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ENGLISH FOR COMPUTING

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Учебное пособие по английскому языку предназначено для студентов 2 курса (4 семестр) и 3, 4 курсов Радиофизического факультета, обучающихся по специальности «Информационные системы и технологии», а также для студентов академической магистратуры. Цель данного пособия – подготовить студентов к самостоятельной работе с оригинальной литературой по специальности.

Пособие содержит аутентичные тексты с лексико-грамматическими упражнениями и ориентировано как на аудиторную так и на самостоятельную работу студентов.

Предисловие

Учебное пособие “English for Computing” предназначено для студентов 2 – 4 курсов Радиофизического факультета, обучающихся по специальности “Информационные системы и технологи”.

Цель данного пособия – обучить студентов языковым средствам эффективного общения с компьютером, а также чтению и пониманию оригинальной литературы по специальности.

Пособие состоит из 13 разделов, содержащих тексты с системой лексико-грамматических упражнений, а также приложение, состоящее из специализированных текстов для дополнительного чтения. Структура данного учебного пособия предусматривает комплексное построение каждого урока, направленное на работу с различными языковыми аспектами, а также на развитие навыков чтения, устной и письменной речи.

Упражнения, содержащиеся в пособии, ориентировано на активное владение специальной лексикой, интенсивное усвоение сложных грамматических явлений, характерных для научно-технической литературы, а также развитие навыков профессионально направленного устного общения.

В пособии используются современные аутентичные тексты по специальности «Информационные системы и технологии».

UNIT 1

Grammar focus **The Passive Voice (Страдательный залог)**

Страдательный залог часто используется в технической, научной литературе, так как описываемые там факты, процессы важнее, чем исполнители действий. В страдательном залоге действие глагола направлено на подлежащее.

1. В предложениях типа **I was given the book** действие глагола **to give** в страдательном залоге направлено одновременно на подлежащее **I** и на прямое дополнение **the book.** В русском языке аналогичная мысль выражается через неопределенно-личное предложение **Мне дали книгу.**

2. Если сказуемое в страдательном залоге выражено глаголом с примыкающим к нему предлогом типа **to look at, to send for**

и т.д., то при переводе также используется форма неопределенно-личного предложения с предлогом в начале. Например:

The film is much spoken **about.**	**О** фильме много говорят.
Nothing was heard **from** him.	**От** него не было никаких вестей.

1. Translate into Russian.

1. We were asked about it again and again. 2. Nobody was answered. 3. The problem is being solved now. 4.The results haven't been approached yet. 5. We were shown some new models. 6. These data are often referred to.7. The "Analytical machine" was invented in 1830. 8. Since then enormous advances have been made in computer technology. 9. The mail will be sent tomorrow. 10. The other users are automatically denied access to that record.

2. Open the brackets and put the verbs into the correct form.

1. Houses (design) with the help of computers. 2. Microsoft (found) by Bill Gates. 3. At the moment the program (run). 4. This problem (solve) in a few days. 5. The speed with which arithmetic operations are performed (affect) by a number of factors. 6. By 3 o'clock all the newspapers (sell) already. 7. The lab (equip) with new devices last month. 8. Programs and data may (store) on optical disks.

3. Translate into English.

1. Меня попросили прийти. 2. За доктором уже послали. 3. Эта проблема может быть решена. 4. В настоящее время компьютеры широко используются крупными и небольшими компаниями. 5. В лаборатории используются новые приборы. 6. Я уверен, ему предложат работу в этой компании. 7. Лекцию слушали с большим вниманием. 8. Программу изменили.

Word and phrase study

1. От основы некоторых английских глаголов при помощи суффиксов **-ment, -ance/ence, -ion/tion/sion, -age** образуются существительные, обозначающие процессы или состояния.

Например: to develop + -ment = development (развитие, разработка)
to depend + -ence = dependence (зависимость)
to describe + -tion= description (описание)

to use + -age = usage (использование)

Form nouns from the following verbs and translate them into Russian:

-ment: to move, to advance, to improve, to manage, to achieve;
-ance/ence: to perform, to differ, to exist, to refer;
-ion/sion/tion: to produce, to consider, to construct, to operate;
-age: to store.

2. Запомните формы множественного числа некоторых слов греко-латинского происхождения.

dat**um** – dat**a**	phenomen**on** – phenomen**a**, phenomenons
medi**um** - medi**a**	criteri**on** - criteri**a**
matr**ix** - matric**es**	thes**is** – thes**es**
ind**ex** - indic**es**	analys**is** – analys**es**
formul**a** - formul**ae**	bas**is** – bas**es**
foc**us** – foc**i**, focuses	hypothes**is** - hypothes**es**
nucle**us** – nucle**i**	ax**is** - ax**es**

Lexis

1.Read and memorize the pronunciation of the following words.

Phenomenon - phenomena, datum - data, circuit, circuitry, versatile, calculus, hardware, software, accurately, store, sophisticated, appliance, capability, exponentially, supply, modify, encode, preceding, variety, reside.

2. Read and guess the meaning of the international words(pay attention to the stress mark).

`Program, con`trol, ma`chine, com`ponent, `process, calcu`lation, `status, `monitor, dis`play, de`sign, perso`nnel, communi`cation, a`ssistant, techno`logical, ope`ration, `physical, `scanner, re`sult, uni`versal, in`ventory, appli`cation, ins`truction, elec`tronic,` digital, gene`ration.

3. Give English equivalents for the following words (use ex. 1, 2 for reference).

Программное обеспечение, физический, микросхема, применение (приложение), точно, инвентарь (товары), способность, аппаратное обеспечение, сложный, цифровой, разнообразие (множество), предшествующий, приспособление, кодировать, управлять, многофункциональный, поколение, обрабатывать (информацию), явление, вычисление.

4. Translate the following word combinations into Russian.

Digital assistant, credit status, electronic circuitry, versatile machine, output device, program instruction, computer component, sophisticated application, set of instructions, computer capability, technological advancement, preceding generation, universal information processing machine, wide variety of activities.

5. Define the part of speech of the following words and translate them into Russian.

a) `process – to `process - `processing - `processor, `program – to `program - `programming - `programmer - `programmable, con`trol – to con`trol – con`troller, `transfer – to trans`fer;

b) to `calculate – ,calcu`lation - `calculator - `calculating, to com`pute – compu`tation – com`puter – com`puting, to a`pply – appl`cation – app`liance – a`pplied.

Reading

1. Read the text and find answers to these questions.

1. What is a computer?
2. What are the main applications of computers?
3. What activities are performed by computers?
4. What is hardware?
5. What is software?
6. How are computers used in business?

What is a computer?

A computer is a machine that performs tasks, such as calculations or electronic communication, under the control of a set of instructions called a program. Programs usually reside within a computer and are retrieved and processed by the computer's electronics. The program results are stored and routed to output devices, such as video display monitors or printers. A wide variety of activities is performed by computers reliably, accurately, and quickly.

Computers are extremely versatile. In fact, they are *universal* information processing machines. According to the Church-Turing thesis, computer with a certain minimum threshold capability is in principal capable of performing the tasks of any other computer. Therefore, computers with capabilities ranging from those of a personal digital assistant to a supercomputer may all perform the same tasks, as long as the time and memory capacity are not considerations. Therefore, the same computer designs may be adapted for tasks ranging from processing company payrolls to controlling unmanned spaceflights. Due to technological advancement, modern electronic computers are exponentially more capable than those of preceding generations (a phenomenon partially described by Moore's Law).

Uses of computers

Computers are used by people in many ways. In business, computers track inventories with bar codes and scanners, check the credit status of customers, and transfer funds electronically. In homes, tiny computers embedded in the electronic circuitry of most appliances control the indoor temperature, operate home security systems, tell the time, and turn videocassette recorders (VCRs) on and off. Computer programs, or applications, exist to aid every level of education, from programs that teach simple addition or sentence construction to programs that teach advanced calculus. Computers are used extensively in scientific research to solve mathematical problems, investigate complicated data, or model systems that are too costly or impractical to build, such as testing the air flow around the next generation of aircraft. Computers are employed by military in sophisticated communications to encode and unscramble messages, and to keep track of personnel and supplies.

How computers work

The physical computer and its components are known as hardware. Computer hardware includes the memory that stores data and program instructions; the central processing unit (CPU) that carries out program instructions; the input devices, such as a keyboard or a mouse, that allow the user to communicate with the computer; the output devices, such as printers and video display monitors, that enable the computer to present information to the user; and *buses* (hardware lines or wires) that connect these and other computer components. The programs that run on the computer are called software. Software is generally designed to perform a particular type of task – for example, to write a letter, to display and modify a photograph, or to direct the general

operation of the computer.

2. Find English equivalents from the text.

1. предназначен для 2. отслеживать (работу, персонал), 3.научное исследование, 4. сохранять информацию, 5. сложные средства коммуникации, 6. минимальный порог возможностей, 7. выполнять задачи, 8. объем памяти, 9. беспилотные полеты в космос, 10. устройства вывода, 11.давать возможность, 12. отыскивать (извлекать), 13. платежные ведомости, 14. встроенный, 15. надежно, 16. электронные схемы, 17. применять, 18. осуществлять денежные переводы, 19. шина.

3. Provide synonyms for the following.

1. to carry out, 2. information, 3. expensive, 4. apply, 5. display, 6. to direct, 7. complicated,
8. small.

4. Find the equivalents.

therefore	такой как
due to	поэтому
as long as	например
such as	благодаря
for example	пока

10. Write the verbs the following nouns are derived from.

Application, storage, calculation, communication, operation, performance, construction, advancement, solution, reference, improvement, residence, investigation.

