

Міністерство освіти і науки України
Рівненський державний гуманітарний університет
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**МЕТОДИЧНІ РЕКОМЕНДАЦІЇ
З ПРАКТИКИ ОСНОВНОЇ МОВИ
(АНГЛІЙСЬКОЇ)**

***ДЛЯ СТУДЕНТІВ II-III КУРСІВ СПЕЦІАЛЬНИХ
ФАКУЛЬТЕТІВ***

Рівне - 2006

Методичні рекомендації з практики основної мови (англійської) для студентів II-III курсів спеціальних факультетів / Укладачі: Л.В. Олесюк, Ю.О. Михальчук, Н.О. Михальчук. – Рівне: РДГУ, 2006. – 62 с.

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Затверджено на засіданні кафедри практики англійської мови, протокол № 5 від 6 грудня 2004 р.

Рекомендовано до друку науково-методичною радою РДГУ, протокол № 12 від 24 червня 2005 р.

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WHAT IS COMPUTING?

Suppose you sit down with pencil and centre your attention on adding a set of figures. You add first all the digits in the right-hand column, then all the digits the next column, and so on – until you finally arrive at the answer.¹ When you do this, you are computing.

When you stop at a street corner, looking first to the left for any coming car, then to the right, to cross the street or to wait on the sidewalk² – you are computing.

When you are walking along a poorly marked path³ in the woods, thinking if you are really on the path or have lost it – you are computing.

When you are taking in information or data, performing reasonable operation (mathematical or logical operations) on the data, and are producing one or more answers⁴ – you are computing.

A machine can also do this. It can take in information or data, perform a sequence of reasonable operations on the information which it has received, and put out answers. When it does this, it is computing.

A very simple example of a computer is the ordinary business adding machines which print on paper tape the number entered into its keyboard, and also prints a total when you press the total key. A complex example of a computer is a modern automatic digital computer which in each second can perform more than 100,000,000,000 additions, subtractions, multiplications, or divisions.

A computing machine can take in and store information because the hardware inside the machine expresses arithmetical and logical relations, such as adding or subtracting, comparing or selecting. A computer can also put out information, display the answers when it receives them. Hardware is useless without software which is computer instructions.

The modern computers are of three kinds called analog, digital and hybrid. An analog computer computes by using physical analogs of numerical measurements. A digital computer computes by using the numbers (digits) and yes and no expressed usually in 1's and 0's.⁵ A hybrid computer is a machine which combines some of the properties of digital and analog computers.

Notes

¹ **until you arrive at the answer** – до того часу, коли ви нарешті не отримаєте відповіді

² **to cross the street or to wait on the sidewalk** – щоб перейти вулицю чи почекати на тротуарі

³ **a poorly marked path** – ледве помітний шлях

⁴ **if you are really on the path or have lost it** – чи дійсно ви знаходитесь на шляху чи заблудились

⁵ **yes and no expressed usually in 1's and 0's** – так і ні, виражені одиницями і нулями

I. Pronounce the following words correctly:

suppose – припускати

digit – цифра, число, розряд

column – стовпчик

compute – рахувати, обчислювати

take in – приймати (інформацію)

data – дані, інформація

perform – виконувати

reasonable – розумний

produce – синтезувати, виконувати

sequence – послідовність

receive – отримувати

put out – видавати інформацію

print – друкувати

number – число, номер, цифра

keyboard – клавішний пульт, клавіатура

press – нажимати

total – підсумок

key – кнопка, клавіша, ключ

addition – додавання

subtraction – віднімання

multiplication – множення

division – ділення

store – зберігати

hardware – забезпечення ЕОМ

express – виражати

relation – відношення, зв'язок
compare – порівнювати
select – вибирати
display – дисплей, показувати
numerical – числовий
measurement – вимір, обчислення
property – властивість, особливість

Exercise I. Give the equivalents:

to centre attention on; to the right; to the left; a set of figures; and so on; a sequence of reasonable operations; to put out answers; to take in information; to store information; such as; to express mathematical and logical relations; hardware is useless without software; numerical measurements.

Exercise II. Translate the words of the same root.

Define speech parts:

to centre – a centre; to add – addition; to compute – a computer – computation; to mark – a mark; to inform – information; datum – data (mind! a date); to perform – performance; reasonable – a reason; to operate – operation;

business – busy; to subtract – subtraction; to multiply – multiplication; to divide – division; logic – logical; arithmetic – arithmetical; measurement – to measure; relation – to relate.

Exercise III. Answer the following questions:

1. How many operations does a modern computer perform?
2. What kinds of operations does an automatic digital computer perform?
3. What is a computer?
4. What is very simple example of a computer?
5. How does a computer take in and store information or data?
6. What kind of modern computers do you know?
7. How does a digital computer compute?
8. What is hybrid computer?
9. What is hardware?
10. What is software?

Exercise IV. Choose the 3rd form of the verbs:

took, takes, take, taken; thought, think, thinks; arrive, arrives, arrived; did, done, do, does; speaks, speak, spoke, spoken; seen, see, sees; was, were, is, am, be, been, an, writes, wrote, written; has, had, have, expresses, expressed; receives, received, receive.

Exercise V. Translate the following sentences paying attention to the use of Indefinite, Continuous and Perfect Tenses in the Active Voice:

1. My friend studies at the department of Electrical Engineering. I study at the same department. We do research. Comrade Ivanov also does his research. We discussed various problems at the seminar. They did many operations on the computer ES-104 Yesterday we went to the Institute library. I answered the questions at the exam in mathematics. We shall solve this algebraic problem. They will do their work in time I shall compare my results with yours. 2. When you came he was calculating his problem. She was discussing some questions with her instructor. I shall be waiting for you at 6 o'clock. 3. He has given a short answer to my question. I have just come from Leningrad. They have already gone home. They had written the program for the computer by June.

Exercise VI. Fill in the blanks with the following verbs in Present Indefinite Active:

to express; to compute; to receive; to perform; to store; to calculate; to put out; to take in; to do; to display;

1. A computer ... or 2. Modern automatic digital computers ... more than 100 mm. additions, subtractions, multiplications, or divisions in each second. 3. A computer ... information or data,... a sequence of reasonable operations on information and ... answers. 4. The hardware inside the computer ... arithmetical or logical relations such as adding or subtracting, comparing or selecting. When computers ... results, they ... them.

Exercise VII. Give the proper tense of the verbs given in brackets

1. An ordinary business adding machine (to be) a very simple example of a computer. 2. When a computer (to do) reasonable operations, it (to compute) or (to calculate). 3. When I (to come) the room my friend (to complete) a program. 4. A computer (to store)

information which it (to receive). 5. ... (to come) to the laboratory, I... (to show) you how to calculate by using a computer. 6. The electronic computer ES-1045 just (to perform) its calculations.

Exercise VIII. Read the dialogue and translate it

COMPUTERS

For the last 5 years personal computers (PC) are becoming more and more popular in our country. There are computers in offices, schools, institutions and universities. More and more people want to have a PC at home. No wonder! PC gives us new opportunities, opens a new wonderful world of interactivity that will change the way we learn, play and communicate with others.

Virtual Reality (VR). With VR goggles and a data glove we are able to see and move things which exist only in our computer programme. Consequently, we will be able to play tennis with Andre Agassi, go on hair-raising rides, or play in our favourite pop group. All in the comfort of our living room.

Videophone. These are already available in some places but the image isn't very good. Since technology is developing fast, we'll soon be able to see a perfect image of the caller. People who don't like to be seen unless they are looking their best shouldn't worry. Videophones come with a lens cover, so the caller won't be able to see them unless they want to be seen.

Interactive TV. In the future we will have access to 500 television channels and in addition to this, homes will be connected to the local video library. We will be able to call up any movie or programme we want, when we want it.

Thanks to CDIs, watching films won't be a passive activity because we will be able to choose alternative story lines and create our own version of any film.

CD-ROM. Nowadays young people are able to have instant access to the best games and collections of their favourite pop group's music. Since CD-ROMs contain masses of information, we are also able to call up the complete contents of the *Encyclopedia Britannica* in a few seconds.

The computer can't write projects or reports, but it can make the process a lot easier. Interactivity can put the world at our fingertips!

Exercise I. Read text and translate it

Exercise II. Answer the questions

1. Why do most people want to have a PC at home?
2. What will you be able to do with VR goggles and data gloves?
3. Would you like to have a videophone? Why?
4. Why will watching films become an active experience?
5. How can a PC change your life? Can it make some things easier?
6. What does the expression "to have the world at our fingertips" mean?

**Exercise III. Translate the sentences,
using a polytechnic dictionary**

1. It is necessary that the communication line with the new telephone exchange be reestablished.
2. Should this happen, the engine won't work.
3. The naked conductor ran across the car.

**Exercise IV. Comment on the meaning of the modal verb "can"
and its equivalents. Translate the sentences**

1. He can not have entrusted this scientific work to the man he has known for such a short period of time.
2. Such a line can not have been set in practice.
3. You could have done it more carefully.
4. The temperature can be kept constant by different means.
5. The quantities of unsold goods were so big they could not be realized in so short a period.

**Exercise V. Make up pairs of these words and translate
them into Ukrainian**

- | | |
|----------------|----------------|
| 1. electronic | a) computers |
| 2. high | b) generators |
| 3. thin | c) contact |
| 4. fast acting | d) cooperation |
| 5. charged | e) instruments |
| 6. reliable | f) frequency |
| 7. fruitful | g) plates |
| 8. stable | h) particles |

MEETING A FRIEND

A: Hallo, B.! Where are you going?

B: Hallo, A.! I haven't seen you for ages! I am going to the Institute.

A: Oh! You are a student now! What Institute have you entered?

B: I've entered the Polytechnic Institute.

A: Good for you! And what department do you study at?

B: I study at the Electrical Engineering Department. My speciality is Electronic Computers (Automated Management Systems, Applied Mathematics. A: You liked mathematics at school, didn't you? They say one should know that subject well to study your speciality.

B: You're right. Mathematics was my favourite subject at school.

A: And you know already what a computer is, don't you?

