ENGLISH
in the Field of Information Technology

АНГЛИЙСКИЙ ЯЗЫК
в сфере информационных технологий

В.А. Радовель

УЧЕБНО-ПРАКТИЧЕСКОЕ ПОСОБИЕ

КНОРУС

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Учебно-практическое пособие

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ЭЛЕКТРОННО-БИБЛИОТЕЧНАЯ СИСТЕМА
КНОРУС • МОСКВА • 2017

УДК 811.111(07)
ББК 81.2Англ9
Р15

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Р15 Английский язык в сфере информационных технологий : учебно-практическое пособие / В.А. Радовель. — Москва : КНОРУС, 2017. — 232 с.

ISBN 978-5-406-05532-8

Предназначено для изучения английского языка, используемого в области информационно-компьютерных технологий (ИКТ). Дает возможность расширить и углубить свои познания в английском языке, а также овладеть основами компьютерной грамотности. В пособие включены тексты из оригинальной литературы, связанной с тематикой ИКТ; разнообразные учебные задания, помогающие усвоению и запоминанию необходимых специальных терминов; задания по свертыванию и развертыванию информации, составлению аннотаций и рефератов на русском и английском языках и другие учебные инструменты для формирования языковой компетенции в области ИК-технологий.

Для учащихся школ и лицеев с информационно-технической специализацией, студентов колледжей и вузов, а также всех, кто интересуется английским языком в его приложении к информационно-компьютерной сфере.

УДК 811.111(07)
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Радовель Валентина Александровна
АНГЛИЙСКИЙ ЯЗЫК В СФЕРЕ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ

Сертификат соответствия № РОСС RU.АГ51.Н03820 от 08.09.2015.

Изд. № 12692. Формат 60×90/16. Гарнитура «Newton».
Усл. печ. л. 14,5. Уч.-изд. л. 11,8.

ООО «Издательство «КноРус».
117218, г. Москва, ул. Кедрова, д. 14, корп. 2.
Тел.: 8-495-741-46-28.
E-mail: office@knorus.ru http://www.knorus.ru

Отпечатано в ПАО «Т8 Издательские Технологии».
109316, г. Москва, Волгоградский проспект, д. 42, корп. 5.
Тел.: 8-495-221-89-80.

ISBN 978-5-406-05532-8

СОДЕРЖАНИЕ

ПРЕДИСЛОВИЕ

Предлагаемое учебное пособие составлено в соответствии с новым образовательным стандартом Министерства образования и науки РФ с учетом рекомендаций, содержащихся в разделах «Английский язык» и «Информатика». Пособие поможет сформировать у учащихся готовность и способность к самостоятельной информационной деятельности. Оно познакомит учащихся с ролью информатики и информационно-компьютерных технологий в современном обществе.

Владение информационно-компьютерными технологиями сегодня абсолютно необходимо для каждого грамотного человека. Неотъемлемой составляющей грамотности в этой области является должный уровень владения определенным корпусом понятий и терминов. В связи с этим требуется целенаправленное и системное изучение специального, функционального аспекта английского языка. Полученные в ходе такого изучения языковые знания необходимы для уверенной ориентировки пользователя в мире информации и повышения его технологических возможностей при работе с компьютером в перспективе.

Таким образом, основной задачей, которая решается данным учебным курсом, является обучение: языковым средствам для эффективного общения с компьютером и ориентации в компьютерно-опосредованной информационной деятельности, пониманию специальных научно-технических текстов в области компьютерных технологий, умению свернуть и развернуть информацию при подготовке рефератов и аннотаций на русском и английском языках.

Для выполнения указанной задачи учебное пособие содержит: тексты из оригинальной литературы, посвященные теме «Компьютеры и информационные системы»; учебные задания, способствующие усвоению и запоминанию специальных терминов, используемых в области компьютерных технологий; задания для развития навыков чтения, свертывания и развертывания информации, составления аннотаций и рефератов на русском и английском языках; задания по совершенствованию навыков письменного перевода; упражнения по усвоению грамматических явлений, характерных для научно-технических текстов; диагностический тест в начале курса, а также контрольные тесты в конце каждого раздела; игровые материалы (викторины, лексические игры, кроссворды), способствующие закреплению полученных знаний и повышению интереса к учебному курсу; англо-русский словарь

специальных технических терминов, в состав которого включен лексический минимум, необходимый для изучения курса информатики; краткий словарь сокращений и условных обозначений с элементами толкования.

Находясь на пересечении двух культур – технической и гуманитарной, данное пособие будет содействовать существенному расширению эрудиции и повышению творческих способностей учащихся. Значительная часть представленного в нем материала прошла многолетнюю апробацию в различных вузах и других учебных заведениях страны.

Учебное пособие рассчитано на учащихся средних учебных заведений, особенно школ и лицеев с информационно-технической специализацией, студентов колледжей и вузов, а также всех, кто интересуется английским языком в его приложении к информационно-компьютерной сфере.

ДИАГНОСТИЧЕСКИЙ ТЕСТ

ВАРИАНТ 1

Выберите правильный вариант из предложенных.

1. What is that? — *[A — They / B — It / C — There]* is my computer.
2. My brother is *[A — one / B — a / C — an]* officer.
3. *[A — This / B — These / C — That]* flowers are very beautiful.
4. Are *[A — those / B — that / C — there]* books interesting?
5. *[A — It has / B — It is / C — There is]* a dog in the garden.
6. I *[A — has / B — have / C — had]* to go to the library tomorrow.
7. Kate is here, but her parents *[A — isn't / B — wasn't / C — aren't]*.
8. You ought *[A — stay / B — to stay / C — staying]* at home.
9. He should *[A — write / B — to write / C — writing]* a letter.
10. Mike *[A — like / B — likes / C — can]* to speak English.
11. I hope you've got *[A — a / B — any / C — some]* money.
12. Do you want *[A — know / B — to know / C — knowing]* the news?
13. We've got *[A — a few / B — a little / C — a number]* apples left.
14. There aren't *[A — a lot / B — many / C — much]* people here today.
15. *[A — Is / B — Has / C — Does]* she get up early every day?
16. Were you in Moscow last year? — No, I *[A — didn't / B — weren't / C — wasn't]*.
17. I *[A — have never been / B — was never / C — am never being]* to Moscow yet.
18. *[A — Isn't / B — Doesn't / C — Hasn't]* she going to clean the room today?
19. The boys *[A — play / B — is playing / C — are playing]* football at the moment.
20. She *[A — caught / B — catches / C — will catch]* the 7.30 train yesterday.
21. Kate *[A — loses / B — has lost / C — lost]* her pencils very often.
22. *[A — Did you do / B — Do you do / C — Have you done]* much work yesterday?
23. He *[A — hurries / B — hurried / C — is hurrying]* because he was late.
24. Who is she looking *[A — on / B — at / C — to]*?
25. Our holidays are *[A — in / B — at / C — on]* August.

26. What's the matter *[A — by / B — on / C — with]* him?
27. This book is *[A — my / B — me / C — mine].*
28. Don't help him. He will do everything *[A — myself / B — himself / C — yourself].*
29. We are playing *[A — ours / B — our / C — us]* favorite game.
30. It is much *[A — warm / B — warmer / C — more warm]* here.
31. She is not as old *[A — that / B — than / C — as]* I am.
32. Ann is *[A — very/ B — more / C — much]* intelligent than Max.
33. Yesterday was the *[A — shortest / B — most short / C — very short]* day this year.
34. We'll listen to Professor's lecture and *[A — therefore / B — then / C — than]* we'll have a break.
35. He is the *[A —very good / B — best / C — better]* student in the group.
36. *[A — Where / B — Why / C — Who]* wrote that letter?
37. She went home early *[A — because / B — while / C — till]* she had finished her work.
38. *[A — Who / B — Where / C — When]* did you put my book?
39. *[A — How / B — Why / C — Where]* is Bill? — Very well, thanks.
40. He drives *[A — more careful / B — very carefully / C — very careful].*

ДИАГНОСТИЧЕСКИЙ ТЕСТ

ВАРИАНТ 2

Выберите правильный вариант из предложенных.

1. *[A — This / B — These / C — That]* pictures are very good.
2. My mother is *[A — one / B — a / C — an]* doctor.
3. What is that? — *[A — They / B — It / C — There]* is my bicycle.
4. Are *[A — those / B — that / C — there]* games very interesting?
5. *[A — It has / B — It is / C — There is]* a cat on the sofa.
6. We *[A — has / B — have / C — had]* to do some shopping tomorrow.
7. You ought *[A — stay / B — to stay / C — staying]* at home.
8. Pete should *[A — send / B — to send / C — sending]* a telegram.
9. Alice *[A — like / B — likes / C — can]* to speak Italian.
10. I hope you've got *[A — a / B — any / C — some]* money.
11. Do you want *[A — know / B — to know / C — knowing]* the news?
12. They've got *[A — a few / B — a little / C — a number]* oranges left.
13. There aren't *[A — a lot / B — many / C — much]* people in the hall today.
14. *[A — Is / B — Has / C — Does]* mother get up early every day?
15. Were you in Kiev last year? — No, I *[A — didn't / B — weren't / C — wasn't]*.
16. I *[A — have never been / B — was never / C — am never being]* to Kiev yet.
17. Ann is here, but her parents *[A — isn't / B — wasn't / C — aren't]*.
18. *[A — Isn't / B — Doesn't / C — Hasn't]* she going to cook dinner today?
19. They *[A — watch / B — is watching / C — are watching]* TV now.
20. We *[A — caught / B — catches / C — will catch]* the 6.30 bus yesterday.
21. Mike *[A — loses / B — has lost / C — lost]* his pen very often.
22. *[A — Did you do / B — Do you do / C — Have you done]* much work yesterday?
23. Nick *[A — hurries / B — hurried / C — is hurrying]* because he was late.
24. Who is he waiting *[A — on / B — for / C — to]*?
25. Their holidays are *[A — in / B — at / C — on]* June.
26. What's the matter *[A — by / B — on / C — with]* you?
27. This book is *[A — us / B — our / C — ours]*.

28. Don't help her. She will do everything *[A — myself / B — herself / C — himself].*
29. We are going to *[A — ours / B — our / C — us]* favorite shop.
30. It is much *[A — cold / B — colder / C — more cold]* today than it was yesterday.
31. He is not as old *[A — that / B — than / C — as]* I am.
32. Ann is *[A — very/ B — more / C — much]* intelligent than Nick.
33. Yesterday was the *[A — hottest / B — most hot / C — very hot]* day this year.
34. He is the *[A — very bad / B — worst / C — worse]* pupil in the group.
35. *[A — Where / B — Why / C — Who]* wrote that letter?
36. She went home early *[A — because / B — while / C — with]* she had finished her work.
37. *[A — Who / B — Where / C — When]* did you put my book?
38. *[A — How / B — Why / C — Where]* is Bill? — Very well, thanks.
39. They'll finish our lesson and *[A — then / B — than / C — therefore]* we'll have a break.
40. He drives *[A — more quick / B — very quickly / C — very quick].*

Unit 1

INFORMATION-DEPENDENT SOCIETY

Texts:	Computer Literacy. What Is a Computer? Application of Computers.
Grammar:	Past Simple Tense.
Tests	

1. Ознакомьтесь с терминами текста 1.

computer literacy [kəm'pju:tə 'lɪtərəsɪ] — компьютерная грамотность
problem-solving device — устройство, обеспечивающее решение задачи
be aware of [bɪ ə'weər əv] — понимать, сознавать
opportunity [ɑ:pə'tu:nɪtɪ] — возможность
basics ['beɪsɪks] — основы
application [əpli'keɪʃn] — применение, использование
to restate [rɪ'steɪt] — пересматривать, переосмысливать
significant [sɪg'nɪfɪkənt] — значительный
achievements [ə'tʃi:vmənts] — достижения
computing [kəm'pju:tɪŋ] — вычисление, счет; работа на компьютере
to embrace [ɪmb'reɪs] — охватывать
dimension [dɪ'menʃn] — измерение
instruction [ɪn'strʌkʃn] — команда, инструкция, указание
to direct the operation — направлять работу
to process [prəʊ'ses] — обрабатывать
subscription magazine [səb'skrɪpʃn mægə'zi:n]— журнал по подписке
data processing system ['deɪtə prə'sesɪŋ 'sɪstəm] — система обработки данных
store manager ['stɔ: 'mænəʤə] — директор магазина
to have much in common — иметь много общего

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

Text 1. COMPUTER LITERACY

Informed citizens of our information-dependent society shoud 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 priviliged people had an opportunity to learn the basics, called the three Rs: reading, writing, and arithmetics. Now, as we are quickly becoming an information-dependent 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 и выполните задания, 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. Прочитайте, переведите и запомните следующие выражения.

An information-dependent society; a computer-literate citizen; an everyday problem-solving device; to be aware; 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.

A. 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.

B. 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 терминами текста 2.

intricate ['ɪntrɪkɪt] — сложный, запутанный
electronic circuit [ələkt'rɒnɪk 'sɜ:kɪt] — электронная цепь (схема)
to operate switches [ɒpə'reɪt 'swɪʧɪz] — приводить в действие переключатели
to store numbers ['stɔ: 'nʌmbəz] — запоминать числа
to manipulate [mə'nɪpjuleɪt] — 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 [prəʊ'ses 'deɪtə] — обрабатывать данные
to supply [sə'plaɪ] — подавать, вводить; снабжать, обеспечивать
addition [ə'dɪʃn] — сложение
subtraction [sʌb'trækʃn] — вычитание
division [dɪ'vɪʒn] — деление
multiplication [ˌmʌltɪplɪ'keɪʃn] — умножение
exponentiation ['ekspəˌnenʃɪ'eɪʃn] — возведение в степень
user ['ju:zə] — пользователь
input device ['ɪnput dɪ'vaɪs] — устройство ввода
disk drive ['dɪsk 'draɪv] — дисковое запоминающее устройство, дисковод
tape drive ['teɪp 'draɪv] — запоминающее устройство на магнитной ленте
cathode-ray tube ['kæθəd reɪ 'tju:b] — электронно-лучевая трубка
to make decisions — принимать решения
instantaneously [ˌɪnstən'teɪnjəsh] — мгновенно, немедленно

7. Прочитайте 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 used are: a printer, printing the new information on paper, and a cathode-ray-tube display, which shows the results on a TV-like screen.

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

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

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

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 слов и 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; катодно-лучевая 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.

10. Составьте пары или группы близких по значению слов из перечня слов, приведенных ниже. Например: A. to perform, to exercise, to carry out; B. a man, a person, a human being.

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

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

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

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

11. Выполните письменный перевод текста 3 по вариантам.

Text 3. APPLICATION OF COMPUTERS

1. At present a great deal of the work force of most countries is engaged in creating, processing, storing, communicating, and just working with information. Computers have become commonplace in homes, offices, stores, schools, research institutes, plants.

The use of computers in business, industry, and communication services is widespread today. Computer-controlled robots are able to improve the quality of manufactured products and to increase the productivity of industry. Computers can control the work of power stations, plants, and docks. They help in making different decisions and in management of economy.

The work of banks depend upon computer terminals for millions of daily operations. Without these terminals, records of deposits and withdrawals would be difficult to maintain, and it would be impossible to make inquiries about the current status of customer accounts.

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

2. Computers find application in astronomy and upper atmosphere research. Weather forecasting, library information services can benefit from computers too.

It is interesting to note that computers are widely used in medicine. They became valuable medical diagnostic tools. Computers are used for optical

scanning and image processing, ranging from pattern recognition to image processing. Technicians can operate computer tomography scanners, which combine x-rays with computer technology to give sectional views of the body of patients. The views then can be combined into a single image shown on the screen.

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

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

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

Notes

to maintain records — вести учет
deposits and withdrawal — вклады и изъятие (выемка)
guidance — наведение (на цель); управление; руководство
on-board environment — бортовое окружение
pattern recognition — распознавание образов

TESTS

1. Выберите вариант, который лучше всего выражает главную идею текста 2.

a) Computers are devices that accept information in the form of instructions.
b) The switches are usualy in one of two states: magnetized or demagnetized.
c) Computers are remarkable devices serving for processing and storage the information and for solving problems.

2. Вставьте необходимые слова вместо пропусков.

1. Information is given into the computer in the form of _____ .
   a) ideas; b) characters; c) rules
2. The basic function of a computer is _____ information.
   a) to switch; b) to keep; c) to process
3. The data needed for solving problems are kept in the _____ .
   a) memory; b) input device; c) output device
4. Inputting information into the computer is realized by means of _____.
   a) printer; b) letters; c) diskettes

5. A computer can carry out arithmetic-logical operations _____ .
   a) quickly; b) instantaneously; c) during some minutes
6. Computers have become _____ in homes, offices, research institutes.
   a) commonwealth; b) commonplace; c) common room
7. Space _____ uses computers widely.
   a) information; b) production; c) exploration
8. Computers are used for image _____ .
   a) processing; b) operating; c) producing
9. Computers help in _____ of economy.
   a) invironment; b) management; c) government
10. Air traffic control depends on computer-_____ information.
    a) generated; b) instructed; c) combined.

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

1. Computer	a) a machine by which information is received from the computer
2. Data	b) an electronic machine that processes data under the control of a stored program
3. Input device	c) a device capable of storing and manipulating numbers, letters and characters
4. Memory	d) a disk drive reading the information into the computer
5. Output device	e) information given in the form of characters

Unit 2

DEVELOPMENT OF MICROELECTRONICS

Texts:	Development of Electronics. Microelectronics and Microminiaturization.
Grammar:	Имя существительное. Суффиксы существительных. Страдательный залог времен Simple.
Tests	

1. Ознакомьтесь с терминами текста 1.

applied physics — прикладная физика
generation [ʤənə'reɪʃn] — создание, формирование, выработка
scientific research [saɪən'tɪfɪk rɪ'sɜ:ʧ] — научные исследования
due to the efforts ['dju: tə ðə 'efəts] — благодаря усилиям
manipulation [mænɪpju'leɪʃn] — управление, обработка, преобразование
to replace vacuum tubes — заменять электронные лампы
a piece of semiconductor [ˌsemɪkən'dʌktə] — полупроводниковый кристалл
reduced weight [rɪ'dju:st 'weɪt] — уменьшенный вес
power consumption ['paʊə kən'sʌmpʃn] — потребление (расход) электроэнергии
to carry out ['kærɪ aʊt] — выполнять, осуществлять
solid body — твердое тело; кристалл; полупроводник
to respond [rɪ'spɒnd] — отвечать, реагировать
at a rate — со скоростью
integrated circuit (IC) [ɪntə'greɪtɪd 'sɜ:kɪt] — интегральная схема
batch processing ['bæʧ prəʊ'sesɪŋ] — пакетная обработка
to assemble [ə'sembl] — собирать, монтировать
to lower manufacturing ['ləʊə mənjʊ'fækʧərɪŋ] — снижать производительность
to increase reliability [ɪn'kri:s rɪlaɪə'bɪlɪtɪ] — увеличивать надежность

2. Прочитайте 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 de-

pends 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 spaceships 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.

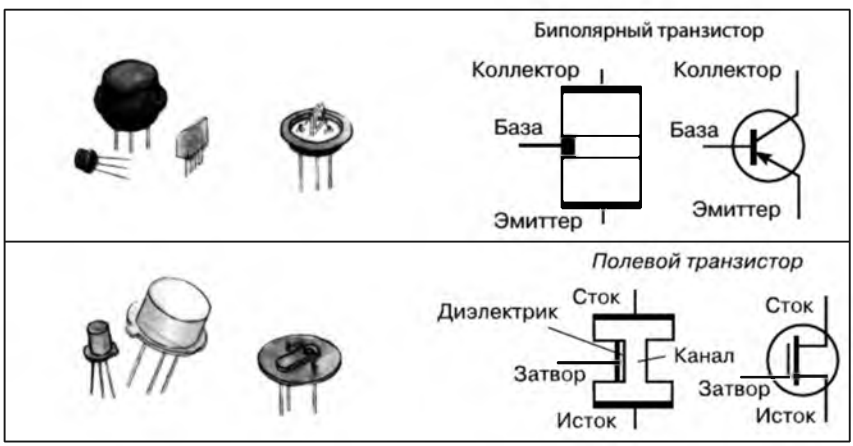


Fig. 1. Schemes of bipolar and field-effect transistors

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 descrete components on a chip one at a time, large groupings of these components together with their interconnections were made all at a time. IC 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. Догадайтесь о значении следующих интернациональных слов и словосочетаний.

Electronics; electrons; physics; information; microelectronics; industrial design; to calculate trajectories; phenomena of nature; automatization of production processes; organisms; vacuum tubes; specialized functions; progress in radio communication technology; transistor; electrode; components; to realize; communication system; technology; descrete components; chip.

5. 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.

6. 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.

7. Ознакомьтесь с терминами текста 2.

performance [pə'fɔ:məns] — рабочая характеристика, параметры; производительность, быстродействие
to predict [prə'dɪkt] — прогнозировать
capability [keɪpə'bɪlɪtɪ] — способность, возможность
branch of science ['brænʧ əv 'saɪəns] — область науки
to embrace [ɪm'breɪs] — охватывать
circuit assembly ['sɜ:kɪt ə'semblɪ] — сборка схемы
film technique ['fɪlm tək'nɪk] — пленочная технология (метод, способ)
invisible to unaided eye — невидимый невооруженному глазу
to react [rɪ'ækt] — реагировать
speed of response — скорость реакции (отклика)
advantage/disadvantage [əd'vɑ:ntɪʤ] — достоинство, преимущество/недостаток
benefit ['benəfit] — выгода, польза; помогать, приносить пользу
to result from [rɪ'zʌlt frəm] — возникать, происходить в результате
packing density ['pækɪŋ 'densɪtɪ] — плотность упаковки
small-scale integrated circuit (IC) — 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 ['faɪnlaɪn] — прецизионный, с элементами уменьшенных размеров
transmission line — линия передачи
waveguide ['weɪvgaɪd] — волновод
to emerge [ɪ'mɜ:ʤ] — появляться, возникать
to displace — перемещать, смещать
mode — вид, метод, способ, режим работы
pattern — шаблон, образец, образ, изображение
power ['paʊə] — мощность, энергия, питание; производительность, быстродействие; способность, возможность

8. Прочитайте 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.

9. 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 tech-

niques 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?

10. Найдите в тексте английские эквиваленты следующих слов и 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.

11. 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, discriminate, disintegrate.

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

un-: uncontrollable, unbelievable, unable, unchanged, uncomfortable, uncommunicative, undisciplined, unexpected, unfavorable, unforgettable, unkind.

non-: non-effective, non-aggressive, noncomparable, noncomputable, nonconstant, noncontrollable, nondigital, nondimensional, nonprogrammable, nonusable.

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

12. Вспомните образование страдательного залога — to be (в нужном времени) + 3-я форма глагола.

A. ***Найдите пять случаев употребления страдательного залога в тексте 1 и четыре случая — в тексте 2. Переведите предложения.***

B. ***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.

13. Прочитайте текст (по вариантам) и озаглавьте его. Выполните письменный перевод текста.

***

1. It is well-known that the quick development of electronics began with the invention of transistors. They replaced electronic tubes due to their numerous advantages. One of the main advantages of the transistors in comparison with the vacuum tube is absence of filament power loss*. One of the principal causes of damages in electronic circuitry is high temperature. The heat causes breakdown of tubes and other circuit elements that are very sensitive to this influence. The transistor, on the other hand, does not heat its surroundings.

Another advantage of the transistor is its long life. The life of the average transistor is more than ten thousand operating hours. Because of its long lifetime and ruggedness, the transistor is very reliable and has much better efficiency in professional equipment.

2. As we know, transistors replaced electronic tubes due to their numerous advantages. One of the advantages of the transistor is its small dimensions. Because of their small size, the absence of heating and other properties, transistors make it possible to produce compact, small-dimensioned electronic devices which consume very little power.

In conclusion it is important to note that transistors revolutionized many fields of technology. They are successfully used for direct transformation of heat energy by means of thermal elements. They are also used to convert radiant energy into electricity with the help of photocells or solar batteries. Light sources and lasers are built on the basis of transistors. They find wide application in computers, automatic device, aviation, communication, etc.

Note

* filament power loss — отсутствие энергии на нити накала

TESTS

1. Вставьте необходимые слова вместо пропусков.

1. Transistors have many _____ over vacuum tubes.
   a) patterns; b) advantages; c) scales
2. They _____ very little power.
   a) consume; b) generate; c) embrace
3. An integrated circuit is a group of elements connected together by some circuit _____ technique.
   a) processing; b) assembly; c) manipulation
4. The transistor consists of a small piece of a _____ with three electrods.
   a) diode; b) conductor; c) semiconductor
5. Modern _____ began in the early 20th century with the invention of electronic tubes.
   a) miniaturization; b) electronics; c) microelectronics
6. John Fleming was the _____ of the first two-electrode vacuum tube.
   a) generator; b) receiver; c) inventor
7. One of the transistor advantages was lower power _____ in comparison with vacuum tubes.
   a) consumption; b) reception; c) transmission
8. Microelectronics greatly extended man's intellectual _____.
   a) subsystems; b) capabilities; c) dimensions

2. Раскройте скобки и выберите глагол в требуемом залоге: действительном или страдательном.

1. Electronic devices (help; are helped) people discover new phenomena of nature. 2. The transistor (replaced; was replaced) by vacuum tubes thanks to its numerous advantages. 3. Due to transistors all circuit functions (carried out; were carried out) inside semiconductors. 4. Electronic devices (use; are used) in scientific research. 5. Before the invention of the transistor its function (performed; was performed) by vacuum tubes. 6. The reliability of electronic systems (connect; is connected) with the number of descrete components. 7. Semiconductor integrated circuits (helped; were helped) to increase reliability of devices. 8. New types of integrated circuits (have developed; have been developed) lately.

Unit 3

HISTORY OF COMPUTERS

Texts:	The First Calculating Devices. The First Computers. Some First Computer Models. Four Generations of Computers.
Grammar:	Причастие I и причастие II, способы их перевода. Инфинитив в функции определения и обстоятельства.
Tests	

1. Ознакомьтесь с терминами текста 1.

calculating device [kəlkju:'leɪtɪŋ dɪ'vaɪs] — вычислительное устройство
multiple ['mʌltɪpl] — кратный
abacus ['æbəkəs] — счеты
slide rule ['slaɪd 'ru:l] — логарифмическая линейка
logarithm table ['lɒgərɪðm 'teɪbl] — логарифмическая таблица
calculus ['kælkju:ləs] — исчисление; математический анализ
general-purpose ['ʤenərəl 'pɜ:pəs] — общего назначения, универсальный
to cut out the human being altogether — полностью исключить человека
to manipulate [mə'nɪpjʊleɪt] — обрабатывать; преобразовывать; управлять
data processing ['deɪtə prə'sesɪŋ] — обработка данных (информации)
tabulate the census — заносить данные по переписи (населения) в таблицу
means of coding ['mi:nz əv 'kəʊdɪŋ] — средства кодирования (шифровки)
to punch the holes ['pʌnʧ ðə 'həʊlz] — пробивать отверстия
punched card ['pʌnʧt 'kɑ:d] — перфокарта
to perform [pə'fɔ:m] — выполнять, производить (действие); осуществлять
unit of data ['ju:nɪt əv 'deɪtə] — единица информации
keyboard terminals — терминал (вывод) с клавишным управлением
proliferation [prə,lɪfə'reɪʃn] — размножение, быстрое увеличение

2. Прочитайте 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.

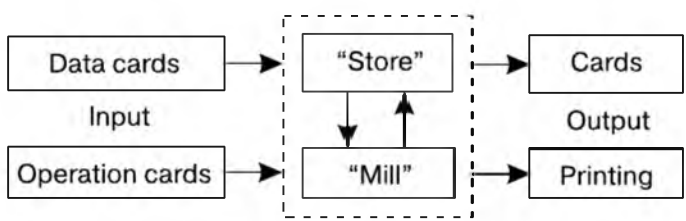


Fig. 2. Ch. Babbage's analytical engine

By the early part of the 20th 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.

Until the middle of the 20th 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 had the computers of 1970s?

4. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Вычислительное устройство; легкий способ вычисления; поэтому (вот почему); кратное десяти; некая форма счет; 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. Вспомните значение следующих глаголов и подберите к ним производные. Например: to calculate — calculating, calculator, calculation.

To compute, to invent, to know, to multiply, to divide, to depend, to solve, to provide, to process, to code, to punch, to collect, to design, to store, to contribute, to use, to manipulate, to assemble, to connect, to consume, to rely, to divide, to multiply, to inform, to instruct, todiscover, to operate.

6. Переведите словосочетания, содержащие:

A. 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.

B. 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; instructions 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.

7. Ознакомьтесь с терминами текста 2.

analog computer [ə'nælǝg kəm'pju:tə] — аналоговый компьютер
digital computer ['dɪʤɪtəl kəm'pju:tə] — цифровой компьютер
to aim guns ['eɪm 'gʌnz] — наводить орудия на цель
to figure out ['fɪgər aʊt] — вычислять
at a fast rate [ət ə 'fa:st 'reɪt] — с высокой скоростью
memory / storage ['meməɪ / 'stɒrɪʤ] — запоминающее устройство
to store data and instructions — запоминать информацию и команды
stored program computer — компьютер с занесенной в память программой
binary code ['baɪnərɪ 'kəʊd] — двоичный код
condition [kən'dɪʃn] — режим, состояние, условие
vacuum tube ['vækjʊəm tju:b] — электронная (вакуумная) трубка (лампа)
to amplify ['æmplɪfaɪ] — усиливать
to perform computations [pə'fɔ:m kəmpjʊ'teɪʃn] — выполнять вычисления

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

9. 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?

10. Найдите в тексте 2 английские эквиваленты следующих слов и 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.

11. Составьте пары близких по значению слов из перечня слов, представленных ниже.

Verbs: to name, to complete, to calculate, to develop, to keep, to interprete, to communicate, to fulfill, to apply, to translate, to improve, to build, to call, to store, to communicate, to figure out, to perform, to use, to finish, to construct, to connect.

Nouns: speed, aim, storage, information, machine, significance, computation, data, device, rate, calculation, purpose, memory, importance.

12. 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.

13. 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.

В. 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.

14. Выполните письменно перевод текста 3 по вариантам.

Text 3. SOME FIRST COMPUTER MODELS

1. Babbage's analytical engine

In 1832 an English inventor and mathematician Charles Babbage was commissioned by the British government to develop a system for calculating the rise and fall of the tides.

Babbage designed a device and called it an analytical engine. It was the first programmable computer, complete with punched cards for data input. Babbage gave the engine the ability to perform different types of mathematical operations. The machine was not confined to simple addition, subtraction, multiplication, or division. It had its own "memory," due to which the machine could use different combinations and sequences of operations to suit the purposes of the operator.

The machine of his dream was never realized in his life. Yet Babbage's idea didn't die with him. Other scientists made attempts to build mechanical, general-purpose, stored-program computers throughout the next century. In 1941 a relay computer was built in Germany by Conrad Zuse. It was a major step toward the realization of Babbage's dream.

2. The Mark I computer (1937—1944)

In 1944 in the United States, International Business Machines (IBM) built a machine in cooperation with scientists working at Harvard University under the direction of Prof. Aiken. The machine, called Mark I Automatic Sequence-Controlled Calculator, was built to perform calculations for the Manhattan Project, which led to the development of atomic bomb. It was the largest electromechanical calculator ever built. It used over 3,000 electrically actuated switches to control its operations. Although its operations were not controlled electronically, Aiken's machine is often classified as a computer because its instructions, which were entered by means of a punched paper tape, could be altered. The computer could create ballistic tables used by naval artillery.

The relay computer had its problems. Since relays are electromechanical devices, the switching contacts operate by means of electromagnets and springs. They are slow, very noisy and consume a lot of power.

3. The ABC (1939—1942)

The work on introducing electronics into the design of computers was going on.

The gadget that was the basis for the first computer revolution was the vacuum tube, an electronic device invented early in the 20th century. The vacuum tube was ideal for use in computers. It had no mechanical moving parts. It switched flows of electrons off and on at rates far faster than possible with any mechanical device. It was relatively reliable, and operated hundreds of hours before failure. The first vacuum-tube computer was built at Iowa University at about the same time as the Mark I. The computer, capable to perform thousands of related computations, was called ABC, the Atanasoff-Berry Computer, after Dr. John Atanasoff, a professor of physics and his assistant, Clifford Berry. It used 45 vacuum tubes for internal logic and capacitors for storage. From the ABC a number of vacuum-tube digital computers developed.

Soon the British developed a computer with vacuum tubes and used it to decode German messages.

15. Поменяйтесь вариантами, прочитайте текст и выразите одним-двумя предложениями основную мысль текстов, предложенных выше.

16. Прочитайте текст 4 и передайте кратко его содержание:
а) на русском языке; б) на английском языке.

Text 4. FOUR GENERATIONS OF COMPUTERS

The first vacuum tubes computers are referred to as *first-generation computers*, and the approximate period of their use was from 1950 to 1959. UNIVAC 1 (UNIVersal Automatic Computer) is an example of these computers which could perform thousands of calculations per second. Those devices were not only bulky, they were also unreliable. The thousands of vacuum tubes emitted large amounts of heat and burned out frequently.

The transistor, a smaller and more reliable successor to the vacuum tube, was invented in 1948. So-called *second-generation computers*, which used large numbers of transistors were able to reduce computational time from milliseconds to microseconds, or millionths of seconds. Second-generation computers were smaller, faster, and more reliable than first-generation computers.

Advances in electronics technology continued, and microelectronics made it possible to reduce the size of transistors and integrate large numbers of circuit elements into very small chips of silicon. The computers that were

designed to use integrated circuit technology were called *third-generation computers*, and the approximate time span of these machines was from 1960 to 1979. They could perform many data processing operations in nanoseconds, which are billionths of seconds.

Fourth-generation computers have now arrived, and the integrated circuits that are being developed have been greatly reduced in size. This is due to microminiaturization, which means that the circuits are much smaller than before; as many as 100 tiny circuits are placed now on a single chip. A chip is a square or rectangular piece of silicon, usually from 1/10 to 1/4 inch, upon which several layers of an integrated circuit are etched or imprinted, after which the circuit is encapsulated in plastic or metal.

TESTS

1. Подберите вместо пропуска подходящее по смыслу слово.

1. British scientists invented a _____ way of multiplying and dividing.
   a) mechanical; b) electrical; c) optical
2. A new branch of mathematics, _____, was invented in England and Germany independently.
   a) mechanics; b) arithmetics; c) calculus
3. A young American clerk invented a means of coding _____ by punched cards.
   a) letters; b) data; c) numbers
4. Soon punched cards were replaced by _____ terminals.
   a) printer; b) scanner; c) keyboard
5. Mark I was the first _____ computer that could solve mathematical problems.
   a) analog; b) digital; c) mechanical
6. J. von Neumann simplified his computer by storing information in a _____ code.
   a) analytical; b) numerical; c) binary
7. Vacuum tubes could control and _____ electric signals.
   a) calculate; b) amplify; c) generate
8. The first-generation computers were _____ and often burned out.
   a) uncomfortable; b) uncommunicative; c) unreliable
9. Computers of the second generation used _____, which reduced computational time greatly.
   a) transistors; b) integrated circuits; c) vacuum tubes
10. Due to_____ the development of the fourth-generation computers became possible.
    a) microelectronics; b) miniaturization; c) microminiaturization

2. Выберите правильный перевод предложений, содержащих неличные формы глагола (Infinitive, Gerund, Participle I, Participle II).

1. That was the machine provided with the necessary facts about the problem to be solved.
   a) Машину обеспечили необходимыми фактами, чтобы она решила проблему.
   b) То была машина, снабженная необходимой информацией о задаче, которую предстояло решить.
   c) Эту машину обеспечили необходимой информацией о решаемой задаче.
2. The computers designed to use IC were called third-generation computers.
   a) Компьютеры сконструировали для использования ИС и назвали их третьим поколением.
   b) Компьютеры назывались третьим поколением, потому что в них использовались ИС.
   c) Компьютеры, сконструированные, чтобы использовать ИС, назывались компьютерами третьего поколения.
3. Mark I was the first machine to figure out mathematical problems.
   a) Первая машина для решения математических проблем была «Марк I».
   b) «Марк I» явилась первой машиной для решения математических задач.
   c) «Марк I» была первой машиной, которая решала математические задачи.
4. Early computers using vacuum tubes could perform computations in milliseconds.
   a) Первые компьютеры, использующие электронные лампы, могли выполнять вычисления в течение миллисекунд.
   b) Ранние компьютеры использовали вакуумные лампы, которые выполняли вычисления за миллисекунды.
   c) Рано компьютеры, использующие электронные трубки, выполняли вычисления за миллисекунды.
5. Vacuum tubes to control and amplify electric signals were invented by Neumann.
   a) Изобретенные Нойманом вакуумные лампы регулировали и усиливали электрические сигналы.
   b) Нойман изобрел электронные лампы для управления и усиления электрических сигналов.
   c) Электронные лампы, которые регулировали и усиливали электрические сигналы, были изобретены Нойманом.

6. Neumann's machine called the EDVAC was designed to store both data and instructions.
   a) Нойманскую машину, называемую EDVAC, сконструировали для хранения информации и команд.
   b) Машина Ноймана, названная EDVAC, была создана, чтобы запоминать как информацию, так и команды.
   c) Машину Ноймана, которая хранила данные и инструкции, назвали EDVAC.
7. Computers were developed to perform calculations for military and scientific purposes.
   a) Компьютеры были созданы, чтобы выполнять вычисления для военных и научных целей.
   b) Компьютеры создали для выполнения военных и научных вычислений.
   c) Созданные компьютеры выполняли вычисления военного и научного назначения.
8. An American clerk invented a means of coding the data by punching holes into cards.
   a) Американский служащий изобрел посредством кодирования информации перфокарту.
   b) Американский клерк изобрел перфокарту, кодируя информацию.
   c) Американский служащий изобрел средство шифрования информации путем пробивания отверстий в карте.

Unit 4

DATA PROCESSING CONCEPTS

Texts:	Data Processing and Data Processing Systems. Advantages of Computer Data Processing. The First Electronic Computers.
Grammar:	Неличные формы глагола: Infinitive, Participle, Gerund. Модальные глаголы и их эквиваленты.
Tests	

1. Ознакомьтесь с терминами текста 1.

data processing ['deɪtə prəʊ'sesɪŋ] — обработка информации (данных)

to convert [kən'vɜ:t] — преобразовывать, переводить (в другие единицы)

to accomplish [ə'kɒmplɪʃ] — завершать, заканчивать; осуществлять, выполнять

to house [haʊs] — помещать, размещать

to improve [ɪm'pru:v] — улучшать, совершенствовать

to control [kən'trəʊl] — управлять, регулировать; управление, регулирование

to store [stɔ:] — хранить, запоминать, заносить в память (размещать в памяти)

storage ['stɔ:rɪʤ] — запоминающее устройство, память; хранение

resource [rɪ'sɔ:s] — ресурс, средство, возможность

facility [fə'sɪlɪtɪ] — устройство, средство; facilities — приспособления, возможности

equipment [ɪ'kwɪpmənt] — оборудование, аппаратура, приборы, устройства

available [ə'veɪləbl] — доступный, имеющийся (в наличии), возможный

display [dɪs'pleɪ] — дисплей, устройство (визуального) отображения, показ

manner ['mænə] — способ, образ (действий)

sequence ['sɪkwəns] — последовательность, порядок (следования)

successively [sək'sesɪvh] — последовательно

data storage hierarchy [haɪə'rɑ:kɪ] — иерархия (последовательность) запоминания информации (данных)

to enter ['entə] — входить; вводить (данные), заносить, записывать
comprehensive groupings — полные (обширные, универсальные) образования
meaningful ['mi:nɪŋfʊl] — имеющий смысл, значащий (о данных)
item ['aɪtəm] — элемент, составная часть
record ['rekɔ:d] — запись, регистрация; [rɪ'kɔ:rd] записывать, регистрировать
file [faɪl] — файл; заносить в файл (хранить в файле)
set — набор, множество, совокупность, серия, группа, система
data base ['deɪtə 'beɪz] — база данных
related [rɪ'leɪtɪd] — смежный, взаимосвязанный, относящийся (к чему-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 17th, 18th, and 19th centuries. Modern computers are marvels of an electronics technology that continues to produce smaller, cheaper, and more powerful components.

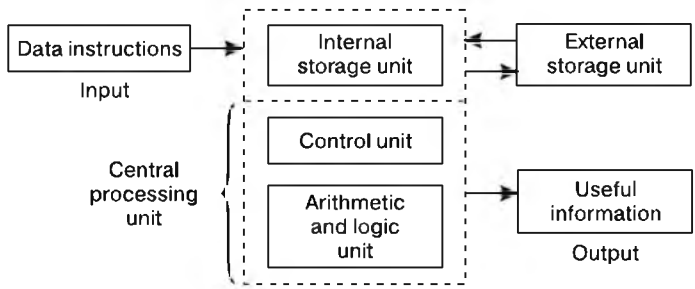


Fig. 3. Computer data processing system

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	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 accepting the data processing results from the computer and displaying them
9. Useful information	i) a set of related files
10. Data bank	j) the resources required to accomplish the processing of data. These 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 терминами текста 2.

manual ['mænjuəl] — ручной, выполняемый вручную
to take advantage of sth — воспользоваться чем-л.
capability [ˌkeɪpə'bɪlɪtɪ] — способность, возможность, характеристика
accuracy ['ækjʊrəsɪ] — точность, правильность, четкость (изображения)
correctly [kə'rektlɪ] — правильно, верно
to eliminate [eɬmɪ'neɪt] — устранять, удалять, отменять, ликвидировать

to make errors ['erəz] — допускать ошибки (погрешности)
error-prone — подверженный ошибкам
to remain vulnerable [rɪ'meɪn 'vʌlnərəbl] — оставаться уязвимым, чувствительным
invalid data [ɪn'vælɪd] — неверные, неправильные, недопустимые данные
communications networks — сети передачи данных, сети связи
travel ['trævəl] — перемещение, прохождение, путь, ход
instant response ['ɪnstənt rɪ'spɒns] — мгновенный ответ (реакция)
to respond [rɪ'spɒnd] — отвечать, реагировать
access ['æksəs] — доступ, обращение; обращаться, иметь доступ
capacity of storage [kə'pæsɪtɪ əv 'stɒrɪʤ] — объем (емкость) памяти
to retrieve [rɪ'tri:v] — извлекать, выбирать (данные); восстанавливать (файл)
value ['vælju] — значение, величина; значимость, ценность; оценка; оценивать
objective [əb'ʤektɪv] — цель, требование; целевая функция
cost-effective ['kɒst ɪ'fektɪv] — экономичный, экономически оправданный
challenge ['ʧælɪnʤ] — трудность, препятствие; представлять трудность

9. Прочитайте 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 systems. 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 disks 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 communications networks? 5. Give examples of a data communications 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.

12. Вспомните значения новых слов и догадайтесь о значении их производных.

To eliminate: elimination, eliminable, eliminator, unlimited.

To respond: respondent, response, responsible, irresponsible, responsibility.

Accuracy: inaccuracy, accurate, inaccurate, accurately.

Correctly: correct, incorrect, to correct, correction, correctional, corrective, corrector.

Vulnerable: invulnerable, vulnerability, invulnerability.

Invalid: valid, invalidity, validity.

Access: accessible, inaccessible, accessibility, inaccessibility.

13. Преобразуйте предложения, содержащие модальные глаголы: а) в прошедшее время; б) будущее время.

1. Computers *can* replace people in dull routine work. 2. The program is a set of instructions that *may* also include data to be processed. 3. Computer-controlled robots *must* increase the productivity of industry. 4. They *can* help in making different decisions. 5. The pupils *may* work with computers at the lessons. 6. Electric pulses *can* move at the speed of light. 7. Storage devices *must* have capacities for the input, output data and programs and for intermediate results. 8. Business minicomputers *can* perform to 100 million operations per second. 9. In order to solve scientific problems researchers *must* deal with the language of science — mathematics. 10. Programmers *must* write application programs in a way that computers *can* understand.

14. Составьте на русском языке аннотации к текстам, предложенным ниже. Обратите внимание на то, что стиль аннотаций, как правило, имеет безличностный характер. Выберите и используйте при работе следующие клише.

Статья (текст) посвящена проблеме (вопросу)...

В начале статьи

— речь идет о...;

— дается определение...;

— обосновывается значимость...;

— привлекается внимание к...

Далее

— *описывается...*;

— рассказывается...;

— рассматривается...;
— излагается...

В частности,
— отмечается, например, ...;
— подробно излагается...;
— описывается схема...;
— указывается...;
— доказывается мысль...

