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Кафедра иностранных языков технических специальностей

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Практикум
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для студентов специальности
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UNIT 1

INFORMATION DEPENDENT SOCIETY

1. Ознакомьтесь с активной лексикой текста 1.

computer literacy — компьютерная грамотность
problem-solving device — устройство, обеспечивающее решение задачи
be aware of — понимать, сознавать
opportunity — возможность
basics — основы
application — применение; использование
to restate — пересмотреть, переосмыслить
significant — значительный
achievements — достижения
computing — вычисление; счет; работа на компьютере
to embrace — охватывать
dimension — измерение
instruction — команда, инструкция, указание
to direct the operation — направлять работу
to process — обрабатывать
subscription magazine — журнал по подписке
data processing system — система обработки данных
store manager — директор магазина
to have much in common — иметь много общего

2. Прочтите текст и скажите, как вы понимаете термины «информационное общество» и «компьютерная грамотность».

Text 1. COMPUTER LITERACY

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

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

In an information society a person who is computer-literate need not be an expert on the design of computers. He needn't even know much about how to prepare *programs* which are the instructions that direct the operations of computers. All of us are already on the way to becoming computer-literate. Just think of your everyday life. If you receive a subscription magazine in the post-office, it is probably addressed to you by a computer. If

you buy something with a bank credit card or pay a bill by check, computers help you process the information. When you check out at the counter of your store, a computer assists the checkout clerk and the store manager. When you visit your doctor, your schedules and bills and special services, such as laboratory tests, are prepared by computer. Many actions that you have taken or observed have much in common. Each relates to some aspect of a data processing system.

3. Просмотрите текст 1 еще раз. Ответьте на вопросы, используя информацию текста.

1. What does "a computer-literate person" mean?
2. Are you aware of the potential of computers to influence your life?
3. What do the people mean by "the basics"?
4. What is the role of computers in our society?
5. What is “computing”?
6. What is a program?
7. Prove that we all are on the way to becoming computer-literate.
8. Give examples of using computers in everyday life.

4. Прочтите, переведите и запомните следующие выражения:

An information-dependent society; a computer-literate citizen; an everyday problem-solving device; to be aware of; to influence the quality of life; to have an opportunity; to learn the basics; to learn computing; the most significant technical achievements; to embrace computer literacy; to prepare programs; to direct the operations of a computer; to be on the way of becoming computer-literate; to process information; to have much in common; a data processing system.

5. Вспомните образование и случаи употребления The Past Simple Tense.

а) назовите три формы следующих неправильных глаголов:

To be; to have; to mean; to learn; to become; to bring; to know; to think; to buy; to pay; to take; to do; to begin; to give; to make; to keep; to get; to read; to show.

б) преобразуйте следующие предложения в Past Simple:

1. Many people have an opportunity to use computers.
2. There is no doubt that computers solve problems very quickly.
3. Instructions direct the operation of a computer.
4. Computers bring with them both economic and social changes.
5. Computing embraces not only arithmetics, but also computer literacy.
6. It is well known that computers prepare laboratory tests.
7. Those persons are computer literate and think of buying a new computer.
8. They receive a subscription magazine once a month.
9. My mother is ill and visits her doctor every other day.
10. Experts know much about how to prepare programs.

6. Ознакомьтесь с активной лексикой текста 2.

intricate — сложный, запутанный.
electronic circuit — электронная цепь, схема

to operate switches — приводить в действие переключатели
to store numbers — запоминать числа
to manipulate — управлять; обращаться; преобразовывать
to input / to feed in — вводить (информацию)
to turn on = to switch on — включать
to turn off = to switch off — выключать
to process data — обрабатывать данные
to supply — подавать, вводить, снабжать, обеспечивать
addition — сложение
subtraction — вычитание
division — деление
multiplication — умножение
exponentiation — возведение в степень
user — пользователь
input device — устройство ввода
disk drive — дисковое запоминающее устройство, дисковод
tape drive — запоминающее устройство на магнитной ленте
cathode-ray tube — электроннолучевая трубка
to make decisions — принимать решения
instantaneously — мгновенно, немедленно

7. Прочтите текст *2* и скажите, что такое компьютер и каковы его основные функции.

Text 2. **WHAT IS A COMPUTER?**

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

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

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

It is considered that computers have many remarkable powers. However most computers, whether large or small, have three basic capabilities.

First, computers have circuits for performing arithmetic operations, such as: addition, subtraction, division, multiplication and exponentiation.

Second, computers have a means of communicating with the user. After all, if we couldn't feed information in and get results back, these machines wouldn't be of

much use. Some of the most common methods of inputting information are to use terminals, diskettes, disks and magnetic tapes. The computer's input device (a disk drive or tape drive) reads the information into the computer. For outputting information two common devices are used: a printer, printing the new information on paper, and a cathode-ray-tube display, which shows the results on a TV-like screen.

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

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

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

8. Переведите текст. Ответьте на вопросы, используя информацию текста.

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

9. Найдите в тексте 2 английские эквиваленты следующих словосочетаний:

Сложная сеть электронных цепей; управлять (приводить в действие) переключателями; возможные состояния; хранить (запоминать) числа; обрабатывать символы; посредством ввода сигналов; включать; выключать; размагничивать сердечники; обработка информации; информация в виде команд; символы, называемые данными; выполнять математические операции; выдавать результаты; обеспечивать необходимую информацию; иметь замечательные возможности; основные свойства; сложение, вычитание, деление, умножение; возведение в степень; средства для общения с пользователем; устройство ввода; дисковод; считывать информацию; вывод информации; катоднолучевая трубка; принимать решения; выполнять тысячи логических операций; без устали; находить решение задачи; значительно меньший промежуток времени; человек; нудная

рутинная работа; в соответствии с введенной программой; вырабатывать свои суждения; возможности ограничены программой, заложенной в него человеком; дать требуемую информацию; электрические импульсы; со скоростью света; мгновенно производить огромное количество математических операций; человеку может не хватить всей жизни, чтобы закончить работу.