11. Translate the sentences into English.

1. Компьютер - это электронное устройство, которое предназначено для хранения и обработки информации. 2. Все физические компоненты компьютерной системы называются аппаратным обеспечением. 3. Когда программа запущена, компьютер выполняет набор инструкций и обрабатывает данные. 4. Результаты программы передаются в устройства вывода (мониторы, принтеры). 5. В научных исследованиях компьютеры используются для решения математических задач, изучения сложных данных. 6. Устройства ввода дают возможность пользователям взаимодействовать с компьютером. 7. В настоящее время компьютеры встроены практически во все бытовые и электронные приборы. 8. Благодаря развитию технологий, современные компьютеры способны выполнять самые сложные задачи.

Speaking

In pairs, discuss other applications of computers.

UNIT 2

Grammar focus **The Infinitive (Инфинитив)**

Инфинитив - это неличная форма глагола, которая дает обобщенное понятие о действии, не выражая лица, числа и наклонения. В английском языке существуют различные формы инфинитива.

Формы инфинитива.

Infinitive	Active	Passive
Indefinite (выражает действие, одновременное с действием сказуемого)	to change	to be changed
Continuous (выражает действие в процессе (интенсивность действия))	to be changing	_____
Perfect (выражает действие, предшествующее действию сказуемого)	to have changed	to have been changed
Perfect-Continuous (выражает действие, начавшееся в прошлом и продолжающееся в настоящем)	to have been changing	_____

Рассмотрим примеры использования инфинитивов и способы их перевода на русский язык.

Indefinite	I am glad **to see** you. I don't like **to be interrupted**.	Я рад видеть вас. Я не люблю, когда меня перебивают.
Continuous	I am sorry **to be interrupting** you.	Извините, что я вас перебиваю.
Perfect	I am sorry **to have left** you alone. He is happy **to have been offered** this post.	Извините, что я оставил вас в одиночестве. Он счастлив, что ему предложили эту должность.
Perfect-Cotinuous	They happened **to have been working** for 3 hours	Оказалось, что они работали уже три часа.

Мы видим, что в русском языке не всегда имеются соответствия, поэтому часто при переводе инфинитивов необходимо создавать придаточные предложения.

Синтаксические функции инфинитива в предложении и способы их перевода на русский язык.

подлежащее	**To write** an absolutely new program is a hard task. **Написать** абсолютно новую программу - трудная задача.
обстоятельство цели	**To compile** a program, the programmer must be a good mathematician ***Для того чтобы*** **написать** программу, программист должен быть хорошим математиком.
часть сказуемого	You have **to check** the data. Вы должны **проверить** данные.
дополнение	Science teaches you **to create.** Наука учит **творить.**
определение	We have some problems **to solve** immediately**.** У нас некоторые проблемы, ***которые*** **необходимо решить** немедленно.

Как определение инфинитив обычно стоит за существительным, которое определяет, и выражает действие еще не реализованное, возможное или необходимое, которое подлежит осуществлению в будущем. При переводе следует использовать слова: " надо, необходимо, следует".

1. Translate, paying attention to the form of the infinitive.

1. I am glad to meet him.
2. I am sorry to have troubled you.
3. He likes to ask questions.
4. He doesn't like to be asked.
5. I am glad to be working with you.
6. I am glad to have been working with you all these years.
7. I'm happy to have invited them.
8. I'm happy to have been invited.

2. Translate. Define the functions of the infinitives.

1. To obtain the data, we must make several experiments.
2. The job to be done is not easy.
3. To build a new railway of this length is a very complicated task.
4. The users want to be helped by the company.
5. Computers are used to store and process a large amount of information.
6. Here are some instructions to be followed.
7. The problem to be solved is very difficult.
8. Such machines will be able to find the best solution to a problem.
9. To get processed data out of the computer is the job of output devices.

10.To be processed by the machine, information has to be in the form of digits and characters.

3. Translate into English.

1. У нас есть несколько вопросов, которые необходимо обсудить.
2. Компьютер – это электронная машина для хранения и обработки данных.
3. Для ввода информации в компьютер обычно используются клавиатура и мышь.
4. Вот данные, на которые надо сослаться.
5. Написать такую программу - чрезвычайно сложно.
6. Данные, которые следует обработать, должны быть сначала загружены в ЦПУ.

Word and phrase study

1**.** Суффикс **–ize** образует глаголы от некоторых существительных и прилагательных.
Например: computer-computer**ize** (компьютеризировать)

От глаголов, оканчивающихся на **-ize** при помощи суффикса **-ation** образуются существительные, обозначающие отвлеченные понятия.

Например: computerize – computeriz**ation** (компьютеризация)

Form verbs then abstract nouns from the following words. Translate into Russian.

Example: *computer- computerize - computerization*

Popular, nation, transistor, standard, miniature, mobile, magnetize.

Lexis

1. Read and memorize the pronunciation of the following words.

Microprocessor [ ], discrete, execute, multiple, facility, accept, miniaturization, standardization, require, consume, quantity, compatible, quantum, advent, launch, ubiquitous, predecessor, era, accelerate, implement, synchronous, vacuum, megahertz, gigahertz.

2. Read and guess the meaning of the international words.

Me`chanical, e`lectrical, co`ordinate, `compact, `transistor, archi`tecture, a`rithmetic, `logic, ,manu`facture, `parallelism, dra`matically, co`mmercial, re`lay, `silicon, electromigration.

3. Provide English equivalents for the following (use ex. 1 and 2 for reference).

Количество, предшественник, ускорять, требовать, принимать, коммерческий, совместимый, запускать, потреблять, существенно, производить, синхронный, многочисленный, кремний, повсеместный, осуществлять (внедрять), выполнять, реле.

4. Translate the following word combinations into Russian.

Computing machine, necessary component, digital device, computer facilities, vacuum tube, electrical relays, standardization trend, complex processor, discrete state, multiple transistors, arithmetic and logic processes, silicon chip, consume much space, commercial acceptance, integrated circuit (IC), the quantity of ICs, quantum computer, synchronous microprocessor, describe accurately, execute program instructions, extreme miniaturization, mechanical predecessor, printed circuit board, CPU implementation.

5. State the part of speech of the following words. Translate into Russian.

To `execute – exe`cution – exe`cutable, `accurate - `accurately, elec`tronic – elec`tronically, com`patible – compati`bility, to `implement - ,implemen`tation, `complex – comp`lexity.

6. Give synonyms for the following words.

Rapidly, to execute, to apply, distinct, enormously, to upgrade, accurately, drastically, trend.

7. Give the principal forms of the following verbs.

Begin, apply, remain, change, suit, have, increase, require, affect, produce, overtake, call, accelerate, dedicate, arise, describe.

Reading

1. ***Read and translate the text. Find the infinitives and define their functions.***

Evolution of CPU

Central processing unit

A central processing unit (CPU), or simply processor, is the nerve centre of a computer since it coordinates and controls the activities of all the other units and performs all the arithmetic and logic processes to be applied to data. All program instructions to be executed must be held within the CPU, and the data to be processed must be loaded first into this unit.

CPUs provide the fundamental digital computer trait of programmability, and are one of the necessary components found in computers of any era, along with primary storage and input/output facilities. The form, design and implementation of CPUs have changed dramatically since the earliest examples, but their fundamental operation has remained much the same.

Early CPUs were custom-designed as a part of a large, usually one-of-a-kind, computer. However, this costly method of designing custom CPUs for a particular application has largely given way to the development of mass-produced processors that are suited for one or many purposes. This standardization trend generally began in the era of discrete transistor mainframes and minicomputers and has rapidly accelerated with the popularization of the integrated circuit (IC). The IC has allowed increasingly complex CPUs to be designed and manufactured in very small spaces. Both the miniaturization and standardization of CPUs have increased the presence of these digital devices in modern life far beyond the limited application dedicated computing machines.

History

Being digital devices, all CPUs deal with discrete states and therefore require some kind of switching elements to differentiate between and change these states. Prior to commercial acceptance of the transistor, electrical relays and vacuum tubes (thermionic valves) were commonly used as switching elements. Although they had distinct speed advantages over their mechanical predecessors, they were unreliable, took up a lot of space, used a lot of electrical power and had limits to the speed at which they could operate. Therefore, by the 1960s the tubes were replaced by the transistor. With this improvement more complex and reliable CPUs were built onto one or several printed circuit boards containing discrete (individual) components. During this period, a method of manufacturing many transistors in a compact space gained popularity. The integrated circuit (IC) allowed multiple transistors and the wires connecting them to be placed on a single, solid piece of silicon. To build an entire CPU out of "small-scale integration" ICs required thousands of individual chips, but still consumed much less space and power than earlier discrete transistor designs. As microelectronic technology advanced, the number of transistors to be placed on ICs grew enormously, thus decreasing the quantity of individual ICs needed for a complete CPU. By the 1970s, the entire ALU and control unit, the combination becoming known as a CPU, were being placed on a single "chip" called a microprocessor.

Microprocessors

The introduction of the microprocessor in the 1970s significantly affected the design and implementation of CPUs. Since the introduction of the first microprocessor (the Intel 4004) in 1970 and the first widely used microprocessor (the Intel 8080) in 1974, this class of CPUs has almost completely overtaken all other central processing unit implementation methods. Mainframe and minicomputer manufacturers of the time launched proprietary IC development programs to upgrade their older computer architectures, and eventually produced instruction set compatible microprocessors that were backward-compatible with their older hardware and software. Combined with the advent and vast success of the now ubiquitous personal computer, the term "CPU" is now applied almost exclusively to microprocessors.