Наконец,
— раскрывается...

В заключение
— приводятся примеры...

Подытоживая сказанное, следует отметить...
Как мне кажется, статья может представлять интерес для...
Думается, статья может оказаться полезной для...

Text 3. THE FIRST ELECTRONIC COMPUTERS

1. The ENIAC (1943—1946)

The first all-electronic computer, the Electronic Numerical Integrator and Calculator (ENIAC) was developed at the Moore School of Electrical Engineering of the University of Pennsylvania. It was developed as a result of a military need. J. Presper Eckert and John Mauchly proposed the machine to solve the problem of calculating firing tables for new weapons.

The ENIAC weighed 90 tons, its 18,000 vacuum tubes demanded 140 kilowatts of electric power. Although it was fully electronic, the ENIAC had two major shortcomings: it could store and manipulate only a very limited amount of information, and its programs were wired on board. Since its programs were hardwired — that is, the programs operating the computer were established by physically changing the patterns of the wires interconnecting the vacuum tubes — the machine was not so flexible in operation. These limitations made it difficult to detect errors and to change the programs. And yet, the project was successful and the ENIAC was used for many years to solve ballistic problems.

2. The EDVAC (1946—1952)

Although the idea of an automatic computing engine occurred first to Charles Babbage in 1832, it was more than a century later, in 1945, that John von Neumann set out the principles that fixed the pattern of computer design.

Dr. John von Neumann, professor of mathematics at the Prinston Institute of Advanced Study, together with P. Eckert, J. Mauchly and Goldstine became a project member of a new improved computer, the Electronic Discrete Variable Computer (EDVAC). Von Neumann was a major contributor

to the project as he developed the concept of storing instructions as well as data in the memory of the computer. As a result it became possible to replace the writing board, which so seriously handicapped the operation of the ENIAC.

Von Neumann is also given a share of the credit for introducing the idea of storing both instructions and data in a binary code instead of decimal numbers or human-readable words.

3. The UNIVAC I (1951)

P. Eckert and J. Mauchly left the EDVAC project to form their own company and built the UNIVAC I computer. UNIVAC stands for UNIVersal Automatic Computer. The first UNIVAC was installed in the Census Bureau in 1951, and it was used continuously for 10 years. From the University laboratories the computer finally entered the wider world in 1951 with the invention of first UNIVAC I. It was the first digital computer which was not "one of a kind," it was produced in quantity.

In 1952 IBM (International Business Machine) introduced the 701 commercial computer. Although limited in storage capacity by modern standards, the 701 could add a column of 10-digit numbers as tall as the Empire State Building in one second. Very soon improved models of the UNIVAC I and other 701-series machines were introduced. In 1953 IBM produced the IBM 650, which used a magnetic drum for storage and was popular with business and science.

15. Поменяйтесь вариантами и выполните письменно перевод предложенных выше текстов.

TESTS

1. Подберите вместо пропусков подходящее по смыслу слово.

1. Computer data _____ system frees humans from routine error-prone tasks.
   a) counting; b) computing; c) processing
2. Computers can store vast amount of information to organize it and _____ it.
   a) to travel; b) to retrieve; c) to respond
3. The entered data can be transmitted by _____ networks.
   a) communications; b) conversions; c) procession
4. The possibility of _____ is reduced if data were correctly put into the data processing system.
   a) character; b) access; c) error

5. Computer data processing systems can _____ at a fraction of a second.
   a) receive; b) respond; c) retrieve
6. Computer systems are vulnerable to the entry of _____ data.
   a) invalid; b) invariable; c) invisible
7. As soon as data were entered into the system correctly, the human _____ is limited.
   a) computation; b) information; c) manipulation
8. The amount of data stored on magnetic disks is constantly _____ .
   a) decreasing; b) increasing; c) eliminating

2. Согласуйте слова в левой колонке с их интерпретацией, предложенной справа.

1. Inputting	a) saving information for further processing
2. Character	b) the process of producing useful information
3. Database	c) meaningful collections of related characters
4. Data elements	d) the most common input device
5. Controlling	e) the part of the computer that receives and stores data for processing
6. Outputting	f) directing the sequence of the operations performed
7. Memory	g) a written language symbol
8. Record	h) a collection of related data elements
9. Keyboard	i) a set of related facts
10. Storing	j) the process of entering collected data into a data processing system

Unit 5

COMPUTER SYSTEMS: AN OVERVIEW

Texts:	Computer System Architecture. Hardware, Software, and Firmware. Steps in the Developing of Computers. From the History of Computer Development in Russia.
Grammar:	Словообразование. Неличные формы глагола. Причастие I в функции обстоятельства. Действительный и страдательный залог существительных.
Tests	
Enjoy Yourself	

1. Ознакомьтесь с терминами текста 1.

architecture [ˌɑ:kɪ'tekʧə] — архитектура, структура
architect ['ɑ:kɪtekt] — разработчик архитектуры (системы, структуры)
unit ['ju:nɪt] — устройство, модуль, блок, элемент, составная часть
accessory equipment [æk'sesərɪ] — вспомогательные устройства
engineering background ['bækgraʊnd] — техническая подготовка, квалификация
analyst ['ænəlɪst] — аналитик, системный разработчик
product line — серия (компьютерных) продуктов
manufacturer [ˌmænjʊ'fækʧərə] — изготовитель, производитель, разработчик
application programmer [æplɪ'keɪʃn prəʊ'græmə] — прикладной программист
to simulate ['sɪmjʊleɪt] — моделировать, имитировать
voltage ['vɒltɪʤ] — напряжение
pressure ['preʃə] — давление, сжатие
digital computer ['dɪʤɪtəl kəm'pju:tə] — цифровой компьютер
hybrid computer ['haɪbrɪd] — смешанного типа, аналого-цифровой компьютер
discrete [dɪs'kri:t] — дискретный, отдельный
continuous quantity [kən'tɪnjʊəs 'kwɒntɪtɪ] — непрерывная величина
on-going process — продолжающийся, постоянный, непрерывный процесс
to rely [rɪ'laɪ] — основываться на чем-л., полагаться
to install [ɪn'stɔ:l] — устанавливать, размещать, монтировать, настраивать

household appliances ['haʊshəʊld əp'laɪənsɪz] — домашние приборы / устройства
microwave oven ['maɪkrəʊweɪv 'ʌvn] — микроволновая печь
indoor climate control system — система регуляции температуры в доме

2. Прочитайте 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 systems 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 businesses. 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 systems 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 centers 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 слов и 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; домашние приборы.

5. Образуйте (и переведите) имена существительные от приведенных ниже глаголов с помощью суффиксов.

A. *-er, -or*

To control, to compute, to design, to use, to manufacture, to work, to simulate, to operate, to protect, to process, to deal, to perform, to examine, to program, to execute, to transmit, to convert, to print, to consume, to record.

B. *-tion, -sion*

To organize, to collect, to combine, to apply (ic), to represent, to add, to corporate, to transact, to compute, to produce, to operate, to execute,

to protect, to substitute, to prepare, to invent, to decide, to eliminate, to communicate, to correct, to inform.

C. *-ment*

To require, to measure, to equip, to invest, to accomplish, to improve, to develop, to achieve, to displace, to govern, to move.

6. 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.

7. Ознакомьтесь с терминами текста 2.

hardware ['hɑ:dweə] — аппаратное обеспечение, аппаратура, оборудование
software ['sɒftwɛə] — программное обеспечение, программные средства
system software — системное программное обеспечение
application software — прикладное программное обеспечение
firmware ['fɜ:mwɛə] — встроенное / микропроцессорное программное обеспечение
visible units ['vɪzɪbl 'ju:nɪts] — видимый блок, устройство
procedure [prə'sɪʤə] — процедура, процесс, метод, методика, алгоритм
to associate [ə'səʊʃɪeɪt] — соединять, объединять, связывать
associated documentation — соответствующая документация
to execute applications programs — выполнять прикладные программы
payroll ['peɪrəʊl] — платежная ведомость
inventory control [ɪn'ventərɪ kən'trəʊl] — инвентаризация, переучет
investment analyses [ə'næhsɪz] — анализ инвестиций (капиталовложений)
to protect [prə'tekt] — защищать

read-only memory (ROM) — постоянное запоминающее устройство (ПЗУ)
to refer to [rɪ'fɜ:] — относиться к; ссылаться на
to substitute ['sʌbstɪtju:t] — заменять, замещать
to cause [kɔ:z] — заставлять, вынуждать; причина, основание
to accomplish [ə'kɒmplɪʃ] — завершать, заканчивать; выполнять, осуществлять
performance [pə'fɔ:məns] — производительность; быстродействие; рабочая характеристика

8. Прочитайте 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 applications 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 applications 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.

9. Ответьте на вопросы, используя информацию текста.

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

10. Найдите в тексте английские эквиваленты следующих слов и 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.

11. Вспомните значения 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: systems software; applications 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; systems 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.

12. Озаглавьте каждый компонент текста и составьте небольшой реферат к нему (по вариантам).

STEPS IN THE DEVELOPMENT OF COMPUTERS

1. In 1948 due to the invention of transistors there appeared the possibility to replace vacuum tubes. The transistor occupied an important place on the way to computer development. The potential advantage of the transistor over the vacuum tube was almost as great as that of the vacuum tube over the relay. A transistor can switch flows of electricity as fast as the vacuum tubes used in computers, but the transistors use much less power than equivalent vacuum tubes, and are considerably smaller. Transistors are less expensive and more reliable.They were mechanically rugged, had practically unlimited life and could do some jobs better than electronic tubes. Transistors were made of crystallic solid material called semiconductor.

With the transistor came the possibility of building computers with much greater complexity and speed.

2. The integrated circuit constituted another major step in the development of computer technology. Until 1959 the fundamental logical components of digital computers were the individual electrical switches, first in the form of relays, then vacuum tubes, then transistors. In the vacuum tubes and relay stages, additional discrete components, such as resistors, inductors, and capacitors were required in order to make the whole system work. These components were generally each about the same size as packaged transistors. Integrated circuit technology permitted the elimination of some of these components and integration of most of the others on the same chip of semiconductor that contains the transistor. Thus the basic logic element — the switch, or "flip-flop," which required two separate transistors and some resistors and capacitors in the early 1950s, could be packaged into a single small unit in 1960. The chip was an important achievement in the accelerating step of computer technology.

3. In 1974 a company in New Mexico, called Micro Instrumentation Telemetry System (MITS) developed the Altair 8800, a personal computer (PC) in a kit. The Altair had no keyboard, but a panel of switches with which to enter the information. Its capacity was less than one percent that of the 1991 Hewlett-Packard handheld computer. But the Altair led to a revolution in computer electronics that continues today. Hardware manufacturers soon introduced personal computers, and software manufacturers began developing software to allow the computers to process words, manipulate data, and draw. During the 1980s computers became progressively smaller, better, and cheaper.

Today the personal computer can serve as a work station for the individual. A wide array of computer functions are now accessible to people with no technical background.

13. Поменяйтесь вариантами и выполните письменный перевод упр. 12.

TESTS

1. Подберите вместо пропусков подходящее по смыслу слово.

1. Computers and their _____ equipment are designed by a computer system architect.
   a) engineering; b) accessory; c) specific
2. Digital computers use numbers instead of analogous physical _____ .
   a) symbols; b) equipment; c) quantities
3. Systems _____ are usualy stored in read-only memory.
   a) hardware; b) software; c) firmware
4. A computer is a machine with a complex network of electronic _____ that operate switches.
   a) circuits; b) cores; c) characters
5. In modern electronic computers the _____ is the device that acts as a switch.
   a) integrated circuit; b) diode; c) transistor
6. A number of actions that convert data into useful information is defined as _____ .
   a) data; b) processing; c) data processing
7. Computers can store, organize, and retrieve great amounts of information, far beyond the _____ of humans.
   a) capacities; b) capabilities; c) accuracy
8. The analyst _____ a computer for solving problems, while the computer system architect _____ computers.
   a) requires; b) designs; c) uses
9. The use of _____ computers will continue to increase with the growth in applications of microprocessors and minicomputers.
   a) analog; b) digital; c) hybrid
10. The development of third-generation computers became possible due to the invention of _____ .
    a) integrated circuits; b) electronic tubes; c) transistors

2. Согласуйте слова в левой колонке с их интерпретацией, предложенной справа.

1. Computer	a) a combination of interconnected circuit elements produced in a chip to perform a definite function
2. Analog computer	b) a sequence of instructions enabling the computer to solve a given task
3. Digital computer	c) a tiny piece of silicon containing complex electronic circuits used inside all computers
4. Hardware	d) a system which processes and stores great amount of data solving problems of numerical computation

5. Software	e) a device which can carry out routine mental tasks by performing simple operations at high speed
6. Program	f) electronic and mechanical equipment in a computer system
7. Programming	g) a set of programs, procedures, and associated documentation
8. Integrated circuit	h) the process of preparation of a set of coded instructions for a computer
9. Chip	i) a device that has input and output represented in the form of physical quantities
10. Transistor	j) a small piece of a semiconductor that greatly reduced power consumption of a circuit

3. Раскройте скобки.

A. Употребите правильную неличную форму глагола.

1. Computing is a concept (embraced; embracing; for embracing) not only arithmetics, but also computer literacy. 2. We can make the computer do what we want (inputted; to input; by inputting) signals (turning; turned; without turning) switches on and off. 3. Computers have a means (by communicating; of communicating; communicated) with the user. 4. Computers work according to the instructions (giving; given; to give) to it by users. 5. The transistor (inventing; invented; for inventing) in 1948 completely changed the vacuum tubes.

B. Употребите глагол в действительном или страдательном залоге.

1. Computers (applied; are applied; are applying) for automatic piloting and automatic navigation. 2. The programs (write; have written; are written) to help people in the use of the computer system. 3. As digital computers (count; counted; are counted) quickly, they widely (use; used; are used) in business data processing. 4. Once data (entered; have entered; have been entered) correctly into the data processing system, the possibility of error (reduced; is reduced; are reduced). 5. It is known that an analyst (use; uses; is used) a computer to solve specific problems.

4. Прочитайте текст и выберите правильные ответы на поставленные ниже вопросы к тексту.

FROM THE HISTORY OF COMPUTER DEVELOPMENT IN RUSSIA

As it is well-known, Russian scientists made great contribution into the development of computers. Russian mathematician P. Chebyshev who lived in the 19th century was interested in calculators. Among many other mechanisms invented by him there was an arithmometer designed in 1876. It was

one of the most unique calculating machines of the time. At the beginning of the 20th century Academic A. Krylov constructed a mechanical integrator for solving differential equations.

The first Soviet computer, a small-size computing machine (MESM) was tested in 1950 under Academician S. Lebedev. Next year it was put into operation. In a year MESM was followed by BESM, a large-size electronic computing machine, with 8,000 operations per second.

Serial production of computers in the USSR has been started since 1953. That year U. Basilevsky headed the design and manufacture of computer STRELA. 1958 witnessed the production of M-20, computers of the first generation under the guidance of S. Lebedev. The first generation of electron tube computers was followed by the second generation of foto transistor computers, using magnetic logic elements.

Starting with 1964 semiconductor computers — URAL, BESM-4 and M-220 were produced. Under Academician Glushkov small-size computers MIR, MIR-2, and DNEPR were designed and tested at the Institute of Cybernetics.

In the late 60s together with other members of the Council of Mutual Economic Assistance the Soviet Union started on the program of Unified Computer System, the program concerned with the third generation of computers with high-speed performance and program compatibility (совместимость).

Fig. 4. Academician B.M. Glushkov

1. What was one of the first achievements in the sphere of calculating in Russia?
   a) calculator; b) arithmometer; c) mechanical integrator
2. When was the first Soviet computer put into operation?
   a) in 1950; b) in 1951; c) in 1952
3. Who headed the serial production of computers in the USSR?
   a) A. Krylov; b) S. Lebedev; c) U. Basilevsky
4. Which machine was the first in the development of the first-generation computers?
   a) MESM; b) STRELA; c) M-20

5. When did the production of the third-generation computers begin?
   a) late 60s; b) early 70s; c) late 70s

ENJOY YOURSELF

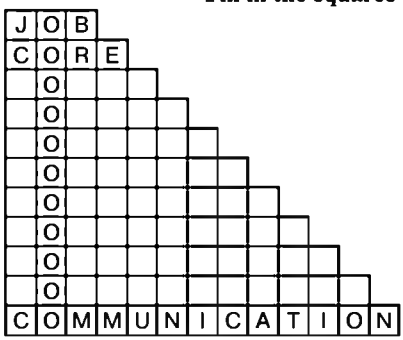
1. Quiz-game "What do you know about computers?" (Who is the first to give the right answers to the questions below?)

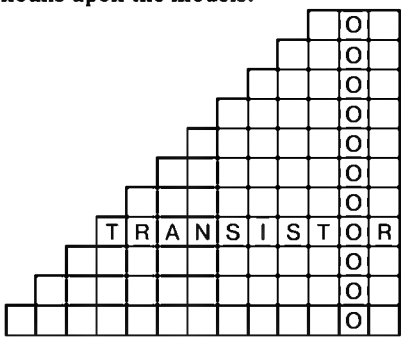
1. What does "a computer-literate" person mean?
2. What is the role of computers in our society?
3. What is electronics?
4. Where are electronic devices used?
5. What invention contributed to the appearance of electronics?
6. When and where was the transistor invented?
7. What advantages did the transistor have over the vacuum tube?
8. When was the integrated circuit discovered?
9. What is the essence of the integrated circuit?
10. What is microelectronics?
11. What techniques does microelectronics use?
12. What scales of integration are known to you?
13. What do you understand by microminiaturization?
14. What was the very first calculating device?
15. Who gave the ideas for producing logarithm tables?
16. Who invented the first calculating machine?
17. How was the first calculating machine called?
18. What was the first means of coding data?
19. What business corporation was the first to produce computers?
20. In what fields were the first computers used?
21. When was the first analog computer built?
22. What was the name of the first digital computer?
23. Who built the first digital computer?
24. What is ENIAC? Decode it.
25. Who contributed the idea of storing data and instructions in binary code?
26. What does binary code mean?
27. What were computers of the first generation based on?
28. What invention contributed to the appearance of the second-generation computers?
29. What was the essence of the third computer generation?
30. What is the basis of the fourth computer generation?
31. What is a computer?
32. What are the main functions of the computers?
33. What is a program?
34. What are data?
35. What is data processing?

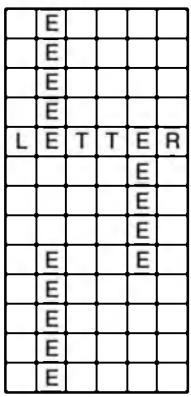
36. What are the four advantages of computer data processing?
37. What is capacity storage?
38. What is hardware?
39. What is software?
40. Who designs computers?

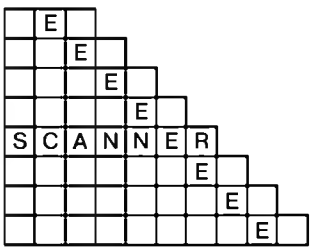
2. Lexical games.

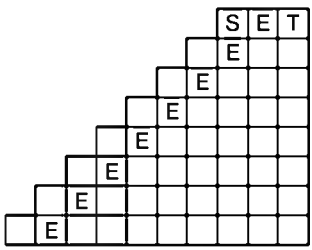
Fill in the squares with nouns upon the models.

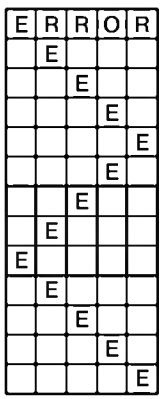


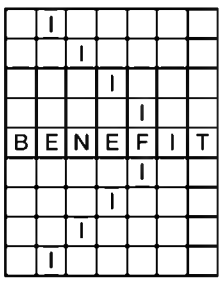


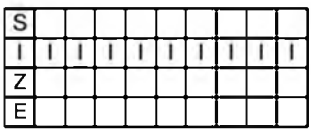




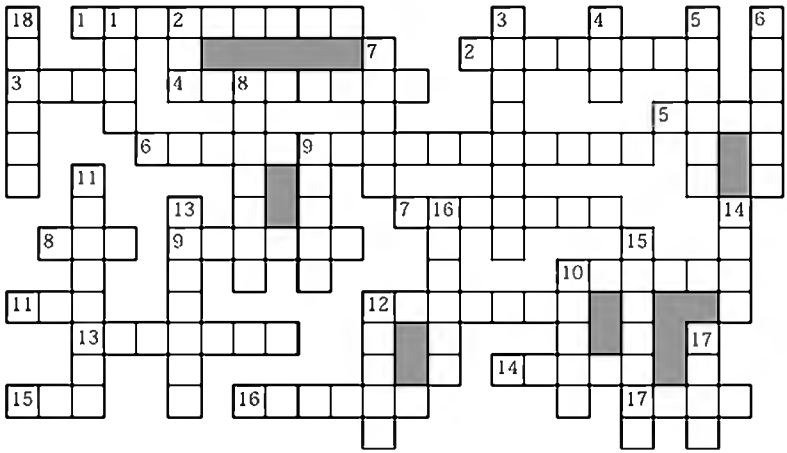








Crossword



Across

1. A more favorable position; gain or benefit. **2.** The following of one thing after another. **3.** Examination, experiment, or trial. **4.** The process opposite to multiplication. **5.** The heart, the central part of anything. **6.** The science dealing with microcircuits. **7.** Thickness, compactness; example: packing _____. **8.** Application. **9.** Doing sth; state of being in motion. **10.** To put in writing, to print for future use. **11.** Goal, purpose. **12.** Memory. **13.** Advantage, help; anything contributing to an improvement in condition. **14.** Intelligence, mental ability. **15.** Method or manner of doing sth. **16.** Display. **17.** A tiny crystal, containing an integrated circuit.

Down

1. Information. **2.** Help. **3.** Reply, answer, or reaction. **4.** A group of elements. **5.** A unit keeping information. **6.** Approach; means of approaching, getting. **7.** A style or design; imitation of an existing object. **8.** Different form of some thing; condition or quality. **9.** A mistake. **10.** A switch. **11.** Fitting together parts to make a whole. **12.** Rate. **13.** A model, a cliché, a standard. **14.** A system of symbols used for entering data into the computer. **15.** A branch of systematized knowledge of nature. **16.** An attempt; a hard try. **17.** A device. **18.** An example, a sample, a model.

Unit 6

FUNCTIONAL ORGANIZATION OF THE COMPUTER

Texts:	Functional Units of Digital Computers. Some Features of a Digital Computer. Logical Circuit Elements.
Grammar:	Словообразование. Степени сравнения прилагательных. Составление аннотации к тексту.
Tests	

1. Ознакомьтесь с терминами текста 1.

operation [ɔpə'reɪʃn] — операция; работа; действие; срабатывание
to relate [rɪ'leɪt] — связывать, устанавливать отношения
a broad view ['brɔ:d 'vju:] — широкий взгляд, обзор
unit ['ju:nɪt] — устройство, модуль, блок, узел, элемент, ячейка
input — ввод, устройство ввода, вводить, подавать на вход
to insert [ɪn'sɜ:t] — вставлять; вносить; включать
storage = memory — память, запоминающее устройство
available [ə'veɪləbl] — 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 [rɪ'mu:v] — удалять, устранять, вынимать, исключать
control unit — блок управления
cause [kɔ:z] — заставлять, вынуждать, быть причиной; причина, основание
to feed (fed, fed) — подавать; питать; вводить (данные)
to interpret [ɪn'tɜ:prɪt] — интерпретировать, истолковывать
to issue commands ['ɪsju: kə'mɑ:ndz] — выдавать команды
pulse — no-pulse — (есть) импульс — холостой импульс

2. Прочитайте 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.

Figure 5 shows how the 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.

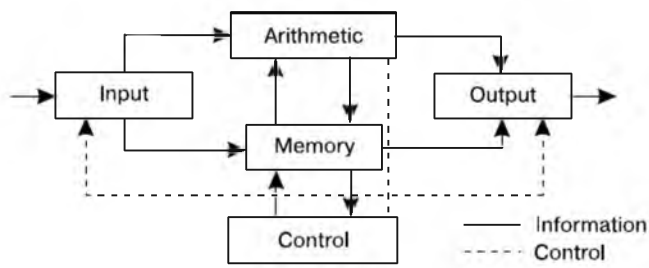


Fig. 5. Functional units of a computer

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. Разделите приведенные ниже слова на три группы, определяя по суффиксу часть речи — существительное, прилагательное или наречие. Переведите слова.

Organization, functional, available, equipment, processor, completely, architectural, converter, convertible, controller, removable, logical, addition, additional, usually, accomplishment, operator, operation, mainly, communication, insertion, electronic, digital, instruction, generally, arithmetic, daily, development, central, lately, visible, substitution, understandable.

6. Вспомните значения 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-logic 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.

7. Вспомните значения следующих прилагательных и преобразуйте их в сравнительную и превосходную степень.

A. Small; fast; new; long; late; wide; young; easy; great; dull; rich; bulky; large; vast; early; old; broad.

B. Frequent; reliable; approximate; significant; intricate; possible; basic; remarkable; common; modern; dependent; general; necessary; successful; scientific; universal.

C. Good; bad; little; many.

8. Ознакомьтесь с аннотацией к тексту 1.

В тексте (статье) описываются функциональные устройства цифровых компьютеров, а именно: устройства ввода и вывода информации, запоминающее устройство, арифметико-логическое устройство и блок управления. Разъясняются назначение каждого устройства и их взаимодействие друг с другом с помощью машинного языка, использующего сочетание электрических импульсов, которые представлены цифрами 1 и 0, т.е. импульс — холостой импульс.

Статья предназначена для учащихся и студентов технических специальностей, изучающих английский язык.

9. Ознакомьтесь с терминами текста 2.

large-scale — большой, крупномасштабный
flip-flop — триггер
circuit ['sɜ:kɪt] — цепь, контур, схема
employ [ɪm'plɔɪ] — использовать, употреблять, применять
logic gates — логический элемент, схема пропускания (сигналов), проход
feasible — возможный, выполнимый, осуществимый
interpret orders — интерпретировать, истолковывать команды
operate switches — приводить в действие переключатели
convey [kən'veɪ] — передавать, сообщать
in response to — в ответ на
correct operand — нужный операнд
original input data — исходная вводимая информация
proceed [prə'si:d] — продолжать(ся), возобновлять(ся), действовать
room — (свободное) место, свободная память

10. Прочитайте текст 2 и скажите, какую дополнительную информацию вы узнали о действии основных устройств компьютера.

Text 2. SOME FEATURES OF A DIGITAL COMPUTER

It should be noticed that even in a large-scale digital system, such as in a computer, or in a data-processing, control, or digital-communication sys-

tem, there are only a few basic operations which must be performed. These operations may be operated many times. The four circuits most commonly employed in such systems are known as the *OR, AND, NOT and FLIP-FLOP.* They are called logic gates or circuits.

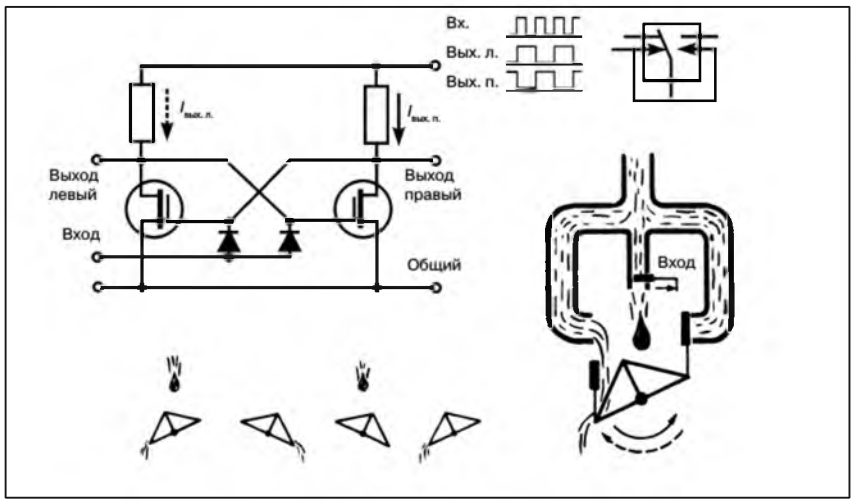


Fig. 6. FLIP-FLOP

An electronic digital computer is a system which processes and stores very large amount of data and which solves scientific problems of numerical computations of such complexity and with such speed that solution by human calculation is not feasible. So the computer as a system can perform numerical computations and follow instructions with extreme speed but it cannot program itself.

We know that the numbers and the instructions which form the program, the computer is to follow, are stored in an essential part of the computer called the memory. The second important unit of the computer is the control whose function is to interpret orders. The control must convert the command into an appropriate set of voltages to operate switches and carry out the instructions conveyed by the order. The third basic element of a computer is the arithmetic device, which contains the circuits performing the arithmetic computations: addition, subtraction, etc. The control and arithmetic components are called the central processor. Finally a computer requires appropriate input-output devices for inserting numbers and orders into the memory and for reading the final result.

Suppose a command to perform an addition or division has been transmitted to the central processor. In response to this order the control

must select the correct operands from the memory, transmit them to the arithmetic unit and return to the memory the result of the computation. The memory serves for storing not only the original input data, but also the partial results which will have to be used again as the computation proceeds.

Lastly, if the computation doesn't stop with the execution of this instruction and the storage of the partial result, the control unit must automatically pass on to the next instruction. The connection of the control unit back to the input permits insertion of more data when there is room in the memory.

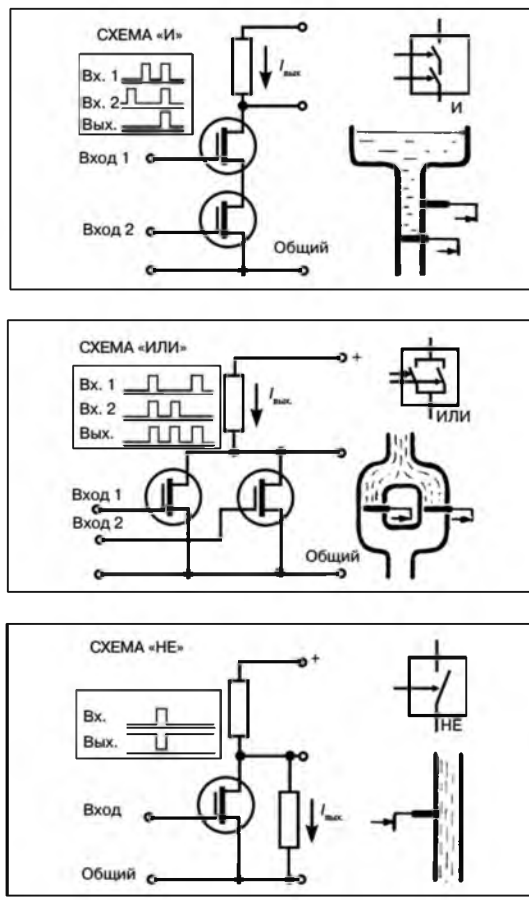


Fig. 7. Circuits AND, OR, and NOT

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

1. What are the most commonly used circuits in any computer? 2. How are they called? 3. What kind of a system is a digital computer? 4. Is there anything that a computer cannot do itself? What is it? 5. Where are the instructions and digits stored? 6. What is the function of the control? 7. What does the arithmetic device serve for? 8. What components form the central processor? 9. What other devices in addition to the above-mentioned ones does a computer require? 10. How are computations performed in a computer?

12. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Крупномасштабная цифровая система; система обработки данных; система цифровой связи; наиболее широко распространенные схемы; логические схемы; решать научные проблемы; выполнять числовые расчеты; интерпретировать команды; приводить в действие переключатели; выполнять команды; нуждаться (требовать) в необходимом устройстве ввода-вывода; введение чисел и команд; считывание конечных результатов; передавать команду в центральный процессор; в ответ на; хранение частичных результатов; позволить введение новых данных; свободное место в памяти.

13. Подберите пары или группы близких по значению слов из предложенных ниже. Переведите слова на русский язык.

Verbs: relate, employ, insert, perform, remove, operate, show, interpret, select, issue, use, receive, perform, cause, print, make, compute, connect, execute, take away, require, act, convert, carry out, demand, permit, demonstrate, choose, transmit, type, store, get, calculate, proceed, continue, keep, allow.

Nouns: response, unit, component, computation, storage, gate, amount, digit, element, memory, instruction, device, equipment, connection, circuit, order, command, information, relation, quantity, answer, calculation, number, data.

Adjectives: broad, complete, each, appropriate, every, basic, essential, digital, original, full, wide, initial, major, large, numerical, common, necessary, usual, important, general, great.

14. Согласуйте слова в левой колонке с их интерпретацией, предложенной справа.

1. Functional organization of a computer	a) processes and stores large amount of data and solves problems of numerical computations
2. Input	b) circuits used in large-scale digital systems

3. Memory	c) method of interrelation of the main units of a computer
4. Control unit	d) removing data from the device to the outside world
5. Output	e) inserting information into the computer
6. Arithmetic unit	f) a code of combinations of electric pulses
7. Machine language	g) performs addition, subtraction, multiplication, etc.
8. Logic gates	h) stores original data as well as partial results
9. Digital computer	i) causes all parts of the computer to act as a team

15. Расскажите о действии функциональных устройств компьютера, пользуясь приведенной ниже схемой.

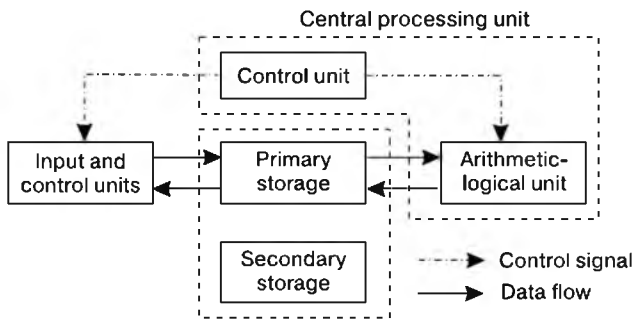


Fig. 8. Computer system organization

16. Составьте аннотации на русском языке к следующим текстам по вариантам. Используйте упр. 14 на с. 45.

1. Logical circuit elements

As it is known, any digital calculation — whether it is performed by "pencil and paper" methods or with the aid of an automatic computer — must first be broken down into a sequence of elementary arithmetical operations, such as addition or multiplication. Each such arithmetical operation may be converted into a sequence of simple *logical operations.* It should be noted that a binary digit may take only two values — "zero" and "one." A logical proposition may be either true or false.

A symbolism and a set of rules suitable for manipulating "yes or no" logical propositions were developed by George Boole, a self-educated genius who became Professor of Mathematics at Cork University in the middle of the 19th century. The techniques of Boolean algebra are now extensively used by electrical engineers for the design and analysis of switching circuits. Both

the arithmetic and control units of a computer consist of sets of switching circuits for directing and manipulating electrical pulse signals.

The process of combining a number of electronic circuits of known logical properties into an integrated system capable of performing special arithmetical or control functions is known as *logical design*.

2. The definition of mechanical brain

Let's imagine a railroad line with four stations marked input, storage, computer, and output. These stations are joined by little gates or switches to the main railroad line. We can imagine that numbers and other information move along this railroad line, loaded (погруженные) in cars. Input and output are stations where numbers or other information go in and come out respectively. Storage is a station where there are many platforms and where information can be stored. The computer is a special station, somewhat like a factory. When two numbers are loaded on platforms 1 and 2 of this station and the command is loaded on platform 3, then another number is produced on platform 4.

There is a tower, marked control. This tower runs a telegraph line to each of its little watchmen standing by the gates. The tower tells them when to open and when to shut which gates. Now we can see that as soon as the right gates are shut, cars loaded with information can move between stations. So by closing the right gates, we can flash (отражать) numbers and information through the system and perform operations of reasoning. Thus we receive a mechanical brain.

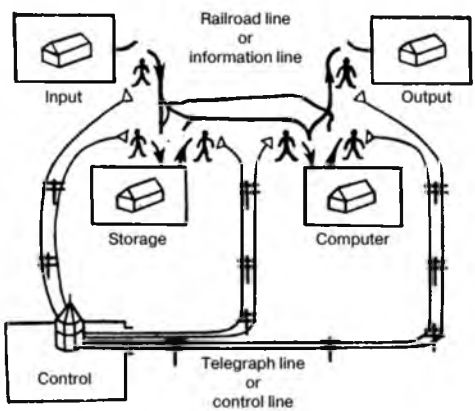


Fig. 9. Logical circuit elements

In general, a mechanical brain is made up of: *a quantity of registers* where information can be stored; *channels* along which information can be sent;

mechanisms that carry out arithmetic and logical operations; *a control*, which guides the machine to perform a sequence of operations; *input and output devices*, where information can go into and out of the machine; and at last *electricity*, which provide energy.

17. Поменяйтесь вариантами и выполните письменный перевод приведенных выше текстов.

TESTS

1. Подберите вместо пропусков подходящие по смыслу слова.

1. The method of _____ all functional categories to one another represents the functional organization of a computer.
   a) showing; b) relating; c) performing
2. Instructions and data are fed through the _____ equipment to the _____ .
   a) output; b) memory; c) input; d) control
3. The main units of the computer communicate with each other _____ a machine language.
   a) in spite of; b) because of; c) by means of
4. The input also _____ the information into the pulse — no-pulse combinations understandable to the computer.
   a) converts; b) removes; c) accomplishes
5. The four _____ are used to perform basic operations in a computer.
   a) basics; b) circuits; c) equipment
6. A computer can solve very complex numerical _____ .
   a) communication; b) computations; c) instructions
7. Numbers and instructions forming the program are _____ in the memory.
   a) solved; b) stored; c) simulated
8. The control unit serves for _____ orders.
   a) reading; b) interpreting; c) inputting
9. The function of memory is to store _____ the original input data _____ the partial results.
   a) not only ... but also; b) either ... or; c) no sooner ... than
10. The _____ includes the control and arithmetic-logic units.
    a) flip-flop; b) digital computer; c) central processor

2. Заполните пропуски, выбрав правильную грамматическую форму.

1. The simplest digital device is any device which [a) can; b) could; c) must] count.

2. In ancient days man [a) learns; b) learned; c) has learned] to substitute beads for fingers to help him count.

3. The ancient Chinese simplified the [a) counted; b) to count; c) counting] board into abacus.

4. The Japanese improved the abacus making it [a) more efficient; b) much efficient; c) efficienter].

5. The tremendous speeds of computers and the flexibility [a) building; b) built; c) to build] into them [a) because of; b) according to; c) due to] the logical control make modern computers more powerful than mechanical calculators.

6. The big problem in understanding digital computers is the logic which relates the logical elements into a unit [a) performed; b) performing; c) having performed] arithmetic and logical operations.

7. Arithmetic operations [a) converted; b) are converted; c) was converted] into a sequence of simple logical operations.

8. Any digital calculation is usually [a) breaking; b) broken; c) being broken] down into a sequence of elementary operations.

9. A computer is a device [a) to accept; b) has accepted; c) accepts] a set of instructions and [a) executes; b) executed; c) to execute] them in the appropriate sequence.

10. The flip-flop [a) is; b) was; c) has been] a storage cell with two inputs and two outputs.

Unit 7

STORAGE

Texts:	Storage Units. Storage Devices. Digital Computer Operation. Memory.
Grammar:	Participle I. Participle II. Perfect Participle Active and Passive.
Tests	

1. Ознакомьтесь с терминами текста 1.

primary/secondary storage — первичное/вторичное запоминающее устройство
main storage — основная память, оперативное запоминающее устройство
internal storage [ɪn'tɜ:nəl] — внутреннее ЗУ
sequence ['sɪkwəns] — последовательность, порядок следования
intermediate results [ˌɪntə'mɪdɪət rɪ'zʌlts] — промежуточные результаты
ongoing process ['ɒngəʊɪŋ 'prəʊsəs] — продолжающий(ся), постоянный процесс
similarity [sɪmɪ'lærɪtɪ] — сходство, подобие
to retain [rɪ'teɪn] — сохранять, удерживать
to locate [ləʊ'keɪt] — размещать(ся), располагать(ся)
value ['vælju:] — значение, величина; значимость, ценность; оценка
binary digit ['baɪnərɪ 'dɪʤɪt] — двоичная цифра, двоичный знак
adjacent [ə'ʤeɪsənt] — смежный, соседний, примыкающий
strings of characters — последовательность символов
consecutive [kən'sekjʊtɪv] — последовательный, смежный, соседний

2. Прочитайте текст и скажите, что такое запоминающее устройство в компьютере и о каких его типах вы узнали из текста.

Text 1. STORAGE UNITS

Computer system architecture is organized around the primary storage unit because all data and instructions used by the computer system must pass through primary storage. Our discussion of computer system units will begin with the functions of the primary and secondary storage units. This leads to the examination of the central processing unit and from there to the

consideration of the input and output units. Therefore, the sequence in which we'll describe the functional units of a digital computer is: 1) storage units, primary and secondary; 2) central processing unit; 3) input and output units.

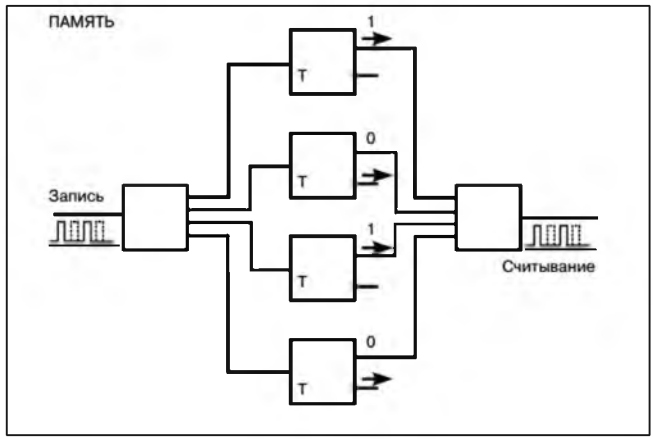


Fig. 10. Storage

As you know, there are primary and secondary storage units. Both contain data and the instructions for processing the data. Data as well as instructions must flow into and out of primary storage.

Primary storage is also called main storage or internal storage. The specific functions of internal storage are to hold (store): 1) all data to be processed; 2) intermediate results of processing; 3) final results of processing; 4) all the instructions required for ongoing process. Another name for primary storage is memory, because of its similarity to a function of the human brain. However, computer storage differs from human memory in important respects. Computer memory must be able to retain very large numbers of symbol combinations, without forgetting or changing any details. It must be able to locate all its contents quickly upon demand. The combinations of characters, that is, the letters, numbers, and special symbols by which we usually communicate, are coded. The codes used by computer designers are based upon a number system that has only two possible values, 0 and 1. A number system with only two digits, 0 and 1, is called *a binary number system*. Each binary digit is called a bit, from BInary digiT. As the information capacity of a single bit is limited to 2 alternatives, codes used by computer designers are based upon combinations of bits. These combinations are called *binary codes*. The most common binary codes are 8-bit codes because an 8-bit code provides for 2^8, or 256 unique combinations of 1s ans 0s, and this is more than adequate to represent all of the characters by which we communicate.

Data in the form of coded characters is stored in adjacent storage locations in main memory in two principal ways: 1) as "strings" of characters — in bytes; and 2) within fixed-size "boxes" — in words. A fixed number of consecutive bits that represent a character is called *a byte*. The most common byte size is 8-bit byte. *Words* are usually 1 or more bytes in length.

Secondary Storage. Primary storage is expensive because each bit is represented by a high-speed device, such as a semiconductor. A million bytes (that is, 8 million bits) is a large amount of primary storage. Often it is necessary to store many millions, sometimes billions, of bytes of data. Therefore slower, less expensive storage units are available for computer systems. These units are called *secondary storage.* Data are stored in them in the same binary codes as in main storage and are made available to main storage as needed.

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

1. What are the functional units of a digital computer? 2. What units make up the central processing unit? 3. How is computer system organized? 4. What are the two main types of storage units? 5. What do they contain? 6. What is the function of a primary storage? 7. Why is primary storage often called memory? 8. In what respect does computer memory differ from human memory? 9. What are codes based on? 10. What is secondary storage and what is it used for?

4. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Функциональный блок; цифровой компьютер; устройство ввода; устройство управления; арифметико-логическое устройство; центральный процессор; структура компьютерной системы; первичное запоминающее устройство; вторичное ЗУ; рассмотрение; поэтому последовательность; оперативное ЗУ; внутренняя память; промежуточные результаты; подобие функции человеческого мозга; размещать содержимое по требованию; система счисления; двоичная система счисления; возможные величины; объем информации; двоичный код; смежные ячейки памяти; последовательность символов; быстродействующее устройство; полупроводник; доступный.