UNIT 2
DEVELOPMENT OF MICROELECTRONICS

1. Ознакомьтесь с активной лексикой текста 1.

applied physics — прикладная физика
generation — создание, формирование, выработка
scientific research — научные исследования
due to the efforts — благодаря усилиям
manipulation — управление; обработка; преобразование
to replace vacuum tubes — заменять электронные лампы
a piece of semiconductor — полупроводниковый кристалл
reduced weight — уменьшенный вес
power consumption — потребление (расход) электроэнергии
to carry out — выполнять; осуществлять
solid body — твердое тело; кристалл; полупроводник
to respond — отвечать; реагировать
at a rate — со скоростью
integrated circuit (IC) — интегральная схема
batch processing — пакетная обработка
to assemble — собирать; монтировать
to lower manufacturing — снизить производительность
to increase reliability — увеличить надёжность

2. Прочтите текст и скажите, что изучает электроника и какие открытия способствовали ее развитию.

Text 1. DEVELOPMENT OF ELECTRONICS

Electronics is a field of engineering and applied physics dealing with the design and application of electronic circuits. The operation of circuits depends on the flow of electrons for generation, transmission, reception and storage of information.

Today it is difficult to imagine our life without electronics. It surrounds us everywhere. Electronic devices are widely used in scientific research and industrial designing; they control the work of plants and power stations, calculate the trajectories of space-ships and help the people discover new phenomena of nature. Automatization of production processes and studies on living organisms became possible due to electronics.

The invention of vacuum tubes at the beginning of the 20th century was the starting point of the rapid growth of modern electronics. Vacuum tubes assisted in manipulation of signals. The development of a large variety of tubes designed for specialized functions made possible the progress in radio communication technology before the World War II and in the creation of early computers during and shortly after the war.

The transistor invented by American scientists W.Shockly, J.Bardeen and W.Brattain in 1948 completely replaced the vacuum tube. The transistor, a small piece of a semiconductor with three electrodes, had great advantages over the best vacuum tubes. It provided the same functions as the vacuum tube but at reduced weight, cost, power consumption, and with high reliability. With the invention of the transistor all essential circuit functions could be carried out inside solid bodies. The aim of creating electronic circuits with entirely solid-state components had finally been realized. Early transistors could respond at a rate of a few million times a second. This was fast enough to serve in radio circuits, but far below the speed needed for high speed computers or for microwave communication systems.

The progress in semiconductor technology led to the development of the integrated circuit (IC), which was discovered due to the efforts of John Kilby in 1958. There appeared a new field of science — integrated electronics. The essence of it is batch processing. Instead of making, testing and assembling discrete components on a chip one at a time, large groupings of these components together with their interconnections were made all at a time. ICs greatly reduced the size of devices, lowered manufacturing costs and at the same time they provided high speed and increased reliability.

3. Просмотрите текст еще раз. Ответьте на вопросы, используя информацию текста.

1. What is electronics? 2. Can you imagine modern life without electronics? 3. Where are electronic devices used? 4. What was the beginning of electronics development? 5. What made the progress in radio communication technology possible? 6. What is the transistor? 7. When was the transistor invented? 8. What aim was realized with the invention of the transistor? 9. When were integrated circuits discovered? 10. What advantages did the transistors have over the vacuum tubes?

4. Найдите в тексте английские эквиваленты следующих словосочетаний:

Прикладная физика; передача и прием информации; поток электронов; трудно представить; научные исследования; промышленное проектирование; вычислять траекторию космических кораблей; обнаруживать явления природы; благодаря электронике; отправная точка; способствовать управлению сигналами; быстрый рост; разнообразие ламп; создание первых компьютеров; полностью заменил; полупроводниковый кристалл; уменьшить вес; сократить стоимость; потребление электроэнергии; высокая надежность; твердотельные компоненты; довольно быстро ... но гораздо ниже; высокоскоростной компьютер; микроволновые системы связи; полупроводниковая технология; область науки; интегральная схема; пакетная обработка; сборка дискретных компонентов на кристалле; снизить производственные затраты; обеспечить высокую скорость.

5. Переведите следующие «цепочки существительных». Запомните, что переводить ряд существительных, не связанных предлогами, следует, как правило, с конца.

Power consumption; power consumption change; signals manipulation; transistor invention; circuit functions; communication systems, data processing system; integrated circuits development; science field; process control; automatization processes control; circuit components; size reduction; electronics development; communication means; problem solution; space exploration; pattern recognition; customers accounts; air traffic control.

6. Ознакомьтесь с активной лексикой текста 2.

performance	— рабочая характеристика; параметры; производительность; быстродействие
to predict	— прогнозировать
capability	— способность; возможность
branch of science	— область науки
to embrace	— охватывать
circuit assembly	— сборка схемы
film technique	— пленочная технология (метод, способ)
invisible to unaided eye	— невидимым невооруженному глазу
to react	— реагировать
speed of response	— скорость реакции (отклика)
advantage / disadvantage	— достоинство, преимущество / недостаток
benefit	— выгода, польза; помогать, приносить пользу
to result from	— возникать, происходить в результате
packing density	— плотность упаковки
small-scale integrated circuit	— малая интегральная схема (МИС)
medium-scale IC	— средняя интегральная схема (СИС)
large-scale IC	— большая интегральная схема (БИС)
very-large-scale IC	— сверхбольшая интегральная схема (СБИС)
fineline	— прецизионный; с элементами уменьшенных размеров
transmission line	— линия передачи
waveguide	— волновод
to emerge	— появляться, возникать
to displace	— перемещать, смещать
mode	— вид, метод, способ; режим работы
pattern	— шаблон, образец; образ, изображение
power	— мощность, энергия, питание; производительность, быстродействие; способность, возможность

7. Прочтите текст 2 и скажите, как вы понимаете термины «микроэлектроника» и «микроминиатюризация». Переведите текст.

Text 2. **MICROELECTRONICS AND MICROMINIATURIZATION**

The intensive effort of electronics to increase the reliability and performance of its products, while reducing their size and cost, led to the results that hardly

anyone could predict. The evolution of electronic technology is sometimes called a revolution: a quantitative change in technology gave rise to qualitative change in human capabilities. There appeared a new branch of science — microelectronics.

Microelectronics embraces electronics connected with the realization of electronic circuits, systems and subsystems from very small electronic devices. Microelectronics is a name for extremely small electronic components and circuit assemblies, made by film or semiconductor techniques. A microelectronic technology reduced transistors and other circuit elements to dimensions almost invisible to unaided eye. The point of this extraordinary miniaturization is to make circuits long-lasting, low in cost, and capable of performing electronic functions at extremely high speed. It is known that the speed of response depends on the size of transistor: the smaller the transistor, the faster it is. The smaller the computer, the faster it can work.