Previous generations of CPUs were implemented as discrete components and numerous small integrated circuits on one or more circuit boards. Microprocessors, on the other hand, are CPUs manufactured on a very small number of ICs; usually just one. The overall smaller CPU size as a result of being implemented on a single die means faster switching time. This has allowed synchronous microprocessors to have clock rates ranging from tens of megahertz to several gigahertz.

While the complexity, size, construction, and general form of CPUs have changed drastically over the past sixty years, it is notable that the basic design and function has not changed much at all. Almost all common CPUs today can be very accurately described as von Newman stored-program machines.

Nowadays concerns have arisen about the limits of integrated circuit transistor technology. Extreme miniaturization of electronic gates is causing the effects of phenomena like electromigration and subthreshold leakage to become much more significant. These factors cause researchers to investigate new methods of computing such as the quantum computer, as well as to expand the usage of parallelism and other methods that extend the usefulness of the classical von Newman model.

2. Answer the questions on the text.

1. Why is a central processing unit called the nerve centre of a computer system?
2. In what way have processors changed in the past sixty years?
3. What were the early CPUs like?
4. Why were the vacuum tubes replaced by the transistor?
5. What is an integrated circuit? Why was it a great improvement?
6. What is a microprocessor? What are the advantages of microprocessors over their predecessors?
7. What are computer researchers concerned with nowadays?

3. Look at the following words from the text, complete the table.

expand	expansion	----------	expandable	----------
	acceptance			
				programmability
		----------	popular	
		researcher	----------	----------
manufacture			----------	----------
		----------	reliable	
			synchronous	

4. Give the English for:

загружать, значительно, улучшать(ся), увеличивать(ся), уменьшать количество микросхем, выполнять инструкции, тактовая частота, общий (полный), различать (отличать), кристалл, расширять, получить распространение, с приходом персональных компьютеров, субпороговая утечка.

5. Find the equivalents.

1) 1. along with 2. however 3. therefore 4. prior to 5. thus 6. since 7. eventually 8. as well as 9. although 10. increasingly 11. due to.

2) 1. так как 2. поэтому 3. все больше и больше 4. благодаря 5. таким образом 6. хотя 7. наряду с 8. в конечном счете (со временем) 9. до (прежде) 10. однако 11. также как.

6. Translate into Russian.

Обрабатывать большое количество информации, загружать в память, существенно изменять, выполнять несколько программ одновременно, потреблять много энергии, использовать передовые технологии, заменить материнскую плату, увеличить производительность компьютера, исследовать новые явления, значительно улучшить компьютерную архитектуру, управлять общей работой системы, соединять при помощи шин, иметь доступ к данным, благодаря миниатюризации, наряду с другими возможностями, встраивать в прибор.

7. Use infinitives to translate the following sentences.

1. ЦПУ выполняет все арифметические и логические операции, которые необходимо производить с данными.2. Все программные инструкции, которые должны быть выполнены должны содержаться в ЦПУ.3. Для электронной обработки информации, данные должны сохраняться в виде двоичных кодов.4. Контрольное устройство использует программный счетчик для нахождения следующей инструкции в главной памяти.5. Интегральная схема позволила расположить множество транзисторов на отдельном чипе.6. С развитием электронной технологии количество транзисторов, встраиваемых в микросхемы, колоссально увеличилось.

Speaking

1. In pairs, discuss the main stages in the CPU evolution. Make a diagram to organize information.

2. In pairs, discuss the future of integrated circuit transistor technology.

UNIT 3

Grammar focus The Infinitive (Инфинитив)

1. Open the brackets to use the proper form of the infinitive. Translate the sentences into Russian.

1. The necessary data are processed by the CPU (become) useful information.
2. A computer program is a list of instructions (perform) by a computer.
3. Mark I was the first machine (figure) out mathematical problems.
4. (Be) precise is in the character of an experimenter.
5. The progress of electronics (result) in the invention of electronic computers was a breakthrough of the 20^{th} century.
6. The data (download) will be used in the scientific report.
7. Computers (design) originally for arithmetic purposes are applicable for great variety of tasks at present.
8. (Improve) the computer's performance, the user can add expansion cards for video, sound and networking.
9. The IC has allowed complex CPUs (place) and (manufacture) in very small spaces.
10. (Integrate) large numbers of circuit elements into a small chip, transistors should be reduced in size.

2. Translate the sentences into English using the appropriate form of the infinitive.

1. Вот данные, на которые необходимо сослаться позже.
2. Россия была первой страной, открывшей космическую эру.
3. Написание программы заняло много времени.
4. Компьютеры были созданы для выполнения тысяч вычислений в секунду.
5. Транзистор, изобретенный в 1948 году, полностью заменил вакуумные лампы.
6. Информация, которая поступает в компьютер для обработки, должна быть зашифрована в двоичный код.
7. Обработка (данных) представляет собой выполнение математических и логических операций с данными для преобразования их в полезную информацию.
8. Миниатюризация позволила использовать цифровые устройства во многих областях современной жизни.

Word and phrase study

Запомните значение приставок, часто используемых в компьютерной литературе:

sub – под, ниже (**sub**program – подпрограмма)
super – сверх (**super**computer - суперкомпьютер)
mono – один (**mono**chrome – монохромный)
multi – много (**multi**ple – множественный)

Translate into Russian.

1. Subscalar, subclass, subjective, subdirectory, subdivide.
2. Superpower, superscalar, superhigh, superstructure, supervisor.
3. Monolingual, monolithic, monologue, monopoly.
4. Multi-user, multimedia, multiply, multipurpose.

Lexis

1. Read and memorize the pronunciation of the following words.

Sequence, subsequent, determine, request, support, subtract, multiply, integer, fetch, retrieve, interpret, precision, simultaneously, pipeline, assembly line, utilize, decrease, feature, technique, scalar, subscalar, superscalar, sine, cosine, matrix, simultaneously, access, thread, efficient, general-purpose.

2. Read and guess the meaning of the international words (pay attention to the stress mark).

`Register, `signal, `series, a`rithmetic, repre`sent, metho`dology, `linear, `graphics, dis`patcher, `parallelism, trigo`nometry, `classify, i`dentical, de`code.

3. Define the part of speech of the following words. Translate into English.

To `operate – `operating – ope`ration, to repre`sent – repre`senting – represen`tation, de`code – de`coding – de`coder, to in`terpret – in`terpreting – in`terpreter – interpre`tation, to add – a`ddition, to sub`tract – sub`traction, to di`vide – di`vision, `multiple – to `multiply – multipli`cation, pre`cise – pre`cision, `parallel - `parallelism, to `access - `access – a`ccessible – accessi`bility, re`trieve – re`trieval.

4. Provide the English equivalents for the words (see ex. 1, 2).

Умножать, одновременно, линейный, последовательность, цикл, вычитать, целое (число), эффективный, множественный (многочисленный), представлять, доступ, определять, последующий, общего назначения, нить (поток, процесс), извлекать (инструкцию), выбирать (выборка), конвейер.

5. Translate the following word-combinations into Russian.

General-purpose CPUs, limited precision, sequence of steps, subsequent instructions, multiple data, to fetch the instruction, to classify the techniques, to behave less linearly, to execute simultaneously, series of control signals, instruction cycle, to perform arithmetic on vectors and matrices, instruction level parallelism, to operate on integers, trigonometry functions, to represent real numbers, quick access, to fetch an instruction, to determine the location in program memory, instruction pipelining.

<u>Reading</u>

1. Read the text and answer the following questions:

1. What is the function of the CPU?
2. What steps are involved in the operation of most CPUs?
3. What is the function of a program counter in the fetch step?
4. How is the instruction decoded?
5. What is the role of the control unit on the CPU operation?
6. What happens in the execute step?
7. What arithmetic and logic operations can an ALU perform?
8. Where are the results of the execute step written to?

CPU Operation

The fundamental operation of most CPUs, regardless of the physical form they take, is to execute a sequence of stored instructions called a program. The program is represented by a series of numbers that are kept in some kind of computer memory. There are four steps that nearly all von Neumann CPUs use in their operation: **fetch**, **decode**, **execute**, and **writeback**.

The first step, **fetch**, involves retrieving an instruction (which is represented by a number of sequence of numbers) from program memory. In a CPU instructions and data are temporarily

stored in registers. The location in program memory is determined by a special register called a program counter. The program counter keeps track of which location in memory the next instruction is to be read from**.*** After an instruction is fetched, the program counter changes – usually increasing a small amount – so that it contains the location of the instruction to be executed next.

In the **decode** step, each instruction is interpreted by a decoder, which determines what the instruction will do. The control unit decodes the instruction and turns it into a series of control signals that operate the other parts of the computer. Control systems in advanced computers may change the order of some instructions so as to improve performance.

After the fetch and decode steps, the **execute** step is performed. It means the CPU executes the instruction. During this step, various portions of the CPU are connected to perform the desired operation. If, for instance, an addition operation was requested, an arithmetic logic unit (ALU) will be connected to a set of inputs and a set of outputs. The inputs provide the numbers to be added, and the outputs will contain the final sum. The set of arithmetic operations that a particular ALU supports may be limited to adding and subtracting or might include multiplying or dividing, trigonometry functions (sine, cosine, etc) and square roots. Some can only operate on whole numbers (integers) while others use floating point to represent real numbers - though with limited precision. Logic operations involve Boolean logic: AND, OR, XOR and NOT.

The final step, **writeback**, simply "writes back" the results of the execute step to some form of memory. Very often the results are written to some internal CPU register for quick access by subsequent instructions. In other cases results may be written to slower, but cheaper and larger, main memory.