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

Storage: available storage; buffer storage; computer storage; data storage; magnetic disk storage; magnetic tape storage; input storage; intermediate storage; internal storage; laser storage; main storage; primary storage; secondary storage; sequential-access storage; variable storage; virtual storage.

Value: absolute value; acceptable value; additional value; binary value; byte value; character value; constant value; correct value; data value; digit value; discrete values; invalid value; negative value; numerical value; output value; valid value.

Digit: binary digit; binary-coded digit; check digit; information digit; input digit; nonsignificant digit; significant digit; digit-by-digit.

Sequence: out of sequence; alphabetic sequence; arithmetic sequence; binary sequence; character sequence; code sequence; instruction sequence; data sequence; digital sequence; historical sequence; increasing sequence; program sequence; string sequence.

6. Найдите в тексте слова, близкие по значению к следующим.

Memory; element; information; command; examination; character; quantity; number; place; computer architect; likeness.

To apply; to form; to move; to hold; to demand; to connect; to supply; to place; to name; to start; to examine.

Continuous; significant; consecutive; usual; enough; main; initial; general.

7. Переведите предложения, содержащие Perfect Participle Active и Perfect Participle Passive.

1. *Having finished* the research, the scientists made the analysis of the data obtained. 2. The designer left the office *having looked* through all the documents. 3. *Having discussed* the functions of storage units, we passed on to the consideration of control processing unit. 4. *Having limited* the information capacity of a single bit to two alternatives, the computer designers expressed data by a combination of bits. 5. *Having translated* the program into machine language, the computer architect put the program into the machine. 6. *Having been coded*, the instruction was transmitted to the central processing unit. 7. *Having been transmitted* to the central processing unit, the instruction made arithmetic-logical unit perform some computations. 8. *Having been regulated* by the operator, the equipment operated well. 9. Data *having been entered* correctly into the computer component of a data processing system, the need for further manipulation by humans is eliminated. 10. *Having been* well *prepared* for the examination, the pupils could answer all the questions the teacher asked them.

8. Ознакомьтесь с терминами текста 2.

medium (pl. media) — носитель; среда
capacity — емкость, объем (памяти); пропускная способность
media capacity — емкость носителя
data access time — время доступа к данным
per bit — на единицу информации

to transfer — передавать(ся), переносить(ся), пересылать(ся)
archival storage — архивное ЗУ, архивная память
to depend — зависеть, полагаться, рассчитывать на
to rotate — вращать(ся); чередовать(ся), сменять(ся)
reason — причина, основание, довод; обосновывать, делать вывод
solid-state device — твердотельный прибор
magnetic core — магнитный сердечник
bipolar semiconductor — биполярный полупроводник
metal-oxide semiconductor (MOS) — структура металл — оксид — полупроводник
randomly — произвольно
random-access memory (RAM) — оперативное запоминающее устройство (ОЗУ)
sound recording — звукозапись
to arrange — размещать, располагать, устанавливать, монтировать
tape device — ЗУ на магнитной ленте
to range — классифицировать, располагать в порядке; лежать в диапазоне
magnetic disk storage — ЗУ на магнитном диске
moving-head device — устройство с двигающейся головкой
predominant — преобладающий, доминирующий
flexible — гибкий, настраиваемый, изменяемый
floppy (disk) — гибкий диск (дискета), ЗУ на гибком диске
to meet the demands — удовлетворять потребности

9. Прочитайте текст 2 и скажите, как вы понимаете термин «запоминающая среда» и какие компоненты ее составляют. Переведите текст.

Text 2. STORAGE DEVICES

Storage media are classified as primary storage or secondary storage on the basis of combinations of cost, capacity, and access time. The *cost* of storage devices is expressed as the cost per bit of data stored. The most common units of cost are cents, millicents (0.001 cents), and microcents (0.000001 cents). The time required for the computer to locate and transfer data to and from a storage medium is called the *access time* for that medium. *Capacities* range from a few hundred bytes of primary storage for very small computers to many billions of bytes of archival storage for very large computer systems.

Memories may be classified as *electronic* or *electromechanical.* Electronic memories have no moving mechanical parts, and data can be transferred into and out of them at very high speeds. Electromechanical memories depend upon moving mechanical parts for their operation, such as mechanisms

for rotating magnetic tapes and disks. Their data access time is longer than is that of electronic memories; however, they cost less per bit stored and have larger capacities for data storage. For these reasons most computer systems use electronic memory for primary storage and electromechanical memory for secondary storage.

Primary storage has the least capacity and is the most expensive; however, it has the fastest access time. The principal primary storage circuit elements are solid-state devices: magnetic cores and semiconductors. For many years magnetic cores were the principal elements used in digital computers for primary storage. The two principal types of semiconductors used for memory are bipolar and metal-oxide semiconductors (MOS). The former is faster, the latter is more commonly used at present. Because data can be accessed randomly, semiconductor memories are referred to as *random-access memory*, or RAM.

There is a wide range of *secondary storage devices*. Typical hardware devices are rotating electromechanical devices. Magnetic *tapes, disks, and drums* are the secondary storage hardware most often used in computer systems for sequential processing. Magnetic tape, which was invented by the Germans during World War II for sound recording, is the oldest secondary storage medium in common use. Data are recorded in the form of small magnetized "dots" that can be arranged to represent coded patterns of bits.

Tape devices range from large-capacity, high-data-rate units used with large data processing systems to *cassettes* and *cartridges* used with small systems. Magnetic disk storage, introduced in the early 1960s, has replaced magnetic tape as the main method of secondary storage. As contrasted with magnetic tapes, magnetic disks can perform both sequential and random processing. They are classified as moving-head, fixed-head, or combination moving-head and fixed-head devices. Magnetic disks are the predominant secondary storage media. They include flexible, or floppy disks, called diskettes. The "floppies" were introduced by IBM in 1972 and are still a popular storage medium to meet the demands of the microcomputer market.

10. Ответьте на вопросы, используя информацию текста.

1. How are storage media classified? 2. How is the cost of storage devices expressed? 3. What is the access time for storage media? 4. How does the storage capacity range? 5. What are the two main types of storage devices? 6. What are electronic storage devices? 7. What are the principal primary storage circuit elements? 8. What are the main secondary storage devices? 9. What is the oldest secondary medium and when was it invented? 10. What is a floppy?

11. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Запоминающие устройства; носители памяти; первичные ЗУ; вторичные ЗУ; время доступа; стоимость ЗУ; диапазон емкости памяти; архивная память; движущиеся механические части; вращающиеся магнитные ленты и диски; по этим причинам; твердотельные устройства; магнитные сердечники; полупроводники; оперативное ЗУ; аппаратное обеспечение вторичной памяти; звукозапись; намагниченные точки; представлять зашифрованную комбинацию единиц информации; в отличие от магнитных лент; последовательная и произвольная обработка; устройства с движущейся и фиксированной головкой; удовлетворять потребности; гибкий диск.

12. Опишите схему.

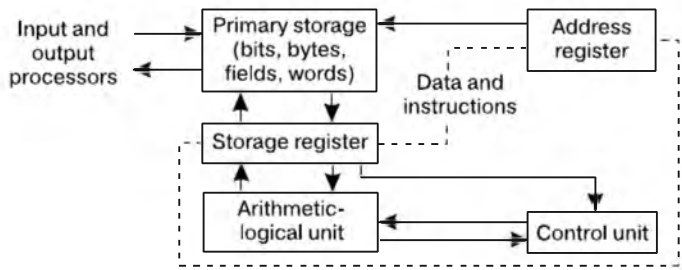


Fig. 11. Communication between the primary storage unit and the arithmetic-logic and control units

13. Переведите предложения, содержащие всевозможные формы причастий: Participle I, Participle II, Perfect Participle Active и Perfect Participle Passive.

1. Electromechanical memories depend upon *moving* mechanical parts for their operation. 2. The time *required* for the computer to locate and transfer data to and from a storage medium is called the access time. 3. *Being* not visible, software makes possible the effective operation of computer system. 4. *Having invented* magnetic tapes, the Germans used them as the secondary storage medium. 5. *When* properly *programmed*, computers don't make computational errors. 6. *Having been introduced* in the early 1960s, magnetic disk storage has replaced magnetic tape storage. 7. The control unit *interpreting* instructions is one of the important parts of any computer system. 8. Data *recorded* in the form of *magnetized* dots can be arranged to represent *coded* patterns of bits. 9. *As contrasted* with magnetic tapes, magnetic disks can perform both sequential and random processing. 10. *While having* no *moving* mechanical parts, electronic memories can transfer data at very high speed.

14. Выполните письменный перевод текста по вариантам.

DIGITAL COMPUTER OPERATION

1. A digital computer is a machine capable of performing operations on data represented in digital or number form. The individual operations performed by a digital computer are very simple arithmetic or logical processes involving the manipulation of the bits in words or characters of information. The great power of any digital computer rests in the ability to store large volumes of data and to perform these operations at extremely high speed.

In most electronic digital computers the method of number representation is based on the system of binary notation. The binary notation system is most widely used because of the convenience in constructing logic curcuits and storage devices capable of handling data in this form. For example, a magnetic memory unit consists of many thousand individual magnetic cells, each of which can be energized in either of two ways to represent the binary digits 0 or 1. If these cells are grouped to form words or binary coded characters, information can be stored for processing in units of specified size. In the same way, digital data can be recorded as a series of magnetized spots on a magnetic tape or a magnetic disk.

2. The computer has pervaded most fields of human activity and is the most important innovation of our age. Born out of the technology of communication, it is capable of handling enormous amounts of information at tremendous speeds. What makes it so potent is the fact that a single mechanism can perform any information-processing task. The same mechanism can control industrial processes, guide space vehicles or help to teach children. This diversity of tasks is made possible by the simple idea of the stored program.

A program is the enumeration of determining commands. It specifies the method used for the solution of a problem in detail. When the machine is in operation, both the commands and the numbers to be processed are constantly being taken out of and put into a depository of information known as a memory.

It can be seen that the processes performed by a digital computer are essentially simple. These operations can be performed at extremely high speeds and with a high degree of coordination between the different functional units of the hardware system, and this ability means that digital computers can undertake highly complex tasks.

15. Прочитайте внимательно текст. Составьте на английском языке план текста, выделив его основные темы. План можно составить в вопросной, назывной или тезисной форме. Познакомьтесь с образцами планов, представленных после текста; сравните со своим планом.

MEMORY

It is interesting to note that memory, one of the basic components of the computer, is often called storage. It stores calculation program, the calculation formulae, initial data, intermediate and final results. Therefore, the functions of the computer memory may be classified in the following way. Firstly, the computer memory must store the information transmitted from the input and other devices. Secondly, memory should produce the information needed for the computation process to all other devices of the computer.

Generally, memory consists of two main parts called the main, primary or internal, memory and the secondary, or external memory. The advantage of the primary memory is an extremely high speed. The secondary memory has a comparatively low speed, but it is capable of storing far greater amount of information than the main memory. The primary storage takes a direct part in the computational process. The secondary storage provides the information necessary for a single step in the sequence of computation steps.

The most important performance characteristics of a storage unit are speed, capacity, and reliability. Its speed is measured in cycle time. Its capacity is measured by the number of machine words or binary digits. Its reliability is measured by the number of failures (отказ) per unit of time.

План в вопросной форме

1. What is memory?
2. What is the function of memory?
3. What are the main parts of memory?
4. What are advantages and disadvantages of a storage unit?
5. What are their functions?
6. What are performance characteristics of the main and secondary memory?
7. What units are performance characteristics measured by?

План в назывной форме

1. The definition of memory.
2. The main functions of memory.
3. Classification of memory.
4. Advantages and disadvantages of memory components.
5. The functions of memory components.
6. Performance characteristics of memory.
7. The units for measuring the performance characteristics of memory.

План в тезисной форме

1. Memory is one of the basic components of the computer.
2. Memory stores initial data, intermediate and final results.
3. It produces the information needed to other devices of the computer.

4. Memory consists of the main (internal) and the secondary (external) storage.
5. The main memory has high speed, but small capacity; the secondary memory possesses lower speed but greater capacity.
6. The main memory performs computation; the secondary memory provides information sequentially, step by step.
7. The performance characteristics — speed, capacity, and reliability — are measured by cycles, binary digits, and the number of failures per unit of time.

TESTS

1. Вставьте необходимые слова вместо пропусков.

1. The time required for the computer to locate and transfer data in the storage device is called the data _____ time.
   a) sequence; b) access; c) value
2. _____ memories have no moving parts.
   a) electronic; b) mechanical; c) electromechanical
3. Magnetic _____ were the main elements used for primary memory in digital computers for many years.
   a) cores; b) tapes; c) disks
4. _____ is more commonly used for memory at present.
   a) bipolar semiconductor; b) MOS; c) field-effect transistor
5. Magnetic disks constitute the _____ storage media.
   a) internal; b) primary; c) secondary
6. Data are stored in _____ codes in primary as well as in secondary storage.
   a) digital; b) binary; c) numerical
7. Data access time is _____ in electronic memories than those in electromechanical memories.
   a) longer; b) much longer; c) shorter
8. Electronic memories have _____ capacities for data storage.
   a) more; b) larger; c) less

2. Согласуйте слова левой колонки с их интерпретацией, предложенной справа.

1. Primary	a) one of the performance characteristics of storage measured in binary digits
2. Secondary	b) memory that has random access to the information
3. Magnetic disk	c) combination of units of information

4. Binary codes	d) the main method of secondary storage performing both sequential and random storage
5. RAM	e) area of memory where protected programs can be read from but not written on
6. Bit	f) a fixed number of consecutive bits representing a character
7. Byte	g) the principal flexible second storage circuit element
8. ROM	h) part of memory having lower speed but greater capacity
9. Floppy	i) a unit of information or binary digit
10. Capacity	j) the most expensive part of memory having the least capacity and the fastest access time

Unit 8

CENTRAL PROCESSING UNIT

Texts:	Central Processing Unit. The CPU Main Components.
Grammar:	Зависимый и независимый причастные обороты.
Tests	

1. Ознакомьтесь с терминами текста 1.

central processing unit (CPU) — центральный процессор (ЦП)
interchangeably [ˌɪntə'ʧeɪnʤəblɪ] — взаимозаменяемым образом
precisely [prɪ'saɪslɪ] — точно
internal memory — внутренняя память, внутреннее ЗУ
activity [ək'tɪvɪtɪ] — деятельность, работа, действия операции
to issue ['ɪsju:] — посылать (сигнал); выводить, выдавать (сообщение)
response [rɪ'spɒns] — ответ, отклик, реакция; отвечать, реагировать
to interprete [ɪn'tɜ:prɪt] — интерпретировать, истолковывать
according to [ə'kɔ:dɪŋ tə] — согласно, в соответствии с
level — уровень, степень, мера; выравнивать
input-output port — порт ввода-вывода
control unit (CU) [kən'trəʊl 'ju:nɪt] — устройство управления
arithmetic-logic unit (ALU) — арифметико-логическое устройство
switch [swɪʧ] — переключатель, коммутатор; переключать; переходить
direct [dɪ'rekt] — направлять, адресовать, указывать; прямой, непосредственный
step-by-step operations — пошаговые операции
to select [sə'lekt] — выбирать, выделять (на экране)
on the other hand — с другой стороны
exponentiation [ekspəˌnenʃɪ'eɪʃn] — возведение в степень
call for — требовать; предусматривать
to load [ləʊd] — загружать, выполнять загрузку

2. Прочитайте текст и скажите, какой компонент составляет сердце компьютерной системы и в чем заключается его функция.

Text 1. CENTRAL PROCESSING UNIT

It is well-known in computer science that the words “computer” and “processor” are used interchangeably. Speaking more precisely, “computer” refers to the central processing unit (CPU) together with an internal memory.

The internal memory, control and processing components make up the heart of the computer system. Manufactures design the CPU to control and carry out basic instructions for their particular computer.

The CPU coordinates all the activities of the various components of the computer. It determines which operations should be carried out and in what order. The CPU controls the operation of the entire system by issuing commands to other parts of the system and by acting on responses. When required, it reads information from the memory, interprets instructions, performs operations on the data according to the instructions, writes the results back into the memory, and moves information between memory levels or through the input-output ports.

In digital computers the CPU can be divided into two functional units called the control unit (CU) and the arithmetic-logic unit (ALU). These two units are made up of electronic circuits with millions of switches that can be in one of two states, either on or off.

The function of the CU within the central processor is to transmit coordinating control signals and commands. The control unit is that part of the computer that directs the sequence of step-by-step operations of the system, selects instructions and data from memory, interprets the program instructions, and controls the flow between main storage and the arithmetic-logic unit.

The ALU, on the other hand, is that part of the computer in which the actual arithmetic operations, namely, addition, subtraction, multiplication, division, and exponentiation, called for in the instructions are performed.

Programs and the data on which the CU and the ALU operate, must be in internal memory in order to be processed. Thus, if located in secondary memory devices, such as disks or tapes, programs and data are first loaded into internal memory.

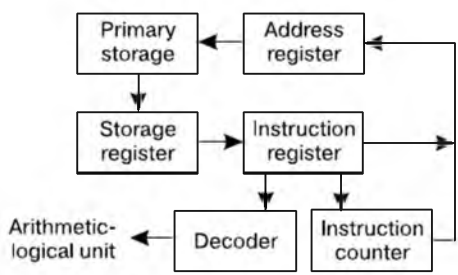


Fig. 12. Control unit functional diagram

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

1. What words in computer science are used interchangeably and why? 2. What components make up the heart of the computer system? 3. What is the function of the CPU? 4. In what way does the CPU control the operation

of the whole system? 5. What is the sequence of operations the CPU performs (use five verbs)? 6. What are the CPU functional units made of? 7. What is the function of the CU? 8. What operations are performed in the ALU? 9. Where are data processed? 10. Where are data to be processed loaded into?

4. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Хорошо известно; к компьютеру относятся; внутренняя память; составлять суть; выполнять; координировать деятельность; определяя, в каком порядке; управлять работой всей системы; при необходимости; в соответствии с командами; уровни памяти; порт ввода-вывода; переключатели; режим включения или выключения; передавать сигналы; указывать последовательность пошаговых операций; основная память; управлять ходом выполнения программы; с другой стороны; выполнять вычитание, сложение, возведение в степень, деление, умножение; для того чтобы.

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

Direction: backward direction; clockwise direction; counterclockwise direction; data direction; forward direction; inverse/reverse direction; negative direction; positive direction; printing direction; transmission direction.

Level: access level; application level; data level; device level; difficulty level; error level; function level; hardware level; high level; input level; output level; performance level; presentation level; program level; protection level; resource level; security level; software level; structural level; system level; transmission level.

Processor: arithmetic processor; central processor; command processor; control processor; data processor; error processor; general-purpose processor; special-purpose processor; image processor; language processor; mail processor; message processor; numeric processor; parallel processor; peripheral processor; text processor.

Switch: to switch between programs; to switch between windows; to switch disks; to switch on; to switch off; to switch over; binary switch; command switch.

Step: conversion step; final step; procedure step; program step; programming step; step by step; one step at a time; to step down; to step out; to step up; to take steps.

6. Переведите предложения, содержащие независимый причастный оборот.

1. *Data being accessed randomly*, semiconductor memories are called random access memory (RAM). 2. *The information capacity of a single bit being limited to two alternatives,* codes are based on combination of bits. 3. *Pri-*

mary storage having similarity to a function of the human brain, the storage is also called memory. 4. *An electron leaving the surface*, the metal becomes positively charged. 5. *Computer system architecture being organized around the primary storage unit*, all instructions must pass through it. 6. Computer system architecture is organized around the primary storage unit, *all instructions passing through it*. 7. Electromechanical memories depend upon moving mechanical parts, *their data access time being longer than is that* of *electronic memories*. 8. For this reason most computer systems use electronic memory for primary storage, *electromechanical memory being used for secondary storage*. 9. Large capacity tape devices are used with large data processing systems, *cassettes and cartridges being applied with small systems*. 10. The CPU controls the operation of the entire system, *commands being issued to other parts of the system*.

7. Составьте аннотацию на английском языке к тексту 1.

8. Ознакомьтесь с терминами текста 2.

to manage ['mænɪʤ] — управлять; организовывать; справляться
to obtain [əb'teɪn] — получать, достигать, добиваться
to cause — заставлять, вынуждать, вызывать, быть причиной; причина, основание
flow [fləʊ] — поток; ход (выполнения программы); последовательность
counter ['kaʊntə] — счетчик
register ['reʤɪstə] — регистр, устройство регистрации, счетчик, датчик
instruction register — регистр команд
storage register — регистр памяти, запоминающий регистр
address register — адресный регистр
temporarily [ˌtəmpə'rerɪlɪ] — временно
decoder [də'kəʊdə] — дешифратор
operand address [ɒpə'rɑ:nd ə'dres] — адрес (хранения) операнда
mark [mɑ:k] — отметка, маркер, знак; помечать, обозначать, выделять
timing mark — отметка времени
accumulate [ə'kju:mjʊleɪt] — накапливать(ся), суммировать, собирать(ся)
accumulator — сумматор, накапливающий регистр, устройство суммирования
compare [kəm'pɛə] — сравнивать, соотноситься
comparer [kəm'pɛərə] — компаратор, устройство сравнения
content ['kɒntənt]— содержимое, смысл; объем, количество
involve [ɪn'vɒlv] — включать, содержать, заключать (в себе)

core [kɔ:] — суть; основная часть; ядро; оперативная память
add [æd] — складывать, суммировать, прибавлять, присоединять
added — добавочный, дополнительный
adder — сумматор, блок суммирования
at least — по крайней мере

9. Прочитайте текст и скажите, о каких компонентах центрального процессора и их назначении вы узнали. Переведите текст.

Text 2. THE CPU MAIN COMPONENTS

As it is known, the two functional units of the CPU are the control unit (CU) and the arithmetic-logical unit (ALU). The control unit manages and coordinates the entire computer system. It obtains instructions from the program stored in main memory, interprets the instructions, and issues signals that cause other units of the system to execute them.

The control unit operates by reading one instruction at a time from memory and taking the action called for by each instruction. In this way it controls the flow between the main storage and the arithmetic-logical unit.

The control unit has the following components: *a counter* that selects the instructions, one at a time, from memory; *a register* that temporarily holds the instructions read from memory while it is being executed; *a decoder* that takes the coded instruction and breaks it down into individual commands necessary to carry it out; *a clock*, which produces marks at regular intervals. These timing marks are electronic and very rapid.

The sequence of control unit operations is as follows. The next instruction to be executed is read out from primary storage into the storage register. The instruction is passed from the storage register to the instruction register. Then the operation part of the instruction is decoded so that the proper arithmetic or logical operation can be performed. The address of the operand is sent from the instruction register to the address register. At last the instruction counter register provides the address register with the address of the next instruction to be executed.

The arithmetic-logic unit (ALU) executes the processing operations called for by the instructions brought from main memory by the control unit. Binary arithmetic, the logical operations, and some special functions are performed by the arithmetical-logical unit.

Data enter the ALU and return to main storage through the *storage register*. The *accumulator* serving as a register holds the results of processing operations. The results of arithmetic operations are returned to the accumulator for transfer to main storage through the storage register. The *comparer* performs logical comparisons of the contents of the storage register and the ac-

cumulator. Typically, the comparer tests for conditions such as "less than," "equal to," or "greater than."

So as you see the primary components of the arithmetic-logical unit are banks of bistable devices, which are called registers. Their purpose is to hold the numbers involved in the calculation and hold the results temporarily until they can be tranferred to memory. At the core of the ALU is a very high-speed binary adder, which is used to carry out at least the four basic arithmetic functions (addition, subtraction, multiplication, and division). The logical unit consists of electronic circuitry which compares information and makes decisions based upon the results of the comparison.

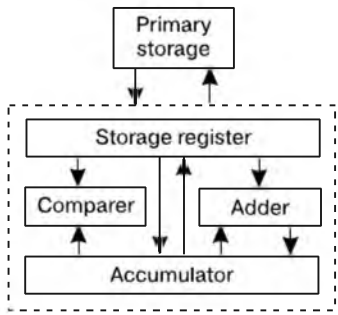


Fig. 13. Arithmetic-logic unit functional diagram

10. Ответьте на вопросы, используя информацию текста.

1. What are the functional units of CPU? 2. What is the function of CU? 3. How does CU operate? 4. What is the function of a counter? 5. What role does a decoder play? 6. What is the sequence of CU operations? 7. What is the function of the arithmetic-logical unit? 8. What operations are performed by ALU? 9. What primary components does ALU consist of? 10. What is the function of an accumulator/comparer?

11. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Функциональные блоки; устройство управления; арифметико-логическое устройство; управлять работой всей ситемы; получать команды; основная память; посылать сигналы; считывать команды поэтапно; таким образом; временно сохранять информацию; производить пометки через равные промежутки времени; последовательность операций; регистр памяти; регистр команд; адресный регистр; счетчик; датчик; дешифратор; адрес операнда; высокоскоростной двоичный сумматор; по крайней мере; вычитание; сложение; умножение; деление; принимать решения; результаты сравнения.

12. Вспомните значения новых слов и попытайтесь перевести словосочетания, употребляемые с этими словами.

Register: address register; base register; clock register; command/instruction register; counter register; CPU register; hardware register; input/output register; memory register; operand register; general-purpose register; special-purpose register.

Counter: binary counter; character counter; data counter; instruction counter; pulse counter; sequence counter; storage counter; software counter; time-out counter.

Selection: color selection; directory selection; drive selection; file selection; function selection; keyboard selection; menu selection; security selection.

Management: data management; database management; disk management; error management; information management; memory management; network management; resource management; task management; window management.

13. Найдите в текстах 1 и 2 слова, близкие по значению к следующим.

Verbs: to work; to control; to receive; to keep; to send; to perform; to demand; to choose; to supply; to pass; to name; to include; to apply; to come back; to found; to explain; to form; to define; to arrange.

Nouns: computer; answer; commands; memory; element; device; information; state; aim; heart; solution; computation.

Adjectives: main; whole; separate; quick; correct; large; main (storage); following; every; following; specific; different; real.

14. Сравните и проанализируйте предложения, содержащие зависимый и независимый причастные обороты. Переведите их.

1. Having returned to the accumulator, the results of arithmetic operations are transferred to main storage. The results of arithmetic operations are returned to the accumulator, the storage register transferring them to the main memory. The results of arithmetic operations being returned to the accumulator, the storage register transfer them to the main memory. Being returned to the accumulator, the results of arithmetic operations are transferred to the main memory.

2. When passing through a conductor, free electrons form an electric current. Free electrons passing through a conductor, an electric current is generated. Free electrons pass through a conductor, an electric current being generated. Free electrons passing through a conductor form an electric current.

3. Instructions being obtained, the control unit causes other units to perform the necessary operations. Instructions are obtained, the control unit causes other units to perform the operations. Having obtained the in-

structions, the control unit causes other units to perform the operations. Obtaining the instructions, the control unit causes other units to perform the operations.

4. The elements having unknown properties cannot be used for experiments. The elements have unknown properties, experiments with these elements being impossible. Having unknown properties, the elements cannot be used for experiments. The elements having unknown properties, experiments with them are impossible.

5. When moving in a material, charged particles (заряженные частицы) produce magnetic properties (свойства) of this material. Charged particles moving in a material produce magnetic properties. Charged particles moving in a material, magnetic properties of this material are produced. Charged particles move in a material, magnetic properties of the material being produced.

15. Прочитайте внимательно текст и составьте к нему план в назывной форме. Прочитайте текст еще раз, разверните пункты плана и составьте реферат на русском языке, озаглавьте текст.

***

It is known that one of the fundamental parts of the computer is a control unit. This unit controls the computation process automatically, without man's participation. It sends signals to all other parts of the computer to specify what they must do. First of all, the control unit tells the main memory what data must be transferred to the arithmetic-logical unit and other devices. Then it enables the arithmetic-logical unit to perform the required operation. Finally, it places the obtained results in the main memory.

It is important to note that the control unit operation is determined by an algorithm of a problem solution. The algorithm is a sequence of arithmetic and logical operations. These operations must be performed on the initial data for solving the problem.

Description of an algorithm in a form acceptable by a computer is called a program. A program is a list of sequential computer instructions enabling a computer to solve a problem. In order to be acceptable by the computer instructions must be encoded into a digital form.

In conclusion it should be pointed out that the main feature of a computer is automatic control of the problem solution process. It is based on the programmed-control principle.

16. Выполните письменный перевод текстов по вариантам. Озаглавьте тексты.

***

1. In 1960s advances in microelectronic components led to the development of the minicomputer, followed more recently by an even smaller microcomputer. Both have filled a need for small but relatively flexible processing systems able to execute comparatively simple computing functions at lower costs.

In 1971 Intel Corporation delivered the first microprocessor, the 4004. All the logic to implement the central processing unit of a tiny computer was put onto a single silicon chip less than ¼ inch square. That design was soon followed by many others. The progress toward smaller computers is continuing, designers are working at nano-computers and pico-computers.

When the central processing unit of a computer is implemented in a single, or very small number of integrated circuits, we call it a microprocessor. When a computer includes a microprocessor as its major component, such device is called a microcomputer.

Today the hardware in data-processing machines is built out of microelectronic devices. Advances in microelectronic devices give rise to advances in data-processing machinery.

2. The computer has made it possible to mechanize much of the information interchange and processing that constitute the nervous system of our society.

The versatility and convenience of the microprocessor has changed the entire architecture of modern computer systems. No longer is the processing of information carried out only in the computer's central processing unit. Today there is a trend toward distributing more processing capability throughout a computer system, with various areas having small local processors for handling operations in those areas.

There are a number of advantages of distributed processing. First, since many elements of the computer can be working on different portions of the same task, the work may be done faster. Second, if one element in the network malfunctions, its workload can be shifted to another element or shared among several elements, so that the entire work is relatively immune to failure. Third, the network can be small enough to be contained within a single laboratory or building, or it can be spread out over a wide area.

TESTS

1. Вставьте необходимые слова вместо пропусков.

1. Programs and data to be processed must be in the _____ memory.
   a) internal; b) external; c) secondary
2. The control unit _____ instructions from the program.
   a) sends; b) changes; c) obtains

3. The results of arithmetic operations are returned to the _____ for transferring to main storage.
   a) decoder; b) counter; c) accumulator
4. The instruction to be _____ in control unit is read out from primary storage into the storage register.
   a) calculated; b) executed; c) read out
5. The _____ performs logical comparisons of the contents of the storage register and the _____.
   a) adder; b) accumulator; c) comparer
6. The read out command is passed from the _____ register to the _____ register.
   a) instruction; b) address; c) storage
7. CPU is designed to _____ and to _____ basic instructions for the computer.
   a) control; b) consist; c) carry out
8. CU and ALU consist of electronic circuits with millions of _____.
   a) sensors; b) servers; c) switches

2. Согласуйте слова левой колонки с их интерпретацией, предложенной справа.

1.	CPU	a)	performs the processing operations
2.	CU	b)	carries out logical comparisons of storage
3.	ALU	c)	executes basic arithmetic functions
4.	Accumulator	d)	coordinates the operation of the whole system
5.	Clock	e)	selects data from memory
6.	Counter	f)	produces electronic marks at regular intervals
7.	Register	g)	controls the flow between the primary storage and the arithmetic-logical unit
8.	Decoder	h)	keeps the instruction while it is being performed
9.	Comparer	i)	holds the results of processing operations
10.	Adder	j)	breaks the instructions into separate commands

3. Выполните перевод следующего текста письменно по вариантам.

MICROPROCESSOR — A BRAIN TO THE HARDWARE

1. The microprocessor forms the heart of a microcomputer. The first microprocessors were developed in 1971 as a branch of pocket calculator development. Since then there has been a tremendous raise of work in this field and there appeared dozens of different microprocessors. Microprocessors are used primarily to replace or increase random logic design.

As it is known, computer actually refers to a computing system including hardware (processor, I/O circuits, power supplies, control panel, etc.)

and software (instruction manual, user's manual, assembler and diagnostic and service routines). Processor refers to the processing circuits: control processing unit, memory, interrupt unit, clock and timing. Most processors also include computer software.

Central processing unit — heart of the processor — consists of the register array, arithmetic and logic unit, control unit (including micro-ROM), and bus control circuits. Microsoftware may also include microinstruction manual, micro-assembler, etc.

2. The very first microprocessors were fabricated using PMOS technology. "Holes" in the p-type material having a low mobility, those microprocessors were relatively slow devices. Later, improved technology permitted microprocessors to be constructed using n-type MOS and these microprocessors are almost as fast as normal minicomputers.

Some microprocessors are now made using CMOS. The speed and logic density of CMOS are inferior to n-type MOS but the process does have some significant advantages. First of all, it has a low power consumption, power being consumed only when a logic element changes a state. Secondly, it can operate over a wide voltage range. As a result, electronics based on CMOS can operate successfully with "noisy" power supplies. The low consumption makes it quite possible to use a simple battery to maintain the security of supply for several weeks. This type of microprocessor has clear advantages over the other types.

Notes

MOS (metal-oxide-semiconductor) — структура металл — оксид — полупроводник, МОП-структура

PMOS (p-channel metal-oxide-semiconductor) — p-МОП-структура

CMOS (complementary metal-oxide-semiconductor) — комплементарная МОП-структура (КМОП)

Unit 9

INPUT-OUTPUT UNITS

Texts:	Input-Output Environment. Input Devices. Output Devices. Printers. Magnetic Media Devices. Keyboard Devices. Scanners.
Grammar:	Инфинитив, его формы, функции и способы перевода. Инфинитивные конструкции.
Tests	

1. Ознакомьтесь с терминами текста 1.

environment [ɪn'vaɪərəmənt] — среда, окружение; режим работы
external environment — внешняя среда
human-related ['hju:mən rɪ'leɪtɪd] — (взаимо)связанный с человеком
human-independent — независимый от человека
remote terminal [rɪ'məʊt 'tɜ:mɪnəl] — удаленный терминал
reel of magnetic tape — бобина с магнитной лентой
input-output interface — интерфейс (сопряжение, место стыковки) ввода-вывода
scan [skæn] — просматривать; сканировать; развертывать
scanner ['skænə] — сканер, устройство оптического считывания
bar-code scanner / bar-code reader — устройство считывания штрих-кода
regardless of [rə'gɑ:dləs əv] — несмотря на, независимо от
to match characteristics ['mætʃ kærəktə'rɪstɪks] — сопоставлять параметры
similarly ['sɪmɪləlɪ] — подобным образом, так же, аналогично
to fall between — падать, попадать в интервал между
card reader — устройство считывания платы (карты)
line printer — построчный принтер, принтер печатания строки
page printer — принтер с постраничной печатью
character printer — принтер с посимвольной печатью
optical character reader — оптическое считывающее устройство текста
optical mark reader — оптическое считывающее устройство знаков
visual display ['vɪzjʊəl dɪs'pleɪ] — визуальный индикатор
digitizer [dɪʤɪ'taɪzə] — аналого-цифровой преобразователь, сканер
keyboard input device — клавишное устройство ввода
plotter ['plɒtə] — графопостроитель

voice recognition and response unit — устройство распозавания голоса и реагирования

2. Прочитайте текст и скажите, какие устройства относятся к сфере ввода-вывода информации.

Text 1. INPUT-OUTPUT ENVIRONMENT

Data and instructions must enter the data processing system, and information must leave it. These operations are performed by input and output (I/O) units that link the computer to its external environment.

The I/O environment may be human-related or human-independent. A remote banking terminal is an example of a human-related input environment, and a printer is an example of a device that produces output in a human-readable format. An example of a human-independent input environment is a device that measures traffic flow. A reel of magnetic tape upon which the collected data are stored in binary format is an example of a human-independent output.

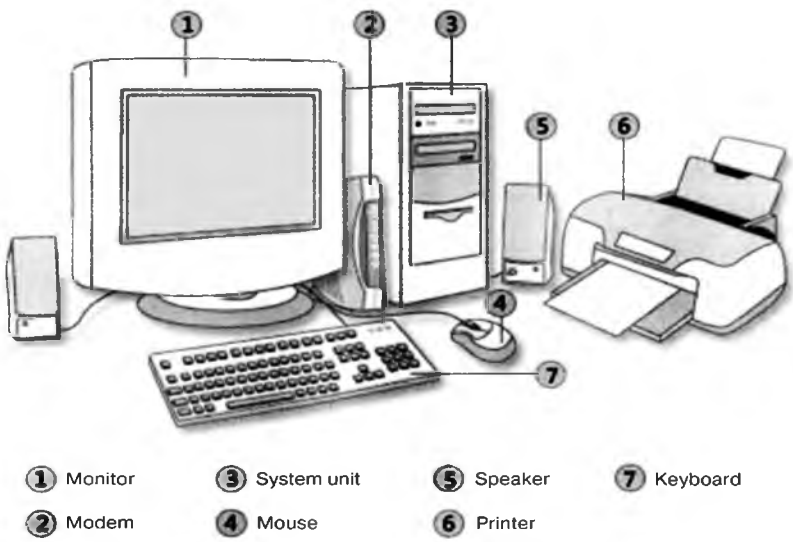


Fig. 14. Input-output environment

Input-output interfaces. Data enter input units in forms that depend upon the particular device used. For example, data are entered from a keyboard in a manner similar to typing, and this differs from the way that data are entered

by a bar-code scanner. However, regardless of the forms in which they receive their inputs, all input devices must provide a computer with data that are transformed into the binary codes that the primary memory of the computer is designed to accept. This transformation is accomplished by units called I/O interfaces. Input interfaces are designed to match the unique physical or electrical characteristics of input devices to the requirements of the computer system. Similarly, when output is available, output interfaces must be designed to reverse the process and to adapt the output to the external environment. These I/O interfaces are also called channels or input-output processors (IOP).

The major differences between devices are the media that they use and the speed with which they are able to transfer data to or from primary storage.

Input-output device speed. Input-output devices can be classified as high-speed, medium-speed, and low-speed. The devices are grouped according to their speed. It should be noted that the high-speed devices are entirely electronic in their operation or magnetic media that can be moved at high speed. Those high-speed devices are both input and output devices and are used as secondary storage. The low-speed devices are those with complex mechanical motion or operate at the speed of a human operator. The medium-speed devices are those that fall between — they tend to have mechanical moving parts which are more complex than the high-speed devices but not as complex as the low-speed.

High-speed devices: magnetic disk; magnetic tape.

Medium-speed devices: card readers; line printers; page printers; computer output microfilms; magnetic diskette; optical character readers; optical mark readers; visual displays.

Low-speed devices: bar-code readers; character printers; digitizers; keyboard input devices; plotters; voice recognition and response units.

3. Дайте ответы на следующие вопросы.

1. What is the purpose of input and output devices? 2. What types of input-output devices do you know? 3. Why are data transformed into a binary code while entering the input device? 4. What is an example of a human independent output? 5. What is an I/O interface? 6. What are the major differences between the various I/O devices? 7. What types of I/O devices tend to be high-speed devices? 8. What type of devices tend to be low-speed devices?

4. Найдите в тексте английские эквиваленты следующих словосочетаний.

Среда устройств ввода-вывода; система обработки информации; внешняя среда; связан с человеком; независим от человека; удаленный банковский терминал; измерять поток данных; бобина с магнитной лентой; хранить собранную информацию; двоичный формат; интерфейс ввода-вывода; вводить с клавиатуры; устройство считывания

штрих-кода; несмотря на; преобразовать в двоичный код; сопоставлять параметры; подобным образом; интерфейс вывода; изменить процесс в обратном направлении; настроить устройство ввода-вывода к внешней среде; главное отличие; основная память; вторичная память; низкоскоростные устройства; в соответствии.

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

Environment: application environment; communication environment; execution environment; external environment; hardware environment; interface invironment; management environment; multimedia environment; network environment; processing environment; security environment; software environment; user environment.

Interface: channel interface; common interface; data interface; database interface; display interface; external interface; flexible interface; floppy-disk interface; general-purpose interface; hardware interface; low-level interface.

Scanner: bar-code scanner; black-and-white scanner; color scanner; desktop scanner; hand scanner; laser scanner; manual scanner; optical scanner; visual scanner.

Terminal: batch terminal; desktop terminal; display terminal; printer terminal; remote terminal; security terminal; logical terminal; text terminal.

6. Вспомните формы инфинитива, проанализируйте и переведите следующие предложения.

Infinitive	Active	Passive
Indefinite	to ask	to be asked
Continuous	to be asked	—
Perfect	to have asked	to have been asked
Perfect Continuous	to have been asking	—

1. A printer is an example of a device *to produce* output in a human-readable format. 2. The high-speed devices *to be used* as secondary storage are both input and output devices. 3. The progress of electronics *to have resulted* in the invention of electronic computers was a breakthrough (прорыв) of the second part of the 20th century. 4. Mendeleyev's periodic law *to have been accepted* as a universal law of nature is of great importance nowadays. 5. When output is available, output interfaces must be designed *to reverse* the process and *to adopt* the output to the external environment. 6. The memory stores the instructions and the data *to be* quickly *retrieved* on demand by the CPU. 7. Computers *to have been designed* originally for arithmetic purposes are applicable for great variety of tasks at present. 8. The film *to have been*

running for over a month this year attracts attention of many spectators. 9. The CPU of a computer *to be arranged* in a single or very small number of integrated circuits is called a microprocessor. 10. Russia was the first country *to start* the cosmic era.

7. **Прочитайте внимательно текст, составьте реферат на английском языке, озаглавьте текст. Для составления реферата используйте следующие клише.**

The text / article under review... (gives us a sort of information about...)
The article deals with the problem...
The subject of the text is...
At the beginning (of the text) the author describes... (dwells...; explains...; touches upon...; analyses...; comments...; characterizes...; underlines...; reveals...; gives account of...)
The article begins with the description of..., a review of..., the analysis of...
The article opens with...
Then (after that, further on, next) the author passes on to..., gives a detailed (thorough) analysis (description), goes on to say that...
To finish with, the author describes...
At the end of the article the author draws the conclusion that...; the author sums it all up (by saying...)
In conclusion the author...

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As it is well-known, a computer cannot perform or complete any useful work unless it is able to communicate with its external environment. All data and instructions enter and leave the central processing unit through primary storage. Input-output devices are needed to link primary storage to the environment, which is external to the computer system. So input devices are used to enter data into primary storage. Output units accept data from primary storage to provide users with information or to record the data on a secondary storage device. Some devices are used for both the input and output functions.

The data with which these devices work may or may not be in a form that humans can understand. For example the data that a data entry operator keys into the memory of a computer by typing on a keyboard are readable by humans. However, the data that tell a computer about the performance of an automobile engine are not in a form that humans can read. They are electrical signals from an analog sensor. Similarly, output may be on a printed page, which humans can read easily, or upon some other medium where the data are not visible, such as on magnetic tape or disk.

As we know, all of the data flow from input to final output is managed by the control unit in the CPU. Regardless of the nature of the I/O devices, special processors called I/O interfaces are required to convert the input data to the internal codes used by the computer and to convert internal codes to a format which is usable by the output device.

8. Ознакомьтесь с терминами текста 2.

keyboard ['ki:bɔ:d] — клавиатура
key [ki:] — клавиша, кнопка, переключатель; ключевой, основной, главный; переключать; набирать на клавиатуре
manipulator [mənɪpju'leɪtə] — манипулятор, блок обработки
trackball ['trækbɔ:l] — трекбол
touch panel ['tʌʧ 'pænl] — сенсорная панель
graphic plotting tables ['græfɪk 'plɔ:tɪŋ 'teɪbls] — графические планшеты
sound card ['saʊnd 'kɑ:d] — звуковая карта (плата)
enable [ɪ'neɪbl] — разрешать, позволять, допускать, делать возможным
operating mode [ɔpə'reɪtɪŋ 'məʊd] — режим работы
press a button — нажать на кнопку
keep buttons depressed — удерживать кнопки в нажатом состоянии
double-click ['dʌbl 'klɪk] — двойное нажатие
erase images [ɪ'reɪz 'ɪmɪʤɪz] — удалять, стирать изображение (объект)
roller ['rɒlə] — ролик, валик
track — следить, прослеживать, проходить; след, траектория, путь, дорожка; соединение
by means of — посредством
permitting capacity — разрешающая способность

9. Прочитайте текст и назовите приборы, которые служат для введения информации в компьютер. Переведите текст.

Text 2. INPUT DEVICES

There are several devices used for inputting information into the computer: a keyboard, some coordinate input devices, such as manipulators (a mouse, a track ball), touch panels and graphical plotting tables, scanners, digital cameras, TV tuners, sound cards, etc.

When personal computers first became popular, the most common device used to transfer information from the user to the computer was *the keyboard*. It enables inputting numerical and text data. A standard keyboard has 104 keys and three more ones informing about the operating mode of light indicators in the upper right corner.