One more advantage of microelectronics is that smaller devices consume less power. In space satellites and spaceships this is a very important factor.

Another benefit resulting from microelectronics is the reduction of distances between circuit components. Packing density increased with the appearance of small-scale integrated circuit, medium-scale IC, large-scale IC and very-large-scale IC. The change in scale was measured by the number of transistors on a chip. There appeared a new type of integrated circuits, microwave integrated circuit. The evolution of microwave IC began with the development of planar transmission lines. Then new IC components in a fineline transmission line appeared. Other more exotic techniques, such as dielectric waveguide integrated circuits emerged.

Microelectronic technique is continuing to displace other modes. Circuit patterns are being formed with radiation having wavelength shorter than those of light.

Electronics has extended man's intellectual power. Microelectronics extends that power still further.

8. Просмотрите текст еще раз и ответьте на вопросы, используя информацию текста.

1. What would you say about electronics? 2. Why is the development of electronics called a revolution? 3. What is microelectronics? 4. What techniques does microelectronics use? 5. What is the benefit of reducing the size of circuit elements? 6. What do you understand by the term of microminiaturization? 7. What does the speed of the signal response depend on? 8. What advantages of microelectronics do you know? 9. What scales of integration are known to you? 10. How are microelectronics techniques developing?

9. Найдите в тексте английские эквиваленты следующих словосочетаний:

Интенсивные усилия; увеличить надежность; увеличить параметры; уменьшить размер и стоимость; вряд ли кто-нибудь мог прогнозировать; количественные и качественные изменения; область науки; пленочная технология; полупроводниковый метод; сокращать элементы схемы; суть миниатюризации в том, что; создать схемы с долгим сроком службы;

чрезвычайно высокая скорость реакции; чем меньше, тем быстрее; преимущество; расходовать энергию; польза; уменьшение расстояния между элементами схемы; большая интегральная схема; микроволновая интегральная схема; волновод; линия передач; смещать; изображение схем; расширять возможности человека.

10. Переведите следующие слова. Обратите внимание на то, что префиксы *dis-, in-, un-, non-, ir-* придают словам отрицательное значение.

dis-: disadvantage; disconnect; disappear; disclose; discomfort; discontinue; discount; discredit; disintegrate.

in-: invisible; inaccurate; inactive; incapable; incompact; insignificant; inhuman; informal; ineffective; indifferent; indecisive; inconsumable; incorrect.

un-: uncontrollable; unbelievable; unable; unchanged; uncomfortable; uncommunicative; undisciplined; unexpected; unfavourable; unforgettable; unkind.

non-: non-effective; non-aggressive; noncomparable; non-computable; nonconstant; noncontrollable; nondigital; nondimensional; nonprogrammable; nonusable.

ir-: irregular; irrelative; irresponsive; irrational; irreplaceable; irrecognizable.

11. Вспомните образование страдательного залога (to be + Participle II).

а) найдите пять случаев употребления страдательного залога в тексте 1 и четыре случая — в тексте 2. Переведите предложения.

б) преобразуйте следующие предложения действительного залога в страдательный по образцу:

People widely *use* electronic devices.

Electronic devices *are* widely *used* by people.

1. Electronic devices control the work of power stations. 2. They calculate the trajectories of spaceships. 3. People discover new phenomena of nature due to electronic devices. 4. Scientists designed a variety of tubes for specialized functions. 5. American scientists invented the transistor in 1948. 6. Integrated circuits greatly reduced the size of devices. 7. New types of integrated circuits increased packing density. 8. Electronics has extended man's intellectual power. 9. Scientists are looking for new ways for the improvement of integrated circuits technology. 10. Jack Kilby developed the concept of integrating device and built the first IC in 1958.

UNIT 3
HISTORY OF COMPUTERS

1. Ознакомьтесь с активной лексикой текста 1.

calculating device — вычислительное устройство
multiple — кратный
abacus — счеты

slide rule — логарифмическая линейка
logarithm table — логарифмическая таблица
calculus — исчисление; математический анализ
general-purpose — общего назначения, универсальный
to cut out the human being altogether — полностью исключить человека
to manipulate — обрабатывать, преобразовывать; управлять
data processing — обработка данных (информации)
tabulate the census — занести данные по переписи (населения) в таблицу
means of coding — средства кодирования (шифровки)
to punch the holes — пробивать отверстия
punched card — перфокарта
to perform — выполнять, производить (действие); осуществлять;
unit of data — единица информации
keyboard terminals — терминал (вывод) с клавишным управлением
proliferation — размножение, быстрое увеличение

2. Прочтите текст и скажите, о каких первых вычислительных приборах рассказывается в нем.

Text 1. THE FIRST CALCULATING DEVICES

Let us take a look at the history of computers that we know today. The very first calculating device used was the ten fingers of a man's hands. This, in fact, is why today we still count in tens and multiples of tens.

Then the abacus was invented. People went on using some form of abacus well into the 16th century, and it is still being used in some parts of the world because it can be understood without knowing how to read.

During the 17th and 18th centuries many people tried to find easy ways of calculating. J.Napier, a Scotsman, invented a mechanical way of multiplying and dividing, which is now the modern slide rule works. Henry Briggs used Napier's ideas to produce logarithm tables which all mathematicians use today.

Calculus, another branch of mathematics, was independently invented by both Sir Isaak Newton, an Englishman, and Leibnitz, a German mathematician. The first real calculating machine appeared in 1820 as the result of several people's experiments.

In 1830 Charles Babbage, a gifted English mathematician, proposed to build a general-purpose problem-solving machine that he called "the analytical engine". This machine, which Babbage showed at the Paris Exhibition in 1855, was an attempt to cut out the human being altogether, except for providing the machine with the necessary facts about the problem to be solved. He never finished this work, but many of his ideas were the basis for building today's computers.

By the early part of the twentieth century electromechanical machines had been developed and were used for business data processing. Dr. Herman Hollerith, a young statistician from the US Census Bureau successfully tabulated the 1890 census. Hollerith invented a means of coding the data by punching holes into cards. He built one machine to punch the holes and others to tabulate the collected data.

