комп'ютерах (від персональних до мейнфреймів)

UPS - uninterruptible power supply - безперебійне джерело, харчування

URL - Universal Resource Locator - універсальний покажчик ресурсів

#### V

VDT - visual display terminal - відеотермінал v. f. - Video frequency -

відеочастоти v. f. - Velocity factor - коефіцієнт швидкості

VLSI - very large-scale integration - інтеграція надвисокого рівня

VR - virtual reality - віртуальна реальність v. r. - voltage regulator -

регулятор напруги

VRML - Virtual Reality Modeling Language - мова моделювання

віртуальної реальності

VT - vertical tabulator - вертикальний табулятор

#### W

WAN - wide-area network - глобальна мережа

WWW - World Wide Web - Всесвітня інформаційна мережа

## GLOSSARY

### A

**ABEND** — this term is short for abnormal end, and refers to a program stopping prematurely due to a bug. It is more commonly associated with main-frame programs, as this is its origin. Another purported origin of the term is that ABEND is called «abend» because it is what system operators do to the computer late on Friday when they want to call it a day, and hence is from the German word «Abend» meaning «Evening». This is untrue.

**Ada** (programming language) — named after Ada Lovelace, who is considered by many to be the first programmer.

**ADSL** (Asymmetric Digital Subscriber Line.) — Typically the upstream data flow is between 16 and 640 kilobits per second while the downstream data flow is between 1.5 and 9 megabits per second. ADSL also provides a voice channel.

**Apache** — the web server from the Apache Software Foundation. Originally this name was chosen by an author just because it was a catchy name. Soon enough, it was suggested that the name was indeed appropriate, because its founders got started by applying patches to code written for NCSA's httpd daemon. The result was «a patchy» server.

**Awk** — a computer pattern/action language, name made up of the surnames of its authors Alfred V. Aho, Peter J. Weinberger, and Brian W. Kernighan.

## B

**B** (programming language) — B was created by Ken Thompson as a revision of the BCPL programming language.

**Biff** — a command to turn on asynchronous email notification on Unix systems. Actually named after a dog at U.C. Berkeley, who would bark when mail was delivered. (The dog belonged to Heidi Stettner, validation of this from Eric Cooper.)

**Bit** — Claude E. Shannon first used the word *bit* in a 1948 paper. Shannon's *bit* is a portmanteau word for binary digit (or possibly binary digit). He attributed its origin to John W. Tukey. **Bon** programming language — Bon was created by Ken Thompson and named after his wife Bonnie. However according to an encyclopedia quotation in Bon's manual, it was named after a religion whose rituals involve the murmuring of magic formulas.

**Booting or bootstrapping** — The term *booting* or *bootstrapping* a computer was inspired by the story of the Baron Munchhausen where he pulls himself out of a swamp by the straps on his boots.

**Bug** — a fault in a computer program which prevents it from working correctly.

The term is often (but erroneously) credited to Grace Hopper. In 1946, she joined the Harvard Faculty at the Computation Laboratory where she traced an error in the Harvard Mark II to a moth trapped in a relay. This bug was carefully removed and taped to the log book.

However, use of the word «bug» to describe defects in mechanical systems dates back to at least the 1870s. Thomas Edison, for one, used the term in his notebooks.

**Byte** — the term was coined by Werner Buchholz in 1956 during the early design phase for the IBM Stretch computer. It was coined by mutating the word *bite* so it would not be accidentally misspelled as bit.

## C

**C** (programming language) — Dennis Ritchie improved on the B programming language and called it *New B*. He later called it C.

**C++** — an object-oriented programming language and a successor to the C programming language.

C++ creator Bjarne Stroustrup called his new language «C with Classes\*» and then «*newC*». Because of which the original C began to be called «*oldC*» which was considered insulting to the C community. At this time Rick Mascitti suggested the name C++ as a successor to C. In C the '++' operator increments

the value of the variable it is appended to, thus C++ would increment the value of *C*.

**Cookie** — A packet of information that travels between a browser and the web server.

The term was coined by web browser programmer Lou Montulli after the term «magic cookies» used by Unix programmers.