Later when the more advanced graphics became to develop, user found that a keyboard did not provide the design capabilities of graphics and text representation on the display. There appeared manipulators, a mouse and a track ball, that are usually used while operating with graphical interface. Each software program uses these buttons differently.

The mouse is an optic-mechanical input device. The mouse has three or two buttons which control the cursor movement across the screen. The mouse provides the cursor control thus simplifying user's orientation on the display. The mouse's primary functions are to help the user draw, point and select images on his computer display by moving the mouse across the screen.

In general software programs require to press one or more buttons, sometimes keeping them depressed or double-click them to issue changes in commands and to draw or to erase emages. When you move the mouse across a flat surface, the ball located on the bottom side of the mouse turns two rollers. One is tracking the mouse's vertical movements, the other is tracking horizontal movements. The rotating ball glides easily, giving the user good control over the textual and graphical images.

In portable computers *touch panels or touch pads* are used instead of manipulators. Moving a finger along the surface of the touch pad is transformed into the cursor movement across the screen.

Graphical plotting tables (plotters) find application in drawing and inputting manuscript texts. You can draw, add notes and signs to electronic documents by means of a special pen. The quality of graphical plotting tables is characterized by permitting capacity, that is the number of lines per inch, and their capability to respond to the force of pen pressing.

Scanner is used for optical inputting of images (photographs, pictures, slides) and texts and converting them into the computer form.

Digital videocameras have been spread recently. They enable getting videoimages and photographs directly in digital computer format. Digital cameras give possibility to get high-quality photos.

Sound cards produce sound conversion from analog to digital form. They are able to synthesize sounds. Special game-ports and joysticks are widely used in computer games.

10. Ответьте на вопросы, используя информацию текста.

1. What devices are used for inputting information into the computer? 2. What was the most common device in early personal computers? 3. What is the function of a keyboard? 4. Why do many users prefer manipulators to keyboard? 5. How does the mouse operate? 6. What is its function? 7. What role does the ball on the bottom of the mouse play? 8. What is used in portable

computers instead of manipulators? 9. What is the touch pad's principle of operation? 10. Where do graphical plotting tables find application?

11. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Введение информации; координатные устройства ввода; манипуляторы; мышь; трекбол; сенсорная панель; графические планшеты; цифровые камеры; сканеры; ТВ-тюнеры; стандартная клавиатура; числовая и текстовая информация; световые индикаторы; клавиши; режим работы; презентация текста на мониторе; графический интерфейс; программные средства; оптико-механическое устройство ввода; управлять движением курсора; упрощать ориентацию пользователя на экране; указывать и выбирать изображения; удерживать кнопки в нажатом состоянии; двойное нажатие; стирать объекты; ровная поверхность; вращать ролики; следить за вертикальным движением; легко скользить; портативный компьютер; рукописный текст; посредством; разрешающая способность.

12. Вспомните значения новых глаголов и переведите слова, производные от них.

To accomplish: accomplished; unaccomplished; accomplishment.
To adapt: adaptable; unadaptable; adaptability; unadaptability; adaptation; adapter.
To digitize: digit; digitization; digitize; digitizer.
To erase: erasable; erasability; eraser; erasing; erasure.
To match: matcher; matching.
To permit: permitted; permissible; permissibility; permissible; permission.
To print: printable; printed; printer; printing.
To scan: scanning; scanner.
To recognize: recognition; recognizer; recognizable; unrecognizable.
To respond: response; responsible; irresponsible; responsibility; irresponsibility.
To reverse: reversed; reversible; irreversible; reversion; reversibility.
To transform: transformer; transformation; transformational; transformative.

13. Проанализируйте предложения, содержащие конструкции for + Infinitive и Objective with the Infinitive. Переведите предложения на русский язык.

1. It was not difficult *for the pupils to understand* the function of the mouse in computer operation. 2. There is no reason *for computer experts to use* computers of the first generation nowadays. 3. The mechanism is provided with

special devices *for the whole system to function* automatically. 4. The text was very interesting but rather difficult *for the students to translate* it without a dictionary. 5. It is not easy *for me to learn* to speak English fluently. 6. We know *the machine to react* to a series of electrical impulses that can be represented in binary numbers. 7. Scientists considered *silicon to be* one of the best materials for the creation of an IC. 8. We know *all data to be translated* into binary code before being stored in main storage. 9. Engineers expect *these new devices to be tested* very soon. 10. They want *their son to become* a computer operator and to design new computer models.

14. Ознакомьтесь с терминами текста 3.

human-readable form — удобная для чтения форма
performance [pə'fɔ:məns] — (рабочая) характеристика, производительность, быстродействие, скорость работы, пропускная способность
character printer — принтер с посимвольной печатью, символьный принтер
line printer [laɪn] — принтер с построчной печатью
page printer [peɪʤ] — принтер с постраничной печатью
(non) impact printer ['nɒnɪmpəkt] — (бес)контактный принтер
letter-quality printer — принтер с типографским качеством печати
dot-matrix printer ['dɒt 'meɪtrɪks] — точечно-матричный принтер
ink-jet printer ['ɪnk 'ʤet] — струйный принтер
laser-beam printer ['leɪzə 'bi:m] — лазерный принтер
to identify [aɪ'dentɪfaɪ] — идентифицировать, распознавать, обозначать
approach [əp'rəʊʧ] — подход, метод, принцип; приближение
at a time — за один раз, одновременно
to cause [kɔ:z] — вызывать, приводить к (чему-л.), заставлять, вынуждать
to strike against a ribbon — ударять по ленте
typewriter ['taɪpraɪtə] — печатное устройство
to spray drops of ink — распылять капли чернил
to affect [ə'fekt] — влиять, воздействовать, сказываться на (чем-л.)
technique [tek'nɪk] — метод, способ, техника, методика, технология
printer output — вывод на печать, распечатываемые данные

15. Прочитайте текст и назовите типы принтеров и их назначение.

Text 3. OUTPUT DEVICES. PRINTERS

Printers provide information in a permanent, human-readable form. They are the most commonly used output devices and are components of almost all computer systems. Printers vary greatly in performance and design.

We will classify printers as character printers, line printers, and page printers in order to identify three different approaches to printing, each with a different speed range. In addition, printers can be described as either impact or nonimpact. Printers that use electromechanical mechanisms that cause hammers to strike against a ribbon and the paper are called impact printers. Nonimpact printers do not hit or impact a ribbon to print.

Character printers print only one character at a time. A typewriter is an example of a character printer. Character printers are the type used with literally all microcomputers as well as on computers of all sizes whenever the printing requirements are not large. Character printers may be of several types. *A letter-quality printer* is a character printer which produces output of typewriter quality. Letter-quality printers typically have speeds ranging from 10 to 50 characters per second. *Dot-matrix printers* form each character as a pattern of dots. These printers have a lower quality of type but are generally faster printers than the letter-quality printers — in the range of 50 to 200 characters per second. One of the newest types of character printer is *the ink-jet printer.* It sprays small drops of ink onto paper to form printed characters. The ink has a high iron content, which is affected by magnetic fields of the printer. These magnetic fields cause the ink to take the shape of a character as the ink approaches the paper.

Line printers are electromechanical machines used for high-volume paper output on most computer systems. Their printing speeds are such that to an observer they appear to be printing a line at a time. They are impact printers. The speeds of line printers vary from 100 to 2,500 lines per minute. Line printers have been designed to use many different types of printing mechanisms. Two of the most common print mechanisms are the drum and the chain. *Drum printers* use a solid, cylindrical drum, rotating at a rapid speed. Speeds of drum printers vary from 200 to over 2,000 lines per minute. *Chain printers* have their character set on a rapidly rotating chain called a print chain. Speeds of chain printers range from 400 to 2,400 lines per minute.

Page printers are high-speed nonimpact printers. Their printing rates are so high that output appears to emerge from the printer a page at a time. A variety of techniques are used in the design of page printers. These techniques, called electrophotographic techniques, have developed from the paper copier technology. *Laser-beam printers* use a combination of laser beam and electrophotographic techniques to create printer output at a rate equal to 18,000 lines per minute.

16. Ответьте на вопросы, используя информацию текста.

1. What are the three types of printers? 2. What is a letter-quality printer? 3. What is a dot-matrix printer? 4. What type of printer is the most common

with microcomputer systems? 5. What is the most common printer type used on large computer systems? 6. What is an impact printer? Give an example. 7. What is a nonimpact printer? Give examples. 8. What are the most widely used printers? 9. How do you distinguish between a letter-quality printer and a dot-matrix printer? 10. Which of these printers is slower? 11. What types of character printers do you know? 12. How are printed characters formed by means of an ink-jet printer? 13. What are the main types of a line printer? Which of them is faster? 14. What techniques are used in the operation of page printers?

17. Найдите в тексте английские эквиваленты следующих словосочетаний.

Удобная для восприятия человека форма; наиболее часто употребляемые устройства вывода информации; различаться по рабочим характеристикам и внешнему виду; принтеры с посимвольной печатью; принтеры с построчной печатью; принтеры с постраничной печатью; различные методы печати; диапазон скорости; принтеры контактные и бесконтактные; ударять по ленте; печатать по одному символу; буквально все компьютеры; а также; требования печати; принтер с типографским качеством печати; точечно-матричные принтеры; струйные принтеры; разбрызгивать капли чернил; высокое содержание железа; магнитные поля; принимать форму символа; кажется, печатают по строчке; барабанный принтер; цепочечные принтеры; лазерный принтер.

18. Вспомните значения новых слов и попытайтесь перевести словосочетания с этими словами.

Approach: comprehensive approach; database approach; educational (training) approach; general approach; graphic approach; self-study approach; step-by-step approach; trial-and-error approach.

Performance: application performance; computer performance; device performance; disk performance; display performance; error performance; execution performance; memory performance; network performance; processor performance.

Printer: black-and-white printer; color printer; character (at-a-time) printer; dot-matrix printer; graphical (image) printer; impact printer; ink-jet printer; laser printer; letter-quality printer; matrix printer; network printer; page (at-a-time) printer.

Technique: advanced technique; analog technique; computing technique; display (video) technique; formatting technique; hardware technique; measuring technique; modeling (simulation) technique; multimedia technique; numerical technique; programming technique; scanning technique; software technique; testing technique.

19. Переведите предложения, содержащие инфинитивный оборот Nominative with the Infinitive (сложное подлежащее).

1. *Printers* are known *to vary* greatly in performance and design. 2. *They* are expected *to be* the most commonly used devices. 3. *Magnetic fields* are supposed *to effect* a high iron content of the ink. 4. *The ink-jet printer* is stated *to be* one of the newest types of character printers. 5. *Electrophotographic techniques* proved *to have developed* from the paper copier technology. 6. *An impact printer* is considered *to produce* a printed character by impacting a character font against the paper. 7. *Dot-matrix printers* seem *to have* a lower quality of type. 8. *The most common printer type* used on larger systems is sure *to be* the line printer. 9. *A lot of techniques* are believed *to be used* in the design of printers. 10. *A laser* is certain *to be* an acronym for light amplification by stimulated emission of radiation.

20. Прочитайте текст и составьте письменно реферат на английском языке.

MAGNETIC MEDIA DEVICES

Some of the devices mentioned above can perform both the input and output functions. Magnetic disk, magnetic diskette, and magnetic tape are examples of such devices. Magnetic disks, diskettes, and tapes can record data as output from primary storage and can also serve as input devices returning the data to primary storage.

Data are recorded on magnetic disks and magnetic tapes either by outputting the data from primary storage or by using a data recorder. Data recorders are not input devices, and they are not connected to the computer system. Instead they are offline recorders. The magnetic media recording devices are key-to-disk, key-to-diskette, and key-to-tape machines.

Key-to-disk devices are used as data-recording stations in multistation shared-processor systems. They are able to correct data before storing it on a magnetic disk and before its entry into the main computer system.

Key-to-diskette systems store data on flexible disks, called diskettes. Diskettes are inexpensive and reusable.

Key-to-tape devices can record data on reels, on cassettes, and on tape cartridges. The magnetic tape reels produced by key-to-tape systems are in a computer-compatible format for subsequent direct data input into a computer. However, data on cartridges and cassettes often are transferred to higher-speed media, such as a full-sized reel of magnetic tape or magnetic disk, for data transfer to the computer.

21. Выполните перевод следующего текста письменно по вариантам.

KEYBOARD DEVICES

1. There is a wide variety of keyboard devices, or terminals, available for use in entering data directly into a computer.

The visual display terminal (VDT) is the most popular type of I/O device in use today. It consists of a typewriter-like keyboard for inputting and a cathode ray tube (CRT) for displaying output data. Each character entered through the keyboard is also displayed on the CRT. When keyed, the data are held in a small memory, called a buffer, within the terminal itself. The data are not sent on to the computer until the operator presses an enter key on the keyboard. This allows the operator the opportunity to proofread or verify the data being entered by reading the data displayed on the screen. There are three major uses of VDTs: alphanumeric displays, graphic displays, and input through a light pen.

Alphanumeric displays. The most common use of the visual display terminal is to display alphanumeric data, that is, character data. Because of their relatively fast output rates and their ability to provide a viewer with an "instant" output, video displays have replaced printers for many applications.

Graphic displays. Visual display terminals with a graphic display capability provide a very powerful and versatile tool for many users. Graphic-display devices provide not only a means of displaying high-resolution drawings but also the capability of manipulating and modifying the graphic display. The businessperson can use the graphic display to present data in the form of line charts, bar charts, or pie charts. Graphic displays can be very effective in information systems for business manager.

2. Different types of keyboard devices, such as visual display terminals, teleprinter terminals, and point-of-sale devices are among the keyboard devices.

A light pen is a photosensitive pen-like instrument which can sense a position on the cathode ray tube (CRT) when the end of the pen is held against the screen. The light pen is an input device. By sensing the position on the screen when you touch it by the light pen, you are inputting data to the main storage. The light pen is commonly used by engineers to modify designs.

Teleprinter terminals. There are situations where it is desirable to have a printed copy of data outputted to a terminal. If a user finds a printed copy to be required, the solution could be a teleprinter terminal. A teleprinter terminal has a keyboard for input and a typewriter-like printer for output. These printers are character printers and are therefore slower output devices than CRT displays.

A point-of-sale (POS) device is the electronic equivalent of a cash register, however it is capable of capturing more data than a cash register. Most point-of-sale devices are online terminals attached to a computer for processing the transaction while the customer is making the purchase. The significant features of most of the current electronic POS devices include: the capability of entering extensive information about the sale, the guiding of the operator through the possible transactions by a series of lighted indicators or messages, a provision for transmission of the data to a central computer, and

the provision for a local computational capability such as price extensions and tax calculations.

TESTS

1. Вставьте необходимые слова вместо пропусков.

1. Input-output devices allow the computer to _____ with its external environment.
   a) compute; b) command; c) communicate
2. An I/O interface is a special _____ that converts input data to the internal codes.
   a) register; b) processor; c) plotter
3. The _____ devices allow the computer to communicate with its external environment.
   a) high-speed; b) medium-speed; c) low-speed
4. The low-speed devices are those with complex mechanical motion or those that operate at the speed of a human operator.
   a) mechanical; b) electrical; c) electronic
5. Data are entered from a _____ in a manner similar to typing.
   a) keyboard; b) digitizer; c) printer
6. A remote banking terminal is an example of a _____ input environment.
   a) human-dependent; b) human-independent; c) human-related
7. Input _____ match the physical or electrical characteristics of input devices to the requirements of the computer system.
   a) interconnections; b) interfaces; c) intercommunication
8. They _____ data into the binary codes.
   a) transmit; b) translate; c) transform

2. Согласуйте слова левой колонки с их интерпретацией, предложенной справа.

1. Scanner	a) a device producing output in a human-readable format
2. Keyboard	b) a manipulator used mainly in computer games
3. Touch pad	c) a device enabling to get video images in digital form
4. Mouse	d) a device converting the finger movement into the cursor movement across the scren
5. Plotter	e) a device for direct data entry, which can convert images into the computer form
6. Joystick	f) a special pen that can draw and input texts

7. Digital camera	g) a device inputting numerical and text data by means of keys
8. Magnetic disk	h) an optic-mechanical device helping the user select images on computer display due to rotating balls
9. Printer	i) an entirely electronic high-speed device keeping information

3. Прочитайте внимательно текст. Заполните пропуски подходящими словами в предложениях, данных после текста.

SCANNERS

Scanners provide a capability for direct data entry into the computer system. The major advantage of this direct data entry is that humans do not have to key the data. This leads to faster and more accurate data entry. The two major types of scanners are optical scanners and magnetic-ink character recognition devices.

Optical scanners are input devices that can "read" data recorded on paper. The scanning techniques used involve a light source and light sensors; thus, they are called optical devices. The data to be scanned may be typed or handwritten characters, data-coded as pencil marks, or data-coded as bars. The common optical scanner devices are called optical character readers, optical mark readers, and bar-code readers.

An optical character reader (OCR) inputs data by using optical scanning mechanisms that can detect or scan alphabetic and numeric characters printed on paper. If the data are typewritten, they must be typed using a special type font, called an OCR font. Examples of the use of OCR devices include the scanners used by the Postal Service to aid in sorting bulk mail, and as first-draft input for word processing system.

Optical mark readers (OMR) are able to detect pencil marks, made on special paper forms. The actual inputting of data through an OMR device involves shining a light on the page being scanned and detecting the reflections from the pencil marks. Pencil marks made with a soft lead pencil (high graphite content) will reflect the light. It is this reflection that the OMR device detects.

Optical bar-code readers detect combinations of marks or printed bars that represent the data. Bar codes have been used for a number of years for some types of credit card processing and by the post office for mail sorting. It is very common to use bar-code readers in conjunction with point-of-sale devices. The most widely known bar code is the universal product code (UPC), which now appears on almost all retail packages.

Magnetic-ink character recognition (MICR) devices were developed to assist the banking industry. MICR devices speed up data input for the banking

industry by reading characters imprinted on paper documents using a magnetic ink (an ink that contains iron oxide particles). Check and deposit form processing is the largest application of MICR.

Notes

bar-coded reader — устройство считывания штрих-кода
type font — печатный шрифт
point-of-sale device — кассовый терминал

1. The scanning techniques of optical scanners use _____.
   a) mechanical mechanisms; b) electronic processor; c) a light source
2. Optical bar-code readers have been used by the _____.
   a) radioengineering; b) banking industry; c) post office
3. The largest application of _____ is processing of various documentation in bank industry.
   a) OMR; b) OCR; c) MICR

Unit 10

PERSONAL COMPUTERS

Texts:	Personal Computers. Application of Personal Computers. A Modem. Microcomputer System Organization.
Grammar:	Сложносочиненные предложения: бессоюзные и предложения с сочинительной связью. Сложноподчиненные предложения. Союзные слова.
Tests	

1. Ознакомьтесь с новыми словами и терминами текста 1.

personal computers — персональные компьютеры
competitive operating system — конкурирующая операционная система
IBM (International Business Machine) — фирма по производству компьютеров
to enter the fray — вступать в борьбу
computer of choice — лучший компьютер
to fall by the wayside — оставаться в стороне; уступать дорогу
to survive onslaught [sə'vaɪv 'ɒnslɔ:t] — выдерживать конкуренцию
word size — размер слова, разрядность двоичного слова
soft-copy output — вывод электронной, программно-управляемой копии
hard-copy output — вывод «твердой», печатной копии
online storage — неавтономное хранение данных в ЗУ
offline storage — автономное хранение данных отдельно от компьютера
input media — носитель для входных данных
output media — носитель для выходных данных
general-purpose — универсальный, общего назначения
stand-alone — автономный
to plug in ['plʌg ɪn] — подключать, подсоединять
leisure activities ['leʒər ək'tɪvɪtɪz] — досуговая деятельность

2. Прочитайте текст и скажите, существуют ли отличия персональных компьютеров от больших компьютеров и в чем они заключаются.

Text 1. PERSONAL COMPUTERS

Personal computers are supposed to appear in the late 1970s. One of the first and most popular personal computers was the Apple II, introduced in 1977 by Apple Computer. During the late 1970s and early 1980s, new models and competitive operating systems seemed to appear daily. Then, in 1981, IBM entered the fray with its first personal computer, known as the IBM PC. The IBM PC quickly became the personal computer of choice, and most other personal computer manufacturers fell by the wayside. One of the few companies to survive IBM's onslaught was Apple Computer, which is sure to remain a major player in the personal computer marketplace. In less than a decade the microcomputer has been transformed from a calculator and hobbyist's toy into a personal computer for almost everyone.

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

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

— Second, a PC has a memory and word size that are smaller than those of minicomputers and large computers. Typical word sizes are 8 or 16 bits, and main memories range in size from 16 K to 512 K.

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

— A PC employs floppy disks as the principal online and offline storage devices and also as input and output media.

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

Probably the most distinguishing feature of a personal computer is that it is used by an individual, usually in an interactive mode. Regardless of the purpose for which it is used, either for leisure activities in the home or for business applications in the office, we can consider it to be a personal computer.

3. Ответьте на вопросы, используя информацию текста.

1. When did the first personal computer appear? 2. What was one of the first PC model? 3. What is a personal computer? 4. What are the four main characteristics of a PC? 5. What does the term "microprocessor-based" mean? 6. What are the typical word sizes of a PC? 7. How is input carried out in personal computers? 8. What principle storage devices do PC use? 9. What kind of a system is a PC? 10. What differs personal computers from large computer systems?

4. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Конкурирующая операционная система; появляться ежедневно; вступать в борьбу; лучший компьютер; остаться в стороне; выдержать конкуренцию; главный поставщик на компьютерном рынке; игрушка для любителя; микропроцессорный; цельный кристалл (микросхема) из кремния; размер слова; компоненты меньшей мощности; посредством; вывести на экран; низкоскоростной принтер с посимвольной печатью; использовать гибкие диски; приборы (не)автономного хранения данных; универсальный; автономная система; отличительная черта; интерактивный режим; независимо от цели; досуговая деятельность.

5. Проведите грамматический анализ текста 1, найдите в нем инфинитивные и причастные конструкции. Переведите предложения.

6. Переведите сложные предложения: бессоюзные (A); с сочинительной связью (B).
Запомните следующие сочинительные союзы: and, but, or, while, both ... and, as well as, not only ... but also, either ... or, neither ... nor.

A. 1. The computer you told me about was constructed at a Russian plant. 2. We hope we'll buy the computer your friend spoke so much about. 3. This is the principle the electronic computer is based upon. 4. The teacher says we may ask any questions we like. 5. Elements integrated circuits are made of are electrically interconnected components. 6. The main tendencies of IC development scientists are working at are to increase the scale of integration and to improve reliability. 7. Where are the computer games I gave you yesterday? — The computer games you are asking about are on the top shelf. 8. He was one of the greatest scientists the world had ever known.

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

10. High-speed devices are both input and output devices that are used as secondary storage.

7. Ознакомьтесь с терминами текста 2.

word processing — обработка текста
telephone dialing ['teləfəʊn 'daɪəlɪŋ] — набор номера телефона
security [sə'kjʊərɪtɪ] — безопасность, охрана
appliance [əp'laɪəns] — устройство, прибор
maintenance ['meɪntənəns] — поддержание, сохранение; эксплуатация
application software — прикладные программы
to delete [dɪ'li:t] — удалять, стирать, очищать память
to move paragraphs around — менять местами абзацы
accountant [ə'kaʊntənt] — бухгалтер
accounting [ə'kaʊntɪŋ] — бухгалтерский учет
income tax ['ɪnkʌm 'tæks] — подоходный налог
stock market forecasting — биржевые прогнозы
worksheet ['wɜ:kʃi:t] — электронная таблица
scheduling ['ʃedjulɪŋ] — составление расписания (графика)
computer-assisted instructions — компьютерные команды
to meet the demands — удовлетворять потребности
record-keeping — регистрация, ведение записей
grading ['greɪdɪŋ] — оценивание, классификация

8. Прочитайте текст и укажите сферы деятельности, где используются персональные компьютеры.

Text 2. APPLICATION OF PERSONAL COMPUTERS

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

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

The list of other home and hobby applications of PCs is almost endless, including: checking account management, budgeting, personal finance, planning, investment analyses, telephone answering and dialing, home security, home environment and climate control, appliance control, calendar management, maintenance of address and mailing lists, and whatnot.

Word processing. At home or at work, applications software, called a word processing program, enables you to correct or modify any document in any manner you wish before printing it. Using the CRT monitor as a dis-

play screen, you are able to view what you have typed to correct mistakes in spelling or grammar, add or delete sentences, move paragraphs around, and replace words. The letter or document can be stored on a diskette for future use.

Professional. The category of professional includes persons making extensive use of word processing, whose occupations are particularly suited to the desktop use of PCs. Examples of other occupations are accountants, financial advisors, stock brokers, tax consultants, lawyers, architects, engineers, educators, and all levels of managers. Applications programs that are popular with persons in these occupations include accounting, income tax preparation, statistical analysis, graphics, stock market forecasting, and computer modeling. The electronic worksheet is, by far, the computer modeling program most widely used by professionals. It can be used for scheduling, planning, and the examination of "what if" situations.

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

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

9. Ответьте на вопросы, используя информацию текста.

1. What are the main spheres of PC application? 2. Do you enjoy computer games? 3. Is it necessary for a person to be an analyst or a programmer to play computer games? 4. What other home and hobby applications, except computer games, can you name? 5. What is "a word processing program"? 6. What possibilities can it give you? 7. Can you correct mistakes while typing any material and how? 8. What other changes in the typed text can you make using a display? 9. Which professions are in great need of computers? 10. How can computers be used in education?

10. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Много областей применения; тем не менее; обработка текстов; пользоваться популярностью; любители; способности компьютера; бесконечный перечень; анализ инвестиций; набор номера теле-

фона; автоответчик; ведение календаря; хранение адресов и почты; и так далее; прикладные программы; исправлять ошибки в написании; стирать предложения; переставлять абзацы; бухгалтер; биржевые брокеры; консультант по налогам; юристы; работники образования; управленцы; бухгалтерский учет; подоходный налог; компьютерное моделирование; электронные таблицы; составление расписания; оказывать огромное влияние; прокладывать путь; дать толчок; удовлетворять потребности; учебная деятельность; компьютерная грамотность; моделирование реальных жизненных ситуаций.

11. Найдите в текстах 1 и 2 слова:

a) близкие по значению к следующим словам:

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

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

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

b) противоположные по значению следующим:

Verbs: to finish; to switch on; to take; to delete.

Nouns: online; input; work.

Adjectives: cheep; weak; common; general; large; soft; high; easy.

12. Расшифруйте следующие аббревиатуры и переведите их.

PC; PU; CU; ALU; CPU; MPU; IBM; DOS; CRT; ROM; RAM; IC; SSI; MSI; LSI; VLSI; MP; CD; I/O; IOP; CMI; CAI.

13. Переведите безличные предложения. Обратите внимание на их специфику.

1. It is well-known that personal computers enjoy great popularity among experimenters and hobbyists. 2. It took years to produce a high-speed computer performing a lot of functions. 3. When making up the summary of the text, one should put down the exact title of the article, the author's name, and the date of the edition. 4. It is difficult to imagine modern life without a computer. 5. It is quite impossible to listen to your English pronunciation: you make bad mistakes while reading. 6. Concerning these substances one must say that they vary in their composition. 7. When working with these substances, one should be very careful. 8. It was once a universal practice to manifacture each of the components separately and then assemble the complete device by wiring (монтаж) the components together with metallic

conductors. 9. It was no good: the more components and interactions, the less reliable the system. 10. It should first be made clear what the term "microelectronics" means.

14. Вспомните формы причастий, проанализируйте и переведите следующие предложения.

Participle	Active	Passive
Present	using	being used
Past	—	used
Perfect	having used	having been used

1. The results obtained are of particular importance for our research. 2. Having obtained the required results, we informed the manager of this fact. 3. The necessary data having been obtained, we could continue our experiment. 4. Being obtained the results of the research were analyzed. 5. While operating with graphical interface, people usually use such manipulators as a mouse and a track ball. 6. Key-to-disk devices used as data recording stations can correct data before storing it on a magnetic disk. 7. D. Mendeleyev having arranged the elements in a table, the existence of yet unknown elements could be predicted. 8. All the necessary preparations having been done, the operator began assembling the machine. 9. Being built on the basis of transistors, lasers are successfully used in technology.

15. Переведите сложноподчиненные предложения. Запомните союзы (союзные слова), вводящие придаточные предложения: that; so that; if, whether; which; when; while; since; till; until; whatever; whenever; in order to; regardless of, etc.

1. It is well-known in computer science that the words "computer" and "processor" are used interchangeably. 2. The operation part of the instruction is decoded so that the proper arithmetic and logic operation can be performed. 3. It is difficult to establish whether this problem can be solved at all. 4. Programs and data on which the control unit and the arithmetic-logical unit operate must be in internal memory in order to be processed. 5. The CU has a register that temporarily holds the instructions read from memory while it is being executed. 6. Regardless of the nature of the I/O devices, I/O interfaces are required to convert the input data to the internal codes used by the computer and to convert internal codes to a format which is usable by the output devices. 7. The purpose of registers in the ALU is to hold the numbers and the results of the calculation until they can be transferred to the memory. 8. Since the computer deals with pulses, the input device is a way of converting numbers written on paper into pulses and sending them to the

storage. 9. The principal characteristics of personal computers are that they are single-user system and are based on microprocessors. 10. However, although personal computers are designed as single-user systems, it is common to link them together to form a network.

16. Прочитайте текст и составьте письменно реферат на английском языке.

A MODEM

The piece of equipment that allows a computer to communicate with other computers over telephone lines is called a modem. The modem allows the individual to access information from all over the world and use that information in everyday life. Connecting with banks, Automatic Teller Machines, cash registers to read credit cards, access travel agents, buy products, e-mail, access databases, and teleconferencing, the modems provide easy access to many services. Files can be transferred easily, by uploading to another machine, or downloading to your own machine within a matter of minutes. The computer modem can be used as a telephone answering system, and documents can be faxed from one computer to another assuring fast and easy access to important documents.

A modem takes computer information and changes it into a signal that can be sent over telephone lines. The modem is a bridge between digital and analog signals. The computer is of the digital type, and the telephone uses analog technology. The modem converts the 0s and 1s of the computer (off-on switches) into an analog signals modulating the frequency of the electronic wave or signal. The modem does just the opposite and demodu-late the signal back into digital code. The modem gets its name from MOdulate and the DEModulate. Most people believe that you need a separate phone line for a modem, but that is not true. Your modem and telephone can share one line, the problem arises when someone else needs to use the telephone while the modem is in use. Also disable call waiting, it could disrupt your modem connection while the modem is in use.

There are three kinds of modems — internal, external, and fax. All modems do the same thing, they allow computers to communicate through tele-

phone lines. This lets computers exchange information everywhere. Internal modem is a circuit board that plugs into one of the expansion slots of the computer. Internal modems usually are cheaper than external modems, but when problems occur, fixing and troubleshooting the modem can sometimes prove to be quite difficult. External modem attaches to the back of the computer by way of a cable that plugs into the modem port. It is usually less expensive and very portable. It can be used with other computers very easily by unplugging it and plugging it into another computer. Fax modem can be hooked up to your telephone and used to send information to your computer. Your computer can also send information to a fax machine. Most computer modems are modems with faxing capabilities.

17. Выполните письменно перевод следующего текста по вариантам.

MICROCOMPUTER SYSTEM ORGANIZATION

1. The organization of a microcomputer system is the same as that of a larger computer system. The microprocessor unit (MPU), usually concentrated in a single chip, consists of the control unit and the arithmetic logic unit. Internal memory is made up of random access memory (RAM) and read-only memory (ROM). Because RAM is only temporary storage, all microcomputers require some instructions to get started after they are turned on, and these are contained in ROM. A microcomputer includes both an MPU and internal memory.

The portion of the system software that is in ROM brings into RAM the additional instructions required to operate the microcomputer. Typically these instructions are stored on a magnetic disk; hence, they are called a disk operating system, or DOS. This start-up process is called bootstrapping*. ROM also contains other programs that help to make personal computers easy to use, such as a programming language. Computer games are also stored in ROM cartridges.

In addition to the MPU, RAM, ROM, and associated control circuits, other components, called peripheral devices, are needed to make a complete microcomputer system The principal peripheral units are: input devices, output devices, mass storage units, and communication components. Like a DOS, the programs that control the flow of data between a microcomputer and its peripheral devices are a part of systems software.

The most common input device used with personal computers is the keyboard. Most personal computer keyboards have extra keys that perform special functions and that can be used to control the movement of a cursor on a screen. A lever-like** device, called a joystick, is also used as an input device, commonly for playing video games.

2. The CRT (cathode-ray tube) screen used with personal computers is called a monitor. Keyboards and monitors may be part of a single unit that also contains the microcomputer and the disk drives, or they may be separate units. Besides the monitor, the most common input units are dot-matrix and letter-quality printers. Dot-matrix printers are suitable for most microcomputer applications. Letter-quality printers are usually used for high-quality office correspondence. Both types of printers are considered to be low-speed character printers.

Mass storage units are available over a range of capacities and access times. Floppy disks, or diskettes, are the most common mass storage media. They store patterns of bits on magnetically coated, flexible plastic platters. A floppy disk platter is sealed permanently in a paper jacket with a small window for reading and writing. Hard disk storage systems are also available. They may be fixed or removable. Some mass storage units contain both floppy and hard disk devices.

Low-cost modulator-demodulator devices, called modems, that allow microcomputer systems to communicate over telephone lines have become increasingly popular. Modems permit networks of personal computer owners to exchange information or to access large data banks. These data banks may be dedicated to special applications, such as law or medicine, or they may provide a variety of consumer services.

Notes

* bootstrapping — начальная загрузка
** lever-like — рычажковый

TESTS

1. Вставьте необходимые слова вместо пропусков.

1. A personal computer is a small relatively inexpensive device designed for an individual _____ .
   a) person; b) producer; c) user
2. One of the first and most popular personal computers was _____ in 1977.
   a) interpreted; b) introduced; c) integrated
3. All personal computers are based on _____ technology, its CPU being called MPU.
   a) microscopy; b) microprocessor; c) microelement
4. Very soon a microcomputer was _____ from a calculator into a PC for everyone.
   a) transformed; b) transferred; c) transported

5. Input in PC is usually performed by means of a _____.
   a) mouse; b) scanner; c) keyboard
6. A personal computer uses _____ disks as input and output media.
   a) hard; b) fixed; c) floppy
7. Personal computers have a lot of _____, scientific, engineering, educational being among them.
   a) multiplication; b) applications; c) investigation
8. Personal computers have a great _____ upon pupils, educators, accountants, stock brokers, and who not.
   a) influence; b) information; c) environment
9. A word processing program called application _____ enables you to modify any document in a manner you wish.
   a) hardware; b) software; c) firmware
10. Using a display you can _____ mistakes, _____ words and replace sentences.
    a) delete; b) dial; c) correct

2. Найдите в предложениях неличные формы глагола и назовите их.

A. a) Gerund; b) Present Participle Active; c) Present Participle Passive; d) Past Participle Passive; e) Perfect Participle Active; f) Perfect Participle Passive.

1. When keyed, the data are held in a small memory called buffer. 2. Data keyed into the memory of a computer by typing on a keyboard are readable by humans. 3. Keyboard enables inputting numerical and text data. 4. The mouse provides the cursor control simplifying user's orientation on the display. 5. Having been constructed recently, a new electronic device has important applications in space exploration. 6. Being supplied with a special appliance, a television set may have a remote control. 7. The control unit operates by reading one instruction at a time. 8. Improved methods of obtaining three-dimensional television pictures have been worked on the basis of holography.

B. a) Indefinite Infinitive Active; b) Indefinite Infinitive Passive; c) Continuous Infininitive Active; d) Perfect Infinitive Active; e) Perfect Infinitive Passive.

1. Input devices are used to enter data into primary storage. 2. These data appeared to have been investigated long ago. 3. We are glad to have obtained such valuable results. 4. You should have known wonderful features of computers long ago. 5. The problem to be solved is of great importance to the development of this branch of industry. 6. The first amplifying semiconductor devices (transistors) are known to have been developed in the USA in 1948. 8. He ordered these devices to be repaired as soon as possible.

3. Прочитайте текст. Выберите основную мысль для каждого абзаца из предложенных ниже.

PERSONAL COMPUTERS

The personal computer can serve as a work station for the individual today. Moreover, as it has become financially feasible to provide a computer for the individual worker, so also technical developments have made the interface between man and machine increasingly "friendly," so that a wide array of computer functions are now accessible to people with no technical background.

A personal computer is a small computer based on a microprocessor; it is a microcomputer. Not all computers, however, are personal computers. A microcomputer can be dedicated to a single task such as controlling a machine tool or metering the injection of fuel into an automobile engine; it can be a word processor, a video game, or a "pocket computer" that is not quite a computer. A personal computer is something different: a stand-alone computer that puts a wide array of capabilities at the disposal of an individual.

The first generation of true personal computers, which came on the market between 1977 and 1981, had eight-bit microprocessors; later introduced systems had 16-bits ones. Now 32-bit microprocessor chips are available, and soon they will be included in complete computer systems.

1. A. Performance of a wide array of a computer functions.
   B. Accessibility of PC for not professionals.
   C. Friendly interface of a personal computer.
2. A. A microprocessor-based PC.
   B. PC — a pocket computer.
   C. Comparison of a microcomputer and a PC.
3. A. Microprocessor's capacity.
   B. The growth of MPC's capacity.
   C. The first generation of personal computers.

Unit 11

COMPUTER PROGRAMMING

Texts:	Computer Programming. Programming Languages — Cobol, Fortran, PL/I, RPG II, Basic, Pascal. The Conversion of Symbolic Languages. Running the Computer Program. Testing the Computer Program.
Grammar:	Сослагательное наклонение. Условные предложения.
Tests.	
Enjoy Yourself	

1. Ознакомьтесь с терминами текста 1.

equation [ɪ'kweɪʃən] — уравнение; приравнивание
list of instructions — перечень команд
guard [gɑ:d] — защищать, предохранять, завершать, заканчивать
appropriate sequence [ə'prɒprɪɪt 'sɪkwəns] — необходимая (требуемая) последовательность
program logic — логическая последовательность выполнения программы
flowchart ['fləʊtʃɑ:t] — блок-схема; составлять блок-схему
flowcharting — построение блок-схемы
pictorial representation — наглядное представление
predefined symbols [prɪdɪ'faɪnd 'sɪmbəlz] — заранее заданные символы
specifics [spə'sɪfɪks] — специальные черты, характерные особенности
emplate [ɪm'pleɪt] — шаблон, маска, образец, эталон
pseudocode ['psju:dəʊkəʊd] — псевдокод, псевдопрограмма
burden ['bɜ:dən] — нагрузка
programming rules — правила программирования
consume [kən'sju:m] — потреблять, расходовать
emphasize ['emfəsaɪz] — выделять, подчеркивать
top-down approach — принцип нисходящей разработки
looping logic — логическая схема выполнения (операций) в цикле

2. Прочитайте текст и объясните, как вы понимаете термин «компьютерное программирование».

Text 1. COMPUTER PROGRAMMING

Programming is the process of preparing a set of coded instructions which enables the computer to solve specific problems or to perform specific functions. The essence of computer programming is the encoding of the program for the computer by means of algorythms. The thing is that any problem is expressed in mathematical terms, it contains formulae, equations, and calculations. But the computer cannot manipulate formulae, equations, and calculations. Any problem must be specially processed for the computer to understand it, that is — coded or programmed.

The phase in which the system's computer programs are written is called the development phase. The programs are lists of instructions that will be followed by the control unit of the central processing unit (CPU). The instructions of the program must be complete and in the appropriate sequence, or else the wrong answers will result. To guard against these errors in logic and to document the program's logical approach, logic plans should be developed.

There are two common techniques for planning the logic of a program. The first technique is flowcharting. A flowchart is a plan in the form of a graphic or pictorial representation that uses predefined symbols to illustrate the program logic. It is, therefore, a "picture" of the logical steps to be performed by the computer. Each of the predefined symbol shapes stands for a general operation. The symbol shape communicates the nature of the general operation, and the specifics are written within the symbol. A plastic or metal guide called a template is used to make drawing the symbols easier.

The second technique for planning program logic is called pseudocode. Pseudocode is an imitation of actual program instructions. It allows a program-like structure without the burden of programming rules to follow. Pseudocode is less time-consuming for the professional programmer than is flowcharting. It also emphasizes a top-down approach to program structure.

Pseudocode has three basic structures: sequence, decision, and looping logic. With these three structures, any required logic can be expressed.

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

1. What is programming? 2. What is the essence of programming? 3. What should be done with the problem before processing by the computer? 4. What is a program? 5. What are instructions? 6. What are the main techniques for planning the program logic? 7. What is a flowchart? 8. What is a template and what is it used for? 9. What do you understand by "pseudocode"? 10. What are the basic structures of pseudocode?

4. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Совокупность закодированных команд; суть компьютерного программирования; кодирование посредством алгоритма; формулы, уравнения, вычисления; обработать особым образом; перечень команд; необходимая последовательность; защищать от ошибок; составлять план логической последовательности; общепринятая методика; логическая последовательность выполнения программы; построение блок-схемы; наглядное представление; заранее заданные символы; шаблон; псевдопрограмма; без издержек; выделять принцип нисходящей обработки; расходовать меньше времени; логическая схема выполнения операций в цикле; необходимая последовательность операций.

5. Подберите из предложенных ниже русских словосочетаний значения следующих терминов на английском языке.

Program: access program; application program; archived program; binary program; common program; compatible/incompatible program; control/management program; database program; debugging program; educational/teaching/training program; free program; general-purpose program; high-performance program; offline program; online program; operating (-system) program; processing program; protected-mode program; remote program; running program; self-loading program; simulation program; support program; utility program; virus-detection program; watch-dog program.

Программа в двоичном коде; прикладная программа; (не)совместимая программа; бесплатная программа; программа отладки; сторожевая программа; дистанционная программа; программа моделирования; сервисная программа; вспомогательная программа; программа для доступа (к данным); заархивированная программа; программа, работающая с базой данных; обучающая программа; программа, выполняемая с большой скоростью; универсальная программа; программа, выполняемая в защищенном режиме; программа обработки данных; программа операционной системы (системная программа); выполняемая программа; (не)сетевая программа; самозагружающаяся программа; часто используемая (распространенная) программа; программа управления; программа обнаружения вирусов.

6. Переведите предложения, содержащие сослагательное наклонение.

1. I should like to be a top specialist in computer technology. 2. It is necessary that the program should be debugged (отлажена) by a programmer. 3. It is required that the programmer should code the instructions of the program in the appropriate sequence. 4. The manager demanded that the work should be performed in time. 5. Write down the algorythm of computer operations lest you should make errors. 6. Our teacher speaks English as if he

were a real Englishman. 7. Without the Sun there would be no light, no heat, no energy of any kind. 8. I wish it were summer now and we could go to the seaside. 9. American scientists suggested that the quantum generator should be called laser, which is the acronym for light amplification by stimulated emission of radiation. 10. I wished you had mentioned these facts while the subject was being discussed.

7. Ознакомьтесь с терминами текста 2.

programming language — язык программирования
coded form — кодированный вид, кодированное представление
to convey — передавать, сообщать
to improve — улучшать, совершенствовать
machine orientd language — машинно-ориентированный язык
business-oriented language — язык для (программирования) экономических задач
problem-oriented language — проблемно-ориентированный язык
string of binary — строка двоичного представления
data handling — обработка данных, работа с данными
field-name length — длина имени поля
incorporate features — включать свойства (особенности)
versatile — многофункциональный, разносторонний, универсальный
generous — большой, значительный (о количестве)
mathematical relationship — математическая связь (соотношение)

8. Прочитайте текст и объясните, что представляют собой языки программирования.

Text 2. PROGRAMMING LANGUAGES

Let's assume that we have studied the problem, designed a logical plan (our flowchart or pseudocode), and are now ready to write the program instructions. The process of writing program instructions is called coding. The instructions will be written on a form called a coding form. The instructions we write will be recorded in a machine-readable form using a keypunch, key-to-tape, or key-to-disk, or entered directly into computer memory through a terminal keyboard.

The computer cannot understand instructions written in just any old way. The instructions must be written according to a set of rules. These rules are the foundation of a programming language. A programming language must convey the logical steps of the program plan in such a way that the control unit of the CPU can interpret and follow the instructions. Programming languages have improved throughout the years, just as computer hardware has improved. They have progressed from machine-oriented languages that

use strings of binary 1s and 0s to problem-oriented languages that use common mathematical and/or English terms.

There are over 200 problem-oriented languages. The most common of them are COBOL, FORTRAN, PL/I, RPG, BASIC, PASCAL.