The entire sequence of steps is called an instruction cycle.

1. What is referred to as a subscalar CPU?
2. Why are subscalar CPUs considered inefficient?
3. What techniques are used to achieve scalar and better performance?
4. What is instruction pipelining?
5. What are the benefits of superscalar processors?

Parallelism

The CPUs which can operate on and execute only one instruction at a time are referred to as subscalar. They are considered inefficient as the entire CPU must wait for that instruction to complete before proceeding to the next instruction. As a result the subscalar CPU gets "hung up" on instructions which take more than one clock cycle to complete execution.

Attempts to achieve scalar and better performance have resulted in a variety of design methodologies that cause the CPU to behave less linearly and more in parallel*. When referring to parallelism in CPUs, two terms are generally used to classify these design techniques*. Instruction level parallelism (ILP) seeks to increase the rate at which instructions are executed within a CPU, and thread level parallelism (TLP) purposes to increase the number of threads (effectively individual programs) that a CPU can execute simultaneously.

One of the simplest methods to use parallelism is to begin the first steps of instruction fetching and decoding before the prior instruction finishes executing. This is the simplest form of a technique known as instruction pipelining, and is utilized in almost all modern general-purpose CPUs. Pipelining allows more than one instruction to be executed at any given time by breaking down the execution pathway into discrete stages*. This separation can be compared to an assembly line, in which an instruction is made more complete at each stage until it exits the execution pipeline and retired.

Further improvement upon the idea of instruction pipelining led to the development of a method that decreases the idle time of CPU components even further. Designs that are said to be superscalar include a long instruction pipeline and multiple identical execution units. In a superscalar pipeline, multiple instructions are read and passed to a dispatcher, deal with multiple pieces of data in the context of one instruction. This contrasts with scalar processors, which deal with one piece of data for every instruction. Graphics processors and computers with SIMD (single instruction, multiple data) and MIMD (multiple instructions, multiple data) features often provide ALUs that can perform arithmetic on vectors and matrices.

2. Give English equivalents for the following.

Плавающая точка, независимо от, последовательность шагов, программный счетчик, квадратный корень, запрашивать операцию, уменьшать время простоя, улучшать производительность, конвейерная обработка инструкций, предшествующий.

3. Fill in the gaps with the appropriate words.

1. The fundamental operation of most CPUs is to ------- a sequence of stored instructions called a program.
   a) control b) examine c) execute
2. The first step in CPU operation is ------ an instruction from program memory.
   a) retrieving b) sending c) changing
3. The instruction decoder ------- software instructions.
   a) performs b) interprets c) seeks
4. The ALU performs the actual arithmetic operations, namely, addition, subtraction, multiplication, ------.
   a) decision b) division c) definition
5. The CPUs which can execute only one instruction at a time are referred to as ------.
   a) scalar b) superscalar c) subscalar
6. ILP seeks to ------ the rate at which instructions are executed within a CPU.
   a) improve b) decrease c) increase
7. One of the ways to use parallelism is to begin the first steps of instruction fetching and decoding ------ the prior instruction finishes executing.
   a) after b) before c)until

4. Find the equivalents.

regardless	хотя
so that	так, чтобы
for instance	пока…
though	независимо
at a time	например
until	одновременно

5. Match the terms on the left with the explanations on the right.

1. Computer	a) a set of instructions for solving a specific problem by a computer
2. CPU	b) performs the actual arithmetic and logical operations asked for by a program
3. Hardware	c) manages and coordinates the entire computer system
4. Software	d) transmits coordinating signals and commands to the

	computer
5. CU	e) holds the instruction from he memory while it is being executed
6. ALU	f) the physical units that make up a computer system
7. Register	g) keeps track of the next instruction to be performed in the main memory
8. Program counter	h) programs and instructions executed by the computer
9. Decoder	i) a machine for manipulating data according to a list of instructions
10. Program	j) a tiny piece of silicon containing complex electronic circuits used inside all computers
11. Chip	k) takes the coded instruction and breaks it down into individual commands necessary to carry it out

6. Provide synonyms from the text for the following words and word-combinations.

To perform, method, to include, at a time, whole number, to look for, effective, sequence, to convert, stage, to use.

7. Form nouns from the following verbs.

To operate, to perform, to represent, to execute, to consider, to add, to subtract, to divide, to multiply, to improve, to compare, to instruct, to develop, to achieve.

8. Provide the translation of the sentences marked*. Define the functions of the infinitives.

9. Translate the following sentences into Russian.

1. Manufacturers design the CPU to carry out basic instructions for the particular computer.
2. The CPU of a computer to be arranged in a single or very small number of integrated circuits is called a microprocessor.
3. Microcomputers were the first computers to use a single microprocessor chip as a processor.
4. There are four steps to be involved in CPU operation.
5. The program counter keeps track of the next instruction to be performed in the main memory.
6. Often the instruction to be fetched must be retrieved from relatively slow memory, causing the CPU to stall while waiting for the instruction to be returned.
7. The control unit interprets the instruction and tells the ALU which operation to perform.
8. To be interpreted, an instruction is transmitted to the instruction decoder.
9. The ALU contains the circuitry to perform simple arithmetic and logical operations.
10. Superscalar computers contain multiple ALUs to process several instructions at a time.

Speaking

1. *Speak about the main steps in the CPU operation.*
2. *In pairs, discuss the ways to improve computer performance.*

UNIT 4

Grammar Focus **Revision (Passive voice, Infinitive)**

1. Choose the proper form of the verb. Translate into Russian.

1. A computer (manipulates, is manipulated) data according to a list of instructions, called a program. 2. Programs (retrieve, are retrieved) and (process, processed) by the computer's electronics. 3. In homes, tiny computers (embed, are embedded) in the electronic circuitry of most appliances. 4. Computer hardware (includes, is included) the memory that stores data and program instructions. 5. Software generally (designs, is designed) to perform a particular type of task. 6. Before the invention of the transistor its function (performed, was performed) by vacuum tubes.7. Semiconductor integrated circuits (helped, were helped) to increase reliability of devices. 8. New types of integrated circuits (have developed, have been developed) lately.

2. Translate the following sentences into English using passive predicates.

1. Компьютеры широко применяются в научных, образовательных, военных целях.
2. Программы, которые выполняются на компьютере, называются программным обеспечением.
3. Сейчас программу можно загрузить в компьютер.
4. К началу 60-х электронные лампы в процессорах были заменены транзисторами.
5. Благодаря микроминиатюризации, размер интегральных схем значительно уменьшился.
6. Эти инструкции будут выполнены одновременно.
7. Информация из памяти поступает в ЦПУ.
8. В настоящее время создаются мощные суперскалярные процессоры.

3. Translate into English using infinitives.

1. Выполнение программных инструкций – есть функция центрального процессорного устройства.
2. Программы и данные, которые необходимо обработать, должны находиться во главной памяти компьютера.
3. Инструкция, которую необходимо выполнить в контрольном устройстве, считывается из первичной памяти в регистр памяти.
4. Программный счетчик находит ячейку в памяти, из которой должна быть считана следующая инструкция.

Word and phrase study

Обратите внимание на значение некоторых английских приставок, используемых в технической литературе:

in – в, внутрь (**in**ternal – внутренний)
ex – внешний (**ex**ternal – внешний)
en – приведение в какое-либо состояние (to **en**code – кодировать)
de – обратное действие (to **de**code – раскодировать)
bi - два (**b**inary – двоичный)
tri – три (**tri**ple – тройной)
semi – полу (**semi**conductor – полупроводник)
deci – десять (**dec**imal – десятичный)
hexadeci – шестнадцать (**hexadec**imal – шестнадцатеричный)
kilo – одна тысяча (kilobyte – килобайт)

mega –один миллион (megabyte – мегабайт)
giga – один миллиард (gigabyte - гигабайт)

Translate into Russian.

1. to input, to insert, inline, interior
2. to extend, to expand, to export, exterior
3. to enable, to encipher, to encrypt, to enlarge
4. to decompress, to defragment, demodulate, to decrypt
5. bidirectional, bistable, bidimensional, binomial
6. Triangular, triode, trichromatic
7. kilobit, kilogram(me), kilowatt
8. megahertz, megabit, megalith, megaton
9. gigabit, gigantic, gigahertz
10. semi-automatic, semicircle, semi-permanent.

Lexis

1. Read and memorize the pronunciation of the following words.

Memory, digit, binary, circuitry, electricity, value, decimal, character, capacity, kilobyte, megabyte, gigabyte, equivalent, internal, external, retrieve, storage, surface, temporary, permanent, electromagnet, magnetize, versatile, medium – media, cache.

2 Translate the following word-combinations into Russian.

Computer memory, binary digit, binary number system, decimal number, electronic circuitry, internal memory, random access memory, read-only memory, storage device, storage capacity, external memory, access time, magnetized surface, magnetic medium, to transfer data, to encode a character, particular sequence of bits, digital versatile disk.

3. Translate the following words and word-combinations into English.

Система представления двоичных данных, ячейка памяти, выбирать величину (значение), емкость памяти, сохранять временно, постоянная память, время доступа, работать быстро, магнитный носитель, определять общую производительность компьютера, внешняя память, электронные микросхемы, отыскивать (извлекать) информацию с диска.

4. State the part of speech of the following words and translate hem into Russian.

Magnet – magnetic – magnetically – magnetism, magnetize – magnetized – magnetizable,
Electric – electrically – electricity, optics – optical.

5. Form adverbs from the following adjectives and translate them into Russian.

Quick, slow, general, permanent, temporary, periodic, particular, principal, electronic, direct, current, economical, typical.