Later Hollerith left the Census Bureau and established his own tabulating machine company. Through a series of merges the company eventually became the IBM Corporation.

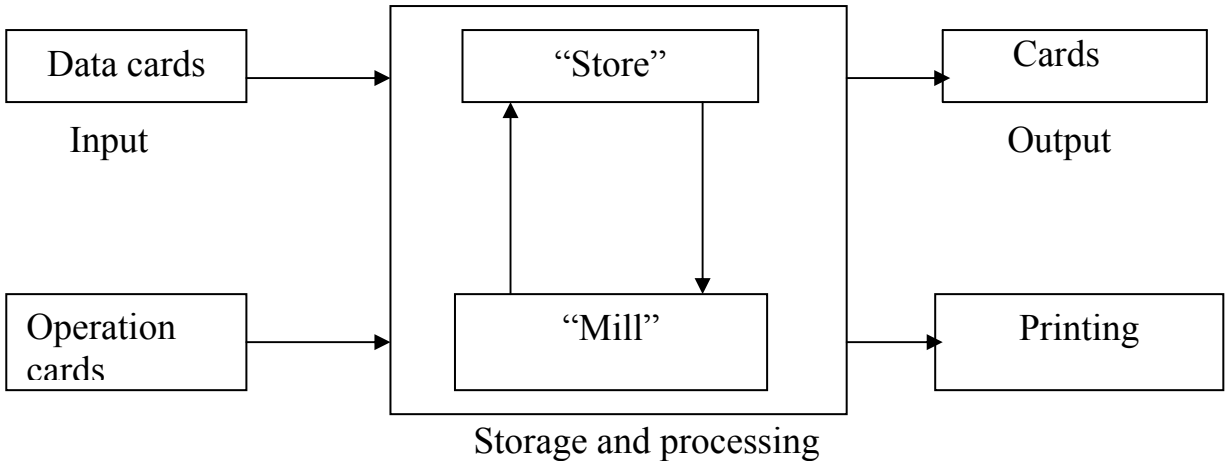

Fig. 1. Ch. Babbage's analytical engine

Until the middle of the twentieth century machines designed to manipulate punched card data were widely used for business data processing. These early electromechanical data processors were called unit record machines because each punched card contained a unit of data.

In the mid-1940s electronic computers were developed to perform calculations for military and scientific purposes. By the end of the 1960s commercial models of these computers were widely used for both scientific computation and business data processing. Initially these computers accepted their input data from punched cards. By the late 1970s punched cards had been almost universally replaced by keyboard terminals. Since that time advances in science have led to the proliferation of computers throughout our society, and the past is but the prologue that gives us a glimpse of the future.

3. Просмотрите текст еще раз. Ответьте на вопросы, используя информацию текста.

1. What was the very first calculating device? 2. What is the abacus? 3. What is the modern slide rule? 4. Who gave the ideas for producing logarithm tables? 5. How did Newton and Leibnitz contribute to the problem of calculation? 6. When did the first calculating machine appear? 7. What was the main idea of Ch.Babbage's machine? 8. How did electromechanical machines appear and what were they used for? 9. What means of coding the data did Hollerith devise? 10. How were those electromechanical machines called and why? 11. What kind of computers appeared later? 12. What new details had the computers of 1970s?

4. Найдите в тексте английские эквиваленты следующих словосочетаний:

Вычислительное устройство; легкий способ вычисления; поэтому (вот почему); кратное десяти; изобрести механический способ умножения и деления; логарифмическая линейка; составить таблицы логарифмов;

математический анализ; изобрести независимо (друг от друга); в результате; полностью исключить человека; кроме (за исключением); обработка деловой информации; средство кодирования информации; перфокарты; пробивать отверстия; оформить собранные данные в таблицу; работать с данными на перфокарте; устройство, записывающее информацию блоками; единица информации; выполнять вычисления; для научных целей; клавишный терминал.

5. Переведите словосочетания, содержащие:

а) причастие I — Participle I

Computers using vacuum tubes; the machine calculating mathematical problems; the computer keeping instructions in its memory; binary code storing data and instructions; the vacuum tube controlling and amplifying electronic signals; computers performing computations in milliseconds; electronic pulses moving at the speed of light; students coding the information by using a binary code; devices printing the information; keyboard terminals replacing vacuum tubes.

б) причастие II — Participle II

The given information; the name given to the machine; the coded data; the device used in World War II; the invention named ENIAC; the machine called EDVAC; instaictions kept in the memory; the engine designed for storing data; data stored in a binary code; vacuum tubes invented by J. Neumann; the general-purpose machine proposed by Ch. Babbage; the machine provided with the necessary facts.

6. Ознакомьтесь с активной лексикой текста 2.

analog computer	— аналоговый компьютер
digital computer	— цифровой компьютер
to aim guns	— наводить орудия на цель
to figure out	— вычислять
at a fast rate	— с высокой скоростью
memory / storage	— запоминающее устройство
to store data and instructions	— запоминать информацию и команды
stored program computer	— компьютер с занесенной в память программой
binary code	— двоичный код
condition	— режим, состояние, условие
vacuum tube	— электронная (вакуумная) трубка (лампа)
to amplify	— усиливать
to perform computations	— выполнять вычисления

7. Прочтите текст 2 и скажите, что вы узнали о первых цифровых и аналоговых компьютерах. Переведите текст.

Text 2. THE FIRST COMPUTERS

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

Many technical developments of electronic ***digital*** computers took place in

the 1940s and 1950s. Mark I, the name given to the first digital computer, was completed in 1944. The man responsible for this invention was Professor Howard Aiken. This was the first machine that could figure out long lists of mathematical problems at a very fast rate.

In 1946 two engineers at the University of Pennsilvania, J.Eckert and J.Maushly, built their digital computer with vacuum tubes. They named their new invention ENIAC (the Electronic Numerical Integrator and Calculator). Another important achievement in developing computers came in 1947, when John von Neumann developed the idea of keeping instructions for the computer inside the computer's memory. The contribution of John von Neumann was particularly significant. As contrasted with Babbage's analytical engine, which was designed to store only data, von Neumann's machine, called the Electronic Discrete Variable Computer, or EDVAC, was able to store both data and instructions. He also contributed to the idea of storing data and instructions in a *binary code* that uses only ones and zeros. This simplified computer design. Thus computers use two conditions, high voltage, and low voltage, to translate the symbols by which we communicate into unique combinations of electrical pulses. We refer to these combinations as codes.