COBOL

COBOL was the most widely used business-oriented programming language. Its name is an acronym for **C**ommon **B**usiness-**O**riented **L**anguage. COBOL was designed to solve problems that are oriented toward data handling and input-output operations. Of course, COBOL can perform arithmetic operations as well, but its greatest flexibility is in data handling. COBOL also was designed as a self-documenting language. Self-documenting languages are those that do not require a great deal of explanation in order to be understood by someone reading the program instructions. The self-documenting aspect of COBOL is made possible by its sentence-like structure and the very generous maximum symbolic field-name length of 30 characters. With a field-name length of up to 30 characters, the name can clearly identify the field and its purpose.

FORTRAN IV

The FORTRAN IV language is oriented toward solving problems of a mathematical nature. The name FORTRAN comes from the combination of the words **for**mula **tran**slation. The version of FORTRAN IV has been designed as algebra-based programming language. Any formula or those mathematical relationships that can be expressed algebraically can easily be expressed as a FORTRAN instruction. FORTRAN is the most commonly used language for scientific applications.

PL/I

PL/I stands for programming language I. It was designed as a general-purpose language incorporating features similar to COBOL for data handling instructions and features similar to FORTRAN for mathematical instructions. PL/I is much more than a combination of the good features of both COBOL and FORTRAN, as it has many capabilities that are unique. Yet, although PL/I is one of the most versatile and the most powerful of the programming languages, it is not the most commonly used. COBOL and FORTRAN have been available for a longer period of time than PL/I, and many more users work with those languages.

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

1. What is the process of writing instructions called? 2. What is a code? 3. How must instructions be written? 4. What is the foundation of any programming language? 5. How was the development of programming languages

progressing throughout the years? 6. What are the most common problem-oriented languages? 7. What is COBOL? 8. What functions was COBOL designed for? 9. What does FORTRAN serve for? 10. What capabilities has PL/I?

10. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Языки программирования; блок-схема; кодированная форма; вид, удобочитаемый для компьютера; в соответствии с набором правил; представить логические шаги программы; таким образом; совершенствовать языки программирования; машинно-ориентированные языки; проблемно-ориентированные языки; обычный термин; язык для программирования экономических задач; обработка информации; операции по вводу-выводу данных; гибкость; идентифицировать поле и его цели; решение проблем математического характера; сферы научного применения; универсальный язык; включать свойства; уникальные возможности; многофункциональный и самый мощный из языков программирования.

11. Найдите в текстах 1 и 2 слова, близкие по значению к следующим.

Nouns: command; line; characteristic; form; evolution; enumeration; mistake; method; character; manual (instruction); consumption; storage; basics; abbreviation; enterpretation; correlation; possibility.

Verbs: include; inform; process; protect; apply; permit; stress; suppose; learn; make up; write; key; explain; define; perfect; advance; decide; execute; demand.

Adjectives: full; incorrect; usual; necessary; accessible; required; considerable; floppy; possible.

12. Переведите условные сложноподчиненные предложения. Обратите внимание на форму выражения разных типов условия.

I. 1. If you try very hard, you can master any language. 2. If you want to master any language, you must know at least three thousand words. 3. You will improve your pronunciation if you read aloud every day. 4. Time will be saved if one uses a computer. 5. If you learn all the words of the lesson, you will write your test successfully. 6. If you or I add up two numbers of six figures without a calculator, it will take us a lot of time.

II. 1. It would be a good thing if you didn't smoke. 2. If the earth didn't rotate, it wouldn't have the shape of a ball. 3. If I had the time, I should help you to solve the problem. But I must be off. 4. I should translate the article without difficulty if I knew English well. 5. If I were in your place, I should learn to speak English fluently. 6. Were you asked to explain why addition is performed the way it is, you would probably have to think for a while before answering.

III. I decided to stay at home last night. I would have gone out if I hadn't been so tired. 2. Had he not been busy, he wouldn't have missed that conference. 3. Why didn't you phone me yesterday? I would have helped you. 4. If you had attended preliminary courses, you would have passed your examinations more successfully. 5. Had the manager had this information before, he would have acted differently. 6. The binary system is particulary appropriate to the nature of an electric machine; if it had not existed, computer designers would have had to invent it.

13. Выполните перевод следующих текстов письменно по вариантам.

1. RPG II programming language

RPG II is a business-oriented language. The name stands for report program generator. RPG is considerably different from other programming languages. RPG is, in effect, a large prewritten program. The programmer simply indicates the options within the master program that are to be used and, through a set of indicators, when they are to be used.

RPG was originally referred to as a "quick-and-dirty" programming language. That is, it is quick for the programmer to write and relatively inefficient in its use of main storage and processing speed. The latest version of RPG, called RPG II, greatly improved the language and gave it additional capabilities. RPG has an advantage over COBOL in that it requires less training for a programmer to become proficient in it. For this reason, RPG is commonly used on many smaller computers and in small business.

2. BASIC

BASIC is the acronym for beginner's all-purpose symbolic instruction code. It was developed in Dartmouth College as an easy-to-learn programming language for students and inexperienced programmers. Its key design goal is simplicity. BASIC has become a very popular language in systems where many users share the use of a computer through terminals and it has become a universal language for personal computers.

The language BASIC is mathematically oriented, that is, its typical use is to solve problems of a mathematical nature. Because BASIC programs are usually executed from a terminal or microcomputer where input is entered through a keyboard and printed output is relatively slow, problems of a business nature requiring large volumes of input-output data are usually not practical.

3. PASCAL

PASCAL was invented in 1970 by Professor Niklaus Wirth of Zurich, Switzerland. It was named after the mathematician Blaise Pascal, who invented one of the earliest practical calculators. PASCAL is a mathematically oriented programming language and, as such, is most commonly used

in mathematics, engineering, and computer science departments of colleges and universities. This language is somewhat unusual in that it was designed to be a structured language. This means that the program must be written in logical modules which are in turn called by a main controlling module. Much of PASCAL's popularity is due to work done at the University of California at San Diego, where PASCAL has been implemented on several different computers including microcomputers.

14. Прочитайте тексты (по вариантам) и составьте рефераты на английском языке.

1. The conversion of symbolic languages

As we see, most of the symbolic languages are oriented toward the particular application areas of business or science (math). The one problem with all symbolic languages is that none of them can be understood by a computer. The symbolic languages may say AP, ADD, or use a "plus" sign to indicate an addition step, but the only thing that means addition to a computer is its binary machine code. We have symbolic programs that are relatively easy for humans to understand, but they cannot be understood by computers. On the other hand, we have machine code that is understood by the computer, but it is difficult for humans to use. The solution is a translator that translates the symbolic program into machine code. The translator allows the human to work with relatively easy-to-understand symbolic languages and it allows the computer to follow instructions in machine code. The translation of symbolic instructions to machine code is accomplished through the use of a program called a language processor. There are three types of language processors. They are called assemblers, compilers, and interpreters. Each translates symbolic instructions to machine code, but each does it differently.

(The translator is a program itself. It is part of a group of programs, called the operating systems, that help us to use the computer.)

2. Running the computer program

The operating system is a collection of programs provided by the computer's manufacturer that allows us to shedule jobs for the computer, to translate source programs into object programs, to sort data stored on secondary storage devices, and to copy data from any input device to any output device. These programs are called control programs, language programs, and utility programs.

The control program (often called the supervisor, monitor, or executive) is a main-storage-resident program. Its functions are to schedule jobs, shedule input and output for our programs, and to monitor the execution of our programs.

The language processors are programs that translate source programs into object programs. There are three types of language processors: assemblers, compilers, and interpreters. Each language has its own language processor.

The service programs are programs that are commonly used in all data processing centers. They have functions that are required by everyone using a computer. Examples of service programs include linkage editors to prepare object programs for execution, a librarian to catalog programs into a library area on magnetic disk, utility programs to transfer data from device to device, and sort-merge programs for sorting data on magnetic tape or disk.

3. Testing the computer program

There are two kinds of errors or bugs with which programmers must deal. The first type is the coding error. Such errors are syntax errors that prevent the language processor from successfully translating the source program to object program code. The language processor identifies the nature and the location of the error on the source program listing, so these errors are relatively easy to find and correct. The second type of bug is the logic error. The computer program can be successfully translated, but the program does not produce the desired results. These errors are generally much more difficult to find and to correct than are coding errors. Logic errors can be avoided through careful planning of the program logic, but it is the programmer's responsibility to test thoroughly all of the program's functions, in order to verify that the program performs according to specifications.

There are many tools provided to the programmer to help in debugging the program logic. These tools are called debug packages or tracing routines. They assist the programmer in following the logic by printing out calculation results and field values used in making logic decisions in the program. In a few cases it may be necessary to use a memory dump — a printout of the instructions and date held in the computer's memory — in order to find the cause of logic errors.

TESTS

1. Подберите вместо пропусков подходящее по смыслу слово.

1. The most common _____ for planning the program logic are flowcharting and pseudocode.
   a) technologies; b) technics; c) techniques
2. _____ was designed for dealing with the complicated mathematical calculations of scientists and engineers.
   a) COBOL; b) FORTRAN; c) PL/I

3. _____ is the foundation of any programming languages.
   a) a set of rules; b) a group of numbers; c) a lot of instructions
4. I/O _____ match the physical and electrical characteristics of input-output devices.
   a) interchanges; b) interfaces; c) interpretations
5. Letter-quality, dot-matrix, and ink-jet printers are all _____ printers.
   a) line; b) page; c) character
6. The most common device used to transfer information from the user to the computer is the _____ .
   a) keyboard; b) printer; c) modem
7. Input-output units link the computer to its external _____ .
   a) requirement; b) development; c) environment
8. I/O devices can be classified according to their speed, visual displays being _____ devices.
   a) high-speed; b) medium-speed; c) low-speed

2. Согласуйте слова в левой колонке с их интерпретацией, предложенной справа.

1.	Computer	a)	an electronic device accepting data processing results from the computer system
2.	Input	b)	the unit performing arithmetic operations called for in the instructions
3.	Output	c)	the unit coordinating all the activities of various components of the computer. It reads information, enterpretes instructions, performs operations, etc.
4.	Software	d)	a set of programs designed to control the operation of a computer
5.	Hardware	e)	lists of instructions followed by the control unit of the CPU
6.	Storage	f)	an electronic device keying information into the computer
7.	CPU	g)	the unit holding all data to be processed, intermediate and final results of processing
8.	CU	h)	visible units, physical components of a data processing system
9.	ALU	i)	the unit that directs the sequence of system operations, selects instructions, and interpretes them
10.	Program	j)	a device with a complex network of electronic circuits that can process information, make decisions, and replace people in routine tasks

3. Определите неличные формы глагола, содержащиеся в следующих предложениях. Переведите их.

1. The problems to be studied are of great importance. 2. The problem studied helped us understand many things. 3. To study the problem we must make some experiments. 4. To study the problem means to give answers to many questions. 5. Having studied the problem, we could answer many questions. 6. The problem studied is unlikely to be of great interest. 7. Scientists studying the problem made a lot of experiments to get answers to the required questions. 8. The problem to have been studied last year will not help us to solve our task now. 9. Having been well prepared for the examination, the pupils could answer all the questions the teacher asked them. 10. The problem to be discussed at the meeting requires careful consideration.

4. Выполните перевод грамматикализованных предложений.

I. 1. Accuracy is one of the major items in judging a control system. The higher the accuracy of the system, the less errors the system makes. 2. The digital computer employs the principle of counting units, digits, and hence, if properly guided, gives answers which have a high degree of accuracy. 3. Electronic computers can choose which of several different operations are the right ones to make in given circumstances. Never before has mankind had such a powerful tool available. 4. In many cases Man has proved to be but an imperfect controller of the machines he has created. Thus it is natural that wherever necessary, we should try to replace the human controller by some form of automatic controller. 5. It is necessary to draw a distinction between calculating machines and computers, the former requiring manual control for each arithmetic step and the latter having the power to solve a complete problem automatically.

II. 1. Many servomechanisms and regulators are known to be composed of a number of control elements connected in series, the output of one being used as the input to the next. 2. We expect a computer to work for at least several hours without a fault; that is to say, supposing a speed of one thousand operations per second, to perform more than ten million operations. 3. Digital programming implies the preparation of a problem for a digital computer by putting it in a form which the computer can understand and then entering this program into the computer storage unit. A problem to be solved by a digital computer must be expressed in mathematical terms that the computer can work with. 4. Among all forms of magnetic storage, magnetic tapes were the first to be proposed in connection with digital computers. 5. Programming a computer involves analyzing the problem to be solved and a plan to solve it.

5. Прочитайте тексты (по вариантам) и составьте короткую аннотацию на каждый из них.

1. The World-Wide Web

People have dreamt of a universal information database since late 1940s. In this database, not only would the data be accessible to people around the world, but it would also easily link to other pieces of information, so that only the most important data would be quickly found by a user. Only recently the new technologies have made such systems possible. The most popular system currently in use is the World-Wide Web (WWW), which began in March 1989. The Web is an Internet-based computer network that allows users on one computer to access information stored on another through the world-wide network.

As the popularity of the Internet increases, people become more aware of its colossal potential. The World-Wide Web is a product of the continuous search for innovative ways of sharing information resources. The WWW project is based on the principle of universal readership: "if information is available, then any person should be able to access it from anywhere in the world." The Web's implementation follows a standard client-server model. In this model, a user relies on a program (the client) to connect to a remote machine (the server), where the data is stored. The architecture of the WWW is the one of clients, such as Netscape, Mosaic, or Lynx, "which know how to present data but not what its origin is, and servers, which know how to extract data," but are ignorant of how it will be presented to the user.

One of the main features of the WWW documents is their hypertext structure. On a graphic terminal, for instance, a particular reference can be represented by underlined text, or an icon. "The user clicks on it with the mouse, and the referenced document appears." This method makes copying of information unnecessary: data needs only to be stored once, and all referenced to it can be linked to the original document.

2. Success of the WWW

Set off in 1989, the WWW quickly gained great popularity among Internet users. What is the reason for the immense success of the World-Wide Web? Perhaps, it can be explained by CERN's attitude towards the development of the project. As soon as the basic outline of the WWW was complete, CERN made the source code for its software publicly available. CERN has been encouraging collaboration by academic and commercial parties since the onset of the project, and by doing so it got millions of people involved in the growth of the Web.

The system requirements for running a WWW server are minimal, so even administrators with limited funds had a chance to become information providers. Because of the intuitive nature of hypertext, many inexperienced computer users were able to connect to the network. Furthermore, the simplicity of the Hyper Text Markup Language, used for creating interactive

documents, allowed these users to contribute to the expanding database of documents on the Web. Also, the nature of the World-Wide Web provided a way to interconnect computers running different operating systems, and display information created in a variety of existing media formats.

In short, the possibilities for hypertext in the world-wide environment are endless. With the computer industry growing at today's pace, no one knows what awaits us in the 21st century.

Note

CERN was originally named after its founding body the "Conseil Europeen pour la Recherche Nucleaire," and is now called "European Laboratory for Particle Physics."

3. A brief history of the Internet

In 1973 the Defense Advanced Research Projects Agency (DARPA) initiated a research program to investigate techniques and technologies for interlinking packet networks of various kinds. The objective was to develop communication protocols which would allow networked computers to communicate transparently across multiple, linked packet networks. This was called the Internetting project and the system of networks which emerged from the research was known as the "Internet" (Intercontinental Network).

During the course of its evolution, particularly after 1989, the Internet system began to intergrate support for other protocol suites into its basic networking fabric. By the end of 1991 the Internet has grown to include some 5,000 networks in over three dozen countries, serving over 700,000 host computers used by over 4,000,000 people.

The bulk of the system today is made up of private networking facilities in education and research institutions, business, and in government organizations across the globe.

A secretariat has been created to manage the day-to-day function of the Internet Activities Board (IAB) and Internet Engineering Task Force (IETF). IETF meets three times a year in plenary and in approximately 50 working groups convene at intermediate times by electronic mail, teleconferencing, and at face-to-face meetings.

There are a number of Network Information Centers (NICs) located throughout the Internet to serve its users with documentation, guidance, advice, and assistance. As the Internet continues to grow internationally, the need for high quality NIC functions increases. Although the initial community of users of the Internet were drawn from the ranks of computer science and engineering, its users now comprise a wide range of disciplines in the sciences, arts, letters, business, military, and government administration.

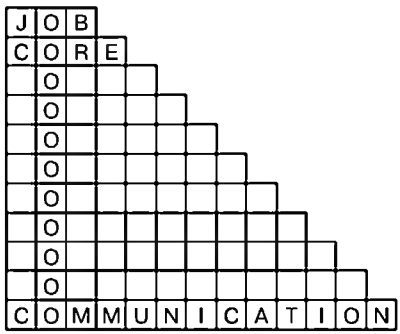
ENJOY YOURSELF

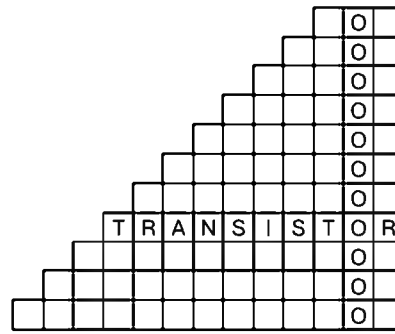
1. Quiz-game "Do you know more about computers"? (Divide into two groups and give answers to even (1 gr.) and odd (2 gr.) question numbers.)

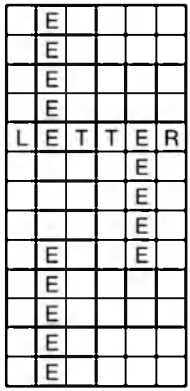
1. What are the main functional units of a digital computers?
2. What types of storage do you know?
3. What is a binary number system?
4. What is storage media?
5. How is storage capacity measured (in what units)?
6. What do you know of electronic memories?
7. What can you say about electromechanical memories?
8. How do you understand the term "access time"?
9. What is RAM/ROM?
10. What storage devices do you know?
11. What is the function of the CPU?
12. What two functional units does the CPU consist of?
13. What components does control unit include?
14. What devices has the arithmetic-logical unit?
15. What is the ALU function?
16. What is the function of CU?
17. What is the heart (brain) of a microprocessor?
18. What is the purpose of input devices?
19. How do you understand the term "input-output environment"?
20. What groups can I/O devices be classified according to their speed?
21. What devices are used for inputting information?
22. What is touch pad?
23. What is a scanner used for?
24. What types of printers do you know?
25. When did the first personal computer appear?
26. What differs PC from large computer systems?
27. What is a personal computer?
28. What are the main spheres of PC applications?
29. What professions are in great need of computers?
30. What is modem and what is it used for?
31. What is programming?
32. What is a program?
33. What techniques for planning the program logic do you know?
34. What do you understand by pseudocode?
35. What is a code?
36. What is the foundation of any programming language?
37. What programming languages do you know?
38. What is FORTRAN used for? Decode it.
39. What does COBOL serve for? Decode it.
40. What is WWW?

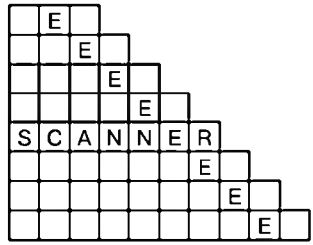
2. Lexical games.

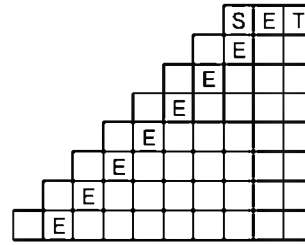
Fill in the squares with nouns upon the models.

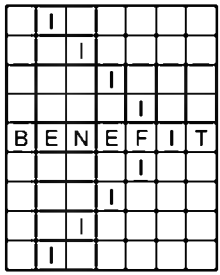


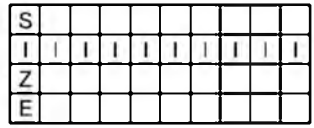


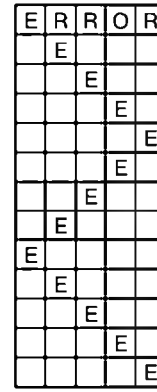




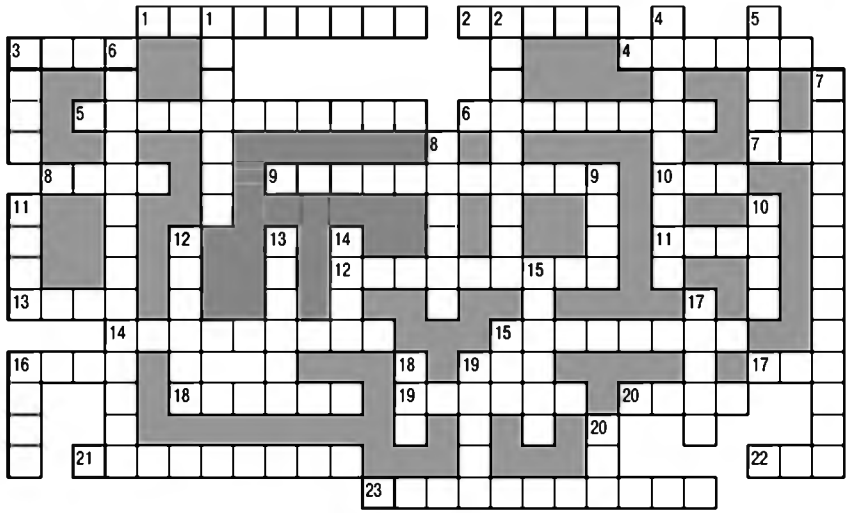








Crossword



Across

1. Discovery; producing sth. new. **2.** Syn. to scale; e.g. large scale of integration. **3.** A type of a plotter. **4.** A flexible disk. **5.** Softness, capability to changing; ant. to rigidity. **6.** One of the elementary arithmetic actions. **7.** A point used as a symbol of multiplication. **8.** A crystal, semiconductor body in which an integrated circuit is formed. **9.** The process of preparing a set of coded instructions, enabling the computer to solve specific problems. **10.** An _____ jet printer. **11.** A means of coding data by punching _____ into cards. **12.** Gain or benefit; a favorable position, superiority. **13.** One of the means of storing information. **14.** A computer program that translates a low-level programming language into machine language. **15.** Electronic or mechanical equipment that uses cassettes, disks, etc. **16.** A device, block, element. **17.** A unit of information. **18.** A cylinder on which smth. is rolled up. **19.** Information resulting from computer processing, that is delivered to a user; one of the main units of a computer. **20.** Postal system; electronic post. **21.** Means of interacting between two systems. **22.** One of the three major uses of visual display terminals, e.g. a light _____ . **23.** Syn. to advancement.

Down

1. Diversity, great number of sth. **2.** Supplies, furnishing, apparatus — things needed for some purpose. **3.** Syn. to information. **4.** A predetermined set of instructions for solving a specific problem in a manner of steps. **5.** Velocity,

quick motion. **6.** One of the elementary arithmetic actions. **7.** Syn. to definition. **8.** A handbook of facts, instructions for use as a guide, reference, or the like. **9.** Any form of play; amusement by means of a computer. **10.** A bobbin of magnetic tape on which the collected data are stored. **11.** A basic unit of storage in a memory, consisting of a number of bits. **12.** A movable indicator light on a computer video screen. **13.** A character, sign, letter, number. **14.** Basis, foundation. **15.** A counting board, a frame with beads on wires for doing or teaching arithmetics. **16.** Intelligence, mental ability. **17.** A person who makes use of a computer. **18.** A container; a screened window. **19.** Status, position, conditions. **20.** Syn. to purpose.

REVIEW OF THE MATERIAL STUDIED

Unit 12

NEW MEDIA

Texts:	What Is New Media? The Computing Era. Steps in Computer Development. Working Methods of a Computer and Its Architecture.
Grammar:	Review of English Tenses and Voices.
Tests	

1. Read text 1 and speak about new media.

Text 1. WHAT IS NEW MEDIA?

New media is a broad term that emerged in the later part of the 20th century to encompass the amalgamation of traditional media such as film, images, music, spoken and written word, with the interactive power of computer and communications technology, computer-enabled consumer devices, and most importantly the Internet. New media holds out a possibility of on-demand access to content any time, anywhere, on any digital device, as well as interactive user feedback, creative participation, and community formation around the media content. What distinguishes new media from traditional media is not the digitizing of media content into bits, but the dynamic life of the "new media" content and its interactive relationship with the media consumer. This dynamic life moves, breathes, and flows with pulsing excitement in real time.

Thus, a high-definition digital television broadcast of a film viewed on a digital plasma TV is still an example of traditional media, while an "analog" paper poster of a local rock band that contains a web address where fans can find information and digital music downloads is an example of new media communication.

Most technologies described as "new media" are digital, often having characteristics of being manipulated, networkable, dense, compressible, in-

teractive, and impartial. Some examples may be the Internet, websites, computer multimedia, computer games, CD-ROMS, and DVDs. New media is not television programs, feature films, magazines, books, or paper-based publications — unless they contain technologies that enable digital interactivity, such as graphic tags containing web-links.

History. In the 1960s connections between computing and radical art began to grow stronger. It was not until the 1980s that Alan Kay and his coworkers at Xerox PARC began to give the power of a personal computer to the individual, rather than have a big organization be in charge of this. "In the late 1980s and early 1990s, however, we seem to witness a different kind of parallel relationship between social changes and computer design."

Until the 1980s media relied primarily upon print and analog broadcast models, such as those of television and radio. The last twenty-five years have seen the rapid transformation into media which are predicated upon the use of digital computers, such as the Internet and computer games. However, these examples are only a small representation of new media. The use of digital computers has transformed the remaining "old" media, as suggested by the advent of digital television and online publications. Even traditional media forms such as the printing press have been transformed through the application of technologies such as image manipulation software like desktop publishing tools.

According to W. Russell Neuman, "We are witnessing the evolution of a universal interconnected network of audio, video, and electronic text communications that will blur the distinction between interpersonal and mass communication and between public and private communication." Neuman argues that new media will:

— alter the meaning of geographic distance;
— allow for a huge increase in the volume of communication;
— provide the possibility of increasing the speed of communication;
— provide opportunities for interactive communication;
— allow forms of communication that were previously separate to overlap and interconnect.

What is new media? The *New Media Reader* defines new media by using some simple and concise propositions:

New Media versus Cyberculture — Cyberculture is the study of various social phenomena that are associated with the Internet and network communications (blogs, online multi-player gaming), whereas new media is concerned more with cultural objects and paradigms (digital to analog television, iPhones).

New Media as Computer Technology Used as a Distribution Platform — new media are the cultural objects which use digital computer technology for distribution and exhibition, e.g. (at least for now) Internet, websites, comput-

er multimedia, Blu-ray disks, etc. The problem with this is that the definition must be revised every few years. The term "new media" will not be "new" anymore, as most forms of culture will be distributed through computers.

New Media as Digital Data Controlled by Software — The language of new media is based on the assumption that, in fact, all cultural objects that rely on digital representation and computer-based delivery do share a number of common qualities. New media is reduced to digital data that can be manipulated by software as any other data. Now media operations can create several versions of the same object. An example is an image stored as matrix data which can be manipulated and altered according to the additional algorithms implemented, such as color inversion, gray-scaling, sharpening, rasterizing, etc.

New Media as the Mix Between Existing Cultural Conventions and the Conventions of Software — new media today can be understood as the mix between older cultural conventions for data representation, access, and manipulation and newer conventions of data representation, access, and manipulation. The "old" data are representations of visual reality and human experience, and the "new" data is numerical data.

Globalization and new media. The rise of new media has increased communication between people all over the world and the Internet. It has allowed people to express themselves through blogs, websites, pictures, and other user-generated media. Globalization shortens the distance between people all over the world by the electronic communication.

New media have created virtual realities that are becoming extensions of the world we live in. With the creation of Second Life people have even more control over this virtual world where anything that a participant can think of in his mind can become a reality in Second Life.

New media changes continuously due to the fact that it is constantly modified and redefined by the interaction between the creative use of the masses, emerging technology, cultural changes, etc.

2. Check your comprehension.

1. What do you understand by the term "new media"? 2. What distinguishes new media from traditional media? 3. Give examples of traditional media and new media communication. 4. What characteristics have most new media technologies got? 5. Can TV be called new media of communication and in what case? 6. What were the early media relied on? 7. What helped to transform the old media into new one? 8. How will new media change according to W. Neuman? 9. What can you say about new media versus cyberculture? 10. How is new media constantly changed?

3. Find in text 1 English equivalents to the following Russian phrases.

Слияние традиционных средств информации с Интернетом; потребительские приборы, появившиеся благодаря компьютеру; предлагать возможность; доступ по требованию; а также; обратная связь пользователя; творческое участие; содержание средств информации; цифровое телевещание; художественные фильмы.

Быть на попечении (отвечать за); издания в компьютерной сети; программированные средства управления построением изображений; настольные издательские системы; межличностные связи.

Краткие предложения; различные явления; коллективная игра в сети; использовать для распределения и показа; корректировать определения; цифровая информация, управляемая программными средствами; основываться на предположении; основываться на цифровом представлении; иметь ряд общих качеств; правила представления информации; цифровые данные.

Средства, созданные пользователем; мир, в котором мы живем; все, что участник может представить в уме; постоянно изменяться; благодаря тому, что.

4. Analyze the underlined predicates in text 1. Name their tense and voice.

5. Make up an annotation to text 1.

6. Read text 2 and say what scientists are mentioned in the text and what their discoveries are.

Text 2. THE COMPUTING ERA

Nobody knows who built the first computer. Some people say that humans were the first computers. Human computers got bored doing the same math over and over again.

A cashier, for example, used to make change every day in her head or with a piece of paper. That took a lot of time and people made mistakes. So people made machines that did those same things over and over. The abacus, the slide rule, the astrolabe are amples of automated calculation machines. This part of computer history is called the "history of automated calculation."

At the end of the Middle Ages people in Europe thought math and engineering were more important. In 1623 Wilhelm Schickard made a mechanical calculator. Other Europeans made more calculators after him. They were not modern computers because they could only add, subtract, and multiply.

Some people wanted to be able to tell their machine to do different things. For example, they wanted to tell the music box to play different music. One of the first examples of this was built by Hero of Alexandria (10—70 A.D.).

He built a mechanical theater, which performed a play lasting 10 minutes and was operated by a complex system of ropes and drums. These ropes and drums were the language of the machine — they told what the machine did and when. Some people think that this is the first programmable machine.

In 1801 Joseph Marie Jacquard used punched paper cards to tell his textile loom what kind of pattern to weave. He could use punch cards to tell the loom what to do, and he could change the punch cards, which means he could program the loom to weave the pattern he wanted. This means the loom was programmable. This part of computer history is called the "history of programmable machines."

Modern computers were made when Charles Babbage had a bright idea. He wanted to make a machine that could do all the boring parts of mathematics, (like the automated calculators) and could be told to do them different ways (like the programmable machines). Charles Babbage was the first to make a design of a fully programmable mechanical computer. He called it the "the analytical engine." Because Babbage did not have enough money and always changed his design when he had a better idea, he never built his analytical engine.

As time went on, computers got more and more popular. Herman Hollerith figured out how to make a machine that would automatically add up information that the Census Bureau collected. The Computing Tabulating Recording Corporation (which later became IBM) made his machines. People were happy until their machines broke down, got jammed, and had to be repaired. This is when the Computing Tabulating Recording Corporation invented technical support.

Because of machines like this, new ways of talking to these machines were invented, and new types of machines were invented, and eventually the computer that we all know and love today was born.

Modern computers have changed very much. They are able to control traffic lights, cars, or locks. Most modern computers can be used to play music or video. The basic principle is still the same though: the computer has a set of rules, usually called an algorithm. Based on these rules it changes information.

7. Check your comprehension.

1. What part of computer history is considered "the history of automated calculation"? 2. Give examples of the first automated calculation machines. 3. Why were they not like modern computers? 4. What were the first programmable machines? Describe them. 5. When did the history of programmable machines come? 6. Who contributed to the appearance of a programmable mechanical computer? 7. What prevented people to be satisfied with the machine designed by H. Hollerith? 8. What important thing favored the improvement of the computer? 9. How do programmers give tasks to computers? 10. What can modern computers do?

8. Make up a plan to text 2 and write an essay using your plan.

9. Put the verbs given in brackets in the necessary form.

1. Cashiers often (to make) mistakes doing a lot of calculations every day. 2. Punched cards (to use) by J. M. Jacquard to program his loom. 3. People greatly (to change) computers lately. 4. During the experiment the machine (to break) down and (must repair). 5. Our programmer (to write) programs for the computer all day long yesterday. 6. He (to finish) his work before 7 o'clock. 7. When the lesson (to be over), we (to switch) the computer off. 8. What idea Charles Babbage (to have)? He (to design) a fully programmable mechanical computer. 9. We (to use) computers for three hours to solve those mathematical problems. 10. The problems (not to solve) before the necessary algorithms (to input) into the computer.

10. Read text 3 and speak about the ways of computer improvements in the 20th century.

Text 3. STEPS IN COMPUTER DEVELOPMENT

In the first half of the 20th century scientists started using computers, mostly because scientists had a lot of mathematics to figure out and wanted to spend more of their time thinking about the secrets of the universe instead of spending hours adding numbers together.

So they put together computers. These computers used analog circuits, making them very hard to be programmed. Then, in the 1930s, they invented digital computers, which made them easier to program.

Nearly all modern computers use the stored-program architecture in some form. It has become the main concept which defines a modern computer. Most of the technologies used to build computers have changed since the 1940s, but many current computers still use the von-Neumann architecture.

In the 1950s computers were built out of mostly vacuum tubes. Transistors, being smaller and cheaper, replaced vacuum tubes in the 1960s. They also need less power and don't break down as much as vacuum tubes. In the 1970s technologies were based on integrated circuits. Microprocessors, such as the Intel 4004 made computers smaller and cheaper, faster and more reliable. By the 1980s computers became small and cheap enough to replace mechanical controls in things like washing machines. The 1980s also saw home computers and personal computer. With the evolution of the Internet, personal computers are becoming as common as the television and the telephone in the household.

In 2005 Nokia started to call some of its mobile phones (the N-series) "multimedia computers" and after the launch of the Apple iPhone in 2007, many are now starting to add the smartphone category among "real" computers.

Kinds of computers. There are three types of computers: desktop computers, mainframes, and embedded computers.

A "desktop computer" is a small machine that has a screen (which is not part of the computer). Most people keep them on top of a desk, that is why they are called "desktop computers." "Laptop computers" are computers small enough to fit on your lap. This makes them easy to carry around. Both laptops and desktops are called personal computers, because one person at a time uses them for things like playing music, surfing the Web, or playing video games.

There are bigger computers that many people at a time can use. These are called "mainframes," and these computers do all the things that make things like the Internet work. You can think of a personal computer like this: the personal computer is like your skin: you can see it, other people can see it, and through your skin you feel wind, water, air, and the rest of the world. A mainframe is more like your internal organs: you (hopefully) never see them, and you barely even think about them, but if they suddenly went missing, you would have some very big problems.

There is another type of computer, called *an embedded computer*. An embedded computer is a computer that does one thing and one thing only, and usually does it very well. For example, an alarm clock is an embedded computer: it tells the time. Unlike your personal computer, you cannot use your clock to play Tetris. Because of this, we say that embedded computers cannot be programmed, because you cannot install programs like Tetris on your clock. Some mobile phones, automatic teller machines, microwave ovens, CD players, and cars are examples of embedded computers.

Home computers have a lot of applications. Among them are the following: playing computer games, writing, solving mathematical problems, looking for things on the Internet, watching TV and films, listening to music, communicating with other people.

11. Check your comprehension.

1. What forced scientists to develop and use computers? 2. Whose architecture is used in modern computers? 3. What type of circuits made computers easier to program? Why? 4. What advantages had transistors over vacuum tubes? 5. When and what devices replaced transistors in computers? 6. What made computers more reliable? 7. When did personal computers appear? 8. What main types of computers do you know? 9. Give examples of embedded computers. 10. Where do home computers find application?

12. Make up an essay to text 3.

13. Analyze the underlined verbals (Participle I, Participle II, Gerund, Infinitive) naming their functions in the sentences.

14. Read text 4 and speak about the functions of an operating system and the computer architecture.

Text 4. WORKING METHODS OF A COMPUTER AND ITS ARCHITECTURE

Working methods. Computers store data and the instructions telling them what to do with the data as numbers, because computers can do things with numbers very quickly. These data are stored as binary symbols (1s and 0s). A 1 or a 0 symbol stored by a computer is called a bit, which comes from the words binary digit. Computers can use many bits together to represent instructions and the data that these instructions use. A list of these instructions is called a program and stored on the computer's hard disk. Computers use memory called "RAM" as a space to carry out the instructions and store data while it is doing these instructions. When the computer wants to store the results of the instructions for later, it uses the hard disk.

An operating system tells the computer how to understand what jobs it has to do, how to do these jobs, and how to tell people the results. It tells the electronics inside the computer, or "hardware," how to work to get the results it needs. This lets most computers have the same operating system, or list of orders to tell it how to talk to the user, while each computer can have its own computer programs or list of jobs to do what its user needs. When a user needs to use a computer for something different, the user can learn how to use a new program.

The Internet. One of the most important jobs that computers do for people is helping with communication. Communication is how people share information. Computers have helped people move forward in science, medicine, business, and learning, because they let experts from anywhere in the world work with each other and share information. They also let other people communicate with each other, do their jobs almost anywhere, learn about almost anything, or share their opinions with each other. The Internet is the thing that lets people communicate between their computers.

Main hardware. Computers come in different forms, but most of them have a common architecture. All computers have a CPU. All computers have some kind of data bus which lets them get inputs or output things to the environment. All computers have some form of memory. These are usually chips (integrated circuits) which can hold information. Many computers have some kind of sensors, which lets them get input from their environment. Many computers have some kind of display device, which lets them show output. They may also have other peripheral devices connected.

A computer has several main parts. When comparing a computer to a human body, the CPU is like a brain. It does most of the "thinking" and tells the rest of the computer how to work. The CPU is on the motherboard, which is

like the skeleton. It provides the basis for where the other parts go, and carries the nerves that connect them to each other and the CPU. The motherboard is connected to a power supply, which provides electricity to the entire computer. The various drives (CD drive, floppy drive, and on many newer computers, USB drive) act like eyes, ears, and fingers, and allow the computer to read different types of storage, in the same way that a human can read different types of books. The hard drive is like a human's memory, and keeps track of all the data stored on the computer. Most computers have a sound card or another method of making sound, which is like vocal cords, or a voice box. Connected to the sound card are speakers, which are like a mouth, and are where the sound comes out. Computers might also have a graphics card, which helps the computer to create visual effects, such as 3D environments, or more realistic colors.

Software development. Software development (also known as software, application development; software design, software engineering) is the development of a software product in a planned and structured process. This software could be produced for a variety of purposes — the three most common purposes are: to meet specific needs of a specific client/business, to meet a perceived need of some set of potential users, or for personal use.

The term software development is often used to refer to the activity of computer programming, which is the process of writing and maintaining the source code, whereas the broader sense of the term includes all that is involved between the conception of the desired software through to the final manifestation of the software. Therefore, software development may include research, new development, modification, reuse, re-engineering, maintenance, or any other activities that result in software products.

15. Check your comprehension.

1. How are data stored on the computer? 2. What is a bit? 3. What are hard disks used for? 4. What is the function of an operating system? 5. How can people share information with each other? 6. Describe the computer's architecture. 7. What is the CPU and what is its function? 8. What is the role of different drives in the computer? 9. What are the main activities of the software? 10. What purposes are software produced for?

16. Make up an essay to text 3.

17. Transform sentences containing the modal verbs into the Past and Future Tense.

1. The user can learn how to use programs. 2. Due to the Internet you may easily communicate with other people. 3. The motherboard must be connected to a power supply to provide electricity to the entire computer. 4. Various drives can allow the computer to read different types of storage like a human can read different types of books. 5. A computer may have a sound

card and a graphic card. 6. Children need computers to play computer games. 7. Embedded computers cannot be programmed because you cannot install programs with games on your clock. 8. Software may include research, new development, modification, etc. 9. The definition of new media must be revised every few years. 10. Computers can use many bits together to represent instructions and data that the instructions must use.

TESTS

1. Fill in the blanks with the necessary words.

1. It is interactive relationship with the media consumer that _____ new media from traditional media.
   a) disconnects; b) discharges; c) distinguishes; d) disintegrates
2. New media provides the possibility of increasing the speed of interactive _____.
   a) consideration; b) computation; c) consumption; d) communication
3. The development of new media has _____ communication between people all over the world and the Internet.
   a) included; b) increased; c) installed; d) investigate
4. Ch. Babbage's idea of a fully _____ mechanical device seemed to be the basis for building today's computer.
   a) processing; b) predominant; c) provided; d) programmable
5. A device that has input and output represented in the form of physical quantities is a _____ computer.
   a) digital; b) analog; c) hybrid; d) modern
6. The discovery of _____ made computers smaller, cheaper, faster, and more reliable.
   a) integrated circuits; b) transistors; c) vacuum tubes; d) capacitors
7. Mobile phones, microwave ovens, cars are examples of _____ computers.
   a) desktop; b) mainframe; c) embedded; d) analog
8. The motherboard is connected to a _____ that provides electricity to the entire computer.
   a) sound card; b) power supply; c) hard disk; d) floppy drive
9. The CPU coordinates the activities of various computer components and performs operations on the data _____ the instructions.
   a) due to; b) according to; c) because of; d) in spite of
10. Television programs, feature films, books, and magazines containing technologies that enable digital _____ may be considered new media.
    a) invisibility; b) interactivity; c) immunity; d) invalidity

2. Coordinate the terms in the left column with their interpretation on the right.

1. New media	a) the set of computer programs, procedures, and associated documentation making possible the effective operation of the computer system
2. Computer	b) the study of various social phenomena associated with the Internet
3. Software	c) the mix between older and newer conventions of data representation, access, and manipulation
4. Hardware	d) a personal computer with a separate screen kept on top of a table
5. Desktop	e) a big computer that many people can use at a time
6. Mainframe	f) a computer doing only one thing rather well. It cannot be programmed
7. Embedded computer	g) a set of rules, a list of instructions stored on the computer in the form of binary digits
8. Program	h) physical components of a data processing system including input, storage, processing, and control devices
9. Integrated circuit	i) a small chip of silicon with a great number of circuit elements (transistors, resistors, capacitors, diodes) imprinted on it
10. Cyberculture	j) an electronic device that processes information under the control of a stored program

3. Make up couples or groups of words close in their meaning.

Power, device, possibility, digit, tool, community, relationship, information, energy, engine, transformation, advent, purpose, usage, arrival, memory, instruction, connection, proposition, education, aim, piece, exhibition, construction, assumption, computation, unit, data, journal, bit, concept, kind, basis, screen, storage, network, architecture, universe, current, command, display, motor, mistake, show, suggestion, foundation, distinction, application, society, number, learning, type, idea, web, error, calculation, electricity, world, magazine, difference.

To emerge, to encompass, to shorten, to discover, to go missing, to demand, to alter, to transform, to modify, to appear, to apply, to supply, to de-

fine, to provide, to require, to change, to control, to calculate, to increase, to rise, to figure out, to check, to compute, to determine, to use, to cover, to convert, to reduce, to invent, to look for, to break down, to store, to perform, to help, to advance, to include, to search, to involve, to develop, to define, to check, to compute.

Principle, whole, digital, common, following, concise, huge, small, rapid, different, full, movable, important, broad, large, typical, numerical, mobile, brief, big, wide, usual, significant, next, main, various, quick, little, fast, complete, short, general, entire.

Unit 13

MODERN PORTABLE COMPUTERS

Texts:	A Notebook or a Modern Laptop. Classes of Laptops. Tablet Personal Computers. Personal Computers Versus Desktops.
Grammar:	Verbals. Infinitive and Participle Constructions. Wordbuilding. Negative Suffixes and Prefixes. Degrees of Comparison of Adjectives.
Tests	

1. Read text 1 and say what you've got to know about portable computers.

Text 1. A NOTEBOOK OR A MODERN LAPTOP

A notebook is considered to be a personal computer designed for mobile use that is small and light enough for a person to rest on their lap. A laptop integrates most of the typical components of a desktop computer, including a display, a keyboard, a pointing device (a touchpad, also known as a trackpad, and/or a pointing stick), and speakers into a single unit. A laptop is powered by mains electricity via an AC adapter, and can be used away from an outlet using a rechargeable battery. A laptop battery in new condition typically stores enough energy to run the laptop for three to five hours, depending on the computer usage, configuration, and power management settings. The laptop being plugged into the mains, the battery charges, whether or not the computer is running.