Reading

1. With a partner, try to answer these questions.

1. What are the two types of computer memory?
2. What are the components of the main memory?
3. What does RAM stand for?

4. What is external memory?
5. How many digits does a binary number system use? What is a bit?
6. What is a group of eight bits called?7

2. Now read the text to check your answers or to find the correct answer.

Computer Memory

Computer memory is a mechanism that stores data for use by a computer. In a computer all data consist of numbers. A computer stores a number into a specific location in memory (a cell) and later fetches the value. Most memories represent data with the binary number system. In the binary number system, numbers are represented by sequences of the two binary digits 0 and 1, which are called bits. In a computer, the two possible values of a bit correspond to the *on* and *off* states of the computer's electronic circuitry.

In memory, bits are grouped together so they can represent larger values. A group of eight bits is called a byte and can represent decimal numbers ranging from 0 to 255. The particular sequence of bits in the byte encodes a single character such as a number, letter or symbol. Most computers operate by manipulating groups of 2, 4, or 8 bytes called words.

Memory capacity is usually quantified in terms of kilobytes, megabytes, and gigabytes. One kilobyte (KB) is 1,024 bytes, one megabyte (MB) is equivalent to 1,024KB, and one gigabyte (GB) is 1,024MB.

How memory works.

Computer memory may be divided into two broad categories known as internal memory and external memory. Internal memory operates at the highest speed and can be accessed directly by the central processing unit. Internal memory is contained on computer chips and uses electronic circuits to store information. External memory consists of storage devices that are slower than internal memories but offer low cost and the ability to hold data after the computer's power has been turned off.

RAM and ROM.

Internal memory (also called main memory) comes in two principal varieties: random access memory or RAM and read-only memory or ROM. RAM is *temporary*, i.e. its information is lost when the computer is turned off. However, the ROM section is *permanent* and contains instructions needed by the processor. RAM can be read and written to anytime the CPU commands it, but ROM is pre-loaded with data and software that never changes, so the CPU can only read from it.

There are different kinds of random access memory. Static RAM (SRAM) holds information as long as power is turned on and is usually used as cache memory because it operates very quickly. Another type of memory, dynamic RAM (DRAM), is slower than SRAM and must be periodically refreshed with electricity otherwise the information it holds is lost. DRAM is more economical than SRAM and serves as the main memory element in most computers.

The time it takes the CPU to transfer data to or from memory is particularly important because it determines the overall performance of the computer. The time required to read or write one bit is known as the *memory access time*. Current DRAM and SDRAM access times are between 30 and 80 nanoseconds (billions of a second). SRAM access times are typically four times faster than DRAM.

In a PC, the ROM contains a specialized program, called the basic input-output system (BIOS), that starts up the operating system. BIOS is stored on computer chips in a way that causes the information to remain even when the power is turned off.

Newer technologies allow ROMs to be semi-permanent, i.e. the information can be changed, but it takes several seconds to make the change. For example, a FLASH memory acts like a ROM because values remain stored in memory, but the values may be changed.

External memory

External, or secondary, memory can generally be classified as either magnetic or optical, or a combination called magneto-optical. A magnetic storage device, such as a computer's hard drive, uses a surface coated with material that can be magnetized in two possible ways. The surface rotates under a small electromagnet that magnetizes each spot on the surface to record a 0 or 1. To retrieve data, the surface passes under a sensor that determines whether the magnetism was set for a 0 or 1. Hard drives can store gigabytes of information. Memory also can be stored on magnetic floppy disks, which can store about 2 megabytes of information.

Optical storage devices such as compact disk (CD) and digital versatile disk (DVD) drives use lasers to store and retrieve information from a disk. A single CD can store nearly as much information as several floppy disks, and some DVDs can hold more than 12 times as much data as a CD.

Magneto-optical memory devices use a combination of optical storage and retrieval technology coupled with a magnetic medium.

3. Read these sentences and decide if they are true (T) or false (F).

1. In a computer all data consist of numbers.
2. Most memories represent data with the decimal system.
3. Byte is the smallest unit of information in the binary system.
4. Each character is a sequence of eight bits.
5. One kilobyte represents 1,024 characters (about a small page).
6. Internal memory is slower than external memory.
7. ROM is temporary, i.e. its information is lost when the computer is turned off.
8. "Access time" refers to the average time required for the CPU to transfer data to or from memory.
9. Hard drives are faster than floppy drives.
10. Hard disks use lasers to store and retrieve information.

4. Give the English for:

Передавать данные, вращаться, соответствовать, двоичная цифра, запускать операционную систему, представлять десятичные числа, накопительные устройства, базовая система ввода-вывода, жесткий диск, периодически обновляться, гибкие магнитные диски, считывать с памяти, внутренняя память, намагничивать точки, сохранять на компьютерных чипах, с высокой скоростью, включать (выключать), кодировать символ.

5. Match the pairs.

in terms of	до тех пор, пока
i.e. (that is)	(столько) сколько
in two ways	в виде
as much as	почти
nearly	то есть

as long as	иначе
otherwise	двумя способами

6. Give synonyms for:

Storage, to store, basic, to revolve, to define, to encrypt, to have, rate, to switch on.

7. Give antonyms for:

Internal, quick, to turn off, low, permanent, to input, to decode, to write to, static.

8. Insert prepositions.

1. In a computer all data consist ____numbers. 2. The numbers are represented ____sequences of the two binary digits 0 and 1. 3. The two possible values of a bit correspond____the *on* or *off* states of the computer's circuitry. 4. One megabyte is equivalent____1,024KB. 5. Internal memory operates____ the highest speed. 6. The CPU can only read____ROM. 7. Dynamic RAM must be periodically refreshed____electricity. 8. A computer stores a number____ a memory cell and later fetches the value.

9. Converse the following into Passive and translate into Russian.

1. A computer stores all data and instructions in computer memory. 2. Eight-digit codes typically represent characters. 3. We may divide computer memory into internal and external memory. 4. ROM provides permanent storage of information. 5. The CPU can directly access internal memory. 6. RAM loses its information when the power is turned off. 7. A computer uses static RAM as cache memory because it operates very quickly.8. Early electronic computers used cathode ray tubes (CRT) to store data. 9. International Business Machines Corporation (IBM) developed magnetic core memory in the early 1950s. 10. We can store information on CDs and DVDs.

10. Translate into English.

1. Для описания емкости памяти обычно используются килобайты, мегабайты и гигабайты. 2. В бинарной системе представления данных используются две цифры: 0 и 1.

3. Для представления больших величин, биты сгруппированы в байты. 4. Внутренняя память содержится в компьютерных чипах и использует электронные микросхемы для хранения данных. 5. ПЗУ содержит информацию, которую нельзя стереть или перезаписать. 6. Гибкие и жесткие диски являются магнитными накопительными устройствами. 7. Данные записываются на диск в виде намагниченных точек, называемых битами. 8. Для обработки на компьютере данные должны быть зашифрованы в двоичный код.

Speaking

Discuss: *- What are the main parts of computer memory? How do they work?*

- What secondary storage devices do you use in your work? How much information can they hold?

- Computer engineers consider it is possible to make multigigabyte memory chips and disks capable of storing a terabyte (one trillion bytes) of memory. Do you believe it, or do you think, memory capacity has reached an upper limit?

Unit 5

Grammar focus: Complex Object (сложное дополнение)

Complex Object в английском языке представляет собой инфинитивный оборот, состоящий из имени существительного в общем падеже или местоимения в объектном падеже и инфинитива.

Оборот **Complex Object** по значению равен дополнительному придаточному предложению. На русский язык он переводится придаточным дополнительным предложением с союзами *что, чтобы, как*.

I want her (my sister) to see him. (*Я хочу, чтобы она (моя сестра) повидала его.)*

Complex Object употребляется после глаголов, выражающих:
восприятие посредством органов чувств;
желание;
предположение;
утверждение, знание, сообщение другим о каком-либо факте;
принуждение;
разрешение, запрет, просьбу;
после глаголов, требующих дополнения с предлогом.

1. Глаголы восприятия посредством органов чувств
to feel , to see , to hear, to watch, to notice, to observe
После глаголов этой группы инфинитив употребляется без частицы **to**.

We saw him buy newspapers near our house every morning.
Мы видели, как (что) он каждое утро покупает газеты около нашего дома,
I heard the director speak about the results of the examination.
Я слышал, как (что) директор говорил о результатах экзаменов.

Если глаголы to hear, to see употребляются в переносном значении (to hear в значении *узнавать,* to see в значении *понимать, замечать),* то вместо конструкции Complex Object следует употреблять дополнительное придаточное предложение.

I heard that he had come to Moscow. (*Я слышал (узнал), что он приехал в Москву.)*
I see that you don't understand me. (*Я вижу (замечаю), что ты меня не понимаешь.)*

2. Глаголы, выражающее желание.
To want, to wish, to like, would like

He wants them (the students) to go to the exhibition.
Он хочет, чтобы они (студенты) пошли на выставку,
I wish him (this man) to be happy.
Я желаю, чтобы он (этот человек) был счастлив.
I would like her to make the report.
Я бы хотел, чтобы она сделала этот доклад.

3. Глаголы, выражающие предположение

to expect, to consider, to suppose, to assume, to hold, to believe.

(После глагола to consider инфинитив, выраженный глаголом to be, иногда опускается.)

They considered the food too heavy for her.
Они считали, что такая пища слишком тяжела для нее.
We expect them to arrive tomorrow.
Мы ожидаем, что они приедут завтра.
I assume this method to be interesting.
Я считаю, что этот метод интересный.