B: Yes, I do. A computer is a machine which performs a sequence of reasonable operations on information. I also know what simple and complex computers are.

A: It's very interesting! Tell me, please. B: With pleasure, listen to: a simple computer is an ordinary business adding machine, and a complex computer is a modern electronic digital computer which performs more than 100 million operations a second.

A: Can you say, please, what kinds of operations a modern electronic computer performs?

B: Yes I can. It performs additions, subtraction, multiplication, and division. These operations are called arithmetical operations. But modern computers perform logical operations too. A: Well, what are they?

B: Logical operations which I know are comparing and selecting. A: In what capacity will you work after graduating from the Institute? B: I shall work as a system-engineer (an engineer-mathematical). But I am sorry. I must hurry to the Institute, I'm afraid to be late for the lectures. So long!

A: Wish you luck in your studying. So long!

COMPUTER SYSTEM

A computer system is a collection of components that work together to process data. The purpose of a computer system is to make it as easy as possible for you to use a computer to solve problems. A functioning computer system combines hardware elements with software

elements. The hardware elements are the mechanical devices in the system, the machinery and the electronics that perform physical functions. The software elements are the programs written for the system; these programs perform logical and mathematical operations and provide a means for you to control the system. Documentation includes the manuals and listings that tell you how to use the hardware and software.

Collectively these components provide a complete computer system: system hardware + system software + system documentation = computer system. Usually, a computer system requires three basic hardware items: the computer, which performs all data processing; a terminal device, used like a typewriter for two-way communication between the user and the system; and a storage medium for storing programs and data. These three devices - the computer, the terminal and the storage medium - are the required hardware components of any computer system.

Optional peripheral devices are added to a computer system according to the specific needs of the system users. For example, a computer system, that is used primarily for program development may have an extra storage device and a high-speed printing device. A computer system used in a laboratory may have graphics display hardware, an oscilloscope device, and an analog-to-digital converter. A computer system that provides (or uses) information in conjunction with another kind of computer system usually has a magnetic device, because a magnetic device is an industry-standard storage device.

Peripheral devices are categorized as input/output (I/O) devices since the functions they perform provide information (input) to the computer, or do both. Line printers are output devices, because they perform only output operations. Terminals and storage devices are I/O devices, because they perform both input and output operations.

System software is an organized set of supplied programs that effectively transform the system hardware components into usable tools. These programs include operations, functions, and routines that make it easier for you to use the hardware to solve problems and produce results. For example, some system programs store and retrieve data among the various peripheral devices. Others perform difficult or lengthy mathematical calculations. Some programs allow you to create, edit, and process application programs of your own.

System software always includes an operating system, which is the "intelligence" of the computer system. Usually the system software includes one of several language processors.

Exercise I. Give the Ukrainian equivalents of the terms:

computer system, machinery, hardware, software, data processing, two-way communication, storage medium, peripheral devices, program development, analog-to-digital converter, input/output devices, line printer, routine, operating system, listing, system software

Exercise II. Answer the following questions:

1. What does a computer system consist of?
2. What are the hardware elements?
3. What are the software elements?

Exercise III. Make up the scheme "Computer System" using the text and picture, retell the text

FROM THE HISTORY OF COMPUTERS

The first generation of computers, which used vacuum tubes, came out in 1950. These computers could perform thousands of calculations per second. About 1960, the second generation of computers was developed and these could perform work ten times faster than their predecessors. The reason for this extra speed was the use of transistors instead of vacuum tubes. Second-generation computers were smaller, faster. One of the best of these second-generation computers is the Soviet BESM-6 (big electronic counting machine).

The third-generation computers began to appear in 1965. These computers could do a million calculations a second, which is 1000 times as many as first-generation computers; they are controlled by tiny integrated circuits and are consequently smaller and more dependable. Fourth-generation computers have now arrived. They are based on ICs greatly reduced in size due to microminiaturization, which means that the circuits are much smaller than before. As many as 1000 tiny circuits now fit onto a single chip. Fourth-generation computers are 50 times faster than third-generation computers.

The most recent mainframe computers based on very large integration are becoming available in the mid-1980's.

Each generation of computers has resulted from an advance in component technology, beginning with the replacement of the vacuum tube by the discrete transistor.

ES (Unified System) series computers developed jointly by CMEA member-states are used not only in the socialist world, but in the developing countries where they help a many areas of the economy and in a number of industrialized capitalist countries.

A major advance in the development of computer technology was the creation of microprocessors and microcomputers. The tiny and versatile computing devices are able to control complex operations to playing chess.

Exercise I. Answer the following questions:

1. Each generation of computers has resulted from an advance in component technology, hasn't it?
2. ES series computers are used not only in the socialist world, but in the developing and industrialized capitalist countries, aren't they?
3. A major advance in the development of computer technology was the creation of microprocessors and microcomputers, wasn't it?

Exercise II. a) Give the full form of abbreviations and translate them :

I/O, ES, LSI, VLSI, CMEA, BESM, IC

b) Give the Ukrainian equivalents of the following word combinations:

vacuum tube, mainframe computer, component technology, discrete transistor, ES series computers, CMEA member-states, developing countries, versatile computing devices, complex operations

Exercise III. Explain how the computer do sums using the scheme, given below:

Problem ——— Set of instructions ——— Instructions use words and numbers

Words and Computer under Computer
numbers are put stands and obeys provides solution
into binary in the instructions—
—computer

DO YOU KNOW THAT...

The first Soviet computers were built under the guidance of the outstanding Soviet academicians Lebedev and Glushkow. The first Soviet computer "Strela" built in several versions was constructed under the guidance of the chief designer Bazilevsky.

IT IS INTERESTING TO KNOW

1. Lady Lovelace (1815 - 1852), the only daughter of the great English poet G.G. Byron, was the first programmer. She was a friend of Ch. Babbage, the inventor of the first universal digital counting machine, and wrote the first program for this machine.

2. A large computer system can do computations in 1 minute that would take 100 to 200 to do manually.

COMPUTER SYSTEM: HARDWARE CONFIGURATION

A computer system consists of two parts: the software and hardware. The software is the form of data and program instructions. The hardware components are the electronic and mechanical parts of the system. The basic structure of a computer system is made up of three main hardware sections: (I) the Central Processing Unit or CPU, (II) the main memory, and (III) the peripherals.

The CPU is a microprocessor chip which executes program instruction and coordinates the activities of all the other components. In order to increase the speed of the central processor, a co-processor chip can be installed inside the computer. This co-processor performs calculations very rapidly.

The main memory holds the instructions and data which are currently being processed by the CPU.

The internal memory of microcomputer is usually composed of two sections: RAM (Random Access Memory) and ROM (Read Only Memory).

The peripherals are the physical units attached to the computer. They include input/output devices. Input devices enable us to present information to the computer; for example, the keyboard and the mouse. Output devices allow us to extract the results from the computer; for example, we can see the output on the monitor or in printed form. Secondary memory devices such as floppy and hard disks are used to provide permanent storage of information.

When you install a hard disk it works extremely well to begin with. Then, after a few months, you may start to notice that it's not so efficient – it becomes slower. This is because of something called fragmentation.

After the operating system has stored, copied and erased lots of files it starts to have difficulty in storing files in sectors that are next to each other, or "contiguous". When it can't find enough "contiguous space" to store complete files it starts to break new files up into fragments. Files start to be stored in different sectors scattered all over the disk instead of in one single group of contiguous sectors.

As more and more files are fragmented, the operating system and the disk heads have to work harder and harder to find all the pieces of a fragmented file.

Access time slows down, and the constant movement of the read/write heads can damage the drive.

One easy way of restoring your disk to its earlier level of performance is called "optimizing". This is when you make a back-up copy of the hard disk, erase the contents of the original and then copy all the files back onto it. You gain more contiguous space because the free space is no longer spread all over the disk. This works quite well, but takes quite a lot of time. There are special defragmenting programs that can help you fix your disk. They can show you the level of fragmentation on your disk and if you decide to optimize the disk they will reorder the files into contiguous sectors. Some can defragment disks while you are using the computer, and can even prevent future fragmentation.

Exercise 1. Read the text and write down the sentences with modal verbs

Exercise 2. Read the dialogue, translate it and learn by heart

Radio Presenter: Now it is time for this week's edition of Hotline, introduced by Miranda Green.

Miranda: Good morning. Are you about to buy a new printer? And are you confused about all the different sorts on the market? Well, this week we're looking at ink-jet and laser printers. In the studio with me is Mr. John Kelly from Text Print, manufactures of ink-jet printer. Mr. Kelly, how does an ink-jet printer work?

Mr. Kelly: Well, basically, an ink-jet printer operates by firing droplets of ink onto the paper.

Miranda: And is this a good method of printing?

Mr. Kelly: Yes it is. It's much quieter than the dot-matrix printer and its output is of a much higher quality.

Miranda: But it's more expensive than the dot-matrix, isn't it?

Mr. Kelly: It is, yes, but, as I say, it's quieter and produces better results.

Miranda: And what about laser printers? How long do they compare with ink-jets?

Mr. Kelly: Well, laser printers do produce better quality output than ink-jets, but ink-jets are still an excellent alternative and could become real competitors for laser printers.

Miranda: Why's that?

Mr. Kelly: Well, they are much cheaper than laser printers and some of them can produce up to 360 dpi resolution, which is very good.

Miranda: And what kinds of things can ink-jet print? Can they just print sheets of paper, or do they do other things as well?

Mr. Kelly: Oh yes, they can print envelopes, labels and even transparencies.

Miranda: And what about colour? Are there many colour ink-jet printers on the market?

Mr. Kelly: There are indeed, and some are PostScript compatible, so they can be used in professional graphics and business presentations. They operate by mixing four inks - magenta, yellow, cyan and black - to produce different colours. They are quite expensive for small businesses they can be ideal.

Miranda: What would your advice be to someone thinking about buying a new printer?

Mr. Kelly: Well, I think that if you can afford it a laser printer is the best option. But if you don't want to spend so much. Then a black-and-white ink-jet printer is very good choice.

Miranda: Thank you very much, Mr. Kelly. And now over to Sally, who's going to tell us how to find out which printer is compatible with which computer...