Modern laptops weigh 1.4 to 5.4 kg. Most laptops are designed in the flip form factor to protect the screen and the keyboard when closed. Modern tablet laptops have a complex joint between the keyboard housing and the display permitting the display panel to swivel and then lie flat on the keyboard housing.

Portable computers, originally monochrome CRT-based and developing into the modern laptop, were originally used mostly for specialized field applications such as the military, accountants, and sales representatives. Portable computers becoming smaller, lighter, and cheaper, and screens becoming larger and of better quality, laptops found very wide application for all purposes.

History of laptops

As the personal computer became feasible in the early 1970s, the idea of a portable personal computer appeared. A "personal, portable information

manipulator" is known to be imagined and described by Alan Kay in 1972. The IBM 5100, the first commercially available portable computer, appeared in September 1975, and was based on the SCAMP project (Special Computer APL Machine Portable) prototype.

8-bit CPU machines became widely accepted, the number of portables having increased rapidly. We know the first laptop to use the flip form factor was demonstrated in the early 1980s. It was the Epson HX-20 which had a LCD screen, a rechargeable battery, and a calculator-size printer in a 1.6 kg chassis.

From 1983 onward, several new input techniques were developed and involved in laptops, including the touchpad (in 1983), the pointing stick (in 1992), and handwriting recognition (in 1987). Some CPUs, such as the 1990 Intel i386SL, were designed to use minimum power to increase battery life of portable computers.

Classification

The general term "laptop" can be used to refer to a number of classes of small portable computers:

Full-size laptop — a laptop which measures at least 11 inches across, which is the minimum specialized field applications; LCD screen; width to allow a full-size keyboard. The first laptops were the size of a standard U.S. "A-size" notebook sheet of paper ($8^1/_2 \times 11$ inches), but later "A4-size" laptops were introduced, which were the width of a standard ISO 216 A4 sheet of paper (297 mm), and added a vertical column of keys to the right and wider screens.

Netbook — a smaller, lighter, more portable laptop. It is also usually cheaper than a full-size laptop, but has fewer features and less computing power. Smaller keyboards can be more difficult to operate.

Ultra-thin laptop — a newer class of laptops which are very thin and light.

Tablet PC — these have touch screens. There are "convertible tablets" with a full keyboard where the screen rotates to be used atop the keyboard, and "slate" form-factor machines which are usually touch-screen only.

Rugged laptops — engineered to operate in tough conditions such as mechanical shocks, extreme temperatures, wet and dusty environments.

2. Check your comprehension.

1. What is a notebook? 2. Why is a notebook often called a laptop? 3. What components does a laptop consist of? 4. How is a laptop powered and how long can it work? 5. What were laptops originally used for? 6. Who first described the idea of a portable computer? 7. When did the first portable computers appear? 8. What new input techniques have been developed in laptops since the 1980s? 9. What are the main classes of laptops? 10. What distinguishes different classes of laptops?

3. Translate the technical terms used in text 1.

Desktop computer; a keyboard; a keyboard housing; a touchpad = trackpad; a single unit; alternating current adapter; outlet; rechargeable battery; power management settings; modern tablet laptops; a complete joint; cathode-ray tube based computers; specialized field applications; accountants and sales representatives; better quality; a calculator-size printer; several input techniques; handwriting recognition; central processing unit; full-size laptops; tablet personal computers; convertible tablets; touch screen; mechanical shocks; wet and dusty environments.

To run the laptop; to be plugged in the main; to design in a flip form; to protect the screen; to permit the display to swivel; to increase rapidly; to increase the life of a computer; to develop and involve in laptops; to operate in tough conditions; to add a vertical column of keys; to include the pointing stick; to depend on computer usage; to refer to a number of classes.

4. Find (in text 1) 5 infinitive constructions and 4 absolute participle constructions. Analyze them.

5. Read text 2 and speak about types of portable computers.

Text 2. CLASSES OF LAPTOPS

Desktop replacement computer

A desktop-replacement computer is a laptop that provides most of the capabilities of a desktop computer, with a similar level of performance. Desktop replacements seem to be larger and heavier than standard laptops. They contain more powerful components and have a 15" or larger display. They are bulkier and not as portable as other laptops, and their operation time on batteries is typically shorter; they are intended to be used as compact and transportable alternatives to a desktop computer.

Some laptops in this class use a limited range of desktop components to provide better performance for the same price at the expense of battery life, a few of those models having no battery. These, and sometimes desktop-replacement computers in general, are sometimes called desknotes, a portmanteau of "desktop" and "notebook".

In the early 2000s desktops were more powerful, easier to upgrade, and much cheaper than laptops, but in later years laptops have become much cheaper and more powerful. Most peripherals are available in laptop-compatible USB versions which minimize the need for internal add-on cards.

Subnotebook

A subnotebook or ultraportable is a laptop designed and marketed with an emphasis on portability (small size, low weight, and often longer battery

life) that retains performance close to that of a standard notebook. Subnotebooks are usually smaller and lighter than standard laptops, weighing between 0.8 and 2 kg; the battery life can exceed 10 hours when a large battery or an additional battery pack is installed.

To achieve the size and weight reductions, ultraportables use 13" and smaller screens (down to 6.4"), have relatively few ports, employ expensive components designed for minimal size and best power efficiency, and utilize advanced materials and construction methods. Most subnotebooks achieve a further portability improvement by omitting an optical / removable media drive. In this case they may be paired with a docking station that contains the drive and optionally more ports or an additional battery.

The term "subnotebook" is reserved to laptops that run general-purpose desktop operating systems.

Netbooks

Netbooks (sometimes also called mininotebooks or ultraportables) are a branch of subnotebooks, a rapidly evolving category of small, lightweight, economical, energy-efficient, and especially suited for wireless communication and Internet access. The origins of the netbook can be traced to the Network Computer (NC) concept of the mid-1990s. In March 1997 Apple Computer introduced the e-mail 300 as a subcompact laptop that was a cross between the Apple Newton PDA and a conventional laptop computer.

Netbooks are intended to rely heavily on the Internet for remote access to web-based applications and are targeted increasingly at cloud computing users who rely on servers and require a less powerful client computer.

Netbooks typically have less powerful hardware than larger laptop computers. Some netbooks do not even have a conventional hard drive. Such netbooks use solid-state storage devices instead, as they require less power, are faster, lighter, and generally more shock-resistant, but with much less storage capacity.

Netbooks in education. Netbooks offer several distinct advantages in educational settings. First, their compact size and weight make for an easy fit in student work areas. Similarly, the small size make netbooks easier to transport than heavier, larger-sized traditional laptops. Despite the small size, netbooks are fully capable of accomplishing most school-related tasks, including word processing, Power Point presentations, access to the Internet, multimedia playback, and photo management.

Netbooks have the potential to change the way students and teachers interact, and have many practical applications in the classroom setting. One major implication of netbooks in schools is cloud computing. Cloud computing eliminates many of the technology related headaches that we have become accustomed to, including incompatability between home computers

and school computers, "data loss" due to computer crash, and printer failure. Virtually all netbooks have wireless Internet connections, allowing complete access to free online applications and servers.

It is well-known that students with laptops do more and higher quality writing, have access to more information, which improves data analysis skills, and that student-centered learning is more easily accomplished. Student-centered learning, a growing trend in education recently, increases student motivation, cultivates critical thinking and problem solving, and fosters positive student collaboration.

6. Check your comprehension.

1. What is a desktop replacement computer? 2. Compare a desktop replacement computer with a standard laptop. 3. How do people sometimes call desktop replacement computers? 4. Describe a subnotebook comparing it with a standard laptop. 5. How do ultraportables achieve improvements in portability? 6. What kind of laptops are netbooks? 7. What are netbooks aimed at? 8. What are the main advantages and disadvantages of netbooks in comparison with larger laptop computers? 9. Where do netbooks find practical application? 10. What do students acquire using netbooks?

7. Make up an essay of text 2.

8. Find in texts 1 and 2 words close in their meaning to the words given below.

Example: To use — to apply, to employ, to utilize; an aim — a purpose, a target, etc.

To use, to let, to unite, to involve, to energize, to keep, to operate, to insert, to defend, to compute, to supply, to reduce, to perfect, to let, to suggest, to communicate, to finish.

An aim, a screen, a touchpad, a device, a notebook, memory, energy, application, a branch, data, method, an idea, characteristics, abilities, variant, education, opportunity, error.

Movable, little, common, usual, up-to-date, compact, broad, several, mighty, massive, brief, distant, usual, light.

Mainly, usually, quickly, particularly, not long ago.

9. Read text 3 and speak about the types of tablet computers.

Text 3. TABLET PERSONAL COMPUTERS

A tablet PC is a laptop PC equipped with a stylus or a touchscreen. Tablet PCs may be used where notebooks are impractical or unwieldy, or do not provide the needed functionality.

The term tablet PC was made popular in a product announced in 2001 by Microsoft. Tablet PCs are personal computers where the owner is free to install any compatible application or operating system. Other tablet computer devices, such as eBook readers or PDAs, do not provide this option and are generally considered another category.

Tablet PCs typically incorporate small (21–36 cm) LCD screens and are popular in health care, education, hospitality, and field work. Applications for field work are sure to often require a tablet PC that has rugged specifications ensuring long life by resisting heat, humidity, and drop / vibration damage.

Booklets. Booklet PCs are dual screen tablet computers that fold like a book. Typical booklet PCs are equipped with multi-touch screens and pen writing recognition capabilities. They are designed to be used as digital day planners, Internet surfing devices, project planners, music players, and displays for video, live TV, and e-reading.

Slates. Slate computers, which resemble writing slates, are tablet PCs without a dedicated keyboard. For text input, users rely on handwriting recognition via an active digitizer, touching an on-screen keyboard using fingertips or a stylus, or using an external keyboard that can usually be attached via a wireless or USB connection.

Convertibles. Convertible notebooks have a base body with an attached keyboard. They more closely resemble modern laptops, and are usually heavier and larger than slates. Typically, the base of a convertible attaches to the display at a single joint called a swivel hinge or rotating hinge. The joint allows the screen to rotate through 180 and fold down on top of the keyboard to provide a flat writing surface. Convertibles are by far the most popular form factor of tablet PCs, because they still offer the keyboard and pointing device (usually a trackpad) of older notebooks, for users who do not use the touchscreen display as the primary method of input.

Hybrids. Hybrids share the features of the slate and convertible by using a detachable keyboard that operates in a similar fashion to a convertible when attached. Hybrids are not to be confused with slate models with detachable keyboards; detachable keyboards for pure slate models do not rotate to allow the tablet to rest on it like a convertible.

Tablets versus traditional notebooks. The advantages and disadvantages of tablet PCs are highly subjective measures. What appeals to one user may be exactly what disappoints another.

Advantages:

— Usage in environments not conducive to a keyboard and mouse such as lying in bed, standing, or handling with a single hand.

— Lighter weight, lower power models can function similarly to dedicated reading devices.

— Touch environment makes navigation easier than conventional use of keyboard and mouse or touch pad in certain contexts such as image manipulation, or mouse-oriented games.

— Digital painting and image editing is enhanced and more realistic than painting or sketching with a mouse.

— The ability for easier or faster entering of diagrams, mathematical notations, and symbols.

— Allows, with the proper software, universal input, independent from different keyboard localizations.

— Some users find it more natural and fun to use a stylus to click on objects rather than a mouse or touchpad, which are not directly connected to the pointer on screen.

10. Check your comprehension.

1. What is a tablet PC? 2. What are characteristic features of a tablet PC? 3. What types of tablets have you got acquainted with? 4. What is the most popular form of tablet PC? 5. What are booklets equipped with? 6. Where are they used? 7. How do slates manage to operate without keyboards? 8. What features of other tablets do hybrids include? 9. What are the main advantages of tablets over traditional notebooks? 10. Have tablets any disadvantages in comparison with notebooks, to your mind? Name some of them, if any.

11. Translate the phrases paying attention to verbals and the ways of their translation.

The needed functionality; a product announced in 2001; tablets folding like a book; booklets equipped with multi-touched screen; pen writing recognition capabilities; computers resembling writing slates; a dedicated keyboard; touching an on-screen keyboard; using fingertips; to ensure long life by resisting heat and vibration damage; an attached keyboard; a joint called a rotating hinge; the screen to rotate through 180; the screen to provide a flat writing surface; hybrids share the features of the slate and convertible by using a detachable keyboard; a keyboard operates in a similar fashion to a convertible when attached; hybrids are not to be confused with slate models; detachable keyboards do not rotate to allow the tablet to rest on it; dedicated reading devices; mouse-oriented games; digital painting and image editing; the ability for faster entering of diagrams; users find it fun to use a stylus to click on objects; touchpad not directly connected to the pointer on screen.

12. Add nouns (from texts 1, 2, 3) to the given adjectives and put them in comparative and superlative degrees. Translate the newly formed phrases.

Fast, easy, high, light, popular, general, low, typical, active, wide, traditional, large, similar, old, feasible, possible, new, available, usual, complex,

bulky, cheap, expensive, difficult, free, extreme, powerful, rapid, economical, remote, full, early, recent, capable, distinct, energy-efficient, modern, few.

Good, bad, little, far, many.

13. Make up an essay for text 3.

14. Translate the texts into English (by variants).

Типы портативных компьютеров

Современные портативные компьютеры можно условно разделить на несколько типов: ноутбук, планшетный ПК, ультрапортативный ПК, нетбук.

Ноутбук (notebook) — это переносной персональный компьютер, имеющий клавиатуру, экран, устройство позиционирования и работающий от аккумулятора. По конструкции ноутбуки выполнены в виде раскладной книги. На рынке можно встретить большое разнообразие ноутбуков, от сверхлегких и компактных моделей, которые можно постоянно носить с собой, до тяжелых и громоздких, которые приходят на смену настольным ПК.

Нетбук (netbook) — ультрапортативный ноутбук, предназначенный в основном для просмотра веб-страниц и других несложных задач (например, для работы с офисными приложениями).

Планшетный ПК (tablet PC). В эту категорию мы относим как «классические» планшетники — мобильные компьютеры, имеющие сенсорный экран, но не имеющие клавиатуры, так и ноутбуки-трансформеры (планшетные ноутбуки), у которых есть и клавиатура, и поворотный сенсорный экран. С помощью сенсорного экрана и стилуса вы можете полностью управлять работой операционной системы. Основное преимущество планшетника — возможность комфортно работать с ним, держа его в руках, тогда как для работы с ноутбуком потребуется стол или другая твердая поверхность.

Ультрапортативные ПК (UMPC — Ultra-Mobile PC) занимают промежуточное положение между карманными портативными компьютерами (КПК) и ноутбуками. Они оснащаются чувствительным экраном, что делает их похожими на планшетники. УППК обычно комплектуются процессорами с низким энергопотреблением, твердотельным диском, что позволяет уменьшить вес до 400—800 г и увеличить время работы до нескольких часов.

Устройства позиционирования

Устройство позиционирования выполняет ту же функцию, что и мышка в настольном ПК. Существуют два типа таких устройств — это Touchpad и Pointstick.

Тачпад представляет собой специальную чувствительную панель размером 5—6 см. Панель может отслеживать как движение пальца, так и нажатие (щелчок), которое эквивалентно нажатию на кнопку мыши. Тачпад имеют практически все ноутбуки.

Пойнтстик представляет собой миниатюрный джойстик, который расположен на клавиатуре между клавиш. Отклоняя мини-джойстик влево или вправо, вы можете управлять курсором. Преимущество использования пойнтстика состоит в том, что вам не нужно отрывать руки от клавиатуры, чтобы перевести курсор в другую часть экрана.

Существуют модели ноутбуков, где присутствуют сразу два устройства позиционирования — Touchpad и Pointstick.

Устройство для чтения флеш-карт

Кардридер. Большинство современных ноутбуков имеет встроенный кардридер (Flesh Card Reader), который позволяет считывать и записывать информацию на флеш-карты. Слоты для установки карт памяти обычно расположены слева и справа на корпусе ноутбука. Устройство для чтения флеш-карт может пригодиться тем, у кого есть цифровой фотоаппарат или MP3-плеер с картами памяти.

С помощью **адаптера беспроводной связи Wi-Fi** ПК можно подключать к беспроводной сети. При наличии уже работающей беспроводной сети для подключения компьютера не требуется прокладывать дополнительный кабель. Если в компьютере поддержка Wi-Fi отсутствует, то всегда можно купить отдельный Wi-Fi-адаптер.

15. Read text 4 and speak about the distinguishing features of laptops and desktop PCs, their advantages and disadvantages.

Text 4. PORTABLE COMPUTERS VERSUS DESKTOPS

I. The basic components of laptops are similar in function to their desktop counterparts, but are miniaturized, adapted to mobile use, and designed for low power consumption. Because of the additional requirements, laptop components are usually of inferior performance compared to similarly priced desktop parts. Furthermore, the design bounds on power, size, and cooling of laptops limit the maximum performance of laptop parts compared to that of desktop components.

The following list summarizes the differences and distinguishing features of laptop components in comparison to desktop personal computer parts:

Motherboard — Laptop motherboards are highly model specific, and do not conform to a desktop form factor. Unlike a desktop board that usually has several slots for expansion cards (3 to 7 are common), a board for a small,

highly integrated laptop may have no expansion slots at all, with all the functionality implemented on the motherboard itself; the only expansion possible in this case is via an external port such as USB. Other boards may have one or more standard, such as Express Card, or proprietary expansion slots. Several other functions (storage controllers, networking, sound card and external ports) are implemented on the motherboard.

Central processing unit (CPU) — Laptop CPUs have advanced power-saving features and produce less heat than desktop processors, but are not as powerful. There is a wide range of CPUs designed for laptops available. Some laptops have removable CPUs, although support by the motherboard may be restricted to the specific models. In other laptops the CPU is soldered on the motherboard and is non-replaceable.

Memory (RAM) — SO-DIMM memory modules that are usually found in laptops are about half the size of desktop DIMMs. They may be accessible from the bottom of the laptop for ease of upgrading, or placed in locations not intended for user replacement such as between the keyboard and the motherboard.

Expansion cards — A PC Card or Express Card bay for expansion cards is often present on laptops to allow adding and removing functionality, even when the laptop is powered on. Some subsystems (such as Ethernet, Wi-Fi, or a cellular modem) can be implemented as replaceable internal expansion cards, usually accessible under an access cover on the bottom of the laptop.

Power supply — Laptops are typically powered by an internal rechargeable battery that is charged using an external power supply. The power supply can charge the battery and power the laptop simultaneously. The battery being fully charged, the laptop continues to run on AC power. The charger adds about 400 grams to the overall "transport weight" of the notebook.

II. Advantages of portable computers

Portability is usually the first feature mentioned in any comparison of laptops versus desktop PCs. Portability means that a laptop can be used in many places — not only at home and at the office, but also during commuting and flights, in coffee shops, in lecture halls and libraries, at clients' location or at a meeting room, etc. The portability feature offers several distinct advantages:

Productivity — Using a laptop in places where a desktop PC can't be used, and at times that would otherwise be wasted.

Immediacy — Carrying a laptop means having instant access to various information, personal and work files. Immediacy allows better collaboration between coworkers or students, as a laptop can be flipped open to present a problem or a solution anytime, anywhere.

Up-to-date information — If a person has more than one desktop PC, a problem of synchronization arises: changes made on one computer are

not automatically propagated to the others. There are ways to resolve this problem, including physical transfer of updated files using synchronization software over the Internet. However, using a single laptop at both locations avoids the problem entirely, as the files exist in a single location and are always up-to-date.

Size — Laptops are smaller than desktop PCs. This is beneficial when space is at a premium, for example in small apartments and student dorms. When not in use, a laptop can be closed and put away.

Low power consumption — Laptops are several times more power-efficient than desktops. A typical laptop uses 20—90 W, compared to 100—800 W for desktops. This could be particularly beneficial for businesses which run hundreds of personal computers and homes.

Battery — A charged laptop can continue to be used in case of a power outage and is not affected by short power interruptions and blackouts. A desktop PC needs a UPS to handle short interruptions, blackouts, and spikes; achieving on-battery time of more than 20—30 minutes for a desktop PC requires a large and expensive UPS.

All-in-one — Designed to be portable, laptops have everything integrated in to the chassis. For desktops (excluding all-in-ones) this is divided into the desktop, keyboard, mouse, display, and optional peripherals such as speakers.

III. Disadvantages of portable computers

Compared to desktop PCs, laptops have disadvantages in the following fields:

Performance. The upper limits of performance of laptops remain much lower than the highest-end desktops (especially "workstation class" machines with two processor sockets), and "bleeding-edge" features usually appear first in desktops and only then, as the underlying technology matures, are adapted to laptops.

Laptops processors can be disadvantaged when dealing with higher-end database, mathematics, engineering, financial software, virtualization, etc. Also, the top-of-the-line mobile graphics processors (GPUs) are significantly behind the top-of-the-line desktop GPUs to a greater degree than the processors, which limits the utility of laptops for high-end 3D gaming and scientific visualization applications.

Upgradeability of laptops is very limited compared to desktops, which are thoroughly standardized. In general, hard drives and memory can be upgraded easily. Optical drives and internal expansion cards may be upgraded if they follow an industry standard, but all other internal components, including the motherboard, CPU, and graphics, are not always intended to be upgradeable. The reasons for limited upgradeability are both technical and economic.

Durability. Due to their portability, laptops are subjected to more wear and physical damage than desktops. Components such as screen hinges, latches, power jacks, and power cords deteriorate gradually due to ordinary use. They say that a laptop is three times more likely to break during the first year of use than a desktop.

Battery life of laptops is limited; the capacity drops with time, necessitating an eventual replacement after a few years. The battery is often easily replaceable, and one may replace it on purpose with a higher-end model to achieve better battery life.

16. Check your comprehension.

1. What unites PCs and desktops? 2. What limits the maximum performance of laptop parts? 3. How is functionality implemented on laptop motherboard? 4. What kind of CPU are PCs provided? 5. Compare PCs and desktops memory. 6. How are PCs and desktops supplied with power? 7. What are the main advantages of portable computers over desktops? 8. Speak about batteries used in PCs and desktops and power consumption by them. 9. What disadvantages do portable computers have compared to desktops? 10. How can one achieve better battery life?

17. Analyze verbals in the given phrases and translate them.

Laptop components adapted to mobile use and designed for low power consumption; distinguishing features; a PC card is present on laptops to allow adding and removing functionality; laptops powered by an internal battery charged by using an external power supply; laptops can be used in many places; using a laptop at times that would otherwise be wasted; a student doing his homework; a laptop can be flipped open to present a problem; there are ways to resolve the problem, including physical transfer of updated files; when not in use a laptop can be closed and put away; a charged laptop can continue to be used; designed to be portable; compared to desktop PCs, laptops have some disadvantages; laptops processors can be disadvantaged when dealing with higher-end database; other components, including the motherboard, CPU, and graphics, are not always intended to be upgradeable; a laptop is three times more likely to break than a desktop; the capacity drops with time, necessitating an eventual replacement after a few years; one may replace the battery to achieve better battery life.

18. Choose as many derivatives as possible to the following words using suffixes and prefixes. Translate the words.

Example: to connect — to disconnect, connection, connected, connecting, connector, etc.

To consume, to add, to require, to perform, to differ, to process, to produce, to replace, to present, to power, to compare, to signify, to change, to convert, to calculate, to improve, to communicate, to manage, to compute.

Access, science, simple.

19. Find in the texts studied words or groups of words opposite in their meaning to the words given below.

To subtract, to appear, to stand, to prohibit, to find, to open, to improve, to rise, to charge, to downgrade.

Expensive, late, slow, difficult, external, big, light, unlike, compatible, low, far, worse, complex, superior, minimum, soft.

Before, over, ahead, less, many.

20. Make up an essay for text 4.

TESTS

1. Fill in the blanks with the necessary words.

1. Due to their compact size and weight _____ offer some advantages in education.
   a) notebooks; b) netbooks; c) desktops; d) ultraportables
2. Users can install any _____ application or operating system in tablets.
   a) capable; b) comparative; c) conventional; d) compatible
3. _____ laptops are engineered to operate in tough conditions.
   a) rugged; b) full-size; c) tablet; d) ultra-thin
4. Using laptops students have _____ to more information, improving data analysis skills.
   a) attach; b) account; c) access; d) attempt
5. Netbooks are targeted at _____ computing users.
   a) cloud; b) column; c) chain; d) chart
6. A port replicator plays the role of a docking station providing _____ from the laptop to input or output ports.
   a) commutation; b) completion; c) conjunction; d) connection
7. Resembling modern laptops _____ have a base body with an attached keyboard.
   a) slates; b) booklets; c) convertibles; d) hybrids
8. Low power consumption is one of the beneficial _____ of laptops.
   a) adjustments; b) advantages; c) arrangements; d) assumptions
9. Laptops are subjected to more wear and physical damage than desktops _____ their portability.
   a) according to; b) due to; c) instead of; d) because of

10. The power supply can charge the battery and power the laptop _____.

a) similarly; b) simultaneously; c) specifically; d) separately

2. Coordinate the terms in the left column with their interpretation on the right.

1. A notebook	a) a portable computer with a touch screen, sometimes rotating atop the keyboard
2. A netbook	b) a very, very thin and light laptop
3. A tablet	c) the most popular tablet PC with the base attached to the display at a rotating hinge
4. An ultra-thin	d) a tablet PC without a keyboard, popular in education, health care, and field laptop work
5. A desktop	e) a very small and light laptop having few features, little computing power replacement, and a very small keyboard
6. A subnotebook	f) shares the features of the slate and the convertible
7. A booklet	g) a small and light PC including a display, a keyboard, a touchpad, and speakers into one unit
8. A convertible	h) an ultraportable computer of a small size, low weight (not more than 2 kg), sometimes without removable media drive, running a general-purpose operating system
9. A hybrid	i) a tablet computer with dual screen folding like a book
10. A slate	j) a bulky, rather large and heavy laptop, not as portable as other ones, containing powerful components and a large display

3. Open the brackets and put the verbs in the necessary form of a verbal.

IMAGE SCANNERS

In (to compute) an image scanner — often (to abbreviate) to just scanner — is (to know) to be a device that optically scans images, (to print) texts, (to handwrite), or objects, (to convert) them to a digital image. Common examples (to found) in offices are variations of the desktop (or flatbed) scanner where the document is (to place) on a glass window for (to scan).

The first image scanner (to develop) for use with a computer was *a drum scanner*. Hand-held scanners where the device is moved by hand, have (to evolve) from text (to scan) "wands" to 3D scanners (to utilize) for industrial design, reverse engineering, test and measurement, gaming and other

applications. Modern scanners typically use a charge-coupled device (CCD), older drum scanners (to apply) a photomultiplier tube as the image sensor. *A rotary scanner* (to use) for high-speed document (to scan) is another type of drum scanner (to use) a CCD instead of a photomultiplier. Other types of scanners are *planetary scanners* (to take) photographs of books and documents, and *3D scanners* for (to produce) three-dimensional models of objects.

Another category of scanner is *digital camera scanners* (to base) on the concept of reprographic camera. While still (to have) disadvantages (to compare) to traditional scanners (such as distortion, reflections, shadows, low contrast), digital cameras offer advantages such as speed, portability and gentle (to digitize) of thick documents without (to damage) the book spine.

Unit 14

MOBILE PHONES

Texts:	History of Mobile Phones. Mobile Phones Features. Types of Mobile Phones. iPhone Devices.
Grammar:	Review of English Tenses.
Tests	

1. Read the text and speak about the steps of mobile phones development.

Text 1. HISTORY OF MOBILE PHONES

A mobile phone (also called mobile, cellular phone, cell phone, or hand phone) is an electronic device used for full duplex two-way radio telecommunications over a cellular network of base stations known as cell sites. Mobile phones are sure to differ from cordless telephones, which only offer telephone service within limited range through a single base station attached to a fixed landline, for example, within a home or an office.

A mobile phone allows its users to make and receive telephone calls to and from the public telephone network which includes other mobiles and fixed line phones across the world. It does this by connecting to a cellular network owned by a mobile network operator. A key feature of the cellular network is that it enables seamless telephone calls even when the user is moving around wide areas via a process known as handoff or handover.

In addition to being a telephone, modern mobile phones also support many additional services and accessories, such as SMS (or text) messages, e-mail, Internet access, gaming, Bluetooth, infrared, camera, MMS messaging, MP3 player, radio, and GPS. Low-end mobile phones are often referred to as feature phones, high-end mobile phones that offer more advanced computing ability being referred to as smartphones.

Radiophones have a long and varied history. It goes back to Reginald Fessenden's invention and shore-to-ship demonstration of radio telephony through the Second World war with military use of radio telephony links and civil services in the 1950s.

In 1960 the world's first partly automatic car phone system, Mobile System A (MTA) was launched in Sweden. MTA phones were composed of vacuum tubes and relays, and had a weight of 40 kg. In 1962 a more modern

version called Mobile System B (MTB) was launched. It was a push-button telephone, which used transistors in order to enhance the telephone's calling capacity and improve its operational reliability. In 1971 the MTD version was launched, opening for several different brands of equipment and gaining commercial success.

Martin Cooper, a Motorola researcher is considered to be the inventor of the first practical mobile phone for hand-held use in a non-vehicle setting. Using a modern, though somewhat heavy portable handset, Cooper made the first call on a hand-held mobile phone in April, 1973.

The first commercially automated cellular network (the 1G — first generation) was launched in Japan in 1979. Within five years the network had been expanded to cover the whole population of Japan and became the first nation-wide 1G network. This was followed by the simultaneous launch of the Nordic Mobile Telephone (NMT) system in Denmark, Finland, Norway, and Sweden. NMT appeared to be the first mobile phone network featuring international roaming. The first network technology on digital 2G (second generation) cellular technology appeared in Finland on the GSM standard. One of the newest 3G technologies to be implemented is mobile telephony communications protocol in the High-Speed Packet Access (HSPA) family. It allows networks based on Universal Mobile Telecommunication System (UMTS) to have higher data transfer speeds and capacity.

2. Check your comprehension.

1. What is a mobile phone? 2. What differs mobile phones from cordless telephones? 3. What is the role of the public telephone network in making calls? 4. What is the main characteristic of the cellular network? 5. What other services, except telephoning, do mobile phones include? 6. Who demonstrated the first hand-held phone? 7. Who invented the first practical mobile phone? 8. What history do radiophones have? 9. Where was the first automated cellular network launched? 10. How were digital cellular technologies developed and perfected?

3. Put the verbs given in brackets in the necessary form.

A CORDLESS TELEPHONE WITH BASE

As it (to know), George Sweigert, an amateur radio operator and inventor from Cleveland, Ohio, (to recognize) as the father of the cordless phone. He (to submit) his "full duplex wireless communication apparatus" and (to award) by the U.S. Patent and Trademark Office a patent for his invention in 1969.

A cordless telephone or portable telephone (to be) a telephone with a wireless handset that (to communicate) via radio waves with a base station connected to a fixed telephone line, usually within a limit ed range of its

base station, which (to have) the handset cradle. The base station (to be) on the subscriber premises, and (to attach) to the telephone network the same way a corded telephone (to do). But unlike a corded telephone, a cordless telephone (to need) mains electricity to power the base station. The cordless handset (to power) by a rechargeable battery, which (to charge) when the handset (to sit) in its cradle.

In the 1980s a number of manufacturers (to introduce) cordless phones for the consumer market. Typically they (to use) a base station that (to connect) to a telephone line and a handset with a microphone, speaker, keypad, and telescoping antenna. The handset (to contain) a rechargeable battery, usually NiCd. The base unit (to power) by household current, typically via a wall wart. The base (to include) a charging cradle, which (to be) generally a form of trickle charger, on which the handset (to rest) when not in use.

4. Make up an essay for text 1.

5. Read text 2 and speak about mobile phones features.

Text 2. MOBILE PHONES FEATURES

All mobile phones are known to have a number of features in common, but manufacturers also try to differentiate their own products by implementing additional functions to make them more attractive to consumers.

The common components found on all phones are:

- a rechargeable battery providing the power source for the phone functions;
- an input mechanism and display to allow the user to interact with the phone. The most common input mechanism is a keypad, touch screen being also found in some high-end smart phones;
- basic mobile phones services to allow users to make calls and send text messages;
- All GSM phones use a SIM card to allow an account to be swapped among devices, some CDMA devices also having a similar card called a R-UIM;
- Individual GSM, iDEN, and some satellite phone devices are uniquely identified by an International Mobile Equipment Identity (IMEI) number.

Low-end mobile phones are often referred to as feature phones and offer basic telephony, as well as functions such as playing music and taking photos. Handsets with more advanced computing ability through the use of native software applications became known as smartphones. The first smartphone was the Nokia 9000 Communicator in 1996, which added PDA functionality to the basic mobile phone at the time. Miniaturization and increased pro-

cessing power of microchips having enabled ever more features to be added to phones, the concept of the smartphone has evolved, and what was a smartphone five years ago, is a standard phone today.

Several phone series have been introduced, such as the RIM BlackBerry focusing on enterprise / corporate customer e-mail needs; the Sony Ericsson Walkman series of music phones and Cybershot series of cameraphone; etc.

Other features that may be found on mobile phones include GSM navigation, music (MP3) and video (MP4) playback, RDS radio receiver, alarms, memo recording, personal digital assistant functions, ability to watch streaming video, video download, video calling, built-in cameras and camcorders (video recording), with autofocus and flash, ringtones, games, instant messaging, Internet e-mail and browsing, and serving as a wireless modem.

The most commonly used data application on mobile phones is sure to be SMS text messaging. The first SMS text message is supposed to be sent from a computer to a mobile phone in 1992 in the UK, while the first person-to-person SMS from phone to phone was sent in Finland in 1993.

Other non-SMS data services used on mobile phones include mobile music, downloadable logos and pictures, gaming, gambling, adult entertainment, and advertising.

It should be noted that GSM mobile phones require a small microchip called a SIM (Subscriber Identity Module) card to function. The SIM card is approximately the size of a small postage stamp and is usually placed underneath the battery in the rear of the unit. The SIM securely stores the service-subscriber key (IMSI) used to identify a subscriber on mobile telephony devices, such as mobile phones and computers. The SIM card allows users to change phones by simply removing the SIM card from one mobile phone and inserting it into another mobile phone or broadband telephony device.

6. Check your comprehension.

1. How do manufacturers of mobile phones try to do their products more attractive? 2. What components are common for many mobile phones? 3. What is the role of SIM card? 4. What does a battery serve for? 5. What are feature phones? 6. What are smartphones? 7. What enabled more features to the mobile phones? 8. What services can modern mobile phones offer? 9. What are SMS messages and where was the first SMS from phone to phone sent? 10. What is the SIM card and what is it used for?

7. Translate the phrases with verbals and analyze them.

By implementing additional functions; to try to differentiate their own products; components found on all phones; a rechargeable battery providing the power source for the phone functions; an input mechanism and display to allow the user to interact with the phone; services to allow users to make

calls and send text messages; a SIM card to allow an account to be swapped among devices; low-end mobile phones being referred to as feature phones; handsets with more advanced computing ability; increased processing power of microchips; features to be added to phones; memo recording; ability to watch streaming video; built-in cameras; instant messaging and browsing and serving as a wireless modem; the most commonly used data application; the SIM card placed underneath the battery; a small microchip called a SIM card; to store the service-subscriber key used to identify a subscriber; to allow users to change phones by removing the SIM card and inserting it into another phone.

8. **Find in text 2 three infinitive constructions and three absolute participle constructions, analyze and translate them.**

9. **Make up an essay for text 2.**

10. **Read text 3 and speak about different types of mobile phones and their functions.**

Text 3. TYPES OF MODERN MOBILE PHONES

A smartphone

It is well-known that a smartphone is a mobile phone that offers more advanced computing ability and connectivity than a contemporary basic feature phone. Smartphones and feature phones may be thought of as handheld computers integrated within a mobile telephone. But while being based on a specific platform, a smatrphone allows the user to install and run more advanced applications than most feature phones. Smartphones run complete operating system software providing a platform for application developers.

The first smartphone is said to be called Simon. It was designed by IBM and released to the public in 1993. Besides being a mobile phone, it also contained a calendar, address book, world clock, calculator, note pad, e-mail, send and receive fax, and games. It had no physical buttons to dial with. Instead customers used a touch screen to select phone numbers with a finger or create facsimiles and memos with an optional stylus. Text was entered with a unique on-screen "predictive" keyboard. Manufacturers consider Nokia to launch the first color screen communicator model, which was the first true smartphone with an open operating system.

A smartbook

A smartbook is considered to be a concept of a mobile device that falls between smartphones and netbooks, delivering features usually found in smartphones (always on, all-day battery life, 3G connectivity, GPS) in

a slightly larger device with a full keyboard. Smartbooks tend to be designed to work with online applications.

BlackBerry

BlackBerry is a line of mobile e-mail and smartphone devices developed and designed by Canadian company Research In Motion (RIM) in 1996. BlackBerry functions as a Personal Digital Assistant (PDA) with address book, calendar, and to-do list capabilities. It also functions as a portable media player with support for music and video playback and camera picture and video capabilities. BlackBerry is primarily known for its ability to send and receive Internet e-mail wherever mobile network service coverage is present, or through Wi-Fi connectivity. BlackBerry is mainly a messaging phone with the largest array of messaging features in a smartphone today. This includes auto-text, auto-correct, text prediction, support for many languages, keyboard shortcuts, text emoticons, push e-mail, push Facebook and Myspace notifications, push instant messaging with BlackBerry Messenger, and many other useful features.

The first BlackBerry device was introduced in 1999 as a two-way pager. In 2002 the more commonly known smartphone BlackBerry was released, which supports push e-mail, mobile telephone, text messaging, Internet faxing, Web browsing and other information services. It is an example of a convergent device.

Twitter

Twitter is known to be a social and microblogging service, owned and operated by Twitter Inc., that enables its users to send and read other user's messages called tweets. Tweets are text-based posts of up to 140 characters displayed on the author's profile page. Tweets are publicly visible by default, however senders can restrict message delivery to their friends list. Users may subscribe to other author tweets, this is known as following, and subscribers are known as followers. As of late 2009, users can follow lists of authors instead of following individual authors. All users can send and receive tweets via the Twitter website, compatible external applications, or by Short Message Service (SMS) available in certain countries.

Since its creation in 2006 by Jack Dorsey, Twitter has gained notability and popularity worldwide. It is sometimes described as the "SMS of the Internet." The use of Twitter's application programming interface (API) for sending and receiving SMS from other applications often dominates the direct use of Twitters.

11. Check your comprehension.

1. What are smartphones? 2. Compare smartphones and feature phones; smartphones and netbooks. 3. When did the first smartphone appear? What

kind of a model was it? 4. What did the first smartphone contain? 5. What kind of a smartphone is BlackBerry? 6. What are BlackBerry's main functions? 7. Describe the operational system of BlackBerry. 8. What is a BlackBerry PIN and what is it used for? 9. What possibilities does Twitter give to its users? 10. How can users send and receive their tweets?

12. Translate the texts into English (by variants).

Разновидности сотовых телефонов

Сотовый телефон — коммуникационное устройство, использующее комбинацию радиопередачи и традиционной телефонной коммутации для осуществления телефонной связи на территории, состоящей из «сот», окружающих базовые станции сотовой связи.

В настоящее время сотовая связь — самая распространенная из всех видов мобильной связи, поэтому обычно мобильным телефоном называют сотовый телефон, хотя мобильными телефонами помимо сотовых являются также спутниковые телефоны, радиотелефоны и аппараты магистральной связи.

Помимо обычных сотовых телефонов существуют следующие их разновидности.

Мультимедийный телефон (плеерфон, мьюзикфон) — специализированный мобильный телефон с расширенными возможностями воспроизведения аудио- и видеофайлов и т.п. Этот термин, как и камерофон, выходит из употребления, поскольку большая часть современных аппаратов может проигрывать MP3-файлы и оснащается разъемом для карты памяти. Тем не менее в ряде мультимедийных телефонов упор делается именно на аудиовозможностях (например, Sony Ericsson серии W (Walkman) со встроенным плеером, Motorola серии W и др.).

Смартфон — мобильный телефон с полноценной операционной системой. Такие телефоны позволяют устанавливать любые новые программы, поддерживаемые данной операционной системой и расширяющие их функциональность: IM-клиенты, офисные пакеты, органайзеры, аудио- и видеопроигрыватели, программы управления звонками, браузеры и т.д. Для смартфонов существуют и вирусы, в то время как возможность внедрения в обычные телефоны деструктивного кода весьма затруднительна в силу закрытости операционной системы.

Коммуникатор — карманный персональный компьютер (КПК) с функциями мобильного телефона. Это иная ветвь мобильных устройств по отношению к смартфонам, но имеющая тенденцию к сближению между ними (в настоящее время функциональность и тех и других в целом сходна). Как и смартфоны, коммуникаторы работают под управлением операционных систем, открытых для разработки сторонних приложений.

Возможности смартфонов и коммуникаторов, как и любых «старших» компьютеров, зависят от установленных программ и «железа».

Бизнес-телефон — телефон со специализированными функциями для корпоративных пользователей. Такие телефоны позволяют просматривать текстовые документы и электронные таблицы, работать с электронной почтой, синхронизировать данные органайзера с корпоративным сервером и т.п. Значительная часть бизнес-телефонов является смартфонами или коммуникаторами, часто встречаются устройства с QWERTY-клавиатурой. Иногда такие телефоны лишены фотокамеры (для организаций с повышенными требованиями безопасности).

Имиджевый телефон — телефон, главная особенность которого — стильный внешний вид и броская функциональность (в частности, автоматизированное раскрытие). В имиджевых телефонах часто применяются необычные формфакторы и стильные и дорогостоящие материалы. При изготовлении таких телефонов для отделки корпуса нередко используются благородные металлы и драгоценные камни. Функциональность таких телефонов обычно невысока, хотя в виде исключения среди них встречаются смартфоны и коммуникаторы.

13. Read text 4 and speak about iPhone models.

Text 4. THE iPHONE DEVICES

The iPod

The iPod is a portable media player (PMP) designed and marketed by Apple and launched in October 2001. As of June 2010, the product line up includes the hard drive-based iPod Classic, the touchscreen iPod Touch, the video-capable iPod Nano, and the compact iPod Shuffle. iPod Classic models store media on an internal hard drive, while all other models use flash memory to enable their smaller size. As with many other digital music players, iPods can also serve as external data storage devices.

Apple's iTunes software can be used to transfer music to the devices from computers using certain versions of Apple Macintosh and Microsoft Windows operating systems. For users who choose not to use Apple's software or whose computers cannot run iTunes software, several open source alternatives to iTunes are also available. iTunes and its alternatives may also transfer photos, videos, games, contact information, e-mail settings, web bookmarks, and calendars to iPod models supporting those features.

The iPhone

The iPhone is a line of Internet and multimedia-enabled smartphones designed and marketed by Apple Inc. The first iPhone was introduced in 2007.

An iPhone functions as a camera phone, including text messaging and visual voicemail, a portable media player, and an Internet client with e-mail, web browsing, and Wi-Fi connectivity. The user interface is built around the device's multi-touch screen, including a virtual keyboard rather than a physical one. Third-party applications, launched in mid-2008, have diverse functionalities, including games, reference, GPS navigation, social networking, and advertising for television shows, films, and celebrities.

There have been four generations of iPhone hardware, and they have been accompanied by four major releases of iOS. The iPhone 3G brought 3G cellular network capabilities and A-GPS location. The iPhone 3GS brought a compass, faster processor, and higher resolution camera, including video. The iPhone 4 has two cameras for face time video calling and a higher resolution display. It was released in June 2010.

The iPad

The iPad is a tablet computer designed and developed by Apple. It is particularly marketed as a platform for audio and visual media such as books, periodicals, movies, music and games, as well as web content. Its size and weight, about 700 grams, are between those of most contemporary smartphones and laptop computers. Apple released the iPad in April 2010.

The iPad runs the same operating system as the earlier iPod and iPhone. It can run its own applications as well as ones developed for the iPhone. Like the iPhone and iPod Touch, the iPad is controlled by a multitouch display sensitive to up to eleven fingers. The iPad uses Wi-Fi or a 3G mobile data connection to browse the Internet, load and stream media, and install software. The device is managed by iTunes on a personal computer via USB cable.

14. Check your comprehension.

1. What is an iPod? 2. What company launched the iPod and when? 3. What types of iPods do you know? 4. What are iTunes used for? 5. When was the first iPhone introduced? 6. What are iPhone functions? 7. What new did each generation of iPhones acquire? 8. What is iPad? 9. Who released the iPad and when? 10. What common features do iPad have with iPod and iPhone?