## D - F

**Daemon** [ ' dʒmɔ:n ] — a process in an operating system that runs in the background.

It is falsely considered an acronym for Disk And Execution MONitor. According to the original team that introduced the concept, «the use of the word daemon was inspired by the Maxwell's daemon of physics and thermodynamics (an imaginary agent which helped sort molecules of different speeds and worked tirelessly in the background)\*. The earliest use appears to have been in the phrase «daemon of Socrates», which meant his «guiding or indwelling spirit; his genius», also a pre—Christian equivalent of the «Guardian Angel», or, alternatively, a demigod (bearing only an etymological connection to the word «demon»). The term was embraced, and possibly popularized, by the Unix operating systems: various local (and later Internet) services were provided by daemons. This is exemplified by the BSD mascot, John Lasseter's drawing of a friendly imp (copyright Marshall Kirk McKusick). Thus, a daemon is something that works magically without anyone being much aware of it.

**Debian** — a linux distribution, a portmanteau of project creator Ian Murdock's name and that of his girlfriend (now wife) Debra.

**Emacs** [ ' ɛmɛks ] — a text editor, acronym for Editor MACroS.

**Finger** — Unix command that provides information about users logged into a system. Les Earnest wrote the finger program in 1971 to solve the need of users who wanted information on other users of the network. Prior to the finger program, the only way to get this information was with a who program that showed IDs and terminal line numbers for logged—in users, and people used to run their fingers down the «who» list. Earnest named his program after this concept.

**Foobar** — from the U.S. Army slang acronym, FUBAR.

## G

**Gentoo** [ ' dʒfɛntu ] — a linux distribution, a variety of penguin, the universal linux logo.

**GHz** Gigahertz, equivalent to one thousand megahertz.

**GNU** — a project with a goal of creating a free operating system. Gnu is also a species of African antelope. Founder of the GNU project Richard Stallman liked the name because of the humour associated with its

pronunciation and was also influenced by the song *The Gnu Song*, by Flanders and Swann which is a song sung by a gnu. Also it fitted into the recursive acronym culture with «GNU's Not Unix».

**Google** — search engine on the web.

The name started as a jokey boast about the amount of information the search-engine would be able to search. It was originally named 'Googol', a word for the number represented by 1 followed by 100 zeros. The word was originally invented by Milton Sirota, nephew of mathematician Edward Kasner in 1938 during a discussion of large numbers and exponential notation.

Gopher — a distributed document search and retrieval network protocol on the internet.

The source of the name is claimed to be three-fold: first, that it is used to «go-for» information; second, that it does so through a menu of links analogous to gopher holes; and third, that the mascot of the protocol authors' organization, the University of Minnesota, is Goldy the Gopher.

**grep** — a Unix command line utility.

The name comes from a command in the Unix text editor **ed** that takes the form *g/re/p* meaning search globally for a regular expression and print lines where instances are found. «Grep» like «Google» is often used as a verb, meaning «tosearch».

## H - K

**Hotmail** — free email service, now part of MSN.

Founder Jack Smith got the idea of accessing e-mail via the web from a computer anywhere in the world. When Sabeer Bhatia came up with the business plan for the mail service, he tried all kinds of names ending in 'mail' and finally settled for Hotmail as it included the letters «HTML» — the markup language used to write web pages. It was initially referred to as HoTMaiL with selective upper casing.

**il8n** — short for internationalization.

«18» is for the number of letters between the *i* and the *n*. The term *11 On* (for localization) has failed to catch on to the same degree, but is used by some.

**ICQ** — an instant messaging service.

ICQ is not an acronym. It is a play on the phrase «I seek you» (similar to CQ in ham radio usage).

**IDIOT** — pronounced «ID ten T» — is a code frequently used by a customer service representative (CSR) to annotate their notes and identify the source of a problem as the person who is reporting the problem rather than the system being blamed. This is a thinly veiled reference to the CSR's opinion that the person reporting the problem is an IDIOT. Example: Problem герой ed caused by IDIOT, no resolution possible. See also PEBKAC.

**ISDN** (Integrated Services Digital Network) which provides speeds of roughly 128,000 bits-per-second.

**Jakarta Project** — a project constituted by Sun and Apache to create a web server for Java servlets and JSPs.

Jakarta was the name of the conference room at Sun where most of the meetings between Sun and Apache took place. The conference room was most likely named after Jakarta, the capital city of Indonesia, which is located on the northwest coast of the island of Java.