Exercise 3

You are in a lecture. Listen to it carefully. Put the statements expressing the main points of the lecture in the right order according to the text. To help you, we have already put two statements in the right order. On your answer sheet put a); b); c); in the boxes.

Computer system

I. Its software:

1) Data and program instructions.

II. Its hardware:

1) The main memory. Its function and components.

2) What peripherals are. Their Components and functions.

3) The CPU and its functions.

Exercise 4

- Fragmentation slows down a computer's performance.
- Fragmentation is a process of breaking new files up into fragments which causes storing of files in different sectors scattered all over the disk instead of in one single group of contiguous sectors.
- A new hard disk stores information in no-contiguous sectors.
- A defragment hard disk is more efficient than a new hard disk.
- The most effective ways of defragmentation are using a defragmenting program or optimizing.

You will get point for every correct answer.

TYPES OF PRINTERS

There are many of printers and which one you decide to use will depend on all sorts of things, like how much you can afford, what kinds of documents you are intending to produce, who will be receiving your

printed material, and so on. It may not always be necessary to use the finest quality of printing all the time. There will be occasions when a draft quality will suffice, for your own use or some other in-house function.

Now then, if you can move round to this work station and make sure everyone can see good, that's fine. Printers provide the user with hard copy (that's permanent copy) of information that can, for example, be posted to clients, etc. I am thinking of bank statements, salary slips, and so on which need to be output on line printer. There are two types of printer: line printers and character printers. Do make a note of those two terms. Line printers can type a complete line at a time whereas character printers can only print a single character at a time. An ordinary typewriter is a character printer.

Now look closely at this. This is a *dot matrix* printer. Some of these are line printers but the majority are character printers. They are mainly used with micro computers because they are fairly cheap. They consist of seven or nine hammers that can be struck individually under computer control against an inked ribbon to make a dot on the paper. By striking the right hammers at the right times they print numbers and letters. By going over each character twice and moving the print head slightly it is possible to produce near letter-quality print. Obviously this takes longer.

The *daisy wheel printer* consists of a wheel with lots of arms attached to it, rather in the way petals are attached to a daisy. At the ends of these arms are two characters, one above the other. The daisy wheel rotates and a hammer presses the carbon paper against the arm. Daisy wheel printers are slow but produce high quality print. They are used mainly for producing business letters in conjunction with word processors and aren't expensive.

Laser printers are extremely fast and are used for producing Giro cheques and gas and electricity bills. Quiet, of course, because the system non impact. Laser printers are quite expensive but are ideal where large quantities of bills need to be sent out in a short space of time.

Ink-jet printers use a technique of spraying tiny drops of ink onto paper to form characters. The new printers are able to print graphics as well as use several coloured inks. They are expensive but have advantage of being quiet. Goodness, we're almost running out of time. Does anyone have any questions? I'll try to...

Exercise 1. Read the extract from the text think of the words to fill in the gaps. Do help you, the first letter of each missing word is given

When you install a hard drive (9) it works extremely well to being with.

Then, after few months, you may start to notice that it is not so efficient-it becomes slower. This is because of something called fragmentation (10). After the operating system (11) has been installed (12), copied and erased lost off (13) it starts to have difficulty in storing files in sectors that are next to each other, or "contiguous" (14). When it can't find enough "contiguous space" to store complete files it starts to break new files up into fragments (15). Files start to be stored in different sectors scattered all over the disk instead of in one group of contiguous sectors.

As more and more files are fragmented (16), the operating system and the disk heads have to work harder and harder to find all the pieces of a fragmented file. Access time slows down, and the constant movement of the read/write heads can damage the disk (17).

You will get 1 point for every correct answer.

Exercise 2. What kind of printer or printers do you prefer to use? Arrange the statements below in the order they are presented in the text

- A black and white ink-jet printer is very good choice for those who don't want to spend much.
- An ink-jet printer is quiet and produces high-quality output.
- Colour ink-jet printers operate by mixing four inks to produce different colours.
- An ink-jet printer operates by firing droplets of ink onto the paper.
- Colour ink-jet printers are very expensive.

Exercise 3

You are visiting the model office. Listen to the lecture on printers given by one of the business Studies lecturer. Choose the appropriate completion of the sentences below.

1) *a dot-matrix printer is more suitable for...*

A ... small companies

B ... in-house function

C ... large companies

2) *a daisy-wheel printer is more appropriate for use in...*

A ...large companies offices

B ... small companies offices

C ...private places

3) *a laser printer is the best option for...*

A ...individuals

B ...failing businesses

C .. .prosperous businesses

You will get points for every correct answer.

INFORMATION, MACHINE WORDS, INSTRUCTIONS, ADDRESSES AND REASONABLE OPERATIONS

Information is a set of marks or signs that have meaning. These consist of letters or numbers, digits or characters, typewriter signs, other kinds, and so on. A computer reacts differently to different digits or characters, and reacts to them as units that have meaning. For example, information for an analog computer has to be in the form of distances, or rotation, or voltages, or other physical variables. And for a digital computer information has to be in the form of digits or numbers.

Any information may be represented by the binary system including two digits: one (1) and zero (0). Each 1 and 0 is a separate binary digit called a bit. A bit is the smallest part of information. Bits are typically grouped in units that are called bytes. A byte is the basic unit of information used in modern computers and consists of eight bits.

The bytes are handled usually in standard groups called machine words or just words. There are two basic types of information or words or words that can be put into a memory cell or location: words that are **numerical quantities** and words that are computer instructions. Regularly, an instruction to the machine is expressed as a word; and so

the same set of characters may have meaning sometimes as a number, sometimes as an instruction. A speed of 96,000 characters per second is the same as a speed of 8,000 words per second. **Most human beings could not take even 12-digit number per second.**

Physically the set of bits is a set of arrangements of some physical equipment. One of the ways of storing information in a computer is storing by using a set of small magnetically polarized spots (*плями*) on a magnetic surface.

The computer is told what operation to perform by means of instructions. An instruction is a command to the computer. It consists of a verb (an operational code) and a noun (an operand). For example, if the computer is instructed "Add 365 the number of times stated in the register R", and if the register R stores the code for number 3, then the computer will perform that operation three times. An instruction word looks like a number, and there is no way to tell from the word itself whether it is a quantity or an instruction. The computer must be told exactly which address contains an instruction and which contains a quantity.

An address is the name of particular memory location or cell. Each memory location (word or byte) has its own unique address or number **just like a post office box.** For example, if the computer contains 100 memory cells, **their respective addresses might be the numbers** from 1 to 100 (or 0 through 99). And instead of saying "A word is in a memory cell", the computer personnel say, "The contents of an address is a word."

Reasonable operations are mathematical and logical. Mathematical operations include arithmetic and algebraic operations. Arithmetic operations are addition, subtraction, multiplication, division, taking a square root, etc.; and algebraic operations are called raising to a power as well as differentiating and integrating.

Logical operations include comparing, selecting, sorting, matching, etc. These are operations which may be performed either on numbers, or on expression consisted of letters such as ordinary words. A very important logical operation performed by a computer is determining, i.e., which of two operations is to be performed next.

Exercise I. Answer the following questions:

1. What is information?
2. What does a set of marks consist of?
3. What is one of the ways of storing information in a computer?
4. What is a byte?
5. What is a bit?
6. How many bits does a byte usually contain?
7. What is an instruction?
8. By means of what is the computer told what operations to perform?
9. What are machine words?
10. What does a machine word consist of?
11. What are addresses?
12. What are reasonable operations?
13. What do mathematical operations include?
14. What do logical operations include?
15. In what system is information represented for the modern electronic computer?
16. What are the two basic types of words that are put into a memory?

Exercise II. Translate the following sentences paying attention to the words in bold type:

a) 1. What kind of computer was it? - It was a digital computer. 2. The computer can perform different kinds of operations. 3. This kind of logical problem is very simple. 4. Will you kindly explain to us the operation of this kind of machine? 5. Be so kind, show us the new equipment.

b) 1. As you already know logical relations in a computer are expressed by hardware. 2. As the ordinary business adding machine has the special equipment inside it, it can store information. 3. An electronic computer can add, subtract, multiply, and divide as well. 4. Natural sciences include mathematics, physics, chemistry, medicine, geology, biology, bionics, as well as the engineering sciences and other fields of knowledge. 5. As our professor was speaking of the history of computers, he mentioned P. L. Chebyshev and his great inventions. 6. My friend works at a plant as an engineer.

c) 1. Progressive people everywhere in the world must fight for peace. Yesterday we heard an interesting lecture on modern electronics which was arranged for the students. 3. He asked me for a book on microcomputers' organization. 4. The first computing machines were not reliable, for there were no good electrical units. 5. The instructions are placed inside the computer, for the computer itself select the numbers of instructions.

RELIABILITY

The first automatic computer of the 1940's were not reliable. The equipment of which they were made had not been accurate and reliable. The programmer for the problem usually had to program the check by doing the same operation in another way. For example, in multiplication A times B he used the equipment differently from B times A, and so both operations might be programmed, and then the computer was given an instruction to compare the results. If a difference in results was more than a tolerance, the machine was stopped, and the operator in charge of the computer and the mathematician in charge of the program consulted on how to get rid of the error. Those days have long since gone. Now computers can operate with extraordinary reliability, with as many as a billion or the billions operations between errors. Automatic checking of different kinds is built into the machine.

TEXT HIGH-LEVEL LANGUAGES

High-level languages are to assembly- or machine-language programming what integrated circuits are to discrete logic - they collect small, related elements into neat modules. The benefits, too, are similar. Just as the hardware designer needs fewer components to build a system, the programmer thinking in a high-level languages needs fewer lines of code to make a system go.

Such languages are not the perfect solution for all programming problems. They require a lot of memory, for example, and in the case of microcomputers, that was economically impractical till quite recently. But now they can often be used to cut expensive microcomputer firmware development time, especially if their user is aware of the languages' strengths and weaknesses.