15. A. Find in the texts studied words close in meaning to the words given below.

Investigation, producer, detail, energy, number, velocity, display, movement, facilities, storage, wireless, application, radio set, grown-up, device, modernization, key, keyboard, characteristic, idea, post, demands, information, advancement, ability, subscriber.

To introduce, to help, to demand, to act, to remember, to delete, to input, to develop, to rise, to calculate, to supply, to distinguish, to limit,

to launch, to choose, to suggest, to let, to assemble, to connect, to discover, to employ, to widen, to vary, to get, to win, to suppose, to phone, to name, to consist, to show.

Mobile, first / early (devices), modern, next, general, fundamental, embedded, dual, immediate, big, special, individual, numerical, tall, broad, up-to-date, pocket (device).

Between, too, across, which, initially, carefully, mostly, while.

B. Find in the texts studied words with opposite meaning to the words given below.

To prohibit, to send, to worsen, to close, to lose, to subtract, to reduce, to remove, to finish, to appear, to stand, to output.

Stationary, different, corded, private, narrow, low-end, short, light, old, low, civil, unlike, individual, large, complex, peaceful, expensive, compatible, difficult.

Few, seldom, fully.

16. Translate the texts into English (by variants).

Потоковое мультимедиа (Streaming Media)

Потоковое мультимедиа — это мультимедиа, которое непрерывно получается пользователем от провайдера потокового вещания. Это понятие применимо как к информации, распространяемой через телекоммуникации, так и к информации, которая изначально распространялась посредством потокового вещания (например, радио, телевидение) или непотоковой (например, книги, видеокассеты, аудио CD).

Первые попытки отображения мультимедийной информации на компьютерах начались в середине XX века. Однако прогресс в этой сфере был очень малым вследствие высокой стоимости и ограниченных возможностей компьютеров тех времен.

Новые достижения в области сетей в совокупности с высокопроизводительными домашними компьютерами и современными операционными системами сделали потоковую мультимедийную информацию доступной широкому кругу простых пользователей.

Твиттеры

Твиттер (от англ. tweet — «щебетать, болтать») — интернет-сайт, представляющий собой систему микроблогов, позволяющий пользователям отправлять короткие текстовые сообщения (до 140 символов), используя веб-интерфейс, эсэмэс, службы мгновенных сообщений или сторонние программы-клиенты.

Создатели «Твиттера» — Джек Дорси (Jack Dorsey), Биз Стоун (Biz Stone) и Эван Вильямс (Evan Williams). Первоначально проект задумывался как возможность ответить на единственный вопрос: «Что

ты сейчас делаешь?» Дорси хотел создать некую платформу, которая позволила бы ему постоянно обмениваться с друзьями короткими сообщениями. Сообщения в «Твиттере» сразу отображаются на странице пользователя и мгновенно могут быть доставлены другим пользователям, которые подписаны на их получение. Доставка может происходить через сайт «Твиттер», службы мгновенных сообщений, эсэмэс, RSS, электронную почту или через «Твиттер-клиент». Из-за короткой длины сообщения в «Твиттере» используется сокращение URL.

Нетбук

Нетбук — небольшой ноутбук, предназначенный для выхода в Интернет и работы с офисными приложениями. Отличается компактными размерами, небольшим весом, низким энергопотреблением и относительно невысокой стоимостью. По габаритам и функциональности нетбуки занимают промежуточное положение между мобильными интернет-устройствами и карманными ПК «снизу» и субноутбуками «сверху».

Изначально термин «нетбук» был использован в 1999 г. компанией Psion для обозначения карманных персональных компьютеров собственного производства. Нетбук в раскрытом виде походил на маленький ноутбук с диагональю экрана 19,6 см и разрешением 640×480 точек.

В нетбуках используются экономичные процессоры и наборы системной логики. Почти все нетбуки снабжены модулями беспроводных сетей (Wi-Fi), часто есть интерфейс Bluetooth. Обычно имеется мультиформатный кардридер.

TESTS

1. Fill in the blanks with the necessary words.

1. The mobile phone is a long-range, _____ electronic device used for mobile communication.
   a) popular; b) pocketful; c) portable; d) political
2. High-end mobile phones offering more advanced computing ability are often called _____.
   a) feature phones; b) smartphones; c) iPod; d) Bluetooth
3. As it is known, the original BlackBerry had a monochrome _____.
   a) discard; b) discharge; c) discomfort; d) display
4. Almost all iPods have five buttons and the later _____ have the buttons integrated into the click wheel.
   a) generators; b) generations; c) gateways; d) gadgets
5. It was Jack Dorsey who _____ the idea of an individual using an SMS service to communicate with a small group.
   a) installed; b) introduced; c) instructed; d) inserted

6. Twitter collects personally identifiable information about its _____ and shares it with third parties.
   a) use; b) usage; c) users; d) useful
7. Those cell phones that do not use a _____ have the data programmed in to their memory.
   a) SIM card; b) operating system; c) SMS message; d) tweet
8. An input mechanism, such as _____ allows the user to interact with the phone.
   a) keycap; b) keylock; c) keyslot; d) keypad
9. The user interface for the iPod Touch is almost identical to that of the _____.
   a) iPad; b) iTune; c) iPod Classic; d) iPhone
10. _____ the standard voice function of a telephone, mobile phones have many additional services.
    a) In spite of; b) In addition to; c) Instead of; d) Due to

2. Coordinate the terms in the left column with their interpretation on the right.

1. Cell phone	a) a portable phone with wireless handset communicating via radio waves and having a base station
2. Smartphone	b) a portable media player, also serving as external data storage device
3. Feature phone	c) one of the first smartphones to be mainly controlled through its touchscreen. It functions as a camera phone, text messaging, a portable media player, and an Internet client
4. Twitter	d) a personal digital assistant with address book and to-do list capabilities
5. BlackBerry	e) a wireless e-mail device, a social networking service enabling the users to send and read short messages
6. Communicator	f) a high-end mobile device with a full OS and a touch-screen instead of physical buttons
7. iPod	g) a hand-held personal computer with functions of a mobile phone
8. iPad	h) a low-end mobile phone, offering basic telephony, playing music, and taking photos
9. iPhone	i) a tablet computer to be used as a platform for audio and visual media (books, newspapers, films, music, etc.)

10. Cordless phone — j) a long-range portable electronic device used for mobile communication and having many additional services

3. Transform the sentences given in the Active Voice into the Passive Voice.

1. As we know, Swedes launched the world's first partly automatic car phone system. 2. Modern mobile phones support many additional services. 3. Martin Cooper demonstrated the first practical mobile phone for hand-held use in 1973. 4. Researchers are working at the implementation of the newest technologies for mobile phones. 5. Japan scientists have already introduced several phone series with modern features. 6. Manufacturers differentiate mobile phones to make them more attractive to consumers. 7. We can find many new features on mobile phones to our liking. 8. GSM mobile phones require a small microchip called SIM card. 9. Students had read and written down the unknown words before they started reading the new text. 10. Many users refer to BlackBerry smartphones as "berries" or simply "BB."

АНГЛО-РУССКИЙ СЛОВАРЬ

A

abacus — счеты
ability — способность, возможность
abolish — отменять, исключать
absence — отсутствие
accelerate — ускорять(ся)
accept — принимать, допускать
acceptable — приемлемый
access — доступ, обращение; обращаться, иметь доступ
    ~ time — время доступа
    database ~ — доступ к базе данных
    sequential ~ — последовательный доступ
accessible — доступный
accessories — реквизиты
accessory equipment — вспомогательные устройства
accomplish — завершать, заканчивать
accomplishment — завершение; выполнение
according — соответствующий
    ~ to — в соответствии с
accordingly — соответственно, соответствующим образом
account — расчет, подсчет, счет (банковский); учитывать, подсчитывать
    take into ~ — принимать во внимание, учитывать
accountant — бухгалтер
accumulate — накапливать(ся), суммировать, собирать
accumulator — сумматор; накапливающий регистр; устройство суммирования
accuracy — точность; правильность; четкость
accurate — точный, правильный
achieve — достигать, завершать
achievement — достижение, завершение
acquire — приобретать, получать
acquirement — приобретение, получение
act — действовать, работать
action — действие, работа, операция
    put into ~ — приводить в действие
activity — деятельность
adapt — адаптировать(ся); настраивать(ся); приспосабливать(ся)
adapter — адаптер
add — сложение, суммирование; складывать
added — добавочный, дополнительный
adder — сумматор, устройство (блок) суммирования

addition — сложение, суммирование
in ~ to — в дополнение к; помимо
additional — дополнительный
address — адрес; адресовать; касаться; затрагивать
adequate — адекватный; соответствующий; достаточный; приемлемый
adjacent — смежный; соседний; примыкающий
adjust — регулировать; настраивать
adjuster — регулятор
adjustment — регулировка; настройка; корректировка; подгонка; поправка
advance — продвигаться(ся); продвижение, успех, прогресс
in ~ — заранее
advanced — улучшенный; усовершенствованный; (более) эффективный
advancement — продвижение; улучшение; усовершенствование
advantage — преимущество; выгода
take ~ of smth. — воспользоваться чем-л.
advent — приход, прибытие
advice — совет; рекомендация
advise — советовать; рекомендовать; консультировать
adviser — консультант; справочник
affect — влиять; воздействовать
agree — соответствовать; согласовывать(ся)
agreement — соглашение
aid — помощь; содействие
aids — средства; приспособления
aim — цель; нацеливать, направлять
alarm clock — будильник
algorithm — алгоритм
align — выравнивать, выстраивать в линию
allocate — распределять; размещать; предоставлять (доступ)
allocation — распределение; назначение; предоставление
allow — допускать; позволять
~ for — учитывать; принимать во внимание
allowable — допустимый
almost — почти; едва не
also — тоже; также; к тому же
alter — (из)менять(ся)
alteration — изменение; перемена
although — хотя; если бы даже; несмотря на то что
altogether — вполне; в общем; в целом; всего
amalgamation — смешение, слияние
amend — исправлять; улучшать
amendment — поправка; исправление
amount — количество; величина; размер; объем; составлять; насчитывать
~ of damage — степень повреждения
~ of memory — объем памяти
~ of time — интервал времени
proper ~ — необходимое количество

amplification — усиление
amplifier — усилитель
amplify — усиливать(ся)
analog — аналог; аналоговый
analog-digital — аналого-цифровой
analyst — аналитик; (системный) разработчик
appear — появляться; возникать; оказываться
appearance — появление; вид
appliance — устройство; прибор
application — приложение; применение; употребление; использование; (прикладная) программа
applied — прикладной
apply — применять(ся); использовать;
approach — приближение; подход; метод; приближаться, подходить
  top-down ~ — принцип нисходящей разработки
  comprehensive ~ — комплексный подход
  database ~ — подход, использованный на использовании базы данных
  educational ~ — метод обучения
  general ~ — общий подход
  graphic ~ — графический метод
  self-study ~ — метод самообучения
  step-by-step ~ — метод поэтапного решения
  training ~ — метод обучения
  trial-and-error ~ — метод проб и ошибок; метод подбора
appropriate — подходящий; соответствующий; свойственный; присущий
approximate — приблизительный; приближенный
architect — разработчик архитектуры
architecture — архитектура; структура
  communications ~ — архитектура средств связи
  computer ~ — архитектура компьютера
  disk ~ — структура диска
  instruction set ~ — структура системы команд
  network ~ — сетевая архитектура
  security ~ — архитектура системы защиты
  software ~ — структура программного обеспечения
argue — спорить; доказывать
arrange — размещать; располагать; устанавливать; монтировать
  ~ **icons** — выстроить значки
arrangement — размещение; расположение; упорядочение; устройство
array — матрица; решетка; массив; упорядочивать, размещать в массиве
arrive — прибывать; поступать; достигать
assemble — собирать; объединять; монтировать; ассемблировать
assembler — ассемблер
assembly — сборка; монтаж; узел; блок; совокупность; система
assign — назначать; получать
assist — помогать; содействовать; поддерживать
assistance — поддержка; помощь

associate — соединять; объединять; связывать
associated — (при)соединенный; объединенный; связанный; соответствующий
~ **documentation** — соответствующая документация
association — объединение; взаимосвязь; совокупность
assume — допускать; предполагать
assumption — предположение; допущение
assurance — гарантия; обеспечение
assure — гарантировать; обеспечивать
attach — подсоединять(ся); подключать(ся); прилагать(ся)
attachment — подсоединение; подключение; (тех.) приспособление
attain — достигать
attempt — попытка; пытаться
attitude — положение; ориентация; отношение
avail — польза; выгода; быть полезным; помогать
availability — готовность; доступность; наличие
available — доступный; имеющийся (в наличии); имеющий место
have ~ — иметь в наличии, иметь в распоряжении
when ~ — при наличии
widely ~ — общедоступный
average — средний;
avoid — избегать; исключать; устранять; предотвращать
aware — осведомленный; информированный
awareness — осведомленность; информированность

B

background — фон; предпосылка, основа; подготовка; квалификация; навыки (работы)
bar — стержень; полоса; строка
barely — едва; лишь; только
base — база; основа; основание;
data ~ — база данных
information ~ — совокупность информации
knowledge ~ — база знаний
user ~ — круг пользователей
based — основанный
basics — основы
batch — пакет; пакетный файл
~ **processing** — пакетная обработка
bay — панель
because — потому что; так как
~ **of** — из-за; вследствие
before — перед; перед тем как
between — между
beyond — вне; сверх; выше; за
beneficial — благоприятный; полезный
benefit — выгода; польза; преимущество; помогать; способствовать

bias — смещать; смещение
binary — двоичный
~ **coded** — в двоичном представлении
bit — бит; двоичный разряд
blog — блог, виртуальный дневник
blur — пятно; размытое изображение; расплываться (об изображении)
board — панель; пульт; плата
chip ~ — плата с микросхемами
circuit ~ — монтажная плата
key ~ — клавиатура
switch ~ — панель переключения
bootstrapping — начальная загрузка
bore — скучное занятие; скучать
boring — скучный
brain — мозг; рассудок; ум
branch — ветвь; раздел; отделение; разветвляться; переходить
break — разрыв; прерывание; пауза; прерывать; нарушать (работу); отказывать (о программе)
~ **into** — внедряться, проникать (в систему)
~ **down** — разбивать(ся), разрушать(ся)
breakdown — разрушение; поломка
brief — краткий; сжатый
in ~ — кратко; вкратце
bring — (пре)доставлять; давать
~ **into** — вводить; заносить в память
~ **into action** — приводить в действие
~ **out** — показывать; демонстрировать
browse — просматривать
browser — программа просмотра; окно просмотра
browsing — просмотр
buffer — буфер; заносить в буфер
bug — ошибка; дефект; недоработка
data ~ — ошибка в данных
loop ~ — ошибка в цикле
security ~ — недоработка системы защиты
bug-free — не содержащий ошибок
bug-test — проверять на наличие ошибок
builder — разработчик; изготовитель; создатель
building — разработка; построение; формирование; создание
burden — издержки; затраты; обязанности;
bus — шина; канал; линия (передачи данных); соединять шиной
control ~ — шина управления
data ~ — шина данных
input ~ — входная шина
input-output ~ — шина ввода-вывода
memory ~ — шина (доступа) к памяти

button — кнопка; кнопочный
  browse ~ — кнопка просмотра
  cancel ~ — кнопка отмены
  emergency ~ — аварийная кнопка
  exit ~ — кнопка выхода
  reset ~ — кнопка сброса
  start ~ — кнопка запуска
byte — байт; размером в байт

C

cache — кэш; файл для хранения (данных); хранить; сохранять
calculate — вычислять; рассчитывать; подсчитывать
calculating device — вычислительное устройство
calculation — вычисление; счет
calculus — исчисление; математический анализ
calibrate — градуировать; выверять; настраивать
call — вызов; обращение; вызывать; обращаться; называть
call for — требовать; предусматривать
cancel — отменять; аннулировать; отмена; аннулирование
capability — способность; возможность
capacitor — конденсатор
capacity — емкость; объем; производительность; пропускная способность
  media ~ — емкость носителя
capture — собирать (данные); переносить; записывать (в память)
card — плата; карта; карточка
  expansion ~ — плата расширения
  sound ~ — звуковая плата
cardfile — картотека
carrier — носитель; держатель; сеть передачи данных
carry — нести; переносить
  ~ out — выполнять (команду)
cartridge — кассета; картридж
cathode-ray tube — электронно-лучевая трубка
cause — заставлять; вынуждать; быть причиной; причина; основание
cell — ячейка; элемент
cellular — сотовый (о связи); сотовый телефон
century — век, столетие
Census Bureau — бюро переписи населения
chain — цепь; цепочка; последовательность
challenge — трудность; препятствие; представлять трудность
change — изменение; замена; изменять(ся); сменять(ся)
character — символ; знак; буква
  ~ map — таблица символов
charge — заряд; заряжать; обязанность; поручение
  be in ~ of — отвечать за; быть на попечении; управлять

chart — диаграмма; график; схема; таблица; строить график; изображать
  bar ~ — столбиковая диаграмма
  dot ~ — точечная диаграмма
  line ~ — график
  pie ~ — круговая/секторная диаграмма
cheap — дешевый; дешево
check — контроль; проверка; проверять
checkout — проверка; наладка; отладка
chip — кристалл; микросхема
choose — выбирать
circuit — цепь; контур; электронная схема
  integrated ~ — интегральная схема
circuitry — (электронные) схемы
clear — чистый; стертый; удаленный; очищать; стирать; удалять
code — код; система команд; кодировать; программировать
coding — программирование
column — столбец; колонка; графа
collaboration — сотрудничество
combine — сочетать; объединять
commission — назначать; уполномочивать; давать заказ
common — обычный; стандартный; типичный
commonplace — общий
communicate — сообщать(ся); связывать
communication — связь; сообщение; взаимодействие
community — сообщество; семейство; серия
  online ~ — сообщество сетевых пользователей
comparative — сравнительный
compare — сравнение; сравнивать; соотноситься
  comparer/comparator — компаратор; устройство сравнения
comparison — сравнение
compatibility — совместимость
compatible — совместимый
compiler — компилятор
complete — полный; целый; завершенный; завершать; заканчивать
completely — полностью; целиком
comprehensive — полный; исчерпывающий; всесторонний; универсальный; комплексный
compressible — сжимаемый; уплотняемый
computation — вычисление; расчет
compute — вычислять; рассчитывать
computer — компьютер; вычислительная машина
  ~ mail — электронная почта
  advanced ~ — современный компьютер
  all-purpose ~ — универсальный компьютер
  analog ~ — аналоговый компьютер
  digital ~ — цифровой компьютер

desktop ~ — настольный компьютер
embedded ~ — встроенный компьютер
first-generation ~ — компьютер первого поколения
general-purpose ~ — универсальный компьютер
handheld ~ — карманный компьютер
IBM-compatible ~ — ИБМ-совместимый компьютер
mobile ~ — портативный/переносной компьютер
notebook ~ — блокнотный компьютер
personal ~ [PC] — персональный компьютер
portable ~ — портативный компьютер

computer-literate — владеющий компьютерной грамотностью; имеющий навыки работы с компьютером
concept — понятие; принцип; концепция
concern — касаться; иметь отношение к; заботиться; касательство; отношение; дело, вопрос, аспект
concise — краткий; сжатый
conclusion — вывод; заключение
condition — условие; состояние; режим
confine — ограничивать
confirm — подтверждать
confirmation — подтверждение
delivery ~ — подтверждение приема
connect — соединять; подключать; связывать
connection — подключение; установление связи; соединение; схема
connector — соединитель; соединительное звено
consecutive — последовательный
consider — рассматривать; учитывать; полагать, считать
considerable — значительный; существенный
considerably — значительно
consideration — рассмотрение; учет; соображение; *pl* особенности; вопросы
constantly — постоянно; часто; то и дело
constitute — составлять; образовывать; представлять собой
consume — потреблять; расходовать
consumer — потребитель; абонент
consumption — потребление; расход
power ~ — расход энергии
contain — содержать; вмещать; включать
content — содержание; смысл; содержимое; объем; количество; вместимость, емкость; удовлетворять; довольствоваться
continuously — постоянно; непрерывно
contrast — контраст; противоположность
as ~ed with — в отличие от
in ~ — напротив; наоборот
contribute — содействовать; способствовать; вносить вклад
contribution — вклад; содействие
control — управление; регулирование; управлять; регулировать

~ panel — панель управления
~ unit — блок управления
access ~ — управление доступом
device ~ — управление устройством
distance ~ — дистанционное управление
error ~ — контроль за ошибками
inventory ~ — инвентаризация; переучет
convenience — удобство; пригодность
convenient — удобный; пригодный
convention — соглашение; правило; *pl* условные обозначения
conversion — преобразование
convert — преобразовывать
converter — преобразователь; конвертор
convey — передавать; сообщать
conveying — передача (информации)
cooperation — сотрудничество; совместные действия
copy — копия; экземпляр; копировать
core — ядро; оперативная память; суть; основная часть
correct — верный; правильный; нужный; требуемый; исправлять
correction — исправление; устранение (неисправности); коррекция
corrective — корректирующий
corrector — корректор; блок или программа корректирования
corrupt — разрушать; портить; искажать; искаженный
corrupted — искаженный; запорченный
corruption — разрушение; искажение; порча; повреждение
data ~ — искажение данных
cost — стоимость; цена
cost-effective — экономичный; экономически оправданный
count — счет; подсчет; отсчет; считать; подсчитывать
counter — счетчик
binary ~ — двоичный счетчик
character ~ — счетчик символов
data ~ — счетчик (элементов) данных
instruction ~ — счетчик команд
pulse ~ — счетчик импульсов
sequence ~ — счетчик команд
software ~ — программный счетчик
storage ~ — накапливающий счетчик
time-out ~ — счетчик времени ожидания
create — создавать; формировать
creation — создание; формирование
current — электрический ток; поток; струя; текущий; находящийся в обращении
alternating ~ — переменный ток
direct ~ — постоянный ток
curriculum — учебная программа
cycle — цикл; период; такт; этап

D

damage — повреждение; разрушение
data — данные; информация
  application ~ — данные прикладной программы
  approximate ~ — приближенные данные
  available ~ — имеющиеся данные
  bad ~ — неверные (искаженные) данные
  calculation ~ — расчетные данные
  check ~ — контрольные данные
  help ~ — справочные данные
  missing ~ — недостающие (отсутствующие) данные
  source ~ — исходные данные
database — база данных; заносить в базу данных
deal — иметь дело; работать
dealer — посредник; поставщик
debug — отлаживать (программу)
debugger — отладчик
debugging — отладка; наладка
decide — решать; принимать решение
decision — решение
  make ~ — принимать решение
decode — декодировать
decoder — дешифратор
decrease — уменьшение; снижение; уменьшать; снижать
default — по умолчанию; подразумеваемый; умолчание; стандартный параметр
deficiency — недостаток; нехватка; отсутствие
define — определять; задавать
definition — определение; задание
degree — степень; мера
  ~ of compatibility — степень совместимости
  ~ of protection — степень защиты
  ~ of security — степень безопасности
delay — задержка; запаздывание; задерживать; откладывать
delete — удалять; стирать; очищать
deleter — программа удаления
deletion — удаление; стирание
delivery — подача; доставка; поставка
demagnetize — размагничивать
demand — требование; запрос; требовать; запрашивать
  meet the ~s — удовлетворять потребности
dense — плотный; компактный
density — плотность
  data ~ — плотность записи данных
  drive ~ — плотность дисковода
  packing ~ — плотность упаковки

storage ~ — плотность заполнения памяти
depend — зависеть от (чего-л.)
dependence — зависимость
dependent — зависимый; зависящий
depending — в зависимости (от)
deposit — помещать; размещать
depository — склад; хранилище
describe — описывать, изображать
design — проектирование; конструирование; разработка; построение
desktop — настольный
detail — деталь; подробность
in ~ — подробно; детально
detect — обнаруживать; выявлять
detection — обнаружение; выявление
error ~ — выявление ошибок
failure ~ — обнаружение неисправностей; выявление ошибок
detector — детектор; средство обнаружения; датчик
develop — развивать; разрабатывать; усовершенствовать; проявлять(ся)
development — разработка; развитие; усовершенствование
device — устройство; прибор; аппарат; приспособление
accounting ~ — счетное устройство
alarm ~ — сигнальное устройство
clock ~ — датчик времени; таймер
computing ~ — вычислительное устройство; способ вычислений
control ~ — устройство управления
drawing ~ — чертежное устройство
encoding ~ — кодирующее устройство
incompatible ~ — несовместимое устройство
measuring ~ — измерительное устройство
pen ~ — чертежное устройство; световое перо
plotting ~ — чертежное устройство
printing ~ — печатающее устройство
recording ~ — записывающее устройство
sensing ~ — датчик; детектор
switching ~ — переключатель
devise — разрабатывать; изобретать
die — умирать
difficult — трудный; сложный
difficulty — трудность; сложность; затруднение
digit — цифра; разряд (числа); знак
binary ~ — двоичная цифра
binary-coded ~ — цифра в двоичной кодировке
check ~ — контрольный разряд
information ~ — информационный разряд
input ~ — вводимая цифра
significant ~ — значащая цифра

digital — цифровой
digitally — в цифровом представлении
digit-by (to)-digit — поразрядный
digitize — преобразовывать к цифровому ряду
digitizer — аналого-цифровой преобразователь; графический планшет; сканер
dimension — размер; измерение
direct — направлять; управлять; руководить; указывать
direction — направление; руководство; указание
  backward ~ — обратное направление
  clockwise ~ — направление по часовой стрелке
  counterclockwise ~ — направление против часовой стрелки
  data ~ — направление передачи данных
  forward ~ — прямое направление
  inverse/reverse ~ — обратное направление
  printing ~ — направление печати
  transmission ~ — направление передачи данных
directory — каталог; справочник; перечень (данных); руководство
disadvantage — недостаток; неудобство
disagreement — несоответствие; расхождение; противоречие
disappear — исчезать; пропадать
discharge — разгрузка; разгружать, освобождать (систему)
disclose — раскрывать; обнаруживать
disconnect — разъединять; отключать
discount — не учитывать; не принимать в расчет; скидка
discover — обнаруживать; выявлять
discovery — обнаружение; выявление
discrete — дискретный; отдельный
disintegrate — разделять(ся); распадаться на составные части
disk — диск
  ~ capacity — емкость диска
  blank ~ — пустой диск
  flexible ~ — гибкий диск
  floppy ~ — гибкий, флоппи-диск
  hard ~ — жесткий диск
displace — перемещать; смещать
display — дисплей; устройство (визуального) отображения
distance — расстояние
distinction — различие; отличие; распознавание
distinguish — различать(ся); отличать(ся)
distortion — искажение
distribute — распределять; распространять
distributed — распределенный; рассредоточенный; распространенный
distribution — распределение; распространение
distributor — распространитель; распределитель
diversity — разнообразие; различие
dot — точка; ставить точку

doubt — сомнение
download — загружать; считывать; считывание (файлов) с сервера
dream — мечта, мечтать
drive — привод; дисковод; запоминающее устройство
    CD ~ — дисковод для компактных дисков
    disk ~ — дисковод
    floppy ~ — дисковод для гибких дисков
    hard (-disk) ~ — дисковод для жестких дисков
    magnetic-tape ~ — запоминающее устройство на магнитной ленте
driver — драйвер; двигатель
    print ~ — драйвер печати
    software ~ — программный драйвер
drum — барабан (графопостроителя)
due to — благодаря; из-за; вследствие
dump — разгрузка; дамп; вывод; разгружать; сбрасывать; выводить
duplication — дублирование; копирование
duplicator — копировальное устройство

E

each — каждый; всякий
    with ~ other — друг с другом
easy – легкий; легко
ebb — отлив
edit — редактировать
editor — редактор; программа редактирования
effect — действовать; оказывать воздействие; влияние; эффект
efficiency — эффективность; коэффициент полезного действия
effort — усилия; работа
either — один/любой (из двух); каждый, любой; или
    ~ ... or — или ... или
eject — выбрасывать; выталкивать; выдавать (данные); выброс; выдача
elaborate — разрабатывать; развивать
elaboration — развитие; разработка
eliminable — устранимый
eliminate — устранять; удалять; отменять; ликвидировать
elimination — устранение; отмена
e-mail — электронная почта
e-mailing — отправка (сообщений) по электронной почте
embedded — встроенный; внедренный; находящийся внутри
embrace — охватывать; содержать
emerge — появляться; возникать
emergency — авария; чрезвычайная ситуация; аварийный
emit — испускать; излучать; выдавать; генерировать (данные)
emphasize — выделять; подчеркивать

employ — использовать, употреблять, применять
enable — разрешать; позволять; делать возможным; допускать
encapsulate — герметизировать; изолировать; помещать (в пакет)
encoder — шифратор; кодирующее устройство; шифровальщик
encompass — охватывать; заключать
engine — механизм; устройство
engineering — конструирование; проектирование; разработка; техника; технология
enough — достаточно; достаточное количество
enquiry — наводить справки; расспрашивать; исследовать
ensure — обеспечивать; гарантировать
enter — входить; вводить; заносить
entire — целый; полный; весь
entirely — целиком; полностью
entry — ввод; занесение; вход
enumerate — перечислять
enumeration — перечисление; перечень
environment — среда; окружение; условия (эксплуатации); средства
  application ~ — прикладная среда
  communications ~ — коммуникационная среда
  computing ~ — вычислительная среда
  execution ~ — среда выполнения программы
  external ~ — внешняя среда
  hardware ~ — аппаратная среда
  management — среда/средства управления
  network ~ — сетевая среда
  processing ~ — условия обработки
  security ~ — условия защиты; режим безопасности
  software ~ — программная среда
  user ~ — операционная среда
equal — равный; одинаковый
equality — равенство
equation — уравнение
equip — оборудовать; оснащать
equipment — оборудование; приборы; аппаратура; (аппаратные) средства
erase — стирать; удалять
erasing — стирание; удаление; очистка
error — ошибка; погрешность
  ~ **handling** — обработка ошибок
  ~ **trapping** — ловушка для ошибок
  access ~ — ошибка доступа
  coding ~ — программная ошибка
  common ~ — типичная ошибка
  connection ~ — неправильное соединение
  operating ~ — ошибка из-за нарушения правил эксплуатации
  outstanding ~ — неустраненная ошибка

permissible ~ — допустимая ошибка
processing ~ — ошибка при обработке данных; погрешность вычисления
startup ~ — ошибка при начальной загрузке
time-out ~ — ошибка из-за неготовности устройства к работе
unrecoverable ~ — неисправимая ошибка
error-free — не содержащий ошибок
error-prone — подверженный ошибкам
essence — суть; существо
essential — существенный; значительный; неотъемлемый; необходимый
establish — основывать; создавать; учреждать; устанавливать
etch — гравировать, наносить
event — событие; случай; исход
eventually — в конечном счете; в конце концов; со временем
evolve — развиваться; развертываться
examination — исследование; рассмотрение; просмотр; проверка
examine — исследовать; проверять
example — пример
for ~ — например
exceed — превосходить; превышать
except for — за исключением
exchange — обмен; замена
excite — возбуждать; активизировать
excitement — возбуждение; активизация
execute — выполнять; исполнять
execution — выполнение; исполнение
executive — диспетчер; управляющая программа; операционная система
exhibition — показ; демонстрация; проявление (свойств); выставка
exit — выход; выходить
expand — расширять(ся); увеличивать; наращивать (возможности)
expansion — расширение; увеличение
experience — опыт; квалификация; испытывать (трудности)
exponentiation — возводить в степень
express — выражать; срочный; быстрый
expression — выражение; представление
extend — расширять; удлинять
extension — расширение; дополнение; удлинение; продление
extract — выделять; извлекать
extraction — извлечение; выборка; выделение
extremely — чрезвычайно; крайне; очень

F

fabricate — изготовлять
fabrication — изготовление
facility — устройство; средство; удобство

facilities — оборудование; приспособления; возможности; средства
  communication ~ — средства связи
  database ~ — средства (поиска) базы данных
  display ~ — средства (визуального) отображения / вывода на экран
  management ~ — средства управления
fail — сбой; отказ; повреждение; выходить из строя; отказывать; не удаваться
failure — отказ; повреждение; дефект; сбой; ошибка; неудача
fall — падать; снижаться; падение; спад
fast — быстрый, скорый
fault — неисправность; дефект; отказ; сбой; давать сбой; отказывать
  assembly ~ — дефект сборки
  data ~ — ошибка в данных
  design ~ — проектная недоработка
  device ~ — неисправность устройства
  latent ~ — скрытый дефект
  random ~ — случайный сбой / ошибка
feasibility — возможность; осуществимость; выполнимость
feasible — возможный; выполнимый; осуществимый
feature — свойство; признак; особенность; характерная черта
  ~ film — художественный фильм
feed — подавать; питать; заправлять (бумагу); вводить (данные)
feedback — обратная связь
feel (felt) — чувствовать
field — поле; область; зона; сфера (деятельности)
figure — цифра; число; вычислять
figure out — вычислять; определять; понимать; постигать
file — файл; заносить в файл
  batch ~ — пакетный файл
  common ~ — общий файл
  data ~ — файл/картотека данных
  help ~ — файл подсказок
  input ~ — входной файл
  output ~ — выходной файл
  user ~ — файл пользователя
  ~ recovery — восстановление файла
finger — палец
firmware — встроенное программное обеспечение
flexibility — гибкость; адаптируемость; настраиваемость; изменяемость
flexible — гибкий; адаптируемый; настраиваемый; изменяемый
flip — переключать(ся)
flip-flop — триггер
flipping — переключение; изменение состояния
floppy — гибкий диск; дискета
flow — поток; ход выполнения (программы); последовательность; проходить
flowcharting — построение блок-схемы
follow — следовать за; следовать, вытекать; следить, отслеживать
follower — последователь

following — следование; отслеживание; слежение
font — шрифт; набор символов
alpha-numeric ~ — текстовый шрифт
default ~ — шрифт, выбираемый по умолчанию; стандартный шрифт
plotter ~ — чертежный шрифт
print/type ~ — печатный шрифт
force — сила; усилие; вынуждать; заставлять; вводить, вставлять (с силой)
foster — воспитывать; поощрять; благоприятствовать
fraction — дробь; доля; часть
frame — блок (данных); структура; система; корпус
framework — структура; система; схема; основа; основания; принципы
fraud — мошенничество; обман
free — свободный; освобождать
frequency — частота
fulfill — выполнять; осуществлять; завершать
fulfillment — выполнение; осуществление; завершение
fundamental — основной; существенный; фундаментальный
furnish — поставлять; снабжать
further — далее, дальше; более удаленный; последующий

G

gadget — приспособление; вспомогательное устройство
gain — достигать; извлекать пользу; выигрывать; выгода; усиление
gather — собирать(ся)
general — общий; универсальный
generate — генерировать; создавать; производить
generation — создание; формирование; образование; поколение
gifted — одаренный; способный; талантливый
give back — возвращать
give out — выдавать; предоставлять
give up — отказывать (об устройстве); не справляться; отказываться
glimpse — взгляд; проблеск; мимолетное впечатление
go missing — выйти из строя; сломаться
go on — продолжать
grade — степень; ранг; класс; сорт; упорядочивать; размещать по рангу
grading — классификация; упорядочивание; выравнивание
grapher — самописец
graphic(al) — графический
~ plotting tables — графические планшеты
graphics — графика
gray-scale — шкала полутонов; полутоновый (об изображении)
groundwork — основа; основание
grow — расти; возрастать; увеличиваться; расширяться
growth — рост; возрастание; увеличение; расширение
guard — защита; защищать; предохранять

guidance — управление; наведение (на цель); руководство
guide — руководство; инструкция; справочник
installation ~ — инструкция по установке (системы)
online ~ — электронный справочник
programming ~ — руководство по программированию
reference ~ — справочное руководство
software ~ — руководство по программному обеспечению
troubleshooting ~ — основные принципы поиска неисправностей
user's ~ — руководство для пользователя

H

habit — навык; привычка; свойство
computing ~s — навыки работы с компьютером
half — половина
handling — обработка; управление; регулирование
data ~ — работа с данными
fault/error ~ — обработка ошибок
hand-operated — управляемый вручную
hand-printed — машинописный
hang (up) — «зависать»; блокировать
hardware — аппаратура; оборудование; аппаратное обеспечение / средства
by ~ — аппаратными средствами
computer ~ — аппаратное обеспечение компьютера
device ~ — аппаратная часть устройства
display ~ — аппаратные средства вывода на экран
expansion ~ — дополнительное аппаратное обеспечение
support ~ — вспомогательное аппаратное обеспечение
harm — вред; ущерб; повреждение
harmful — вредный
harmless — безвредный (о вирусе)
heading — заголовок
healthy — исправный; работоспособный (о системе); незапорченный
heat — теплота; нагревать
~ capacity — теплоемкость
specific ~ — удельная теплоемкость
help — подсказка; справка; помощь
hereafter — далее; в дальнейшем
hereby — таким образом; тем самым
hierarchy — иерархия
high-capacity — большой емкости
high-density — с высокой плотностью
high-fidelity (Hi-Fi) — с высокой точностью воспроизведения
high-frequency — высокочастотный
high-level — высокоуровневый
high-quality — высококачественный

high-reliable — высоконадежный
hold — хранить; содержать (данные)
~ **out** — предлагать, выдерживать
hole — отверстие; гнездо; окно
access ~ — окно доступа
connector ~ — гнездо разъема
home — начало; исходная позиция
hook — рычаг
hook-up — подключать; подсоединять (устройство)
household — домашнее хозяйство
human-oriented — ориентированный на пользователя
hurt — повреждение; вред; ущерб; повреждать; вредить
hypertext — гипертекст

I

icon — условный символ; пиктограмма; изображать условно
identifier — идентификатор; имя; обозначение
identify — идентифицировать; распознавать; выявлять (ошибку)
ignorance — незнание
ignorant — несведущий; незнающий
image — изображение; образ; копия; формат
2 D (dimension) ~ — двухмерное изображение
3 D (dimension) ~ — трехмерное изображение
imagine — воображать; представлять
imbed — встраивать; внедрять; включать
immunity — невосприимчивость; нечувствительность
impartial — беспристрастный; справедливый; непредвзятый
implement — выполнять; осуществлять
implementation — реализация; осуществление; разработка; внедрение
implementor — конструктор; разработчик
implication — вовлечение; смысл; значение; (по)следствие; влияние
importance — важность; значимость (результата)
important — важный; значительный
impossible — невозможный; невероятный
imprint — впечатывание; отпечаток; штамп; впечатывать
improper — непригодный; недопустимый; неправильный; неподходящий
improve — улучшать; уточнять (данные)
improvement — улучшение; усовершенствование; уточнение (данных)
inaccurate — неточный; ошибочный
inadequate — несоответствующий; непригодный; неприемлемый
incapable — неспособный
inch — дюйм
include — включать; содержать
incompatible — несовместимый
inconsiderable — незначительный

incorporate — включать; содержать; встраивать; внедрять
increase — увеличивать; возрастать; увеличение; повышение
independent — независимый
inferior — низший; худший (по качеству)
influence — влияние; воздействие; влиять; воздействовать
initial — первоначальный; исходный
initially — первоначально; в исходном состоянии
inject — вносить; вводить
injection — внесение; введение
injury — повреждение; порча
ink-jet — струйный (о принтере)
innovate — вводить новшества; усовершенствовать
innovation — нововведение; новшество; усовершенствование
innovative — новаторский; инновационный
input — ввод; входное устройство; вводить; подавать на вход
    character ~ — посимвольный ввод
    command ~ — ввод команды
    data ~ — ввод данных; устройство ввода данных
    disk ~ — ввод (данных) с диска
    keyboard ~ — ввод с клавиатуры
    system ~ — ввод по запросу системы
input/output — устройство ввода-вывода
inquiry — запрос; опрос
insert — вставлять; вносить; включать
inside — внутри; в пределах (чего-л.); внутренняя часть
install — устанавливать; монтировать
installation — установка; размещение; монтаж; вставка; настройка
instant — мгновенный; немедленный
instantaneously — мгновенно; немедленно
instead — вместо; взамен
interconnection — внутреннее соединение; взаимосвязь
interface — интерфейс; сопряжение; место стыковки; сопрягать(ся)
    common ~ — стандартный интерфейс
    data ~ — информационный интерфейс
    database ~ — интерфейс (программы) с базой данных
    external ~ — внешнее сопряжение
    flexible ~ — гибкий/настраиваемый интерфейс
    floppy-disk ~ — интерфейс гибкого диска
    general-purpose ~ — универсальный интерфейс
    software / hardware ~ — интерфейс ввода-вывода
intermediate — промежуточный; средний; вспомогательный
internal — внутренний
interpret — интерпретировать; истолковывать
interpretor — интерпретатор; переводчик
interrupt — прерывание; прерываться
intricate — сложный; запутанный
introduce — вводить; вставлять; представлять

invade — вторгаться; проникать
invalid — неверный; недопустимый; недействительный; необоснованный
invalidate — аннулировать; отменять
invalidity — неверность; недопустимость; необоснованность
invasion — вторжение; проникновение
invent — изобретать; делать открытие; придумывать
invention — изобретение
inversion — инверсия; обратное преобразование; перестановка
investigate — исследовать; расследовать
investigation — исследование
invisible — невидимый; неразличимый
involve — включать; вовлекать; вызывать
irregular — неправильный; непостоянный; нестандартный
irrelative — несвязанный; несущественный; не относящийся к делу
irreplaceable — не подлежащий замене; несменный
issue — вывод; выдача; выводить; выдавать (сообщение); посылать
item — элемент; составная часть

J

jack — гнездо
jam — заедание; заклинивание; замятие (бумаги)
job — работа; задание; работать
join — соединение; соединять
joystick — джойстик (рычажковое устройство)
junction — соединение; стык
justification — выравнивание (данных); обоснование; доказательство
justify — выравнивать; обосновывать; доказывать; оправдывать

K

key — клавиша; кнопка; переключатель
- **break ~** — клавиша прерывания
- **control <Ctrl> ~** — управляющая клавиша
- **delete ~** — клавиша удаления
- **end ~** — клавиша перехода в конец
- **enter ~** — клавиша ввода
- **erase ~** — клавиша удаления
- **escape ~** — клавиша выхода
- **home ~** — клавиша перехода в начало
- **insert ~** — клавиша вставки
- **page-down ~** — клавиша листания вперед
- **page-up ~** — клавиша листания назад
- **pause ~** — клавиша останова (паузы)
- **reset ~** — кнопка сброса
- **shift ~** — клавиша переключения регистров

keyboard — клавиатура; клавишный
kind — вид; разновидность
know-how — технология; методика; знания; приемы; *жарг.* ноу-хау
knowledge — знания; осведомленность
be common ~ — быть общеизвестным
programming ~ — знания в области программирования
knowledgeable — осведомленный; компетентный

L

lack — отсутствие; недостаток
lagging — отставание; запаздывание
language — язык
all-purpose/general-purpose ~ — универсальный язык
artificial ~ — искусственный язык
assembler ~ — язык ассемблера
business-oriented ~ — язык для (программирования) экономических задач
compiler ~ — язык компилятора
data ~ — информационный язык
database ~ — язык для работы с базой данных
high-level ~ — язык высокого уровня
low-level ~ — язык низкого уровня
modeling/simulation ~ — язык моделирования
programming/development ~ — язык программирования
lap – пола, фалда; подол; колени
laptop — наколенный компьютер
last — последний; длиться, продолжаться
launch — запускать (программу); вводить в действие
layer — слой; уровень
layout — размещение; распределение
lead [led] — свинец
learn online — обучаться с помощью компьютера
letter — буква; символ
level — уровень; выравнивать
access ~ — уровень доступа
data ~ — информационный уровень
device ~ — уровень устройств
error ~ — уровень ошибки
hardware ~ — аппаратный уровень
input ~ — уровень входного сигнала
output ~ — выходной уровень
performance ~ — степень быстродействия
presentation ~ — уровень представления
protection/security ~ — уровень/степень защиты
software ~ — программный уровень
transmission ~ — уровень передаваемого сигнала

life — жизнь; срок службы
light — легкий
like — подобно; похожий
lifetime — срок службы
line — строка; линия; шина; канал
link — связь; соединение; связывать; соединять
list — список; перечень; таблица
listing — распечатка; перечень; представление в виде списка
literacy — грамотность
literate — грамотный
load — загружать; заправлять (ленту)
loading — загрузка; заправка
locate — размещать; располагать
location — местоположение; позиция
lock — затор; шлюз; плотина
logic — логика; логическая последовательность; логический блок
    processing ~ — логическая последовательность обработки
    program ~ — логическая последовательность выполнения программы
look for — искать
loom — ткацкий станок
loop — цикл; петля; виток; контур
looping logic — логическая схема выполнения (операций) в цикле
loss — потеря; затраты
    ~ of performance — снижение быстродействия / пропускной способности
    ~ of productivity — снижение производительности труда
    data ~ — потеря данных
lower — понижать; уменьшать
    ~ manufacturing — снижение производительности