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

8. Просмотрите текст еще раз и ответьте на вопросы, используя информацию текста.

1. When was the first analog computer built? 2. Where and how was that computer used? 3. When did the first digital computers appear? 4. Who was the inventor of the first digital computer? 5. What could that device do? 6. What is ENIAC? Decode the word. 7. What was J.Neumann's contribution into the development of computers? 8. What were the advantages of EDVAC in comparison with ENIAC? 9. What does binary code mean? 10. Due to what invention could the first digital computers be built?

9. Найдите в тексте 2 английские эквиваленты следующих словосочетаний.

Цифровые компьютеры; технические усовершенствования; совершенствование компьютеров; ответственный за изобретение; математические задачи; электронные трубки; важное достижение; запоминающее устройство; значительный вклад; двоичный код; высокое напряжение; низкое напряжение; электрические импульсы; тысячная доля секунды.

Происходить; завершать; вычислять; хранить команды внутри компьютера; запоминать информацию; запоминать команды; содействовать; использовать единицу и ноль; упрощать дизайн; усиливать сигналы; выполнять вычисления.

10. Заполните пропуски необходимыми словами.

1. The first digital computer could ___a lot of mathematical problems at a fast. 2. Vannevar Bush built the first____computer in 1930. 3. Babbage's analytical engine was designed to ____data. 4. J.von Neumann invented a machine that was able to ____not only data but also___. 5. Neumann ____the idea of storing data in a ___ ____. 6. Computers use two conditions for____symbols. 7. The invention of ___ ____made computers possible to control and ____electronic signals. 8. Due to ___ _____ computers could perform ____much faster.

11. Переведите предложения или словосочетания, содержащие:

а) инфинитив в функции обстоятельства

1. Computers were designed to perform thousands of computations per second. 2. To make computers more reliable transistors were used. 3. They were applied to reduce computational time. 4. To integrate large numbers of circuit elements into a small chip, transistors should be reduced in size. 5. To use integrated circuit technology new computers were built. 6. Analytical engine was invented to store data.

б) инфинитив в функции определения

The problem to be solved; the work to be finished; the cards to be punched; calculations to be performed; the machine to be shown at the exhibition; the device to be provided with the necessary facts; computers to be used for data processing; efforts to increase reliability; electronics to connect systems and subsystems; the speed of response to depend on the size of transistor; computers to perform thousands of calculations per second; vacuum tubes to control and amplify electric signals; these are circuits to use a large number of transistors; operations to be performed.

UNIT 4
DATA PROCESSING CONCEPTS

1. Ознакомьтесь с активной лексикой текста 1.

data processing	— обработка информации (данных)
to convert	— преобразовывать; переводить (в др. единицы)
to accomplish	— завершать, заканчивать; осуществлять, выполнять
to house	— помещать, размещать
to improve	— улучшать, совершенствовать
to control	— управлять, регулировать; управление, регулирование
to store	— хранить, запоминать, заносить (размещать) в памяти
storage	— запоминающее устройство, память; хранение
resource	— ресурс; средство; возможность
facility	— устройство; средство
facilities	— приспособления; возможности
equipment	— оборудование; аппаратура; приборы; устройства
available	— доступный; имеющийся (в наличии); возможный
display	— дисплей; устройство (визуального) отображения; показ

manner — способ, образ (действий)
sequence — последовательность, порядок (следования)
successively — последовательно
data storage hierarchy — иерархия (последовательность) запоминания информации (данных)
to enter — входить; вводить (данные); заносить, записывать
comprehensive groupings — полные, обширные, универсальные образования
meaningful — имеющий смысл; значащий (о данных)
item — элемент; составная часть
record — запись, регистрация; записывать, регистрировать
file — файл; заносить (хранить) в файл
set — набор; множество; совокупность; серия; группа; система
data base — база данных
related — смежный; взаимосвязанный; относящийся (к ч.-л.)

2. Прочтите текст и скажите, как вы понимаете термины «обработка информации» и «иерархия запоминания информации».

Text 1. DATA PROCESSING AND DATA PROCESSING SYSTEMS

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

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

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

Basic data processing operations

Five basic operations are characteristic of all data processing systems:

inputting, storing, processing, outputting, and controlling. They are defined as follows.

Inputting is the process of entering data, which are collected facts, into a data processing system. *Storing* is saving data or information so that they are available for initial or for additional processing. *Processing* represents performing arithmetic or logical operations on data in order to convert them into useful information. *Outputting* is the process of producing useful information, such as a printed report or visual display.

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

Data storage hierarchy

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

1) *Characters,* which are all written language symbols: letters, numbers, and special symbols. 2) *Data elements,* which are meaningful collections of related characters. Data elements are also called data items or fields. 3) *Records,* which are collections of related data elements. 4) *Files,* which are collections of related records. A set of related files is called a data base or a data bank.

3. Просмотрите текст еще раз. Ответьте на вопросы, используя информацию текста 1.

1. What is processing? 2. What is data processing? 3. What does the term of data processing system mean? 4. What basic operations does a data processing system include? 5. What is inputting / storing / outputting information? 6. What do you understand by resources? 7. How did ancient Egyptians convert facts into useful information? 8. When were mechanical aids for computation developed? 9. What does data storage hierarchy mean? 10. What are the general groupings of any data storage hierarchy?

4. Найдите в тексте английские эквиваленты следующих словосочетаний:

Системы обработки информации; определение (термина) обработки данных; совокупность фактов; последовательность действий; преобразование входных данных в полезную информацию; включать ресурсы; завершить обработку данных; обеспечивать ввод информации в компьютер; ленты принтера; расходовать в большом количестве; размещать компьютерное оборудование; нуждаться (требовать) в приспособлениях; явление современной жизни; на протяжении доисторического периода; превращать информацию в выражения; регистрировать отливы и приливы; прогнозировать урожай зерновых культур; механические средства вычисления; ввод данных; хранение данных; первоначальная обработка данных; дополнительная обработка; выдача полезной информации; напечатанное сообщение; зрительное отображение; последовательность запоминания информации; записанные символы языка; элементы информации; база данных; набор взаимосвязанных файлов.