**Java** [ ' dʒRvɔː ] — programming language.

Originally called «D», but with the connotation of a near-failing mark on a report card the language was renamed *Oak* by Java-creator James Gosling, from the tree that stood outside his window. The programming team at Sun had to look for a substitute name as there was already another programming language called Oak. «Java» was selected from a list of suggestions, primarily because it is a popular slang term for coffee, especially that grown on the island of Java. As the programmers drank a lot of coffee, this seemed an appropriate name.

**Kerberos** — a computer network authentication protocol that is used by both Windows 2000 and Windows XP as their default authentication method.

When created by programmers at MIT in the 1970s, they wanted a name that represented true security for the project, so they named it after the Greek mythology character kerberos, (also spelled Cerberus), the mythical three-headed canine guarding Hades' gates. The reference to Greek mythology is most likely because Kerberos was developed as part of Project Athena.

## L

**Linux** — an operating system kernel, and the common name for the operating system which uses it.

Linux creator Linus Torvalds originally used the Minix operating system on his computer, didn't like it, liked MS-DOS less, and started a project to develop an operating system that would address the problems of Minix. Hence the working name was *Linux* (Linus' Minix). He thought the name to be too egotistical and planned to name it *Freax* (*free + freak + x*). His friend Ari Lemmke encouraged Linus to upload it to a network so it could be easily downloaded. Ari gave Linus a directory called *linux* on his FTP server, as he did not like the name *Freax*.

**Lisa** [ ' lɪʒɔː / ' lɑɪzɔː ] — A personal computer designed at Apple Computer during the early 1980s.

Apple stated that LISA was an acronym for Local Integrated Software Architecture; however, it is often inferred that the machine was originally named

after the daughter of Apple co-founder Steve Jobs, and that this acronym was invented later to fit the name. Accordingly, two humorous suggestions for expanding the acronym included Let's Invent Some Acronym and Let's Invent Silly Acronyms.

**Lotus Software** — Lotus founder Mitch Kapor got the name for his company from 'The Lotus Position' ('Padmasana' in Sanskrit). Kapor used to be a teacher of Transcendental Meditation technique as taught by Maharishi Ma-heshYogi.

## M

**Apple Macintosh, Mac** [ 'mɔkɪntɔʃ ] — computer system from Apple Computer.

from McIntosh, a popular type of apple. Jef Raskin, a computer scientist, is credited with this naming.

**Mac OS** — The operating system used in the Macintosh computer system from «Mae», a shortened form of Macintosh and a commonly used name for the Macintosh computer system (see elsewhere on this page), and «OS», the common abbreviation for «operating system\*».

**Memoization** — the process of automatically modifying functions to include caching behavior.

Coined by Donald Michie in his 1968 paper *Memo Functions and Machine Learning*.

**Mozilla** — a web browser and successor to Netscape Communicator. When Marc Andreessen, founder of Netscape, created a browser to replace the Mosaic browser, it was internally named Mozilla (Mosaic-Killer, Godzilla). When Netscape's Navigator source code was made open source, Mozilla was the internal name for the open source version.

**MPEG** (Moving Pictures Experts' Group) [ 'ɛmˈpɛɡ ] — a standard for compressing and decompressing images.

## N- O

**Nerd** [nɜrd] — A colloquial term for a computer person, especially an obsessive, singularly focused one.

Earlier spelling of the term is «Nurd» and the original spelling is «Knurd», but the pronunciation has remained the same. The term originated at the Rensselaer Polytechnic Institute in the late 1940s. Students who partied, and rarely studied were called «Dunks», while the opposite — students who never partied and always studied were «Knurd» («Drunk» spelled backwards). The term was also (independently) used in a Dr. Seuss book, and on the TV show Happy Days, giving it international popularity.

**Novell NetWare** — a network operating system from Novell.

Novell, Inc. was originally Novell Data Systems co-founded by George Canova. The name was suggested by George's wife who mistakenly thought that «Novell» meant «new» in French.

**Oracle** [ ' P r ɔ k ( ɔ ) l ] — a relational database management system (RDBMS).

Larry Ellison, Ed Oates and Bob Miner were working on a consulting project for the CIA (Central Intelligence Agency). The code name for the project was called Oracle (the CIA evidently saw this as a system that would give answers to all questions). The project was designed to use the newly written SQL database language from IBM. The project eventually was terminated but they decided to finish what they started and bring it to the world. They kept the name *Oracle* and created the RDBMS engine.