M

magnetize — намагничивать
mail — (электронная) почта
main — главный; основной
mainframe — большая ЭВМ
mains — сеть электропитания
maintain — поддерживать; сохранять; эксплуатировать
maintenance — эксплуатация; техническое обслуживание
major — главный, основной
malfunction — сбой; отказ; неисправность; отказывать; давать сбой
manage — управлять; организовывать
management — управление; регулирование; организация
    data ~ — работа с данными
    database ~ — управление базой данных
    error ~ — управление обработкой ошибок

software ~ — разработка и сопровождение программного обеспечения
task ~ — управление ходом выполнения задач
manifestation — проявление
manipulate — управлять; манипулировать; обрабатывать
manipulation — управление; работа; обработка; преобразование
manipulator — блок обработки
manual — руководство; справочник; инструкция; описание
help ~ — справочное руководство
operation ~ — руководство по эксплуатации
manufacture — изготавливать; производить; разрабатывать
manufacturer — изготовитель; производитель; разработчик
mark — признак; метка; знак; помечать; обозначать; выделять
marvel — чудо, диво; замечательная вещь
match — сопоставлять; сравнивать; согласовывать; соответствовать
mathematician — математик
mean — значить; подразумевать
meaning — значение; смысл
means — средства; способ
by ~ of — с помощью; посредством
measure — измерять; мера; критерий
measurement — измерение; размер
medium (*pl* media) — среда; носитель; средство; способ; средний
data ~ — носитель данных
input ~ — носитель для входных данных; способ ввода (данных)
output ~ — носитель для выходных данных; способ вывода
portable/removable ~ — съемный носитель
meet — удовлетворять (условию); отвечать; соответствовать
~ the demands / requirements — удовлетворять нужды, потребности
memory — память; запоминающее устройство
additional ~ — добавочная память
core ~ — оперативная память
extended ~ — дополнительная память
external ~ — внешняя память
high-capacity ~ — память большой емкости
internal ~ — внутренняя память
main ~ — основная память
random-access ~ (RAM) — оперативное запоминающее устройство (ОЗУ)
read-only ~ (ROM) — постоянное запоминающее устройство (ПЗУ)
secondary ~ — вторичная память
merge — слияние; объединение; сливать(ся); объединять(ся)
message — сообщение; запрос; посылать сообщение
meter — измерительный прибор; датчик; счетчик
metering — измерение
microwave oven — микроволновая печь
miss — промахнуться; упустить; пропустить
mistake — ошибка; ошибаться

mobile — переносной; портативный; подвижный; мобильный
mode — способ; метод; режим
free-running ~ — режим свободного доступа
operating ~ — рабочий режим
programming ~ — режим программирования
read-only ~ — режим доступа к данным без возможности их изменения
modification — модификация; изменение; вариант; версия
modify — модифицировать; изменять; преобразовывать
monitor — монитор; дисплей; наблюдать; контролировать; следить
monitoring — мониторинг; наблюдение; контроль
mostly — главным образом; большей частью; преимущественно
motherboard — материнская плата
mouse — мышь
movable — перемещаемый; подвижный; съемный
move — двигать; перемещать; передвигать; переходить; перенос; переход
movement — движение; перемещение
multimedia — мультимедийные средства; мультимедийный
multiplayer — для нескольких игроков, коллективный
multiple — множественный; многокомпонентный; составной
multiplication — умножение; усиление
multiply — умножать; усиливать; увеличивать
mutual — взаимный; общий; совместный

N

namely — а именно; то есть
nearly — почти; приблизительно; близко
necessary — необходимый; нужный; нужно
need — потребность; необходимость; требовать(ся); быть необходимым
network — сеть; схема; контур
~ drive — сетевой накопитель
never — никогда
noisy — шумный; с помехами
noncomparable — несравнимый
noncompatible — несовместимый
noncomputable — невычисляемый
noncontrollable — неуправляемый
notation — запись; представление; обозначение
binary ~ — двоичная система
notebook — блокнотный компьютер; ноутбук
notepad — блокнот
number — число; количество; цифра
numeric(al) — числовой; цифровой
numerous — многочисленный

O

objective — цель; целевая функция; требование
observation — наблюдение; отслеживание
observe — наблюдать; следить; соблюдать (правила)
obtain — получать; достигать
occur — происходить; случаться
on-board — расположенный на плате; встроенный; бортовой
ongoing — продолжающийся; постоянный; непрерывный
online — неавтономный; подключенный к компьютеру
onset — начало; ввод в действие
open — открывать; начинать; размыкать
operand — операнд
    address ~ — адресный операнд
operate — работать; действовать; функционировать
operation — работа; действие
    basic ~ — основной режим работы
    cancel ~ — операция отмены
    computer ~ — работа компьютера
    debugging ~ — работа в режиме отладки
    error-free ~ — безотказная работа
    exchange ~ — операция обмена
    input/output ~s — операции ввода-вывода
opinion — мнение
opportunity — возможность
option — выбор; вариант; средство; возможность
optionally — необязательно; по усмотрению; при желании
order — команда; порядок; последовательность; приводить в порядок; приказывать
    ~ of execution — последовательность выполнения
    ~ of use — очередность использования
    put in ~ — приводить в порядок
other — другой; иной; остальные
outlet — выход; вывод; розетка
    network ~ — сетевой вывод
outline — контур; очертание; схема; план; краткое изложение
out-of-order — неисправный
output — вывод; выход; устройство вывода; выводить
    hard-copy ~ — распечатка; данные, выведенные на печать
    soft-copy ~ — данные, выведенные на экран
outside — внешний; наружная сторона; снаружи; вне; за пределами
over — над; сверх; через; чрезмерный; верхний
over and over — снова и снова; много раз
overlap — перекрывать(ся); накладывать(ся); совмещаться

P

package — пакет; блок; модуль
application ~ — прикладной пакет
data ~ — пакет данных
packaged software — готовое программное обеспечение
partial — частичный; неполный; частный (о значении)
particularly — очень; в особенности; особенно; подробно
password — пароль
pattern — шаблон; образец; форма
~ recognition — распознавание образов
pen — перо
graphic/light ~ — световое перо
perform — выполнять; осуществлять; работать; действовать
performance — (рабочая) характеристика; производительность; быстродействие; режим работы
application ~ — скорость работы прикладной программы
computer ~ — быстродействие компьютера
device ~ — скорость работы устройства
error ~ — скорость исправления ошибок
execution ~ — скорость выполнения (программы)
memory ~ — скорость доступа к памяти; скорость выборки
network ~ — пропускная способность
processor ~ — быстродействие процессора
permit — разрешать; допускать
permitted — допустимый
pervade — распространять; охватывать
phenomenon (*pl* **phenomena**) — явление
photocell — фотоэлемент
piece — кусочек; кристалл
pick — выбирать; извлекать
plotter — графопостроитель
plug — штепсель; вилка; штекер; подключать; подсоединять
point — точка; место; узел; суть; указывать; отмечать
~ out — указывать; отмечать
in ~ of — в отношении (чего-л.)
pointer — указатель; стрелка
pointing — указание (положения); задание координат; указывающий
~ device — устройство управления курсором
~ stick — ручка управления курсором
possibility — возможность; вероятность
possible — возможный; вероятный
poster — объявление; плакат; афиша
potent — могущественный; мощный; убедительный
power — мощность; энергия; питание; снабжать энергией
~ saving — энергосберегающий

~ **supply** — источник питания
predefined symbols — заранее заданные символы
predicate — утверждать; основываться
predict — предсказывать; прогнозировать
predominant — преобладающий
predominate — преобладать; доминировать
prepare — подготавливать; составлять
pressure — давление
prevent — предотвращать; предохранять; препятствовать
prevention — предотвращение; предупреждение
previously — заранее; предварительно
primary — первичный; исходный; основной; главный
primarily — главным образом; преимущественно; в основном
print — печатать; выводить на экран
~ **engine** — механизм печати
~ **head** — головка печати
printer — принтер; печатающее устройство
character ~ — символьный принтер
dot-matrix ~ — точечно-матричный принтер
graphical/image ~ — графический принтер
impact ~ — контактный принтер
ink-jet ~ — струйный принтер
laser ~ — лазерный принтер
letter-quality ~ — принтер с типографским качеством печати
line (at-a-time) ~ — принтер с построчной печатью
page (at-a-time) ~ — принтер с постраничной печатью
print out — распечатка; вывод на печать или экран
procedure — процедура; процесс; метод; алгоритм
accounting ~ — процедура учета
computational ~ — алгоритм вычислений
control ~ — метод управления
error-correcting ~ — процедура/алгоритм исправления ошибок
formatting ~ — процедура/процесс форматирования
installation ~ — процедура/процесс установки (системы)
solution ~ — алгоритм решения
proceed — продолжать(ся); возобновлять; действовать
process — процесс, обработка
processing — обработка (данных)
processor — процессор; программа обработки
control ~ — управляющий процессор
data ~ — программа обработки данных
error ~ — блок обработки ошибок
general-purpose ~ — универсальный процессор
image ~ — графический процессор
mail ~ — программа обработки сообщений электронной почты
message ~ — программа обработки сообщений

numeric ~ — числовой процессор
special-purpose ~ — специализированный процессор
text/word ~ — текстовый процессор
program — программа; план; программировать
access ~ — программа для доступа
application ~ — прикладная программа
archived ~ — заархивированная программа
binary ~ — программа в двоичном коде
common ~ — часто используемая, распространенная программа
compatible ~ — совместимая программа
debugging ~ — программа отладки
educational ~ — обучающая программа
free ~ бесплатная программа
general-purpose ~ — универсальная программа
high-performance ~ — программа, выполняемая с большой скоростью
incompatible ~ — несовместимая программа
machine language ~ — программа в машинном коде
offline ~ — несетевая программа
online ~ — сетевая программа
processing ~ — программа обработки
protected-mode ~ — программа, выполняемая в защищенном режиме
remote ~ — дистанционная программа
running ~ — выполняемая программа
self-loading ~ — самозагружающаяся программа
simulation ~ — программа моделирования
support ~ — вспомогательная программа
utility ~ — сервисная программа
watch-dog ~ — сторожевая программа
programmable — программируемый
programmer — программист
programming — программирование
~ **environment** — среда программирования
~ **language** — язык программирования
proliferation — быстрое увеличение; разрастание; распространение
prompt — подсказка; запрос
proof-read — считывать с целью проверки (правильности записи)
proof-reader — корректор
properly — правильно; как следует
property — свойство; качество; *pl* параметры; характеристики
propose — предлагать; предполагать
proposition — предложение; утверждение
proprietary — особый; особенный; нестандартный; (за)патентованный
protect — защищать
protection — защита; система/средства защиты
protector — защитное устройство; предохранитель
provide — доставлять; обеспечивать; снабжать; предусматривать

provided — при условии что; в том случае если; только если
provider — поставщик; провайдер
provision — обеспечение; снабжение; *pl* средства
pulse — импульс
punch — пробивать (отверстия)
punched card — перфокарта
purpose — цель; (пред)назначение
push — нажимать; толкать
push-button — кнопка

Q

qualitative — качественный
quality — качество; свойство; характеристика
  image ~ — качество изображения
  running ~ — рабочая характеристика
quantitative — количественный
quantity — количество; число; величина; значение
  absolute ~ — абсолютная величина
  alternating ~ — переменная величина
  continuous ~ — непрерывная величина
  digital ~ — числовое значение
  discrete ~ — дискретная величина
  input ~ — входная/вводимая величина
  unknown ~ — неизвестная величина
  variable ~ — переменная величина
quit — выход (из программы); выходить (из программы)
quitting — выход (из программы)

R

raise — поднимать; повышать; увеличивать; подъем; повышение
random — случайный; произвольный
random-access — с произвольным доступом
  ~ memory (RAM) — память с произвольным доступом
range — диапазон; область; интервал
rapid — быстрый
rate — степень; скорость; быстрота
  ~ of change — скорость изменения
  ~ of exchange — скорость обмена
  ~ of response — быстрота реакции
reader — устройство считывания
  bar-code ~ — устройство считывания штрих-кода
  character ~ — устройство считывания/распознавания знаков
reading — чтение; считывание

read-only — работающий только в режиме чтения
reason — причина; основание; довод; обосновывать; заключать
reasonable — разумный; допустимый
receive — принимать; получать
receiver — приемное устройство
reception — прием; получение
recharge — перезарядка; перезаряжать
recognition — распознавание; идентификация
record — запись; регистрация; записывать; регистрировать
recorder — устройство/программа регистрации; самописец
    data ~ — устройство регистрации данных
    tape ~ — запись на (магнитную) ленту
rectangular — прямоугольный
reduce — уменьшать; сокращать; понижать; сжимать
reduction — уменьшение; сокращение; понижение; сжатие (данных)
reel — катушка; бобина
refer — ссылаться; относить (к чему-л.)
reference — ссылка; сноска; справочник; руководство
    computer ~ — руководство по работе с компьютером
    hardware ~ — документация по аппаратному обеспечению
    for ~ — для справки
    in ~ to — по отношению к
    make ~ — ссылаться; упоминать
    user ~ — руководство для пользователя
    without ~ to — независимо от
referenced — вызываемый; указываемый
regardless — несмотря на; независимо от
register — регистр; устройство регистрации; счетчик; датчик
    address ~ — адресный регистр
    base ~ — базовый регистр
    cash ~ — кассовый аппарат
    clock ~ — счетчик времени; таймер
    command/instruction ~ — регистр команд
    counter ~ — регистр счетчика
    general-purpose ~ — регистр общего назначения
    memory/storage ~ — регистр памяти
    operand ~ — регистр операнда
    special-purpose ~ — регистр специального назначения
relate — связывать; иметь отношение
related — смежный; взаимный; относящийся (к чему-л.)
relation — отношение; соотношение; зависимость; связь
relationship — зависимость; связь; соответствие
relative — относительный
relatively — относительно
relay — реле; (ре)трансляция; передавать; транслировать
reliability — надежность

reliable — надежный
reload — перезагружать; повторная загрузка
rely — основывать(ся); полагать(ся)
remain — оставаться
remaining — остальной; оставшийся; остающийся
remarkable — замечательный; удивительный; выдающийся
remember — помнить
remote — дистанционный
~ **control program** — программа дистанционного управления
~ **management** — дистанционное управление
remove — удалять; устранять; убирать;
rename — переименовывать
repair — исправлять; устранять (дефект); восстанавливать (данные)
replace — заменять; замещать
replacement — замена; замещение; смена; подстановка
represent — представлять
representation — представление
pictorial/picture ~ — графическое представление
representative — представитель
require — требовать
requirement — требование; необходимое условие; потребность
research — исследование; изучение; исследовать
reset — сброс; восстановление; возврат в исходное состояние; сбрасывать; восстанавливать
~ **button** — кнопка сброса
~ **computer** — перезагружать компьютер
resource — ресурс; средство; возможность
data ~ — информационный ресурс
printer ~ — средство вывода на печать
security ~ — средство защиты
software ~ — программный ресурс
storage ~ — ресурс памяти
respect — отношение; учитывать; принимать во внимание; соблюдать
respond — отвечать; реагировать
response — отклик; реакция; ответ
~ **time** — время реакции
responsibility — ответственность
responsible — ответственный
restate — пересматривать; переосмысливать
restore — восстанавливать; возвращать (в прежнее состояние)
restrict — ограничивать
retain — сохранять; удерживать
retrieve — отыскивать; извлекать, выбирать (данные); восстанавливать (файл)
retry — выполнять повторно; повторять
return — возврат; обратный ход; возвращать(ся)
reusable — многократно используемый

reuse — повторно использовать; многократное использование
reverse — возвращать; двигать в обратном направлении; перематывать назад; обратный ход
reversibility — обратимость; возможность изменить направление на противоположное
reversible — обратимый; реверсивный
reversion — возвращение; возврат
revise — исправлять; изменять; переосмысливать
revision — пересмотр; корректировка; изменение
ribbon — лента
right — право; полномочие; правый; правильный
~ **away** — немедленно; сразу же
~ **now** — в данный момент
rise — рост; увеличение; повышаться; увеличиваться
roller — ролик; валик
rope — веревка; трос
rotate — вращать(ся); чередовать(ся)
rotation — вращение; чередование; смена
routine — (стандартная) программа/операция; (установленный) порядок
ruggedness — прочность
rule — правило; управлять; руководить
ruler — (масштабная) линейка
run — выполнять, запускать (программу); работать; запуск; прогон; выполнение
running — запуск; выполнение; работа
run-time version — исполняемая версия

S

safe — безопасный; надежный
safety — безопасность; надежность
sale — продажа, сбыт
same — тот (же) самый
all the ~ — все-таки; тем не менее; все равно
save — сохранять; сберегать
satellite — спутник
scale — шкала; масштаб
scaling — масштабирование
scan — просмотр; сканирование; развертка; просматривать
scanner — сканер; устройство оптического считывания
bar-code ~ — устройство считывания штрихкода
color ~ — цветной сканер
hand/manual ~ — ручной сканер
laser ~ — лазерный сканер
optical/visual ~ — оптический сканер
scanning — просмотр; поиск; развертка; считывание; сканирование

schedule — план; расписание; график
scheduling — составление расписания или графика; планирование
science — наука; теория
scientific — научный
scientist — ученый
    computer ~ — специалист по вычислительной технике и информатике
screen — экран; отображать на экране
    ~ saver — хранитель экрана
screening — вывод на экран
search — поиск; искать; просматривать
security — безопасность; сохранность
seek — искать; поиск
select — выбирать; выделять (на экране)
selection — выбор; выделение
    color ~ — выбор цвета
    directory ~ — выбор каталога
    drive ~ — выбор дисковода/привода
    function ~ — выбор функции
    keyboard ~ — выбор клавиатуры
    security ~ — выбор способа защиты
selectivity — избирательность
semiconductor — полупроводник
    bipolar ~ — биполярный полупроводник
    metal-oxide ~ — структура металл — оксид — полупроводник
sensibility — чувствительность
sensitive — чувствительный
sensor — датчик
separate — отделять(ся); отдельный; изолированный
separation — разделение; отделение
sequence — последовательность
    alphabetic ~ — алфавитный порядок
    arithmetic ~ — последовательность арифметических операций
    binary ~ — двоичная последовательность
    character / string ~ — порядок следования символов
    code ~ — последовательность кодов
    command / instruction ~ — порядок выполнения команд
    data ~ — порядок размещения данных
    digital ~ — цифровая последовательность
    historical ~ — хронологическая последовательность
    in ~ — последовательно; по порядку
    increasing ~ — возрастающая последовательность
    out of ~ — не по порядку
serve — обслуживать; служить
server — сервер; обслуживающая/сервисная программа
service — обслуживание; услуги; сервис
    data ~ — информационная услуга

debugging ~ — средство отладки
installation ~ — (сервисная) программа начальной установки
memory ~ — программа обеспечения доступа у памяти
networking ~ — сетевое обслуживание
reference ~ — информационное программное средство
running ~ — выполняемая сервисная программа
security ~ — служба безопасности; средство защиты

set — набор; совокупность; серия
~ of actions — совокупность действий
~ of guidelines — набор рекомендаций
~ of keys — группа клавиш
~ of rules — набор правил
~ of utilities — набор сервисных программ
~ off — отключать
~ on — включать

setting — установка; режим; настройка
power ~s — параметры (режима) энергопотребления

shape — форма; придавать форму
share — совместно использовать; делиться (информацией); часть; доля
sharing — совместное использование; коллективный доступ; разделение
sharpen — заострять; повышать резкость (изображения)
shift — сдвигать; перемещать; сдвиг; смещение; смена регистра
shortcoming — недостаток; изъян; дефект
sign — знак; символ
significance — значимость; важность; значительность; значение; смысл
significant — важный; значительный
silicon — кремний
similar — подобный; аналогичный
similarity — сходство; подобие
similarly — подобным образом; так же
simple-to-use — простой в использовании
simplicity — простота
simplify — упрощать(ся)
simulate — моделировать; имитировать
simulation — моделирование; имитация
simulator — имитатор; тренажер; программа моделирования/имитации
simultaneously — одновременно; параллельно
since — с; с тех пор (как); так как
single — один; единственный; отдельный; однократный
size — размер
skin — кожа; оболочка; наружный слой
skip — пропускать; переходить
slide — скользить; сдвигать; смещать
~ rule — логарифмическая линейка

slot — гнездо; разъем; щель; ниша
bus ~ — гнездо для подключения к шине

expansion ~ — разъем для модуля расширения
slow — медленный, тихий, неторопливый
small-dimensioned — малогабаритный
society — общество
soft — программный; программируемый; электронный (о копии); мягкий
software — программное обеспечение; программные средства
~ compatibility — программная совместимость
~ engineering — технология проектирования программного обеспечения
~ package — программный пакет
~ program — прикладная программа
application ~ — прикладное программное обеспечение
database ~ — программное обеспечение для работы с базой данных
educational ~ — программные средства обеспечения
management ~ — управляющие программы
simulation ~ — программные средства моделирования
solar — солнечный
solid body — твердое тело; кристалл; полупроводник
solution — решение
solve — решать (проблему)
sound — звук; звуковой сигнал
~ board — звуковая плата
~ card — звуковая плата
source — источник; исходное устройство; исходная программа
~ code — исходный код
light ~ — источник освещения
space — пространство; область
~ exploration — исследование космоса
~ vehicle — космический летательный аппарат
spaceship — космический корабль
specific — особый; особенный; определенный; конкретный
specifications — (технические) характеристики, требования
specifics — специальные черты; характерные особенности
specify — задавать; определять; указывать; специфицировать
speed — скорость; спешить; ускорять
~ of operation — быстродействие
~ of response — скорость реакции
spend — проводить; тратить
spray — распылять; разбрызгивать
spread — разброс (значений); протяженность; продолжительность
~ out — расширять(ся); распространять(ся)
network ~ — протяженность сети
spring — пружина; рессора; прыгать; появляться
stand for — обозначать
stand-alone — автономный
start — запуск; начало; запускать
state — состояние; режим; сообщать; утверждать; констатировать

active ~ — рабочее состояние
control ~ — режим управления
default ~ — стандартный режим (выбираемый по умолчанию)
emergency ~ — аварийное состояние
read-only ~ — режим чтения без (возможности) записи
step — шаг; этап; стадия; ступень
~ down — понижать, уменьшать
~ out — выходить (из окна, цикла)
~ up — повышать; увеличивать
conversion ~ — этап преобразования данных
one ~ at a time — поэтапно; постепенно
program ~ — шаг программы
programming ~ — этап программирования
step by step — пошаговый; поэтапный
still — все еще; по-прежнему; тем не менее
stock — запас; снабжать
~ broker — биржевой брокер
~ market forecasting — биржевые прогнозы
storage — запоминающее устройство; память; хранение; запоминание
archival ~ — архивная память
available ~ — доступная память
buffer ~ — буферная память
computer ~ — запоминающее устройство / память компьютера
data ~ — хранение данных
input ~ — хранение входных данных
intermediate ~ — промежуточное запоминающее устройство
internal ~ — внутренняя память
magnetic-disk ~ — запоминающее устройство на магнитных дисках
magnetic-tape ~ — запоминающее устройство на магнитных лентах
main ~ — основная память; оперативное запоминающее устройство (ОЗУ)
offline ~ — автономное запоминающее устройство; автономное хранение
online ~ — оперативно доступная память; неавтономное хранение
sequential-access ~ — запоминающее устройство с последовательным доступом
variable ~ — память для хранения переменных
store — хранить; запоминать; заносить в память / размещать в памяти
string — строка; последовательность
~ of characters — последовательность символов
subscribe — подписываться (на услуги компьютерной сети)
subscriber — подписчик; абонент
subsequent — последующий; дальнейший
subsequently — в дальнейшем; затем; впоследствии
substitute — заменять; замещать
substitution — замена; подстановка
subtract — вычитать
subtraction — вычитание
success — успех

successful — успешный
succession — последовательность
successively — последовательно
successor — следующий член (последовательности); очередная версия; последователь
such as — такой как
suddenly — вдруг, внезапно
suggested — предлагаемый; рекомендуемый
suit — походить; соответствовать
suitable — подходящий; соответствующий
suite — набор; комплект; группа; серия
  protocol ~ — набор протоколов
  software ~ — комплект программных средств
supply — подача; питание; ввод; подавать; вводить; снабжать
  data ~ — ввод данных
  paper ~ — подача бумаги
  power ~ — источник питания
support — поддержка; обеспечение; поддерживать; обеспечивать
  technical ~ — служба технической поддержки; служба консультаций
surround — окружать
surrounding — окружающий, соседний; окружение; среда
switch — переключать; переставлять; переключатель; коммутатор
  ~ between programs — переходить к выполнению другой программы
  ~ between windows — переходить из одного окна в другое
  ~ in/on — включать; запускать
  ~ off — выключать; отключать
  ~ over — переключать
  binary ~ — двоичный переключатель
  button ~ — кнопочный переключатель
  reset ~ — кнопка сброса
swivel — поворачивать(ся); поворот
system — система; установка; устройство; способ; принцип; методика
  artificial-intelligence ~ — система искусственного интеллекта
  assistance/help ~ — справочная система
  basic input/output ~ — базовая система ввода-вывода
  closed ~ — замкнутая система
  common ~ — распространенная система
  disk operating ~ — дисковая операционная система
  executive/operating ~ — операционная система
  general-purpose ~ — универсальная система
  healthy ~ — исправная система
  incompatible ~ — несовместимая система
  monitoring ~ — система контроля
  reference ~ — справочная/информационная система
  support ~ — система поддержки, система сопровождения
  tutorial ~ — обучающая система

T

table — таблица
tabulate — табулировать; заносить в таблицу
tabulation — занесение в таблицу
tag — метка; ярлык; этикетка; наклейка; признак
take — брать; выбирать (команду); принимать (вид, значение)
~ **advantage of** — воспользоваться
~ **care** — принимать меры; проследить
~ **into account/consideration** — учитывать; принимать во внимание
~ **notes** — записывать; регистрировать
~ **part** — принимать участие
~ **place** — происходить; состояться
tape — магнитная лента
~ **backup unit** — устройство получения резервных копий на магнитной ленте
~ **drive** — накопитель на магнитной ленте
technique — метод; способ; техника; технические приемы; методика
advanced ~ — усовершенствованная методика; современная технология
computing ~ — вычислительная техника
display/video ~ — техника отображения; способ вывода на экран
formatting ~ — способ форматирования
hardware ~ — метод аппаратного решения
measuring ~ — измерительная техника
numerical ~ — метод числовых расчетов
programming ~ — методика программирования
software ~ — метод программного решения
technology — технология; техника; методика; методы; способы
communications ~ — технология организации связи
template — шаблон; маска; образец; форма
temporarily — временно
terminal — терминал; зажим; вывод; конец
~ **adapter** — терминальный адаптер
~ **mode** — терминальный режим
alphanumeric ~ — текстовый терминал
character ~ — текстовый терминал
point-of-sale ~ — кассовый терминал
remote ~ — удаленный терминал
security ~ — защищенный терминал
therefore — следовательно; поэтому
thin-film magnetic medium — тонкопленочный магнитный носитель
thorough — тщательный; подробный
thoroughly — тщательно; как следует
through — через; сквозь; в течение; по причине
throughout — повсюду; во всех отношениях
tide — прилив; поток; течение

timing — хронометрирование; согласование во времени; расчет времени
tiny — сверхмалый; крошечный
title — заголовок; название
toggle — тумблер; переключатель
tool — средство; инструмент
total — общий; суммарный; совокупный; итоговый; весь; целый
touch pad — сенсорная панель
tough — жесткий; плотный; крепкий; сильный; выносливый
tracing — слежение; поиск; выявление; определение; трассировка
    fault ~ — поиск неисправностей
track — след; траектория; путь; следить; прокладывать путь
trackball — трекбол
traffic — движение; транспорт
    ~ light — светофор
transaction — транзакция; группа операций
transfer — передача; пересылка; переход; передавать; пересылать; переносить
    ~ rate — скорость пересылки
transform — преобразовывать; превращать; трансформировать
transformation — преобразование; трансформация
transformational, transformative — трансформационный; связанный с преобразованием
transformer — преобразователь; устройство преобразования; трансформатор
transition — переход; превращение; модификация
translate — транслировать; преобразовывать; переводить
translator — транслятор; преобразователь
transmission — передача; пересылка; распространение; пропускание
transmit — передавать; посылать; пропускать
transmitter — передатчик; датчик; преобразователь
transparent — прозрачный; незаметный
transparently — с соблюдением прозрачности; незаметным образом
trapping — вылавливание; перехват
    error ~ — поиск ошибок
trigger — пусковая кнопка
trouble — неисправность; *pl* нарушения; неполадки; трудности; затруднения
troubleshoot — искать неисправности; диагностировать; отыскивать ошибки
tube — (электронно-лучевая) трубка
    vacuum ~ — электронная лампа
tuner — ручка настройки; программа настройки (параметров)
tuning — настройка; регулирование
turn — поворот; оборот; виток; вращать; поворачивать; превращать
    ~ off — выключать; отключать
    ~ on — включать; запускать
tutorial — обучающая программа; средство обучения; учебное пособие
tweet — щебетать; чирикать
twitter — щебет; чириканье
type — тип; вид; разновидность; способ; шрифт; печатать; выводить на печать

~ in — вводить с клавиатуры
~ out — выводить на печать; распечатывать
heavy ~ — жирный шрифт
italic ~ — курсив
typewriter ~ — машинописный шрифт
typewriter — печатающее устройство

U

unable — неспособный
unacknowledged — неподтвержденный (о приеме сообщений)
unaided eye — невооруженный глаз
unattached — неподсоединенный
unbelievable — невероятный; неправдоподобный
unchanged — неизменный; неизмененный
uncontrollable — неуправляемый; нерегулируемый; неконтролируемый
underline — подчеркивать
understand — понимать; подразумевать
undertake — предпринимать
undo — отменять; отмена
unexpected — неожиданный; непредвиденный; внезапный
unfavorable — неблагоприятный
unit — устройство; модуль; механизм; узел; блок; элемент
~ of data — блок данных
~ of language — элемент языка
~ of measurement — единица измерения
~ of memory — блок памяти
arithmetic ~ — арифметическое устройство
arithmetic and logical ~ — арифметико-логическое устройство
central processing ~ — центральный процессор
computing ~ — исчислительное устройство
control ~ — устройство управления
input ~ — устройство ввода
input/output ~ — блок ввода-вывода
operational ~ — работающее устройство
output ~ — устройство вывода
power (supply) ~ — блок питания
processing ~ — устройство обработки; процессор
programming ~ — устройство программирования; программатор
reader ~ — считывающее устройство
recording ~ — записывающее устройство
storage ~ — запоминающее устройство
universe — Вселенная; космос
unless — если не
unload — выгружать; удалять из памяти

unplug — вынимать (разъем из гнезда); отсоединять; отключать
unplugging — отсоединение; отключение
unsuitable — неподходящий; непригодный
until — пока; до тех пор как
up-to-date — современный
usage — использование; применение; эксплуатация
use — польза; использовать; применять
    in ~ — используемый; задействованный
    of ~ — полезный
    of general ~ — общеупотребительный
    of no ~ — бесполезный
    make ~ of — применять; использовать
used — используемый; применяемый
    ~ to — привыкать, иметь обыкновение
useful — полезный; пригодный
useless — бесполезный
user — пользователь; абонент
advanced/expert ~ — квалифицированный пользователь
utility — полезность; пригодность; (сервисная) программа; вспомогательное средство
up-to-date — самая последняя версия программы
utilize — использовать

V

valid — правильный; допустимый
validity — правильность; адекватность; допустимость; пригодность
valuable — ценный; полезный
value — значение; величина; значимость
    acceptable ~ — допустимое значение
    additional ~ — дополнительное значение
    binary ~ — двоичное значение
    byte ~ — значение в виде байта
    character ~ — значение кода символа
    check ~ — контрольное значение
    correct ~ — правильное значение
    data ~ — информационное значение
    invalid ~ — неверное, недопустимое значение
    numeric ~ — числовое значение
    output ~ — выводимое/выходное значение
    valid ~ — верное/допустимое значение
variable — переменная (величина)
variety — разнообразие; разновидность; ряд, множество
various — различный; разнообразный; разный
velocity — скорость

verification — проверка; контроль
verifier — устройство/программа проверки
verify — проверять; контролировать
versatile — разносторонний; многофункциональный; универсальный
versatility — разносторонность; многофункциональность; универсальность
version — версия; вариант
  common ~ — распространенная версия
  data ~ — вариант данных
  electronic ~ — электронная версия
  executable ~ — исполняемая версия
  original ~ — первоначальный вариант
versus — по сравнению с; в сопоставлении с; в противоположность (чему-л.)
view — вид; представление; просмотр; просматривать
viewpoint — точка зрения
viewport — окно просмотра/вывода
virtual — виртуальный; нереальный; несуществующий
vocal cords — голосовые связки
voice — голос
voltage — (электрическое) напряжение
volume — объем; величина; количество
  sound ~ — громкость звука
vulnerability — уязвимость; чувствительность; подверженность
vulnerable — чувствительный; уязвимый; подверженный

W

wafer — пластина; подложка
wait — ожидание; ждать, ожидать
want — недостаток; нехватка; потребность; недоставать; требовать(ся)
wanted — нужный; необходимый
warning — предупреждение
watchdog — сторожевая программа
waveguide — волновод
wavelength — длина волны
way — путь; способ; средство; возможность;
  in a ~ — в некотором отношении; до известной степени
  in any ~ — любым способом; как угодно
  in different ~s — разными способами; по-разному
  in no ~ — ни в коей мере; никак
  in the same ~ — так же; таким же образом
weather forecasting — прогноз погоды
weave — ткать, плести
web — (информационная) сеть
  ~ site — сайт Всемирной информационной сети
  information ~ — информационная сеть (сайтов на серверах сети Интернет)

World-Wide ~ — Всемирная информационная сеть
weight — вес
well — хорошо
as ~ as — а также
whereas — тогда как; принимая во внимание; поскольку
wherever — где бы ни; куда бы ни
why — почему; на каком основании
wide area network — глобальная сеть
width — ширина; разрядность (шины, памяти)
win — победить; выиграть
withdraw — удалять; убирать; вынимать
withdrawal — удаление; выемка; изъятие
witness — свидетель; очевидец; доказательство; свидетельство; быть свидетелем чего-л.; обращать особое внимание
word — слово; текстовый
~ processing — редактирование текстов
~ processing program — текстовый редактор
~ wrap — перенос слов
worksheet — электронная таблица
world-wide — глобальный; всемирный
worm — (компьютерный) червь
writer — записывающее устройство; программа записи; автор; разработчик

X

xerocopy — ксерокопия
xerox — ксерокопировать
X-ray — рентгеновский (об излучении монитора)

Y

yet — тем не менее; все же; еще
yield — выход (результатов); выдача; выдавать; получать (значение); урожай
crop ~ — урожай зерновых

Z

zero — нуль; нулевой; обнулять
of ~ — равный нулю
to ~ out — обнулять
time ~ — начало отсчета времени
zone — зона; область; полоса
buffer ~ — буферная область
storage ~ — область памяти

СОКРАЩЕНИЯ И УСЛОВНЫЕ ОБОЗНАЧЕНИЯ
(с элементами толкования)

A

ABC — Atanasoff Berry Computer — компьютер Атанасоф
AC — analog computer — аналоговый компьютер; alternating current — переменный ток
ACS — Automatic Control System — АСУ, автоматическая система управления
ADC — analog-to-digital converter — аналого-цифровой преобразователь
ADP — automated data processing — автоматизированная обработка данных
ALU — arithmetic-logical unit — арифметико-логическое устройство (*блок центрального процессора, который выполняет все действия микропроцессора на основе математических и логических операций*)
API — application programming interface — интерфейс прикладного управления
APL — a programmable language — высокоуровневый язык программирования
ASM — Association for System Management — ассоциация по системному управлению
AU — arithmetic unit — арифметическое устройство
a.v.c. — automatic volume control — автоматическое регулирование громкости

B

BASIC (сокр. от Beginner's All-Purpose Symbolic Instruction Code) — простой в употреблении язык программирования высокого уровня, разработанный в 1964 г.
BDOS — basic disk operating system — базовая дисковая операционная система
BIOS — basic input/output system — базовая система ввода-вывода
BIS — BlackBerry Internet Service — служба «Блэкберри» в Интернете
b.o.p.s. — billion operations per second — миллиард операций в секунду (*единица измерения быстродействия системы*)
b.p.i. — bits per inch — число бит на дюйм
b.p.s. — bits per second — число бит в секунду (*единица измерения плотности записи на носителе*)

C

CAD — computer-aided design — компьютерное проектирование
CAI — computer-aided instruction — компьютерное обучение
CAN — cancel — символ отмены
CAT — computer-aided testing — компьютерный контроль (тестирование)
CD — compact disk — компакт-диск

CDD — compact-disk drive — дисковод для компакт-дисков
CD-DA — compact disk-digital audio — цифровой аудио-компакт-диск
CD-ROM — compact disk, read-only memory — неперезаписываемый компакт-диск
CGA — color graphics adapter — цветной графический адаптер
CMI — computer-managed instruction — команды, подаваемые компьютером
CMOS — complementary metal-oxide-semiconductor — комплементарная структура металл — оксид — полупроводник (*носитель КМОП-памяти*)
COBOL — Common Business-Oriented Language — Кобол — Всеобщий бизнес-ориентированный язык (*язык программирования высокого уровня, специально разработанный для бизнес-приложений в 1964 г.*)
CP — central processor — центральный процессор
c.p.s. — characters per second — число символов в секунду (*единица измерения скорости печати принтера*)
CPU — central processing unit — центральный процессор (ЦП)
CRT — cathode-ray tube — электронно-лучевая трубка (дисплея)
CU — control unit — устройство управления

D

DB — database — база данных
DC — direct currant — постоянnный ток
DEL — delete — символ удаления
DMA — direct memory access — прямой доступ к памяти
DOS — disk operating system — дисковая операционная система
DPS — data processing system — система обработки данных
DS — double-sided — двусторонний
DVD — digital video disk — цифровой видеодиск

E

ECC — error-correction code — код с исправлением ошибок
EDI — Electronic Data Interchange — электронный обмен данными
EM — Electronic Mail — электронная почта
ENIAC — Electronic Numerical Integrator and Calculator — электронно-числовой интегратор и калькулятор
EDP — electronic data processing — электронная обработка данных
EPROM — erasable programmable read-only memory — стираемое программируемое постоянное запоминающее устройство (ППЗУ)
ETB — end of transmission block — конец блока передачи (символ)

F

FCB — file control block — блок управления файлами
FD — floppy disk — гибкий диск

FDD — floppy-disk drive — дисковод для гибких дисков
FORTRAN — сокр. от fourth generation programming language — Фортран (первый компилирующий язык программирования высокого уровня, ориентированный на решение задач математического характера)
FTR — File Transfer Protocol — протокол передачи файлов

G

GB, Gb — gigabyte — гигабайт
Gc — gigacycle — гигацикл
GP — general purpose — общего назначения
GPS — Global Positioning System — глобальная система радиоопределения
GUI — Graphical User Interface — графический интерфейс пользователя

H

HD — high density — высокая плотность
HDD — hard-disk drive — дисковод для жесткого диска
Hi-Fi — high fidelity — высоконадежный; с высокой точностью воспроизведения
HF — high frequency — высокочастотный
HW, hw — hardware — аппаратура; оборудование; аппаратные средства

I

IAB — Internet Activities Board — Управляющий совет по вопросам деятельности Интернета
IBM — International Business Machine — фирма по производству компьютеров
IC — integrated circuit — интегральная схема
ID — identifier — идентификатор, обозначение, код
I/O – input/output — устройство ввода-вывода
Intel — самая большая в мире корпорация по производству микропроцессоров (США)
Internet — Intercontinental Network — система соединенных компьютерных сетей мирового масштаба
IP — Internet Protocol — протокол маршрутизации
ISOC — Internet Society — Общество Интернета
IT — information technology — информационная техника/технология
ITU — International Telecommunication Union — Международное телекоммуникационное объединение

K

KB, Kbyte — килобайт
K/B, KBD, kbd — keyboard — клавиатура

Kc — kilocycle — килоцикл
KHz — kilohertz — кГц, килогерц

L

LAN — local-area network — локальная сеть
LASER — Light Amplification by Stimulated Emission of Radiation — оптический квантовый генератор
LCD — liquid-crystal display — жидкокристаллический дисплей
LSI — large-scale integration — высокий уровень интеграции

M

MB, Mb — megabyte — мегабайт
M / B — motherboard — материнская плата
MCB — memory control block — блок управления памятью
MID — mobile Internet device — мобильное интернет-устройство
MIS — management information system — управленческая информационная система
MMCD — Multimedia Compact Disk — мультимедийный компакт-диск
MMS — Multimedia message service — мультимедийная служба сообщений
MODEM — modulator/demodulator — модулятор/демодулятор
MP — microprocessor — микропроцессор
MPU — microprocessor unit — микропроцессорное устройство
MS DOS — Microsoft Disk Operational System — стандартная операционная система для IBM и IBM-совместимых компьютеров, рассчитанная на одного пользователя
MSI — medium-scale integrated circuit — средняя интегральная схема
MTA — Mobile System A — мобильная система A
MTB — Mobile System B — мобильная система B
MTS — Message Transfer System — система пересылки сообщений

N

NAK — negative acknowledgement — неподтверждение приема (символ)
NCC — National Computing Center — национальный вычислительный центр
NetBIOS — Network Basic Input/Output System — базовая система ввода-вывода сети

O

OCR — optical character reader — оптическое устройство считывания (распознавания) знаков
OMR — optical mark reader — оптическое устройство считывания знаков

OR — ИЛИ (логическая операция)
OS — operating system — операционная система

P

PC — personal computer — персональный компьютер
PDA — personal digital assistance — индивидуальная цифровая помощь
PFM — pulse-frequency modulation — частотно-импульсная модуляция
PIF — program information file — информационный файл программы
PILOT — сокр. от Programmed Inquiry Learning Or Teaching — авторизованный язык для машинного обучения, разработанный Дж. Старквезером (John Starkweather) в Калифорнийском университете в 1968 г.
PIN code — personal identification number — индивидуальный шифр идентификации
PL — programming language — язык программирования
PROLOG — PROgramming in LOGic — язык программирования высокого уровня, используемый в исследованиях, связанных с искусственным интеллектом
PROM — programmable read-only memory — программированное постоянное запоминающее устройство
PS, ps — power supply — источник питания

R

RA — random access — произвольный доступ
RAM — random-access memory — оперативное запоминающее устройство
r.c. — remote control — дистанционное управление
r.mt. — reverse motion — обратное движение
ROM — read-only memory — постоянное запоминающее устройство
R / W — read/write — чтение — запись

S

SATAN — Sequrity Administrator Tool for Analyzing Networks — программа, предназначенная для оценки состояния безопасности компьютера или локальной сети, подключенной к Интернету
SCSI — Small Computer System Interface — интерфейс малых компьютерных систем
SIM (card) — Subscriber Identity Module — модуль идентификации подписчика
SMS — short message service — служба коротких сообщений
SNOBOL — String-Oriented Symbolic Language — язык программирования высокого уровня, ориентированный на обработку символьных последовательностей
SOM — start of message — начало сообщения

SP — space character — символ пробела
SSI — small-scale integration — интеграция малого уровня

T

TCP — Transmission Control Protocol — транспортный протокол
TF — time factor — коэффициент времени
Turbo Pascal — быстродействующий компилятор для языка Pascal (1984)

U

ULSI — ultralarge-scale integration — интеграция ультравысокого уровня
UMTS — Universal Mobile Telecommunication System — универсальная мобильная телекоммуникационная система
UNIVAC — UNIVersal Automatic Computer — универсальный автоматический компьютер
UNIX — операционная система, используемая во многих компьютерах (от персональных до мэйнфреймов)
UPS — uninterrupted power supply — бесперебойный источник питания
URL — Universal Resource Locator — универсальный указатель ресурсов

V

VDT — visual display terminal — видеотерминал
v. f. — video frequency — видеочастота; velocity factor — коэффициент скорости
VLSI — very large-scale integration — интеграция сверхвысокого уровня
VR — virtual reality — виртуальная реальность
v. r. — voltage regulator — регулятор напряжения
VRML — Virtual Reality Modeling Language — язык моделирования виртуальной реальности
VT — vertical tabulator — вертикальный табулятор

W

WAN — wide-area network — глобальная сеть
WWW — World-Wide Web — Всемирная информационная сеть

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