5. Переведите следующие цепочки существительных:

Data resource; storage resource; network resource; security resource; system

resource.

Communication facilities; data base facilities; display facilities; management facilities.

Distance control; device control; keyboard control; position control; program control.

Computer storage; laser storage; file storage; disk storage; data storage hierarchy.

Character sequence; instruction sequence; message sequence; pulse sequence.

Batch file; catalog file; data file; help file; input file; output file; menu file; user file.

Command input; data input; disk input; file input; keyboard input; program input.

6. Подберите к терминам, данным в левой колонке, определения, представленные справа.

1. Computer	a) the set of instructions that direct the operations of computers;
2. Computer literacy	b) a part of a computer, entering data into the device;
3. A program	c) facts unorganized but able to be organized;
4. Data	d) the output of a data processing system;
5. Data processing	e) possessing sufficient knowledge of how computers work and what they can do to use them as problem-solving tools;
6. Data processing system	f) a series of operations that results in the conversion of data system into useful information;
7. Input	g) an electronic device performing calculations on numerical data;
8. Output	h) an electronic device performing calculations on nu merical data;
9. Useful information	i) a set of related files;
10. Data bank	j) the resources required to accomplish the processing of data. Theses resources are personnel, material, facilities and equipment.

7. Проанализируйте неличные формы глагола и правильно переведите предложения.

1. Data are processed to become useful information. 2. We use the term data processing to include the resources applied for processing of information. 3. Resources required for accomplishing the processing of data are called data processing system. 4. Processing is a series of operations converting inputs into outputs. 5. Facilities are required to house the computer equipment. 6. Egyptians used the information to predict crop yields. 7. Information to be put into the computer for processing should be coded into ones and zeroes. 8. Processing is operations on data to convert them into useful information. 9. The first machines designed to manipulate punched card data were widely used for business data processing. 10. Hollerith built one machine to punch the holes and the other to tabulate the collected data.

8. Ознакомьтесь с активной лексикой текста 2.

manual	— ручной, выполняемый вручную
to take advantage of smth	— воспользоваться ч.-л.
capability	— способность; возможность; характеристика
accuracy	— точность; правильность; четкость (изображения)
correctly	— правильно; верно
to eliminate	— устранять; удалять; отменять; ликвидировать
to make errors	— допускать ошибки (погрешности)
error-prone	— подверженный ошибкам
to remain vulnerable	— оставаться уязвимым, чувствительным
invalid data	— неверные, неправильные, недопустимые данные
communications networks	— сети передачи данных; сети
связи travel	— перемещение; прохождение; путь; ход
instant response	— мгновенный ответ (реакция)
to respond	— отвечать; реагировать
access	— доступ; обращение; обращаться, иметь ..,
доступ	
capacity of storage	— объем (емкость) памяти
to retrieve	— извлекать, выбирать (данные); восстанавливать
(файл)	
value	— значение; величина; значимость; ценность;
оценка;	оценивать
objective	— цель; требование; целевая функция
cost-effective	— экономичный; экономически оправданный
challenge	— трудность; препятствие; представлять трудность

9. Прочтите текст и скажите, каковы основные достоинства компьютеров. Переведите текст.

Text 2. **ADVANTAGES OF COMPUTER DATA PROCESSING**

Computer-oriented data processing systems or just computer data processing systems are not designed to imitate manual sys terns. They should combine the

capabilities of both humans and computers. Computer data processing systems can be designed to take advantage of four capabilities of computers.

1. *Accuracy.* Once data have been entered correctly into the computer component of a data processing system, the need for further manipulation by humans is eliminated, and the possibility of error is reduced. Computers, when properly programmed, are also unlikely to make computational errors. Of course, computer systems remain vulnerable to the entry by humans of invalid data.

2. *Ease of communications.* Data, once entered, can be transmitted wherever needed by communications networks. These may be either earth or satellite-based systems. A travel reservations system is an example of a data communications network. Reservation clerks throughout the world may make an enquiry about transportation or lodgings and receive an almost instant response. Another example is an office communications system that provides executives with access to a reservoir of date, called a corporate data base, from their personal microcomputer work stations.

3. *Capacity of storage.* Computers are able to store vast amounts of information, to organize it, and to retrieve it in ways that are far beyond the capabilities of humans. The amount of data that can be stored on devices such as magnetic discs is constantly increasing. All the while, the cost per character of data stored is decreasing.

4. *Speed.* The speed, at which computer data processing systems can respond, adds to their value. For example, the travel reservations system mentioned above would not be useful if clients had to wait more than a few seconds for a response. The response required might be a fraction of a second.

Thus, an important objective in the design of computer data processing systems is to allow computers to do what they do best and to free humans from routine, error-prone tasks. The most cost-effective computer data processing system is the one that does the job effectively and at the least cost. By using computers in a cost-effective manner, we will be better able to respond to the challenges and opportunities of our post-industrial, information-dependent society.

10. Ответьте на вопросы, используя информацию текста.

1. What capabilities should data-processing systems combine when designed? 2. What are the main advantages of computers? 3. What do you know of computers accuracy? 4. What is the function of communication networks? 5. Give examples of a data communication network. 6. What do you understand by capacity storage? 7. What other values of computer data processing systems do you know? 8. What is an important objective in the design of computer data processing systems? 9. What is the most effective computer data processing system? 10. What is the best way of responding to the challenges and opportunities of our post-industrial society?

11. Найдите в тексте английские эквиваленты следующих словосочетаний:

Система обработки информации компьютером; система ориентирования на обработку данных компьютером; сочетать возможности человека и машины;

ограничивать управление; вряд ли допустят ошибку; оставаться уязвимым; недопустимые данные; легкость осуществления связи; сеть передачи информации; системы, основанные на использовании спутников; служащие по резервированию жилья; получить мгновенный ответ; наводить справки; хранилище данных; корпоративная база данных; объем памяти; запоминать огромное количество информации; извлекать информацию; добавить значимости; упомянутый выше; доля секунды; подверженный ошибкам; экономически оправданный.