Exercise 1. Translate the sentences paying attention to the meaning of the words: run, tradeoff, background:

1. The system **ran** in continuous operation for several months. 2. The problem is now ready for **running**. 3. The value of variable is computed at **run** time. 4. A factory can **run** non-stop. 5. Many new projects are being **run**. 6. This paper will explain the **background** and principles needed to select and apply microprocessors and microcomputers. 7. Some readers have no **background** in digital electronics. 8. **Tradeoffs** versus other logic solutions must be considered more carefully than ever before.

Exercise 2. Translate the sentences from English into Ukrainian:

1. The concept of distributed computing is spurred by the inexpensive availability of minis and micros. 2. The mind boggles at the concepts microcomputers permit designers to realize. 3. The potential for microcomputers applications has already out stepped eve the most inventive minds. 4. One-chip computers rival the power of the digital computers.

Exercise 3. Speak on the topic:

1. The contemporary scene and historical perspective of the computer. 2. The processor is the "brains" of the computer.

Exercise 4. Agree or disagree with the statements:

The impact of micros on the big machines, especially large centralized computer systems, is that large systems will decline in number but increase in power. 2. Designers of mini-micro systems are becoming aware of their background limitations. The digital designers are finding that software is an indispensable tool, and the programmers are learning that lack of knowledge in electronics may disastrous to successful project realization.

SOFTWARE

The chips and other electronic elements and the various peripheral devices constitutes the computer's hardware. The hardware can do nothing by itself; it requires the array of programs, or instructions, collectively called software. The core of the software is an

"operating system" that controls the computer's operations and manages the flow of information.

The operating system mediates between the machine and the human operator and between the machine and an "application" program that enables the computer to reform a specific task.

To understand the kind of tasks done by operating system, consider the sequence of steps that must be taken to transfer a file of data from the primary memory to disk storage. It is first necessary to make certain there is enough space available on the disk to hold the entire file. Other files might have to be deleted in order to assemble enough continuous blank sectors. For the transfer itself sequential portions of the file must be called up from the primary memory and combined with "housekeeping" information to form a block of data that will exactly fill a sector. Each block must be assigned a sector address and transmitted to the disk. Numbers called checksums that allow errors in storage or transmission to be detected and sometimes corrected must be calculated. Finally, some record must be kept of where the of information has been stored.

If all these tasks had to be done under the direct supervision of the user, the storage of information in a computer would not be worth the trouble. Actually the entire procedure can be handled by the operating system; the user merely issues a single command, such as "Save file". When the information in the file is needed again an analogous command (perhaps "Load file") begins a sequence of events in which the operating system recovers the file from the disk and restores it to the primary memory.

Exercise I. Affirm or reject the statements using the expressions in affirmation: Yes, you are right that; It's true that; It's a well-known fact that; in rejection: I am afraid you are wrong that; It's a pity you are mistaken that

1. The word computer came from Greek.
2. Hardware elements are the mechanical devices of a computer system.
3. Software is optimal to the computer.
4. Software includes programs and documentation.
5. There are two basic types of memory, namely read/write memory and read memory only.

6. In all types of computer system memory plays a very important role.

Exercise II. Make up word combinations of the words in columns and translate them:

- | | |
|------------------|-----------------|
| 1. to process | 1. data |
| 2. to stare | 2. information |
| 3. to carry out | 3. manipulation |
| 4. to go over to | 4. instruction |
| 5. to input | 5. character |
| 6. output | 6. problem |
| 7. to solve | 7. operations |
| 8. to perform | |
| 9. to interpart | |

NEW DEVELOPMENTS IN ELECTRONIC MEMORIES

1. The versatile capabilities that have made the computer the great success of our age are due to exploitation of the high speed of electronic computation by means of stored programs. This process requires that intermediate results be stored rapidly and furnished on demand for long computations, for which high speed is worthwhile in the first place.

Storage devices or memories must have capacities sufficient not only for intermediate results but also for the input and output data and the programs.

Once prepared a program can be reused any number of times, which involves remembering.

Computers can "remember" and "recall" and virtually unlimited is the capacity of computers to remember (that is, to store information). Associated with the capacity of remembering is the capacity of recalling.

In the context of electronics "memory" (or, in British usage, "store") usually refers to a device for storing digital information. Storage ("write") and retrieval ("read") operations are completely under electronics control. The storage of auditory or visual information in analogue form is usually referred to as recording.

There is some overlap between analogue and digital recording. Described here is digital memory.

The most widely used digital memories are read/write memories, the term signifying that they perform read and write operations at an identical or similar rate.

Of primary importance to characteristics for memories are storage capacity, cost per bit and reliability. Other important characteristics are speed of operation (defined in terms of access time), cycle time and data-transfer rate. Access time is simply the time it takes to read or write at any storage location.

The demand for fast access and large capacity has grown constantly. Never before has man possessed a tool comparable to a computer. Today there are memories accessible in tens of nanoseconds and memories with more than a billion bits. However although the existence of computer was a reality, only in 1970s have we got a microprocessor. It is the microprocessor that helps to solve many problems.

Ideal would be a single device in which vast amounts of information could be stored in non-volatile form suitable for archival record-keeping and yet be accessible at electronic speeds when called for. So far there is no way to realize this ideal. Fortunately, the benefits of large capacity and rapid access can be obtained by use of a hierarchy of different types of storage devices of decreasing capacity and increasing speed.

A prime distinction between memories is the manner in which information is stored (written) and accessed (read). Random - access memories involve column and row matrices which allow information to be stored in any cell and accessed in approximately the same time. By contrast, "serial access" means that information is stored in column order, and access time depends on the storage location selected.

The main hierarchy today comprises, on the one hand, large - capacity magnetic recording devices, which are accessed mechanically and serial (reels of tapes, disks, and drums), and on the other hand, fast electronic memories (the core memory and various types of transistor memories).

Random-access memories can complete read and write operations in specified minimum period known as the cycle time. Serial-access and block-access memories have a variable and relatively

large access time after which the data transfer rate is constant. The data-transfer rate is the rate at which information is transferred to or from sequential storage positions.

The smallest block of information accessible in a memory system can be a single bit (represented by 0 or 1), a larger group of bits such as a byte or character (usually eight or nine bits), or a word (12 or 64 bits depending on the particular system). Most memories are location addressable, which means that a desired bit, byte or word has a specified address or physical location to which it is assigned.

Of prime interest to a reader will be the knowledge of the development of memories.

One of the first electronic memories was a circulating delay line, a signal transmission device in which the output, properly amplified and shaped, was fed back into the input. Although it was economical it had the inherent drawback of serial access: the greater the capacity, the longer the average access time. What was really needed was selective access to any stored data in a time that was both as short as possible and independent of the data address or any previous access. This is known as random access, so named to emphasize the total freedom of accessing and therefore of branching (following one or another part of a program). The first random-access memories (RAM's) were electrostatic storage tubes.

In the early 1950's the core memory replaced these early devices providing a solution to the need for random access that truly fired the emerging computer industry. The core memory has become the main internal computer memory and was used universally until challenged recently by semiconductor memories. Typical are memories with 1 million words of 30 to 60 bits each randomly accessible in 1 microsecond. The core memory has also been extended to very large capacities, of the order of 100 million words.

In the early 1970's semiconductor memory cells that served the same purpose as cores were developed and integrated memory circuits began to be installed as the main computer memory.

In the 1980's new memory technologies involving magnetic bubbles, superconducting tunnel-junction devices and devices accessed by laser beams or electron beams come into play.

The most widely used form of electronic memory is the random-access read/write memory (RAM) fabricated in the form of a single

memory chip capable of storing as many 65000 bits in an area less than half a centimeter on a side. Only the storage element at the intersection of the selected row and column is the target for the reading or writing of one bit of information. A read/write control signal determines which of the 2 operations is to be performed. The memory array can be designed with several parallel lines for the simultaneous input or output of four, eight or more bits.

2. Different categories of semiconductor memories and specific data storage applications where they find primary use provide system engineers with a wide range of options. In general, metal-oxide semiconductor (MOS), erasable-programmable read - only memories (EPROMs) and dynamic random access memories (RAM's) are extensively used in micro- and minicomputer applications. The slow electrically -alterable read - only memories (EAROMs) are most suitable to peripherals, at present. In addition, dense dynamic MOS RAMs are used in large volume in small and large mainframe computers, and so on and so forth.

However, we are still far from the ideal shoe - box device with 10^{12} bits accessible in nanoseconds and still farther from the capacities of 10^{15} bits needed for many already well - defined applications. Although much can still be expected from VLSI and magnetic techniques, these great goals may require radically new approaches.

Thus computers today use a hierarchy of large - capacity, relatively slow mechanically accessed memories in conjunction with fast electronically accessed memories of relatively small capacity. It would be highly desirable to fill the gap by some device of sufficient capacity and speed.

Candidates for gap-filing memories include metal oxide semiconductor (MOS) random access memories (RAM's) made by large - scale (LSI); magnetic bubble devices based on cylindrical domains of magnetization, charge-coupled devices (CCD).

The vast number of different types of semiconductor memories available to the system engineer is increasing steadily.

Radically new technologies, still at an early laboratory stage, are aimed at a more ideal solution than today's hierarchy.

Many laboratories are looking into basic principles. Semiconductor memories based on the Josephson effect may be able to operate in picoseconds on small power. The boundaries within the

walls of magnetic domains, exploited in the bubble lattice devices, are also used in a so-called cross-tie memory mat may provide non-volatile storage memories on LSI chips.

Researches now are looking forward to light particles-photons-which will permit the performance to be made a thousand times faster. This would mean that in the future we can expect the emergence of photon computers and that computations will be done by means of light.

Any radical improvement in memory technology will ultimately greatly affect our way of life, as previous innovations have shown.

Exercise 1. Write the sentences with the words, given below:

1. Store (зберігати), storage;
2. Capacity (об'єм, ємність), capacitance;
3. Retrieve (знаходити), retrieval;
4. Overlap (перекривати, дублювати), overlapping;
5. Call (викликати), recall;
6. Distinction (відмінності), distinct;
7. Contrast (протилежність), by contrast;
8. Address (адреса), addressable;
9. Average (середній, звичайний), average;
10. Branching (розгалуження), branch;
11. Challenge (проблема), challenging;
12. Succeed (слідувати), succession;
13. Option (вибір), optional;
14. Approach (підхід), approach;
15. Innovation (нововведення), innovator.