4. Глаголы, выражающие утверждение, знание, сообщение другим о каком-либо факте

to find, to declare, to know, to think, to report, to show, to state, to note, to claim.

I know her to have painted a beautiful picture.
Я знаю, что она написала красивую картину.
He declared the meeting to have been postponed.
Он заявил, что собрание отложили.

5. Глаголы, выражающие принуждение

to make, to have, to get, to cause, to force

После глаголов to have, to make (в значении *заставлять),* to cause инфинитив в сложном дополнении употребляется без частицы to.

I will have him do it.
Я заставлю его сделать это.
We made them surrender.
Мы вынудили их сдаться.

6. Глаголы, выражающие разрешение, запрет, просьбу

to allow, to permit, to let, to ask, to enable, to forbid

He allowed the construction of the machine to be started.
Он разрешил начать конструирование машины.
Let him do it.
Позвольте (дайте) ему сделать это.

7. После глаголов, требующих дополнения с предлогом:

to rely on, to wait for, to count on

We relied on him to make a good report.
Мы рассчитывали на го, что он сделает хороший доклад.
He waited for me to introduce him to the mistress.
Он ждал, чтобы я представил его хозяйке.

Complex Object with Participle I and II
(Сложное дополнение с причастиями I и II)

I. В тех случаях, когда нужно показать, что действие, выраженное неличной формой глагола, происходит или происходило в момент речи, вместо инфинитива в сложном дополнении употребляется причастие I, которое переводится на русский язык глаголом несовершенного вида. Сложное дополнение с причастием употребляется после глаголов: to see, to feel, to watch, to find, to like, to dislike и др.

I hear them speaking.
Я слышу, как они говорят.

Однако, если дается перечисление действий, то употребляется только инфинитив.

I saw him sit at the table and read something.
Я видел, что он сидит за столом и что-то читает.

2. Для того чтобы показать результат действия, употребляется причастие II.

He wants all the documents signed by Friday.
Он хочет, чтобы все документы были подписаны к пятнице.

3. В тех случаях, когда после глагола to have (to get) в конструкции Complex Object вторым членом конструкции является причастие II, то оно обозначает действие, выполняемое не подлежащим, а каким-нибудь другим лицом, причем и разговорной речи глагол to have часто опускается.

I want to have my photo taken.
I want my photo taken.
Я хочу сфотографироваться,

Exercise 1. *Translate the following sentences into Russian according to the given model:*
I wanted him to be present at the meeting.
Я хотел, чтобы он присутствовал на встрече.
She wanted the child to wash his hands before dinner.
The teacher wanted the pupils to rewrite the composition.
I wanted my son to do his home task before going for a walk.
The governor wanted the man to tell everything about himself.
Her uncle wanted us to join the excursion.

I wanted the work to be done properly.
Я хотел, чтобы работа была сделана должным образом.
She wanted the question to be raised again.
They wanted the operation to be performed as soon as possible.
I didn't want my report to be discussed there.
The student wanted the dictionary to be given to him at the exam.
The teacher wanted the book to be read in three days.

I know him to live in N street.
Я знаю, что он живет на улице Н.
He knows his neighbour to be a cruel woman.
I know the performance to be a success.

3. We know that man to work at our factory.
4. We know this professor to travel much.
5. I know this girl to be fond of music.

I know him to have lived in N. street.
Я знаю, что он жил на улице Н.
1. He knows them to have met by accident.
2. I know the delegation to have left for Moscow.
3. We know this politician to have studied at our institute.
4. I know her to have brought that magazine.
5. They know Carla to have left thy city many years ago.

*I made **her help** mother to cook dinner.*
Я заставил её помочь матери приготовить обед.
1. He made *me tell* them about my adventures.
2. I could not make *them agree.*
3. They made *him enter* the house.
4. I made *my brother take* the raincoat.
5. She made *us sing* the song again.

Exercise 2. Translate the following sentences Into English replacing the object clauses by Complex Object.

Я хочу (желаю, хотел бы),
- чтобы все хорошо провели время.
- чтобы никто не опаздывал.
- чтобы мы пошли в театр.
- чтобы вся семья сегодня вечером была вместе.
- чтобы ты последовал моему совету.

Я видел (слышал, наблюдал, заметил)
- как он вошел в дом и закрыл дверь.
- как девушка играла и пела.
- как они разговаривали.
- как дети бегали и прыгали.
- как братья ссорились.

Я считаю (нахожу)
- что он вполне здоров.
- что эта работа слишком трудна для него.
- что Ник не очень способный студент.
- что отец должен пойти туда.
- что этот фильм очень интересный.

Я попросил (приказал, велел, разрешил)
- им остаться дома и подождать меня.
- детей играть в саду.
- студентов принести словари.
- её не опаздывать.
- всех занять места.

Exercise 3. Translate the following sentences into Russian Pay attention to Complex Object.

1. I must have my shoes repaired.
2. We want to have the floor and windows washed.
3. Where did you have your hair cut?
4. She had this dress made last month.
5. He wanted to have his bad tooth pulled out.
6. I want my TV set repaired.
7. You must have this coat cleaned.
8. When do you want to have tea prepared?
9. He would like his things brought upstairs.
10. He made his sister come home in time yesterday.

Exercise 4. Translate the following sentences into English.

Он хотел, чтобы его книгу напечатали.
Я бы хотел, чтобы дерево под домом срубили.
Вы должны почистить ботинки.
Я думаю, что смогу подстричь волосы сегодня.
Нам нужно было сменить обои.
Когда вы хотите, чтобы вам принесли завтрак?
Я хочу, чтобы все письма, газеты и журналы приносили утром.

Exercise 5. Translate the following sentences into English, using Complex Object wherever possible.

1. Я *бы* хотел, чтобы вы остались здесь еще на два дня.
2. Болезнь сестры заставила его написать вам такое письмо.
3. Вы не позволить, чтобы разногласия между ними так долго.
4. Мы знали, что он был известным певцом.
5. Они не ожидали, что он остановится и заговорит с ними.
6. Она села на скамью и наблюдала, как дети играли в мяч.
7. Мы попросили мать позволить ему поиграть с нами.
8 Они никогда не слышали, чтобы я говорил об этом человеке.
9. Я слышал, как часы били полночь.
10. Сосед слышал, как он пришел домой.

Exercise 6 Translate into Russian.

We know B.Pascal to be the inventor of the mechanical computer.
They saw his activity bring great success.
We know the information to have been accepted.
The Intel developers want the computer to be noiseless.
We know the cybernetics to be an important branch of modern technology.
It is convenient to consider the central processor to have three separate sections: an internal or main memory, an arithmetic and logic unit and a control unit.
We expect the computer to run the most sophisticated applications.
PC system designers consider the hard drive to be a key component of the overall system performance.
We know each user to have unique needs for data storage and access.
We expect Intel’s multi-core processors to be widely used in the future.

Word formation (Revision)

1. *Derive nouns from verbs (-tion, ation, -ion, -sion, -ssion, - ence).*

To apply, to specify, to interconnect, to depend, to instruct, to represent, to distinct, to automate, to instruct, to communicate, to connect, to differ, to compress, to produce, to collide, to disturb, to organize, to admit., to assist, to edit, to interpret, to distribute, to relate, to execute, to operate, to limit, to compute, to simulate.

2. Derive adjectives from verbs (-able, -ible).

To adjust, to move, to extend, to sense, to expand, to rely.

3. Derive verbs from the following words with the help of the suffix -ize.

Crystal, real, national, computer, transistor, standard, mobile, popular, miniature.

4.Fill in the blanks:

Verb	Noun	Adjective
to compute		
		specific
to reason		
		different
	industry	

Lexis

1. Read and memorize the pronunciation of the following words.

Software, hardware, enable, machine, binary, value, sequence, particular, assembly language, essentially, mnemonic, engine, major, arbitrary, blurred, diagnostic tools, utility, to insulate, feature, convenient, debugger, multiple, automation, ultimately, iteratively, ingenuity, module.

2. Translate the following word-combinations into Russian.

Specific tasks, application software, to perform a task, system software, operating system, to run properly, to interface with hardware, custom software, user specification, to encompass, in a particular sequence, high-level programming languages, assembly language, mnemonic representation, software engineering, to read instructions into the memory of a device.

3. Translate the following words and word combinations into English.

Следовательно, одновременно, значение (величина), требовать, синхронный, координировать, выполнять программные инструкции, загружать, различать (отличать), получить распространение, выполнять несколько программ одновременно, программное обеспечение, цифровой, многофункциональный, вычисление, человеческая деятельность.

Reading.

1. Read the text and try to give the definition of computer software.

Computer software

Software, or program, enables a computer to perform specific tasks, as opposed to the physical components of the system (*hardware*). This includes application software such as a

word processor, which enables a user to perform a task, and system software such as an operating system, which enables other software to run properly, by interfacing with hardware and with other software or custom software made to user specifications.

Computer software is so called in contrast to computer hardware, which encompasses the physical interconnections and devices required to store and execute (or run) the software. In computers, software is executed in the central processing unit. At the lowest level, software consists of a machine language specific to an individual processor. A machine language consists of groups of binary values signifying processor instructions (object code), which change the state of the computer from its preceding state. Software is an ordered sequence of instructions for changing the state of the computer hardware in a particular sequence. It is usually written in high-level programming languages that are easier and more efficient for humans to use (closer to natural language) than machine language. High-level languages are compiled or interpreted into machine language object code. Software may also be written in an assembly language, essentially, a mnemonic representation of a machine language using a natural language alphabet. Assembly language must be assembled into object code via an assembler.