UNIT 5
COMPUTER SYSTEMS: AN OVERVIEW

1. Ознакомьтесь с активной лексикой текста 1.

architecture – архитектура; структура
architect — разработчик архитектуры (системы, структуры)
unit – устройство; модуль; блок; элемент; составная часть
accessory equipment — вспомогательные устройства
engineering background — техническая подготовка, квалификация
analyst — аналитик; системный разработчик
product line — серия (компьютерных) продуктов
manufacturer — изготовитель; производитель; разработчик
application programmer — прикладной программист
to simulate — моделировать; имитировать
voltage — напряжение
pressure — давление, сжатие
digital computer — цифровой компьютер
hybrid computer — смешанного типа, аналого-цифровой компьютер
discrete — дискретный; отдельный
continuous quantity — непрерывная величина
on-going process — продолжающийся, постоянный, непрерывный процесс
to rely — основываться на ч.-л.; полагаться
to install — устанавливать; размещать; монтировать; настраивать
household appliances — домашние приборы / устройства
microwave oven — микроволновая печь
indoor climate control system — система регуляции температуры в доме

2. Прочтите текст и скажите, о каких типах компьютеров и сферах их применения вы узнали.

Text 1. COMPUTER SYSTEM ARCHITECTURE

As we know all computer systems perform the functions of inputting, storing, processing, controlling, and outputting. Now we'll get acquainted with the computer system units that perform these functions. But to begin with let's examine computer systems from the perspective of the system designer, or architect.

It should be noted that computers and their accessory equipment are designed by a *computer system architect,* who usually has a strong engineering background.

As contrasted with the *analyst,* who uses a computer to solve specific problems, the computer system architect usually designs computer that can be used for many different applications in many different business. For example, the product lines of major computer manufacturers such as IBM, Digital Equipment Corporation and many others are the result of the efforts of teams of computer system architects.

Unless you are studying engineering, you don't need to become a computer system architect. However, it is important that as a potential user, applications programmer or systems analyst you understand the functions of the major units of a computer system and how they work together.

Types of computers

The two basic types of computers are analog and digital. *Analog computers* simulate physical systems. They operate on the basis of an analogy to the process that is being studied. For example, a voltage may be used to represent other physical quantities such as speed, temperature, or pressure. The response of an analog computer is based upon the measurement of signals that vary continuously with time. Hence, analog computers are used in applications that require continuous measurement and control.

Digital computers, as contrasted with analog computers, deal with discrete rather than continuous quantities. They count rather than measure. They use numbers instead of analogous physical quantities to simulate ongoing, or real-time processes. Because they are discrete events, commercial transactions are in a natural form for digital computation. This is one reason that digital computers are so widely used in business data processing.

Machines that combine both analog and digital capabilities are called *hybrid computers.* Many business, scientific, and industrial computer applications rely on the combination of analog and digital devices. The use of combination analog devices will continue to increase with the growth in applications of microprocessors and microcomputers. An example of this growth is the trend toward installing control systems in household appliances such as microwave ovens and sewing machines. In the future we will have complete indoor climate control systems and robots to do our housecleaning. Analog sensors will provide inputs to the control centres of these systems, which will be small digital computers.

3. Просмотрите текст еще раз. Ответьте на вопросы, используя информацию текста.

1. Who designs computers and their accessory equipment? 2. What is the role of an analyst? 3. Is it necessary for a user to become a computer system architect? 4. What functions do computer systems perform? 5. What types of computers do you know? 6. What is the principle of operation of analog computers? 7. How do digital computers differ from analog computers? 8. Where are digital and analog computers used? 9. What are hybrid computers? 10. Where do they find application?

4. Найдите в тексте английские эквиваленты следующих словосочетаний:

Функции ввода, хранения, обработки, управления и вывода информации;

познакомиться; системные блоки; для начала; вспомогательные устройства; разработчик компьютерной системы; хорошая компьютерная подготовка; различные сферы применения; корпорация цифрового оборудования; прикладной программист; системный разработчик; главные устройства компьютерной системы; моделировать физические величины; измерение сигналов; в отличие от; иметь дело скорее с дискретными, чем непрерывными величинами; в режиме реального времени; коммерческие операции; цифровое вычисление; аналого-цифровые компьютеры; тенденция к установке систем управления; бытовые приборы.

5. Переведите предложения, содержащие Participle I и Participle II в функции обстоятельства.

1. When entering the Internet, I always find a lot of interesting information. 2. Though never built Babbage's analytical engine was the basis for designing today's computers. 3. When written in a symbolic language programs require the translation into the machine language. 4. While operating on the basis of analogy analog computers simulate physical systems. 5. When used voltage represents other physical quantities in analog computers. 6. Being discrete events commercial transactions are in a natural form for a digital computer. 7. As contrasted with the analyst, the computer system architect designs computers for many different applications. 8. While dealing with discrete quantities digital computers count rather than measure. 9. When using a microcomputer you are constantly making choice — to open a file, to close a file, and so on. 10. As known all computer systems perform the functions of inputting, storing, processing, controlling, and outputting.

6. Ознакомьтесь с терминами текста 2.

hardware — аппаратное обеспечение; аппаратура; оборудование
software — программное обеспечение; программные средства
system software — системное программное обеспечение
application software — прикладное программное обеспечение
firmware — встроенное /микропроцессорное программное обеспечение
visible units — видимый блок, устройство
procedure — процедура, процесс; метод, методика; алгоритм
to associate — соединять; объединять; связывать
associated documentation — соответствующая документация
to execute applications programs — выполнять прикладные программы
payroll — платежная ведомость
inventory control — инвентаризация; переучет
investment analyses — анализ инвестиций (капиталовложений)
to protect — защищать
read-only memory (ROM) — постоянное запоминающее устройство (ПЗУ)
to refer to — относиться к; ссылаться на
to substitute — заменять; замещать
to cause — заставлять, вынуждать; причина, основание
to accomplish — завершать, заканчивать; выполнять, осуществлять

performance – производительность; быстродействие; рабочая характеристика

7. Прочтите текст 2 и объясните, как вы понимаете термины «аппаратное обеспечение» и «программное обеспечение». Переведите текст.

Text 2. **HARDWARE, SOFTWARE, AND FIRMWARE**

The units that are visible in any computer are the physical components of a data processing system, or ***hardware.*** Thus, the input, storage, processing and control devices are hardware. Not visible is the ***software*** — the set of computer programs, procedures, and associated documentation that make possible the effective operation of the computer system. Software programs are of two types: systems software and applications software.