Exercise 2. Give a summary of the text. Answer the following questions:

1. What is the storage device?
2. What are the most important characteristics of memory?
3. What were the first electronic memories like?
4. What were their drawbacks?
5. What are the advantages of semiconductor memories?
6. What new memory technologies emerged in the 1980's?
7. What are research laboratories aimed at ?
8. What is expected of a new generation of super fast computers?

Exercise 3. Give the meaning of the words:

1. memory;
2. core memory;
3. digital memory;
4. read/write memory;
5. random-access memory;
6. serial-access memory;
7. access time;
8. cycle time;
9. bit;
10. byte;
11. word;
12. address.

Exercise 4. Translate the extracts:

1. Not only were such controls difficult to arrange they were; 2. Not only does the number of protons determine the element, but it determines its chemical characteristics; 3. Of primary importance to science will be the knowledge obtained by sputniks; 4. Of primary interest is the so-called mesons; 5. Discussed in this paper are some options of memories; 6. Shown in the photo is the equipment available; 7. Little though the probability of collision may be, the possibility still exists; 8. Difficult as it is to observe the phenomenon, it is far more difficult to obtain.

Exercise 5. Read the text and translate it.

Give the title of the text

The solution to the memory problem in computers made a significant transition in the early 1950's with the development of ferrite core memories. Magnetic ferrites being made of ceramic rather than metal were capable of providing a much shorter access time through electronic circuitry than the drums, tapes and discs which were based on metallic magnetic and mechanical access times. The gap between mechanical access times and electronic access time of the core is between 10^4 seconds and 10^6 seconds. With the development of integrated circuits the first trend toward what is now called large scale integrated circuits or LSI was the development of scratch pad memories using bipolar transistors made in large quantities on one large substrate. This was followed almost

immediately by the development of MOS random-access memories (RAMs) with 1 to 16K capacity. The access times to the bipolar memories are in the order of 1 to 10 nanoseconds and for MOS memories on the order of 100 nanoseconds. More recently we have been able to return to the concept used years ago of the recirculation delay line by using charge transfer coupled devices in a shift register configuration which recirculation's bits and is accessed in a serial fashion. Because of the serial access, access time is slower - of the order of 2 milliseconds with a data rate of one megahertz. The bubble memory first described in 1967 is now a reality with the advantage of high capacity, of the order of 500 kilobits, but with the disadvantage of bit rates of a few hundred kilobits per second compared to the megabits per second possible in charge transfer devices. All of these recent developments, the MOS, RAM, CCD, and bubble are in the gap between the mechanical access memories and the higher speed MOS devices and bipolar memories.

Exercise 6. Read the text and translate it

Some applications require random - access memories containing permanently stored or rarely altered information. For example, the control programs in pocket calculator are usually permanently stored. Such storage is provided by read-only memories (ROMs). Information is placed in the storage array when the chip is manufactured. A read only memory can be obtained by replacing the storage capacitor in a one-transistor memory cell with either an open circuit or a connection to ground, thus representing one or the other of two binary states.

Exercise 7. Read the text and answer the questions:

Another variation of the read-only memory is the read-mostly memory, which is desired when read operations are far more frequent than write operations but for which non-volatile storage is required. Read-mostly memories have two forms. The commonest is the optically erasable (стирающая) read-only memory, this memory is read and written by entirely electronic means, but before a write operations all the storage cells must be erased to the same initial state by exposing the packed chip to ultraviolet radiation.

1. What is the read-mostly memory are reoffered to?
2. Which variations of read-mostly memories are reoffered to?

LOOK WHAT THOSE KNUCKLE-HEADS ARE DOING

If you think of a world free of human error, a society that is regulated by the quiet clicking of a computer which makes no mistakes you get disappointed.

Like us, the mechanical brains are showing signs of nervousness, indecisiveness. In taking human skills, the machines also have taken our human weaknesses.

An American engineer designed a computer with ears. It responded to carefully spoken numbers with a regulated "clack-click", but one day it became excited by a movie camera spring that was being wound within its hearing, and went into a hysteria producing its tickety-clacks. It returned to normal state, but repeated the performance as soon as it again heard the spring being wound.

Several large computers have suffered nervous breakdowns that were not planned. It was a very human kind of breakdown suffered by a machine which worked too hard at an impossible job. All night long it clicked and clacked widely, and in the morning it was whirring angrily and gnashing its gear teeth in despair. Finally it stopped in a state of shock. It had been trying to divide by zero. Didn't know any better!

So far translation machines are not quite perfect as they have limited vocabularies and one word must often do the work of several words.

The title of a Russian technical article "New Uses for Hydraulic Rams" was translated "New Uses for Water Goats!" Another machine was asked to translate into Russian the expression "The spring is willing, but the flesh is weak." The translation appeared to be more than strange: "Vodka is strong, meat is weak."

The advocates of computers stand firm in their conviction that all computer mistakes are likely to be caused by wrong information people often feed the machines with. But manufacturers admit that the machines are not perfect; that a big computer can be expected to make a mistake about once a month. Mistakes are caused by worn-out tubes, loose connections in the machines or over heating and so on.

In the theory, robot mistakes can be prevented by using two robots, one to check on the work of the other.

Exercise 1. Read the text and translate it

Exercise 2. Ask questions about the words italics:

1. An American engineer designed a computer with ears.
2. Some of the Ukrainian scientists took interest in vibrations.
3. Vibration motors can do the job.
4. Several large computers have suffered nervous breakdowns.
5. The behave our of molecules in a laser radiation field has been theoretically predicted.

Exercise 3. Give the four forms of the following verbs:

Come, blow, drive, prefer, ski, put, sweep, hang, show, build, stop, sit, write, play, leave.

Exercise 4. Give the degrees of comparison of the following adjectives and translate them:

Dark, heavy, hard, large, old, severe, pleasant, bad, good, strong, weak, far, hear, late, hot, warm, beautiful.

WHAT IS AN ELECTRON?

What is an electron? We can think of the electron as a very small, indivisible, fundamental particle major constituent of all matter. All electrons appear to be identical and to have properties that do not change with time. Two essential characteristics of the electron are its mass and its charge. Qualitatively, we can think of an electron as a "piece of matter" that has weight and is affected by gravity. Just as the mass of any object is defined, we can define the mass of the electron by applying a force and measuring the resulting rate of change in the velocity of the electron, that is, the rapidity with which its velocity changes. This rate of change is called acceleration and the electron mass is then defined as the ratio of the applied force to the resulting acceleration. The mass of the electron is found to be about 9.11×10^{-31} grams. Not only the electron but all matter appears to have positive mass, which is equivalent to saying that a force applied to any object results in an acceleration in the same direction as the force. How does the other aspect, the change of the electron, arise? If we investigate

further, we find that all electrons have an electric charge, and the amount of charge, like the mass, is identical for all electrons. No one has ever succeeded in isolating an amount of charge smaller than that of the electron. The sign of the charge of the electron is conventionally defined as negative; the electron thus represents the fundamental unit of a negative charge. No experiment has yet succeeded in removing the charge from the electron, leaving only its mass. Therefore, instead of considering the electron a "massive" body that has somehow acquired a charge, it seems more realistic to think that the charge and the mass are two inseparable aspects of a single unity. The motion of an electron, like that of any other body, results from a force acting on it. How can force be applied to an electron? One way is by gravity. Another is by bringing a second charge near the electron, thus exerting an attractive or a repulsive force on it. In this case we may say that the second charge sets up an electric field which applies a force to the first charge. Finally, we find that an electric current flow will affect the motion of a nearby charge, but only if that charge is already in motion. In this case, we say that the current sets up a magnetic field which applies a force to the moving charge. These three are the only known ways of applying force to an electron. The relationship between these fields, the changes producing them and the resulting effects on other charges are the laws of electron motion.

Exercise 1. Read the text and translate it

Exercise 2. Answer the following questions:

1. What are the essential characteristics of the electron?
2. How can you define the mass of the electron?
3. Do all electrons have an electric charge?
4. How can force be applied to an electron?

Exercise 3. Comment on the tenses:

1. Pictures can now be sent over the telephone by sound signals.
2. The length of the document determines the time needed for transmission.
3. In 1932 the third basic atomic particle, neutron, was discovered.

4. The atom is mostly empty space.
5. The weights of the parts of the atom were calculated very carefully.
6. Other particles have been also found inside the atom.
7. Protons, neutrons and electrons are the main bricks of atomic structure.
8. In 1911 Ernest Rutherford discovered that the atom had a core, or nucleus, in its centre, and that the nucleus was positively charged and contained nearly all the weight of the atom.
9. He showed that the positive charge of the nucleus was caused by particles called "protons".

Exercise 4. Arrange the following words in pairs of synonyms and translate them into Ukrainian:

hard, sphere, fast, brave, field difficult, labour, storey, opportunity, to come in, to wish floor, to desire, to search for employment, to look for a job, possibility, rapid, to enter, hard work, bold, to prepare, to arrange.

WILL THE DESK COMPUTERS THINK INSTEAD OF US?

One of the main characteristics of the present-day global "computerization" in the West is the boom in domestic computers. The desk computer is expected to function as your personal librarian, carry out simple optimization computations, control your budget or diet play several hundred games, etc. Further development of computer is believed to lead to a situation in which most of the knowledge accepted by mankind will be stored in computers and made accessible to anyone with a home computer.

Communication between man and computer will not replace man's creative abilities but will expand them. It is natural that the advent of minicomputers with extensive memories and possibilities will lead to a new higher level in information culture. The creation of the domestic computer industry will allow a lot of problems in culture and education to be solved. Among other things, we shall be able to organize the educational process in the country's colleges and universities and also in the system of school education on a new basis.

Working out computerized models of materials studied by schoolchildren or students will allow us to see the results of this instruction on a display screen make understanding of the material very simple and make the development of a creative approach to the studying of knowledge and its application easier.