## P

**Pac-Man** — a video arcade game.

The term comes from *paku paku* which is a Japanese onomatopoeia (written version of a noise) used for noisy eating; similar to *chomp chomp*. The game was released in Japan with the name *Puck-Man*, and released in the US with the name *Pac-Man*, fearing that kids may deface a Puck-Man cabinet by changing the *P* to an *F*.

**PCMCIA** — the standards body for PC card and ExpressCard, expansion card form factors.

The Personal Computer Memory Card International Association is an international standards body that defines and promotes standards for expansion devices such as modems and external hard disk drives to be connected to notebook computers. Overtime, the acronym PCMCIA has been used to refer to the PC card form factor used on notebook computers. A twist on the acronym is People Can't Memorize Computer Industry Acronyms.

PDA (Personal Digital Assistant) which includes an address book, a calendar, Internet access, etc.

PEBKAC — an acronym for «Problem Exists Between Keyboard And Chair», which is a code frequently used by a customer service representative (CSR) to annotate their notes and identify the source of a problem as the person who is reporting the problem rather than the system being blamed. This is a thinly veiled reference to the CSR's opinion that the person reporting the problem is the problem. Example: PEBKAC, no resolution possible. See also IDIOT.

**Pentium** — Microprocessor from Intel.

The fifth microprocessor in the 80x86 series. It would have been called i586 or 80586, but Intel decided to name it *Pentium* (penta = five) after it lost a trademark infringement lawsuit against AM D (the judgment was that numbers

like «286», «386», and «486» could not be trademarked). According to Intel, *Pentium* conveys a meaning of strength, like titanium. Since some early Pentium chips contained a mathematical precision error, it has been jokingly suggested that the reason for the chip being named Pentium rather than 586 was that Intel chips would calculate  $486 + 100 = 585.99999948$ .

**Perl** [pɜːl] — an interpreted scripting language.

Perl was originally named *Pearl*, after the «pearl of great price» of Matthew 13:46. Larry Wall, the creator of Perl, wanted to give the language a short name with positive connotations and claims to have looked at (and rejected) every three- and four-letter word in the dictionary. He even thought of naming it after his wife Gloria. Before the language's official release Wall discovered that there was already a programming language named *Pearl*, and changed the spelling of the name. Although the original manuals suggested the backronyms «Practical Extraction and Report Language\*» and «Pathologically Eclectic Rubbish Lister», these were intended humorously.

**PHP** — a server-side scripting language.

Originally called «Personal Home Page Tools» by creator Rasmus Lerdorf, it was rewritten by developers Zeev Suraski and Andi Gutmans who gave it the recursive name «PHP Hypertext Preprocessor\*». Lerdorf currently insists the name should not be thought of as standing for anything, for he selected «Personal Home Page\*» as the name when he did not foresee PHP evolving into a general-purpose programming language.

**Pine** [paɪn] — e-mail client. Acronym for «Program for Internet News & Email\*». It is also a recursive acronym for «Pine Is Not Elm» (in reference to Elm, another email client).

**Ping** — computer network tool used to detect hosts.

The author of ping, Mike Muuss, named it after the pulses of sound made by a sonar called a «ping». Later Dave Mills provided the backronym «Packet Internet Groper».

**PKZIP** — compression, or zipping tool. It was written by Phil Katz and stands for Phil Katz's ZIP program.

**Python** (programming language) ['paɪt(ɔ)n] — an interpreted scripting language. Named after the television series Monty Python's Flying Circus.

## R

**Radio button** ['reɪdɪəv 'bʌtn] — a GUI widget used for making selections.

Radio buttons got their name from the preset buttons in radio receivers. When one used to select preset stations on a radio receiver physically instead of

electronically, depressing one preset button would pop out whichever other button happened to be pushed in.

**Red Hat Linux** — a Linux distribution from Red Hat.

Company founder Marc Ewing was given the Cornell lacrosse team cap (with red and white stripes) while at college by his grandfather. People would turn to him to solve their problems, and he was referred to as «that guy in the red hat». He lost the cap and had to search for it desperately. The manual of the beta version of Red Hat Linux had an appeal to readers to return his Red Hat if found by anyone.