The term "software" was first used in this sense by John W. Tukey in 1957. In computer science and software engineering, **computer software** is all computer programs. The concept of reading different sequences of instructions into the memory of a device to control computations was invented by Charles Babbage as part of his difference engine. The theory that is the basis for most modern software was first proposed by Alan Turing in 1935.

Types

Practical computer systems devide software into three major classes: system software, programming software and application software, although the distinction is arbitrary, and often blurred.

System software helps run the computer hardware and computer system. It includes operating systems, device drivers, diagnostic tools, servers, windowing systems, utilities and more. The purpose of systems software is to insulate the applications programmer as much as possible from the details of the particular computer complex being used, especially memory and other hardware features, and such accessory devices as communications, printers, readers, displays, keyboards, etc.

Programming software usually provides tools to assist a programmer in writing computer programs and software using different programming languages in a more convenient way. The tools include text editors, compilers, interpreters, linkers, debuggers, and so on. An Integrated development environment (IDE) merges those tools into a software bundle, and a programmer may not need to type multiple commands for compiling, interpreter, debugging, tracing, and etc., because the IDE usually has an advanced *graphical user interface*, or GUI.

Application software allows end users to accomplish one or more specific (non-computer related) tasks. Typical applications include industrial automation, business software, educational software, medical software, databases, and computer games. Businesses are probably the biggest users of application software, but almost every field of human activity now uses some form of application software. It is used to automate all sorts of functions.

Operation

Computer software has to be "loaded" into the computer's storage (such as a *hard drive*, *memory*, or *RAM*). Once the software is loaded, the computer is able to execute the software. Computers operate by *executing* the computer program. This involves passing instructions from the application software, through the system software, to the hardware which ultimately receives

the instruction as machine code. Each instruction causes the computer to carry out an operation - moving data, carrying out a computation, or altering the control flow of instructions.

Data movement is typically from one place in memory to another. Sometimes it involves moving data between memory and registers which enable high-speed data access in the CPU. Moving data, especially large amounts of it, can be costly. So, this is sometimes avoided by using "pointers" to data instead. Computations include simple operations such as incrementing the value of a variable data element. More complex computations may involve many operations and data elements together.

Instructions may be performed sequentially, conditionally, or iteratively. Sequential instructions are those operations that are performed one after another. Conditional instructions are performed such that different sets of instructions execute depending on the value(s) of some data. In some languages this is known as an "if" statement. Iterative instructions are performed repetitively and may depend on some data value. This is sometimes called a "loop." Often, one instruction may "call" another set of instructions that are defined in some other program or module. When more than one computer processor is used, instructions may be executed simultaneously.

Currently, almost the only limitations on the use of computer software in applications is the ingenuity of the designer/programmer. Consequently, large areas of activities (such as playing grand master level chess) formerly assumed to be incapable of software simulation are now routinely programmed. The only area that has so far proved reasonably secure from software simulation is human art— especially, pleasing music and literature.

2.Give the English for

Последовательно, изобретательность программиста, неспособный к компьютерному моделированию, производить (выполнять) одновременно, перемещение информации, загружать программное обеспечение, промышленная автоматизация, база данных, в определенной последовательности, последовательность инструкций, ограничение, процессор, компоненты системы, системное программное обеспечение, устройство.

3.Translate these phrases into Russian

Particular computer complex, as much as possible, to increment, graphical user interface, An Integrated development environment, a software bundle, accessory devices, computer’s storage, the control flow of instructions, high speed data, ultimately, sequentially, conditionally, iteratively, feature, to be incapable of software simulation, value of a variable data element, the biggest user of application software, high-level languages, diagnostic tools.

4. Change these sentences so you get constructions with Complex Object, using the verbs in the brackets.

1. Because of the standardization trend the development of mass-produced processors has rapidly accelerated. (to make)
2. Thanks to electric circuit increasingly complex CPUs were designed and manufactured in very small spaces. (to allow)
3. As microelectronic technology advanced, the number of transistors to be placed on ICs grew enormously. (to make)
4. Extreme miniaturization of electronic gates takes place, so the effects of phenomena like electromigration and subthreshold leakage become much more significant. (to cause)
5. When you load software into the computer, the computer executes a computer program. (to force)

6. Conditional instructions are performed such that different sets of instructions execute depending on the value(s) of some data. (to allow)

7. Software is an ordered sequence of instructions for changing the state of the computer hardware in a particular sequence. (to make)

8. Object code changes the state of the computer from its preceding state.(to enable)

9. Practical usage of computer systems devide software into three major classes: system software, programming software and application software. (to make)

10. Integrated development environment (IDE) merges those tools into a software bundle, and a programmer may not need to type multiple commands for compiling, interpreter, debugging, tracing, and etc. (to let)

5. Translate into Russian

1. The integrated circuit allowed multiple transistors and the wires connecting them to be placed on a single, solid piece of silicon.

2. Mainframe and minicomputer manufacturers of that time launched proprietary IC development programs to upgrade their older computer architectures.

3. This has allowed synchronous microprocessors to have clock rates ranging from tens of megahertz to several gigahertz.

4. These factors cause researches to investigate new methods of computing.

5. Each instruction causes the computer to carry out an operation - moving data, carrying out a computation, or altering the control flow of instructions.

6. Software, or program, enables a computer to perform specific tasks, as opposed to the physical components of the system (*hardware*).

7. This includes application software such as a word processor, which enables a user to perform a task, and system software such as an operating system, which enables other software to run properly, by interfacing with hardware and with other software or custom software made to user specifications.

8. Programming software usually provides tools to assist a programmer in writing computer programs and software using different programming languages in a more convenient way.

9. Application software allows end users to accomplish one or more specific (non-computer related) tasks.

10. Application software lets the user to automate all sorts of functions.

6. Answer the questions:

1. What does software allow a computer to do?
2. What is machine language used for?
3. What does a machine language consist of?
4. What kinds of languages can software be written in?
5. Who first introduced the term “software” and when?
6. What are the three types of computer software?
7. What does loading computer software into the computer storage involve doing?
8. Why can moving data be costly?
9. In what way can instructions be performed?
10. What areas of human activities are still secure from software simulations?

Speaking

1. Tell what you know about the types of software.

2. Discuss in pairs how software can be operated.

UNIT 6

Grammar Focus **Complex Subject (Сложное подлежащее)**

Complex Subject в английском языке – это инфинитивный оборот, который используется для выражения мнения (суждения, предположения) группы неопределенных лиц о каком-либо лице (факте или понятии).

Complex Subject состоит из существительного в общем падеже, или местоимения в именительном падеже, и инфинитива. Между существительным и инфинитивом стоит сказуемое предложения, выражающее мнение, суждение или предположение. Например:

He *is said* ***to know*** *six languages.*
Clyde *was expected* ***to arrive*** *at the weekend.*

Предложение с **Complex Subject** переводится на русский язык сложно-подчиненным предложением. Перевод следует начинать со сказуемого предложения и переводить его неопределенно-личным предложением (*известно, сообщают, считают* и т.д.), за которым следует придаточное предложение с союзом *что.* Например:

She is known **to be** a good specialist. (Известно, что она хороший специалист.)

The experiment is reported **to have been** a success. (Сообщают, что эксперимент прошел успешно.)

Complex Subject употребляется со следующими глаголами:

1) в страдательном залоге:

to know - знать
to say - говорить, сказать
to suppose - предполагать, полагать
to assume - допускать, предполагать
to believe - считать, полагать
to think - думать, считать
to consider - считать
to expect - ожидать
to find - находить, устанавливать
to report - сообщать
to prove - доказывать
etc.

Например: This device **is supposed** to be used in our experiment. (Предполагается, что этот прибор будет использован в нашем эксперименте.)

They are believed **to be working** at this problem. (Полагают, что они работают над этой проблемой.)

2) в действительном залоге:

to seem - казаться, по-видимому
to appear - казаться, оказываться
to happen }
to turn out } оказываться
to prove }

Например: He **seems** to know all about it. (По-видимому, он знает все об этом.)

Their prediction **turned out** to be right. (Их предположение оказалось верным).

Инфинитив в **Complex Subject** может стоять после сочетаний слов:

to be likely - вероятно
to be unlikely - маловероятно
to be sure - безусловно
to be certain - непременно

Например: He **is unlikely** to take part in this discussion.
(Маловероятно, что он примет участие в этом обсуждении.)

При переводе предложений с **Complex Subject** следует обращать внимание на форму инфинитива. Например: They are believed **to work (to be working/ to have worked/ to have been working) at this problem.** Полагают, что они *работают (работают в данное время/ работали/ работают уже некоторое время) над этой проблемой.*

В отрицательных предложениях отрицание **not** при переводе обычно относится к инфинитиву, если сказуемое предложения выражено глаголом в действительном залоге. Например: This phenomenon **does not appear** to have been studied.
По-видимому, это явление *не было изучено.*

Если сказуемое выражено глаголом в страдательном залоге, то отрицание обычно относится к сказуемому. Например: This reaction **was not expected** to start at lower temperatures. *Не предполагали*, что эта реакция начнется при более низкой температуре.

1. Translate into Russian.

1. They were reported to arrive in a few days. 2. The device appears to be of some interest. 3. They are supposed to be conducting the experiment. 4. This problem doesn't seem to have been discussed before. 5. He is certain to come to the party. 6. The students are likely to be familiar with this phenomenon. 7. For a long time atom was thought to be indivisible. 8. A computer is considered to have four basic components: input, processor, memory, and output.
9. Internal memory is known to refer to the storage locations inside the computer. 10. Optical drives turned out to be slower than hard drives.