As for the information in various traditional branches of knowledge the application of electronics will allow side by side with the traditional printed material to have the contents of books, magazines and articles fed into the computer memory, where this will be analyzed, arranged in a certain order, stored and produced on request as a printed computer programme.

Knowledge is the most valuable wealth of our times. And minicomputers will help to make it accessible to everyone.

Exercise 1. Read the text and translate it

Exercise 2. Read and analyze the verb-forms in italics:

1. They are required for the development of electrical engineering, radio and electronics, rocketry, etc.
2. In our time achievements in this branch are associated with the utilization of crystals, among them semiconductor crystals.
3. More attention is given to the study of thin film properties.
4. Cybernetics is gaining a growing importance.
5. Nowadays, many processes of man's activities can be mathematically described and, mere for, technical facilities may be provided to simulate these processes automatically.
6. Ukrainian scientists are making a worthy contribution to the national effort to promote further the progress of Ukrainian economy and culture.

Exercise 3. Use the following words and word combinations in sentences of your own:

Domestic computers, communication, extensive memories and possibilities, to see smth. on a display screen, branches of knowledge, the application of electronics, to be accessible to smb.

Exercise 4. Ask questions about the words in italics:

1. The Ukrainian people have achieved great success in power generation and nationwide electrification.
2. Technical progress is now impossible without high-quality materials.
3. Success in this field depends on the achievements of physics and chemistry.
4. Electrons orbit around the nucleus at a distance that is really very small.

THE INTERNET

The internet, a global computer network which embraces millions of users all over the world, began in the United States in 1969 as a military experiment. It was designed to survive a nuclear war. Information sent over the Internet takes the shortest path available from one computer to another. Because of this, any two computers on the Internet will be able to stay in touch with each other as long as there is a single route between them. This technology is called packet switching. Owing to this technology, if some computers on the network are knocked out (by a nuclear explosion, for example), information will just route around them. One such packet-switching network already survived a war. It was the Iraqi computer network which was not knocked out during the Gulf War.

Most of the Internet host computers (more than 50%) are in the United States, while the rest are located in more than 10 other countries. Although the number of host computers can be counted fairly accurately, nobody knows exactly how many people use the Internet, there are millions, and their number is growing by thousands each month worldwide.

The most popular Internet service is e-mail. Most of the people, who have access to the internet, use the network only for sending and receiving e-mail messages. However, other popular services are available on the internet: reading USENET News, using the World-Wide-Web, telnet, FTP, and Gopher.

In many developing countries the Internet may provide businessmen with a reliable alternative to the expensive and unreliable telecommunication systems of these countries. Commercial users can communicate over the Internet with the rest of the world and can do it

very cheaply. When they send e-mail messages, they only have to pay for phone calls to their local service providers, not for calls across their countries or around the world. But who actually pays for sending e-mail messages over the Internet long distances, around the world? The answer is very simple: a user pays his/her service provider a monthly or hourly fee. Part of this fee goes towards its costs to connect to a larger service provider goes to cover its cost of running a worldwide network of wires and wireless stations.

But saving money is only the first step. If people see that they can make money from the Internet, commercial use of this network will drastically increase. For example, some western architecture companies and garment centers already transmit their basic designs and concepts over the Internet into China, where they are reworked and refined by skilled – but inexpensive - Chinese computer-aided-design specialists.

However, some problems remain. The most important is security. When you send an e-mail message to somebody, this message can travel through many different networks and computers. The data are constantly being directed towards its destination by special computers called routers. Because of this, it is possible to get into any of computers along the route, intercept and even change the data being sent over the Internet. In spite of the fact that there are forms of encoding, i.e. "in the clear". But when it becomes necessary to send important information over the network, these encoding programs may be useful. Some American banks and companies even conduct transactions over the Internet. However, there are still both commercial and technical problems which will take time to be resolved.

WHAT IS ELECTRONICS?

Electronics is a rather young science. It belongs to the twentieth century. Within a short period it has become a powerful means of progress.

Electronics surrounds us everywhere. Television, radio-receiving, tape-recording -are all based on electronics. The ideas of electronics are embodied in computer technology and means of automation, biology and genetics which have advanced biotechnology as a new branch of the national economy.

Electronic computers are widely used in scientific research, in planning and controlling our national economy. Very complicated electronic systems control the work of huge plants and power stations;

even whole industries are controlled by electronic robots. Planets and rockets are also electronically controlled.

Electronics has sharpened our vision and given us chance to see the micro world more clearly. It helps us discover new and puzzling phenomena of nature.

Due to electronics the first man-made sputnik was launched into space, and now man has already set his foot on the Moon, sends probes to distant planets. Radio-electronic systems ensure reliable communication with space probes at distances of million of kilometers, relay telephotos of distant planets. The greatest application of electronics is in the field of communications.

The range of radio communication in space is extending more and more. There is every reason to believe that radio links may be set over distanced of 100 million kilometers or even more.

Now we cannot imagine our life without electronics.

But it all began with the invention of radio. It was Russian scientist A.S. Popov who discovered the principles of wireless communication that finally led to the development of electronic tubes for use in various communication devices.

Exercise 1. Answer the/allowing questions:

- 1) What is electronics?
- 2) What century does electronics belong to?
- 3) What do electronic systems control?

Exercise 2. Translate word combinations with the prepositions OF:

a powerful means of progress, the ideas of electronics, means of automation, to control the work of plants and power stations, phenomena of nature, application of electronics, the field of communication, the invention of radio, the principles of wireless communication.

Exercise 3. Read the/allowing words and give Ukrainian equivalents/or them:

electronics, progress, television, computer, technology, automation, national, economy, electronic systems, electronic robots, radio-electronic systems, radio communications.

**Exercise 4. Arrange the following words in pairs
of synonyms:**

progress, to get, to achieve, to begin, great, to reach, a great deal, to train, to teach, sphere, to illustrate, to go on, to construct, job, to continue, field, to start, tremendous, deep, to show, much, to build, profound, success, to receive.

WHAT IS A LASER?

Laser is a wonder child of quantum physics. Quantum physics came into being in 1954 when Soviet scientists Alexander Prokhorov and Nikolai Basov in the USSR and Charles Towns in New York simultaneously and independently discovered the generation of radio waves in molecular beams.

A laser is a quantum electronic device. It is a Machine for making and concentrating light waves into a very intense beam. The letters Laser stand for Light Amplification by Stimulated Emission of Radiation. The light made by a laser is much more intense than ordinary light. Which ordinary light, all the light waves are of different lengths. With lasers, all the light waves are of the same length, and this increases the intensity.

Laser is an extremely simple-looking device. It is nothing more than a cylinder of synthetic ruby about $\frac{1}{4}$ inches in diameter and $1\frac{1}{2}$ inches long mounted in the center of a spiral coil of glass. The coil is a xenon-filled flash tube, very much like the ones used by photographers for talking flash pictures.

At one end of the tube there is a mirror, and at the other end of the tube there is a partial mirror.

The laser beam is made by exciting the atoms of a suitable material - ruby is one - until most of the atoms have electrons orbiting in a higher energy level than usual. The excitation is then stopped and all the excited electrons fall back together, to their normal orbits, each one emitting a pulse of light of the same energy. In this way an intense beam of light is generated for a very short time. And every pulse or wave-train in this beam is in step with every other pulse. In this way a beam of light is obtained which is both monochromatic and coherent and easy to focus end of the tube.

Laser beams carry surprisingly intense amounts of energy and so they can be dangerous to living tissue. It is therefore necessary to protect

the human eye, when laser beams are being used. The damage can be done very quickly, so protection from accident is very necessary.

A laser beam carries its energy in a compact form, until it is absorbed when it strikes something opaque.

Exercise 1. Read the words and translate them:

Laser, ruby, xenon, coherent, stimulate, stimulation, stimulated, emit, emission, emitted, excite, excitation, excited, quantum, generation, radio, molecular, electronic, to concentrate, intense, radiation, ordinary, extremely, cylinder, synthetic, orbit, to stop, pulse, monochromatic, protection, compact, to absorb.

Exercise 2. Form the nouns meaning the process or result of the process with the suffixes -ion/-(at)ion and translate them:

To generate, to concentrate, to stimulate, to emit, to radiate, to excite, to absorb, to form.

Exercise 3. Translate the following sentences:

1. The excitation being stopped, all the excited electrons fall back together.
2. The laser beam being so small, it is used eye operations.
3. Laser beams carrying intense amounts of energy, it is necessary to protect the human eye.
4. Light being reflected by the mirror at one end of the tube, it can only escape at the other end of the tube.
5. Laser being a multi-purpose tool, it is used.

Exercise 4. Confirm the following statements using expressions

"It is correct that", "It is true that",

"It is common knowledge that", "It goes without saying that":

1. Laser is a wonder child of quantum physics.
2. The laser beam is made by exciting the atoms of a suitable material.
3. Laser is an extremely simple-looking device.
4. It is necessary to protect the human eye, when laser beams are used.
5. A laser beam carries its energy in a compact form.
6. Laser is a multi-purpose tool.

7. Alexander Prokhorov and Nikolai Basov in the USSR and Charles Towns in New York simultaneously and independently discovered the generation of radio waves in molecular beams.

RADAR

One of the wonderful applications of electronics is radar.

Like other communication systems, radar (an acronym for radio detection and ranging) did not emerge suddenly. Many researchers contributed to its development.

The reflection of radio waves from aircraft had been observed in England in the early 1930s and the possibility for aircraft detection was discussed in 1934. It was soon realized that radio waves would be the ideal alternative to the existing inadequate acoustic warning equipment, which merely listened for the sound of aircraft engines and had too short a range for proper warning of approach of fast aircraft. In contrast, experiments indicated that radar could give a warning when the aircraft was 100 miles or more away.

The principles of radar in a simplified form might be stated as follows:

- 1) electromagnetic radiation at high radio frequencies is used to detect and locate remote reflecting objects;
- 2) the radiation is sent out in pulses of a few microseconds' duration, separated by intervals many times the duration of each pulse;
- 3) the pulses are returned from the reflecting objects and the returns are detected and displayed by receiving equipment placed at the point of transmission;
- 4) the distance to the objects is determined by measurement of the time it took the pulses to reach the targets from transmission equipment and return to it;
- 5) the directions of the targets are determined by use of highly directive radio antennas.