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

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

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

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

8. Ответьте на вопросы, используя информацию текста.

1. What is hardware? 2. Give the definition of software. 3. What are the types of software? 4. What are the systems software? 5. What kind of tasks do systems software perform? 6. Who prepares systems software? 7. What are applications software? 8. What problems do applications software solve? 9. What is firmware? 10. How can a computer system architect use firmware?

9. Найдите в тексте английские эквиваленты следующих словосочетаний:

Видимые устройства; система обработки данных; аппаратное обеспечение; набор компьютерных программ; соответствующая документация; эффективная работа; системное программное обеспечение; прикладное программное

обеспечение; системный программист; платежная ведомость; переучет; анализ инвестиций; прикладная программа; работающий только в режиме чтения; постоянное запоминающее устройство; последовательность команд; в случае; производительность; электронная цепь; умножать числа; заставить машину выполнять ту же функцию; выполнять сложение.

10. Вспомните значение новых слов и попытайтесь перевести словосочетания, употребляемые с этими словами.

Architecture: communication architecture; computer architecture; disk architecture; microprocessor architecture; network architecture; security architecture; system architecture; virtual architecture.

Software: system software; application software; database software; disk software; educational software; game software; management software; simulation software.

Hardware: computer hardware; device hardware; display hardware; memory hardware; mouse hardware; network hardware; system hardware; video hardware.

Procedure: accounting procedure; computational procedure; control procedure; data-processing procedure; decision procedure; error-correcting procedure; formatting procedure; installation procedure; management procedure; solution procedure.

Protection: computer protection; data protection; device protection; display protection; error protection; hardware protection; software protection; resource protection; security protection; system protection; virus protection.

UNIT 6
FUNCTIONAL ORGANIZATION OF THE COMPUTER

1. Ознакомьтесь с активной лексикой текста 1.

operation — операция; работа; действие; срабатывание
to relate — связывать; устанавливать отношения
a broad view — широкий взгляд, обзор
unit — устройство; модуль, блок; узел; элемент; ячейка
input — ввод; устройство ввода; вводить; подавать на вход
to insert — вставлять; вносить; включать
storage = memory — память; запоминающее устройство
available — доступный; имеющийся в наличии
at the appropriate time — в нужное время
arithmetic-logical unit — арифметико-логическое устройство
output — вывод; устройство вывода; выводить; подавать на выход
to remove — удалять; устранять; вынимать; исключать
control unit — блок управления
cause — заставлять; вынуждать; быть причиной; причина; основание
to feed (fed, fed) — подавать; питать; вводить (данные)
to interpret — интерпретировать; истолковывать
to issue commands — выдавать команды
pulse — no-pulse — (есть) импульс — холостой импульс

2. Прочтите текст и назовите основные функциональные блоки компьютера и их назначение.

Text 1. **FUNCTIONAL UNITS OF DIGITAL COMPUTERS**

As we know, all computer operations can be grouped into five functional categories. The method in which these five functional categories are related to one another represents the functional organization of a digital computer. By studying the functional organization, a broad view of the computer is received.

The five major functional units of a digital computer are:

1) *Input* — to insert outside information into the machine;
2) *Storage or memory* — to store information and make it available at the appropriate time;
3) *Arithmetic-logical unit* — to perform the calculations;
4) *Output* — to remove data from the machine to the outside world and
5) *Control unit* — to cause all parts of a computer to act as a team.

These five functional units of the computer act together. A complete set of instructions and data are usually fed through the input equipment to the memory where they are stored. Each instruction is then fed to the control unit. The control unit interprets the instructions and issues commands to the other functional units to cause operations to be performed on the data. Arithmetic operations are performed in the arithmetic-logical unit, and the results are then fed back to the memory. Information may be fed from either the arithmetic unit or the memory through the output equipment to the outside world. The five units of the computer must communicate with each other. They can do this by means of a machine language which uses a code composed of combinations of electric pulses. These pulse combinations are usually represented by *zeros* and *ones,* where the *one* may be a pulse and the *zero* — a-no-pulse. Numbers are communicated between one unit and another by means of these one-zero or pulse — no-pulse combinations. The input has the additional job of converting the information fed in by the operator into machine language. In other words, it translates from our language into the pulse — no-pulse combinations understandable to the computer. The output's additional job is converting the pulse — no-pulse combinations into a form understandable to us, such as a printed report.

3. Просмотрите текст еще раз. Дайте ответы на вопросы, используя информацию текста.

1. What represents the functional organization of a computer? 2. What can we get by studying the functional organization? 3. What is the function of the input device?4.What does memory serve for? 5. What is the task of the arithmetic-logical unit?6. What is the function of the output? 7. What is the main purpose of the control unit? 8. How do all units of the computer communicate with each other? 9. What is the additional job of the input? 10. What is the additional function of the output?

4. Найдите в тексте английские эквиваленты следующих словосочетаний:

Функциональная организация; действия компьютера; связывать друг с

другом; вводить информацию извне; делать информацию доступной; выполнять вычисления; выводить информацию; блок управления; выдавать команды; заставлять выполнять команды; выходное устройство; внешний мир; связываться друг с другом; комбинация электрических импульсов; холостой импульс; импульсы, распознаваемые компьютером.

5. Вспомните значение новых слов и попытайтесь перевести словосочетания, употребляемые с этими словами.

Computer, analog computer; digital computer; hybrid computer; all-purpose computer; general-purpose computer; fifth-generation computer; game computer; handheld computer; mobile computer; multimedia computer; notebook computer; pocket computer; portable computer.

Unit: unit of memory; unit of data; unit of measurement; arithmetic unit; arithmetic-logical unit; central processing unit; computing unit; control unit; functional unit; input unit; output unit; network unit; system unit.

Function: arithmetic function; checking function; complex function; computer function; continuous function; conversion function; distribution function; encoding function; logical function; numeric function; output function; program function; search function; software function; support function; utility function; variable function.

Control: access control; batch control; coding control; distance / remote control; error control; execution control; hardware control; input/output control; memory control; power control; production control; program control; rate control; self-acting control; software control; system control.

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