**RSA** — an asymmetric algorithm for public key cryptography.

Based on the surnames of the authors of this algorithm — Ron Rivest, Adi Shamir and Len Adleman.

## S

**Samba software** [ ' s x m b q ] — a free implementation of Microsoft's networking protocol. The name *samba* comes from inserting two vowels into the name of the standard protocol that Microsoft Windows network file system use, called SM B (Server Message Block). The author searched a dictionary *usingrep* for words containing S M and B in that order; the only matches were *Samba* and *Salmonberry*.

**SCO UNIX** - a UNIX variant from SCO.

The company was called «Santa Cruz Operations\*», as its office was in Santa Cruz, California.

**Sed** — stands for stream editor, used for textual transformation of a sequential stream of text data. It is modelled after the ed editor.

**Shareware** [ ' s F q " w F q ] — coined by Bob Wallace to describe his word processor PC-Write in early 1983. Prior to this Jim Button and Andrew Fluegelman called their distributed software «user supported softwares- and «freeware» respectively, but it was Wallace's terminology that stuck.

**Slashdot** — a technology oriented weblog.

While registering the domain, Slashdot-creator Rob Malda wanted to make the U R L silly, and unpronounceable. Alternatively, many say that the Slashdot(/.) name refers to the \*NIX command line interpretation of the «root» directory, or a play on the website being the «root» of all tech news.

**SMS** (Short Message Service) which allows you to send short text messages with maximum 160 characters to GSM mobile phones worldwide. GSM is the Global System for mobile Communication that allows transmission of voice and data on mobile phones.

**Sosumi** — one of the system sounds introduced in Apple Computer's System 7 operating system in 1991.

Apple Computer had a long litigation history with Apple Records, the Beatles' recording company. Fearing that the ability to record musical sound would cause yet more legal action, the Apple legal department allegedly ordered the sound to be renamed from its original, musical name. So the developers changed the name to Sosumi («So sue me»). Depending on who was asked, they quipped that it was Japanese for either «absence of sound\* or «a light pleasing tone».

**Spam** [spɪxm] — unwanted repetitious messages, such as unsolicited bulk e-mail.

The term *spam* is derived from the Monty Python SPAM sketch, set in a cafe where everything on the menu includes SPAM luncheon meat. While a customer plaintively asks for some kind of food without SPAM in it, the server reiterates the SPAM-filled menu. Soon, a chorus of Vikings join in with a song: «SPAM, SPAM, SPAM, SPAM, SPAM, lovely SPAM, wonderful SPAM», over and over again, drowning out all conversation.

**SPIM** — a simulator for a virtual machine closely resembling the instruction set of MIPS processors, is simply MIPS spelled backwards. MIPS stands for Millions of Instructions Per Second, from way back when that was something to boast of. In recent time, SPIM has also come to mean SPam sent over Instant Messaging.

**Swing** — a graphics library for Java.

*Swing* was the code-name of the project that developed the new graphic components (the successor of AWT). It was named after swing, a style of dance band jazz that was popularized in the 1930s and unexpectedly revived in the 1990s. Although an unofficial name for the components, it gained popular acceptance with the use of the word in the package names for the Swing API, which begin with javax.swing.

## T - V

**Tomcat** — a web server from the Jakarta Project

*Tomcat* was the code-name for the JSDK 2.1 project inside Sun. Tomcat started off as a servlet specification implementation by James Duncan Davidson who was a software architect at Sun. Davidson had initially hoped that the project would be made open-source, and since most open-source projects had O'Reilly books on them with an animal on the cover, he wanted to name the project after an animal. He came up with Tomcat since he reasoned the animal represented something that could take care of and fend for itself.

**Troff** — a document processing system for Unix.

*Troff* stands for «typesetter **roff**», although many people have speculated that it actually means «Times roff» because of the use of the Times font family in

troff by default. Troff has its origins from **Roff**, an earlier formatting program, whose name is a contraction of «run off».

**Trojan horse** (computing) [ ' t r ɔ̃ v d z ( ɔ ) n ] — a malicious program that is disguised as legitimate software.

The term is derived from the classical myth of the **Trojan Horse**. Analogously, a Trojan horse appears innocuous (or even to be a gift), but in fact is a vehicle for bypassing security.

**TWAIN** — a standard for acquiring data from image scanners.

Strictly speaking, TWAIN is not an acronym, but has often been referred to as an acronym for «Technology Without An Intelligent Name».