Radars were first developed for aircraft detection, ship detection, weapon-fire control, navigation and identification systems. Many were later used in other sectors; one of the examples is the weather forecasts, detection of storms.

Exercise 1: Read the text and translate it

Exercise 2. Give Ukrainian equivalents of the following words:

acoustic, detection, communication, adequate, contrast, mile, principle, object, pulse, distance, military, civilian, navigator, transmission.

Exercise 3: Form verb combinations from the words of left and right columns and translate them:

- | | |
|---------------|----------------|
| 1. to employ | 1. time |
| 2. to develop | 2. distance |
| 3. to improve | 3. radar |
| 4. to observe | 4. radio waves |
| 5. to measure | 5. circuitry |
| 6. components | |
| 7. equipment | |

Exercise 4: Arrange the following words in pairs of antonyms:

near, old, low, narrow, literate, far, separable, to shut, high, unimportant, new, wide, easy, illiterate, inseparable, important, to open, difficult.

Exercise 5: Make the/allowing sentences interrogative.. negative:

1. She has read many books of poetry this year.
2. They have already discussed their plan.
3. Our students have practiced this text at the laboratory today.
4. He has missed some lectures this month.

THE DEVELOPMENT OF RADIO

Many developments contributed to the flowering of commercial radio. By 1930 wireless telegraphy was more than 50 years old. Carrier systems were widely used to multiplex voice signals for long-distance transmission. Engineers made radio an electronic success. If one development paced the growth of radio more than any other, it was that of the vacuum tube. The triode had been invented by de Forest as far back as 1906, and by 1930 it was generally recognized that improvements in every aspect of transmission and reception of radio signals could be attained most easily by improving the vacuum tube. So the tubes and other equipment advanced size by size.

At the right time the super heterodyne receiver emerged, for example. This circuit led to larger coils and less shielding for the entire tuning system. When it became necessary to compensate for oscillator drift, bimetal temperature-compensating capacitors moved to center stage. One after another the technical challenges were met.

Commercial radio broadcasting began with medium-wave transmitters. These had wavelengths of 300 to 500 meters and powers of about 3 kilowatts, but were not reliable beyond 40 kilometers.

Relay stations were set up to retransmit programs to localities outside the range of the main stations. Transmission lines carried programs from one relay center to another.

An important development was short-wave transmission, the use of wavelengths of 10 to 100 m. It relied on reflection from ionized layers in the upper atmosphere and could cover thousand of miles.

The fidelity of amplitude-modulated radio improved steadily.

The high-gain triode had been fully developed in 1927. The development of the four element tetrode occurred about that time and the resulting increase in tube gain improved receiver sensitivity. Then receiving and small-power pentodes were invented and the result was a tube that had very high gain, high plate resistance, uniform characteristics. This was the most productive era in the history of vacuum tube development.

Exercise 1. Read the words and define their meaning:

telegraphy, tube, vacuum, distance, reception, equipment, receiver, coil, shielding, diode, triode, pentode.

Exercise 2. Find the Ukrainian equivalents/or the following words:

commercial, carrier, to invent, to improve, reception, equipment, to receive, coil, to tune, gain, shielding, to transmit.

Exercise 3. Form the nouns with suffixes -er/-or and translate them

Exercise 4. Make up sentences with the following words:

vacuum tube, transmission line, short-wave transmission, relay station, relay center, medium-wave transmission, high gain, plate resistance, tube gain.

Exercise 5. Write plan for the text and retell it.

TEXT MEMORY

In all types of computer systems memory plays a very important role. The function of the memory section of the computer system either to hold information that the computer will need or information that the computer already generated which will be used in the future, in other words, the memory of a computer is used for storing the program and data. There are two basic types of memory, namely read/ write memory whose contents may be changed by writing new information into it and read only memory (ROM) whose contents are fixed. Read/write memory is usually referred to as random access memory (RAM) for historical reasons, although strictly speaking most modern read only memories can also be accessed in a random order.

The semiconductor RAM memory is of the volatile type. That is, when power is removed, all information previously written in memory is lost. ROM retains the information in it even without power.

ROM's, which are non-volatile, must have the information loaded into them somehow before they can be used. This can either be done during the manufacturing process, they are then referred to as mask-programmed ROM's or be the user. In the latter case they are referred to as programmable ROM's (PROM's). Programming is done either by burning the required information pattern into them with high voltage pulses (the fusible link type PROM) or by storing minute charges on them. The latter are erasable through exposure to ultra-violet light and are referred to as EPROM's (erasable PROM's).

Exercise I. a) Give the complete form of the next abbreviations and translate them; b) Give the English equivalents.

Постійна пам'ять, вибірка, довільна вибірка, програмована пам'ять, шаблон, імпульси високої напруги, зберігаючи інформацію при вимкненні електроспоживача.

Exercise II. Translate the marked sentences

Exercise III. Ask you classmate if he is sure in expressions.

Use these sentences: "Are you sure that" (ти впевнений, що);

"Is it right that" (чи правильно, що);

"Is it correct to say that" (чи правильно сказати, що)

1. There are two basic types of memory. 2. The semiconductor RAM memory is of the volatile type. 3. ROM retains the information in it even without power. 4. EPROM erasable through exposure to ultra-violet light. 5. In all types of computer systems memory plays a very important role.

TEXT

DEVELOPMENT OF COMPUTER MEMORIES

One of the most important characteristics of a computer is its capability of storing information in its memory long enough to process it. Not all computers have the same type of memory.

The memory of the first computers was made up of a kind of grid of fine vertical and horizontal wires. At each intersection where the wires crossed there was a small ferrite ring called a core and therefore we use the name "core memory". With the development of integrated circuits semiconductor memories (or chips) came into use. There is one problem, however, with semiconductor memory: when power is removed, information in the memory is lost, unlike core memory which is capable of retaining information during a power failure.

Another development in the field of computer memories is bubble memory. A magnetic bubble memory can store information at a greater density than existing memories, which makes it very suitable. Microbubble memories are not expensive, consume little power, are small in size, and are highly reliable.

TEXT

THE STORAGE MEDIUM

The term "memory" is usually used to describe the internal storage of a computer. In its strictest sense it refers to the storage locations that can be immediately addresses by the program counter. They are often referred to as the primary storage while magnetic tape, magnetic disk or diskette, magnetic drum are referred to as the secondary storage.

One of the standard mediums for the secondary storage is the floppy disk: a flexible disk of plastic, now either 5 ¼ or 8 inches in diameter coated on one side or both sides with a magnetic material. Information is stored in concentric tracks of minute magnetized regions. The information is written on the disk and retrieved from it by a recording head that is moved radially across the spinning disk to a particular track. Most floppy disks now have a capacity from 125 to 500 kilobytes; disks of higher density are beginning to be available.

In the Winchester 1 disk the magnetic coating is applied to rigid aluminium platter. A personal computer Winchester disk unit can have a capacity of from 5 to 50 megabytes (millions of bytes), and it can transfer data faster than a floppy disk. On the other hand, the Winchester disk is permanently sealed in the drive unit whereas a floppy disk can be removed from the drive and replaced by a new one.

A simpler, less expensive secondary memory medium is the audio magnetic-tape cassette. One cassette can store about as much information as a relatively low-capacity floppy disk.

Exercise I. Read the text, and translate it

Exercise II. Translate the sentences, paying attention to the translation of the word one:

1. One of these problems was solved with the help of a computer.
2. One should solve a difficult problem using a computer.
3. You may take this article or that one.
4. The new device is better than the old one.
5. One must know that the light year is the distance that the light will travel during one year.

Exercise III. Translate the following word-combinations and analyze their attributes

1. Cares magnetized; information processed; characters called data; operations performed; problem solved; instructions called a program; information needed;
2. Inputting information; punched card; display screen; special-purpose computer; general-purpose computer; output section;

3. Nerve center of the machine; high speed memory large enough to hold; the function of interpreting or decoding.

Примітка:

1. **Winchester disk** – жорсткий магнітний диск
2. **Rigid aluminium platter** – жорстка алюмінієва пластина.

Exercise IV. Translate sentences:

1. One of these problems was solved with the help of a computer.
2. One should solve a difficult problem using a computer.
3. You may take this article or that one.
4. The new device is better than the old one.
5. One must know that the light year is the distance that the light will travel during one year.

TEXT

WHAT IS A MICROPROCESSOR?

A microprocessor is the central arithmetic and logic unit of a computer, together with its associated circuitry, scaled down so that it fits on a single silicon chip (sometimes several chips) holding tens of thousands of transistors, resistors and similar circuit elements. A typical microprocessor chip measures half a centimeter on a side. The task of the microprocessor is to receive data in the form of strings of binary digits (0's and 1 's), to store the data for later processing, to perform arithmetic and logic operations on the data according to the previously stored instructions and to deliver the results to the user through an output mechanism such as an electric typewriter, a cathode-ray-tube display or a two-dimensional plotter. A typical microprocessor would consist of the following units: a decode and control unit (to interpret instructions from the stored program), registers (to serve as an easily accessible memory for data which are frequently manipulated), an accumulator (a special register closely associated with the ALU), address buffers (to supply the control memory with the address from which to take the next instruction) and input/output buffers (to read instructions or data into the microprocessor or to send them out).

Exercise I. Read the text, translate it and tell about the construction of microprocessor

Exercise II. Make up the sentences with word combinations:

Silicon chip, binary digits, output mechanism, electric typewriter, two-dimensional plotter, control unit, accumulate, register, buffer, address buffer, arithmetic and logic unit.

Exercise III

1. Programming languages are divided into high level languages like BASIC and FORTRAN and machine level languages, such as assembly language.
2. A silicon chip holds ten of thousand of transistors, resistors and similar circuit elements.
3. When power is removed from semiconductor memory, information in it is lost.
4. ROM retains the information in it even without power.
5. Words and numbers are put into binary form in the computer.
6. Punched cards are used to input information.
7. A printer and a CRT display screen are used to output information.

FROM THE HISTORY OF TELEVISION

Unlike digital computers – which started out as mechanical devices and then went through a brief electromechanical period during the 1930s, finally becoming electronic only in the 1940s - television was an electrical medium from the very beginnings.

Attempts to send images over distance with the use of electricity date to 1876, the year Alexander Graham Bell invented the telephone. The first television invention that had practical consequences was the "electrical telescope", patented by Paul Nipkow in 1884. At the heart of his camera was the now famous Nipkow disk. It had 24 holes equally spaced along a spiral near the periphery of the disk. The image to be transmitted was focused on a small region at the disk's periphery, and the disk was made to spin at 600 revolutions per minute. As the disk rotated, the sequence of hole scanned the image in a straight line. A

lens behind the image region collected the sequential light samples and focused them on a single selenium cell. The cell would then produce a succession of currents, each proportional to the intensity of the light on a different element of the image.

At the receiving end, Nipkow proposed using a magneto-optic (Faraday-effect) light modulator to vary the intensity of the reconstructed image. To form the image, a second disk, identical to and rotating synchronously with the one at the transmitter, would be needed.

One step closer to reality was Boris Rosing of the Technological Institute of ST. Petersburg University in Russia, who in 1907 developed a TV system that used mechanical scanning on the transmitting end and the Braun CRT as a receiver.

Zworykin's most critical invention was the first iconoscope camera tube, which he patented in 1923. The key to its success was the fact that its silvered-mica photocathodes stored the charges induced by the image that was focused on them until the scanning electron beam simultaneously neutralized the charges and modulated itself.

A year after he invented the iconoscope, Zworykin invented the kinescope - a TV picture tube - thus becoming responsible for both the key transmitting and receiving elements of electronic television.

Exercise I. Read the text and translate it

Exercise II. Tell about the development of television

Exercise III. Ask questions about the words in italics:

1. The first television invention that had practical consequences was the "electrical telescope".
2. Nipkow proposed using a magneto-optic.
3. The sequence of holes scanned the image in a straight line.
4. Alexander Graham Bell invented the telephone.

Exercise IV. Complete the following questions:

1. You are tired, ... ?
2. You have English lessons twice a week, ... ?
3. She didn't work in the laboratory yesterday, ... ?
4. The students are preparing for the lesson, ... ?

5. They don't like to travel by sea, ... ?
6. He speaks English fluently, ...?
7. You found all necessary material in this book, ... ?
8. We shall have school practice next year, ... ?

COMPUTER IN BUSINESS

The computer industry is one of the largest in modern world. It includes companies that manufacture, sell and lease computers, as well as companies that supply products and services for people working with computers.

A computer cannot think. A human operator puts data into the computer and gives instructions. The operator writes instructions, which determine the mathematical operations on information. Traditionally, a computer in business is used to process data. A computer is programmed to do it fast and accurately. This involves different administrative functions such as preparation of payrolls, inventory control in manufacturing, warehousing and distribution operations, customer accounting, billing by banks, insurance companies, public utilities and mass circulation magazines. A computer is now more involved in business operations as an essential tool in making decisions at the highest administrative level.

Exercise I. Read and translate the text, and answer the questions:

1. What does the computer industry include?
2. How is a computer operated?
3. How is a computer used in business?

Exercise II

1. A human operator puts data into the computer and gives instructions.
2. A computer is programmed to do it fast and accurately.
3. The operator puts data into the computer and gives instructions.

Exercise III. Translate the words, paying attention to tile suffix

Efficient, efficiency, establishment, excessive, local, locate, locality, electric, electricity, approximately, approximation, transmission, availability, available, specialize, electrify, consumption.

Exercise IV. Choose the right word or word combination and fill in the blanks:

1. Without radio electronics ... cybernetics, astronautics and nuclear physics.
a) would not have; b) to have; c) having; d) has.
2. There ... special multipliers of oscillations to achieve super high frequencies.
a) was; b) have; c) are; d) has.
3. Radio telescopes ... by astronomers.
a) to use; b) for using; c) be used; d) are used.

VOCABULARY

A

access n, v – доступ (до пам'яті ЕОМ)
accumulator n – суматор накоплюючого типу
advance n – прогрес
amount n – кількість
analog a – аналоговий
artificial a – штучний
available a – доступний, той, що є в розпорядженні
axis n – вісь

B

base n – база
beam n – пучок, промінь
pulsed beam – пульсуючий пучок
bias n, v – зміщення, зміщати
binary a – двійковий
buffer n – буфер
bulk n, a – об'єм, об'ємний

C

capable of: be c. of – бути спроможним
capacitor n – конденсатор
capacity n – ємність (пам'яті)
current-carrying c. – допустима сила струму
carrier n – носій (заряду) majority c. – основний носій
minority c. – неосновний носій
celestial a – зоряний, небесний
ceramics n – кераміка
character n – знак, символ, цифра
charge n – заряд
chip n – кристал, чіп
circuitry – схеми
coherent a – когерентний
coil n – катушка, спіраль

commercial a – промисловий
common a – звичайний
compartment n – відсік (космічного корабля)
composition n – (хім) розчин
computer n – комп'ютер
conventional a – традиційний, звичайний
core n – серцевина
count v – рахувати
create v - створювати

D

data n pl – данні, інформація
depletion n – об'єднання
deposit v – напилувати, наносити
design n,v – проект, конструкція
develop v – розробляти, удосконалювати
development n – розробка (програми)
device n – пристрій
digit n – цифра
dimension n – вимірювання, розмір
discrete a – дискретний
display n – дисплей
distortion n – викривлення
drill n – свердло
drive n,v – передача, приводити у дію, запускати
driver n - пристрій

E

edit v - редагувати
emit v – виділяти
emitter n – емітер
engine n – двигун
equip v – обладнувати
erase v – зтирати (пам'ять)
error n - помилка
etch v – травити, витравлювати
excite v – збуджувати

F

failur n – відмова, порушення
fan n – вентилятор
fidelity n – точність
fill in v – заповнювати, записувати
film n,a – плівка
flash tube – імпульсна лампа
flip-flop n – триггер
fuse v – сплявляти

G

gain n – підсилення, коефіцієнт підсилення
gate n – затвір, схема пропуску
generation n – генерація, покоління (ЕОМ)

H

hardware n – апаратне забезпечення

I

identify v – розпізнавати
inject v – інжектувати
inherent a – власний
instrument n – прилад
input n,v – вхід, ввід, прилад вводу (даних)
interaction n – взаємодія
internal a – внутрішній
instruction n – команда

J

jamming n – (рад. Фіз.) перешкоди
junction n – перехід (в транзисторі)

L

lap v – перехід
lattice n – решітка (кристалічна)
law n – закон
launch v – запускати (ракету)
lead n – вивід, ввід; провід
leg n – фаза (трьохфазної системи)
letter n – літера
level n – рівень
listing n – друк (програми)
load v – загрузити

M

machine v – виготовляти, обробляти на станку
machinery n – механізми
manual a – ручний
map v – розподілення
medium n – середнє число, засіб, спосіб
memory n: bubble m. – бульбашкова пам'ять
mica n – слюда
minute a – маленький
mode n – режим (роботи)
monitor n,v – монітор, контрольнo-попереджувальний пристрій
mount v – монтувати, встановлювати

O

on-board a – бортовий
open n – розрив
operate v – працювати, управляти
output n – вихід, вивід

P

package n – стандартний блок, корпус
pattern n – шаблон, схема
perform v – виконувати, здійснювати
peripherals n pl – периферія, зовнішній пристрій

phenomenon n – феномен
plotter n – плотер
porous a – пористий
print v – друкувати
printer n - принтер
line p. – построчно друкуючий пристрій
process v – обробляти інформацію
provide v – забезпечувати
pure a – чистий (без добавок)

Q

quantum n,a – квант, фотон

R

rate n – швидкість
ratio n – відношення
read v – зчитувати
reader n – зчитуючий пристрій
reading n – покази шкали вимірювального приладу
register n – реєстр
reliability n – надійність
reliable a – надійний
remote a – той
remove v – що знаходиться на відстані
result v: r. in – приводити до будь-чого; r. from – відбуватися в результаті
retrieve v – відшукувати (інформацію)
routine n – стандартна форма
ruby n,a – рубін

S

sandwich v – розміщувати поміж
satellite n – супутник
scattering n – розсіяння
screen n – екран
seal n – ізолюючий слой

set n – набір, комплект
shielding n – захист
short n – коротке замикання
site n – сторона (кристалу)
slice n – шар (рідини)
software n – програмне забезпечення
solid n,a – твердий
source n – джерело
specifications n pl – технічні характеристики
spin v – крутитись
stage n – каскад
stimulate v – збуджувати
storage n – запам'ятовуючий пристрій, пам'ять
store v – запам'ятовувати, зберігати
strain n - деформація
suspend v – висіти
switch n,v – перемикач висіти

T

take v: t. Into account – приймати до уваги
target n – ціль
technician n – спеціаліст
tempering n – закалка (металу)
terminal n – термінал
track n – доріжка, канал
transistor n: field effect t. – польовий транзистор
transition n – перехід
tool n – інструмент; machine t. – металообробляючий станок
train n – ряд, серія
tube n – (вакуумна) лімба

U

unipolar a - однополярний
unit n – блок (ЕОМ)

V

valve n – (вакуумна) лампа
vapour n – пар, випаровування
versatile a – універсальний, різносторонній
volatile a – не зберігаючий інформацію при відключенні електроживлення

W

wafer n – плата
warning n – попередження
wastage n – затрати
waste n – затрати, відходи
weld v – зварювати
workpiece n – заготовка

X

xenon n – ксенон

Y

yield n,v – вихід працюючих виробів (в мікроелектроніці)

Для нотаток:

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Навчальне видання

**Методичні рекомендації
з практики основної мови
(англійської)**

для студентів II-III курсів спеціальних факультетів

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Підписано до друку 24.06.2005 р.
Папір офсет. Формат 60/84 1/16.
Ум. др. арк. 2,5.
Тираж 100. Зам. № 59/2.

Редакційно-видавничий відділ
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