**Ubuntu Linux** — a Debian-based Linux distribution sponsored by Canonical Ltd. The name derives from ubuntu, a South African ideology.

**Unix** [ ' j h n i k s ] — an operating system.

When Bell Labs pulled out of MULTICS (M U L T i p l e x e d I n f o r m a t i o n a n d C o m p u t i n g S y s t e m), which was originally a joint Bell Labs/GE/MIT project, Ken Thompson of Bell Labs, soon joined by Dennis Ritchie, wrote a simpler version of the operating system. They needed the OS to run the game Space War which had been compiled under MULTICS. The new OS was called UNICS — U N I p l e x e d o p e r a t i n g a n d C o m p u t i n g S y s t e m by Brian Kernighan. An alternative spelling was *Eunuchs*, it being a sort of 'reduced' MULTICS. It was later shortened to *Unix*.

**UMTS** — Universal Mobile Telecommunications System, used by 3G mobile phones.

**Vi** [ v a i ] — a text editor, initialism for visual, a command in the ex editor which helped users to switch to the visual mode from the ex mode.

Vim — a text editor, acronym for Vi improved after Vim added several features over the vi editor. Vim however had started out as an imitation of Vi and was expanded as Vi imitation.

**Virus** [ ' v a i ( ɔ ) r ɔ̃ s ] — a piece of program code that spreads by making copies of itself.

The term *virus* was first used in print by Fred Cohen in his 1984 paper «Experiments with Computer Viruses\*», where he credits Len Adleman with coining it. Although Cohen's use of *virus* may have been the first academic use, it had been in the common parlance long before that. A mid-1970s science fiction novel by David Gerrold, *When H.A.R.L.I.E. was One*, includes a description of a fictional computer program called *VIRUS* that worked just like a virus (and was countered by a program called *ANTIBODY*). The term «computer virus\*» also appears in the comic book «UncannyX-Men» No. 158, published in 1982. A computer virus's basic function is to insert its own executable code into that of other existing executable files, literally making it the

electronic equivalent to the biological virus, the basic function of which is to insert its DNA code into the DNA code of other existing cells.

## W – Z

**Wiki or WikiWiki** — a hypertext document collection or the collaborative software used to create it.

Coined by Ward Cunningham, the creator of the wiki concept, who named them for the «wiki wiki» or «quick» shuttle buses at Honolulu Airport. Wiki wiki was the first Hawaiian term he learned on his first visit to the islands. The airport counter agent directed him to take the wiki wiki bus between terminals.

**Worm** [wŏrm] — a self-replicating program, similar to a virus.

The name 'worm' was taken from a 1970s science fiction novel by John Brunner entitled *The Shockwave Rider*. The book describes programs known as «tapeworms» which spread through a network for the purpose of deleting data. Researchers writing an early paper on experiments in distributed computing noted the similarities between their software and the program described by Brunner, and adopted that name.

**WYSIWYG** ['wɪzɪ'wɪg] — describes a system in which content during editing appears very similar to the final product.

Acronym for *What You See Is What You Get*, the phrase was originated by a newsletter published by Arlene and Jose Ramos, called WYSIWYG. It was created for the emerging Pre-Press industry going electronic in the late 1970s.

**X Window System** ['wɪndəʊ] — a windowing system for computers with bitmap displays.

X derives its name as a successor to a pre-1983 window system called W (the W Window System). X follows W in the alphabet. **Yahoo!** — internet portal and web directory.

Yahool's history site says the name is an acronym for «Yet Another Hierarchical Officious Oracle», but some remember that in its early days (mid-1990s), when Yahoo! lived on a server called akebono.stanford.edu, it was glossed as «Yet Another Hierarchical Object Organizer.\* The word «Yahoo!» was originally invented by Jonathan Swift and used in his book *Gulliver's Travels*. It represents a person who is repulsive in appearance and action and is barely human. Yahoo! founders Jerry Yang and David Filo selected the name because they considered themselves yahoos.

**Zip** [zɪp] — a file format now also used as a verb to mean *compress*.

The file format was created by Phil Katz, and given the name by his friend Robert Mahoney. The compression tool Phil Katz created was called PKZIP. Zip means «speed», and they wanted to imply their product would be faster than ARC and other compression formats of the time.

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Для приміток

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