2. Paraphrase the following sentences using Complex Subject.

1. It is said that he is one of the promising nuclear physicists. 2. It is supposed that this type of rocket has many advantages. 3. It was expected that the delegation would arrive on Monday.
4. It was reported that the number of unemployed was increasing with every year. 5. It is considered that electricity exists throughout space. 6. It was found that the helium atom had two electrons. 7. It turned out that my prediction was right. 8. It is known that computer software is all computer programs. 9. It is considered that software is divided into system software and application software. 10. It is unlikely that the discussion will finish soon.

3. Translate the following into English using Complex Subject.

1. По-видимому, он знает о нашем решении.
2. Предполагают, что заседание закончится в 10 часов.
3. Условия работы оказались более трудными, чем предполагалось.
4. Говорят, что эта книга переведена на все языки мира.
5. Оказалось, что они уже пользовались подобным прибором.

6. Вероятно, величина изменится.
7. Он оказался хорошим программистом.
8. Кремний считается лучшим материалом для производства интегральных схем.
9. Предполагают, что емкость компьютерной памяти будет быстро увеличиваться.
10. Известно, что операционная система – это группа программ, которые координируют программное и аппаратное обеспечение компьютерной системы.

Word and phrase study

Компьютерные термины часто представляют собой цепочки, состоящие из двух или нескольких существительных. Например: *information systems, computer memory.*

В таких словосочетаниях главным словом является последнее существительное. Существительные, стоящие перед ним, определяют его. Переводить такие цепочки необходимо справа налево:

2 1
memory capacity - емкость памяти
3 2 1
program production time - время производства программы
3 2 1
database management system - система управления базами данных

Часто цепочки существительных могут переводиться на русский язык словосочетанием *прилагательное + существительное.* Например:

system software - системное программное обеспечение
program counter - программный счетчик
address bus - адресная шина

В цепочке слов, относящихся к основному слову, есть смысловая иерархия: чем ближе к главному слову стоит определение, тем более существенный и постоянный признак оно выражает. Например:

constant output file - *output (выходной)* передает существенный и постоянный признак файла
current output file - *constant (постоянный) и current (текущий)* передают переменные признаки

Словосочетания из двух или трех слов переводить сравнительно легко. Гораздо сложнее перевести на русский язык многокомпонентные термины (из четырех, пяти и более компонентов), образующиеся путем прибавления слов в начало словосочетания. В русском же языке элементы преимущественно добавляются в конец словосочетания, что необходимо учитывать при переводе с одного языка на другой.

Для корректного перевода такого словосочетания надо найти главное слово, стоящее, скорее всего в конце словосочетания, перевести слова слева направо, понять смысл высказывания с учетом контекста и передать этот смысл нормальным русским языком, пусть даже описательно.

general-purpose operating system - операционная система общего назначения
Internet Control Message Protocol - протокол контроля сообщений Интернет
code division multiple access - кодоворазделенный коллективный доступ

1. Translate the following word-combinations into Russian.

Input device, network configuration system, computer performance, bar code scanner, storage media, hardware errors, text-oriented command interpreter, command-oriented operating system, disk file, application software, machine language object code, device driver, hardware features, Hypertext Markup Language, desktop publishing operator, on-line data processing.

2. Translate into English.

Компьютерные технологии, производительность компьютера, время доступа, скорость передачи данных, устройство памяти, система представления двоичных данных, программная инструкция, ячейка памяти, шаг программы, протокол передачи файлов, емкость носителя, регистр памяти, дисковод для гибких дисков, высокоуровневые языки программирования, сервер локальной сети, слот расширения памяти.

Lexis

1. Read and memorize the pronunciation of the following words.

Coordinate, manipulate, command, allot, scheduler, perceptible, technique, oriented, apparent, presumably, imprecise, accessible, resource, consequently, distribute, consume, delay, recognize, suspend, virtual.

2. Translate the following word-combinations into Russian.

Operating system, to manipulate computer hardware, storage media, to manage hardware errors, command interpreter, graphically oriented interpreters, single-tasking (multitasking) operating systems, time-slice multitasking, to run several processes simultaneously, to minimize perceptible delay, to implement the technique, allotted time, to recognize an individual's handwriting, distributed system, to share resources, to suspend a process.

3. Translate into English.

Однозадачная (многозадачная) операционная система, выделенное время, реагировать на команды, виртуальная память, текстовые командные интерпретаторы, многочисленные пользователи, приостанавливать процесс, увеличивать производительность, распознавать слова, управлять доступом к файлам, программа обработки электронных таблиц.

3. Fill in the blanks:

Verb	Noun	Adjective
to access		
	recognition	
		responsive
	operation	
to suspend		

Reading

1. Before you read the text, try to answer these questions.

1. What is an operating system?
2. How does it work?

3. Make a list of the current operating systems. What are their advantages and disadvantages?

2. Now read the text and check your answers to task 4.

Operating System

Operating system (OS), in computer science, is the basic software that controls a computer. The operating system is known to have three major functions: it coordinates and manipulates computer hardware, such as computer memory, printers, disks, keyboard, mouse, and monitor; it organizes files on a variety of storage media, such as floppy disk, hard drive, compact disc, digital video disc, and tape; and it manages hardware errors and the loss of data.

How an OS works.

Operating systems control different computer processes, such as running a spreadsheet program or accessing information from the computer's memory. One important process is interpreting commands, enabling the user to communicate with the computer. Some command interpreters are text oriented, requiring commands to be typed in or to be selected via function keys on a keyboard. Other command interpreters use graphics and let the user communicate by pointing and clicking on an icon, an on-screen picture that represents a specific command. Graphically oriented interpreters are considered to be easier to use, but many experienced computer users prefer text-oriented command interpreters.

Operating systems are either *single-tasking* or *multitasking.* The more primitive single-tasking operating systems can run only one process at a time. For instance, when the computer is printing a document, it cannot start another process or respond to new commands until the printing is completed.

All modern operating systems are multitasking and can run several processes simultaneously. In most computers, however, there is only one central processing unit, so a multitasking OS creates the illusion of several processes running simultaneously on the CPU. The most common mechanism used to create this illusion is time-slice multitasking, whereby each process is run individually for a fixed period of time. If the process is not completed within the allotted time, it is suspended and another process is run. This exchanging of processes is called *context switching*. The OS performs the "bookkeeping" that preserves a suspended process. It also has a mechanism, called a scheduler that determines which process will be run next. The scheduler runs short processes quickly to minimize perceptible delay. The processes appear to run simultaneously because the user's sense of time is much slower than the processing speed of the computer.

Operating systems can use a technique known as *virtual memory* to run processes that require more main memory than is actually available. To implement this technique, space on the hard drive is used to mimic the extra memory needed. Accessing the hard drive is more time-consuming than accessing main memory, however, so performance of the computer slows.

Current operating systems

Operating systems commonly found on personal computers include UNIX, Macintosh OS, and Windows. UNIX, developed in 1969 at AT&T Bell Laboratories, is a popular operating system among academic computer users. Its popularity is due in large part to the growth of the interconnected computer network known as the Internet. Software for the Internet was initially designed for computers that ran UNIX. Variations of UNIX include SunOS (distributed by SUN Microsystems, Inc.), XENIX (distributed by Microsoft Corporation), and Linux (available for download free of charge and distributed commercially by companies such as Red Hat, Inc.).

UNIX and its clones support multitasking and multiple users. Its file system provides a simple means of organizing disk files and lets users control access to their files. The commands in UNIX are not readily apparent, however, and mastering the system is difficult. Consequently, although UNIX proves to be more reliable and is popular for professionals, it is not the operating system of choice for the general public. Instead, windowing systems with graphical interfaces, such as Windows and the Macintosh OS, which make computer technology more accessible, are widely used in personal computers (PCs). However, graphical systems have the disadvantage of requiring more hardware - such as faster CPUs, more memory, and higher-quality monitors – than do command-oriented operating systems.

Future technologies

Operating systems continue to evolve. A recently developed type of OS called a distributed operating system is designed for a connected, but independent, collection of computers that share resources such as hard drives. In a distributed OS, a process can run on any computer in the network (presumably a computer that is idle) to increase that process's performance. All basic OS functions – such as maintaining file systems, ensuring reasonable behavior, and recovering data in the event of a partial failure – become more complex in distributed systems.

Research is also being conducted that would replace the keyboard with a means of using voice or handwriting for input. Currently these types of input are thought to be imprecise because people pronounce and write words very differently, making it difficult for a computer to recognize the same input from different users. However, advances in this field have led to systems that can recognize a small number of words spoken by a variety of people. In addition, software has been developed that is likely to recognize an individual's handwriting.

3. Read the text again and complete these sentences.

1. The operating system coordinates and manipulates computer hardware such as.....
2. It organizes files on …… …… ……
3. Some command interpreters are text oriented, requiring….....
4. Other command interpreters use…… ……...
5. Multitasking operating systems can run…… …… ……..
6. The scheduler determines……..
7. Operating systems can use a technique known as virtual memory to …….
8. The popularity of UNIX is due in large part to…… …… …….
9. A distributed operating system is designed for…… …… …..
10. Research is being conducted to replace the keyboard with…… …..

4. Give the English for:

Получать доступ к информации, потеря данных, контекстное переключение, планировщик (программа), квантование времени, находиться в режиме ожидания, учет использования системных ресурсов, трудоемкий (отнимающий много времени), заметный (ощутимый), явный (очевидный), освоить операционную систему, графическая ОС, частичный сбой, имитировать, восстанавливать данные, неточный, распределенная ОС.

5. Give synonyms for:

To stop, simultaneously, to control, method, text-based, to emulate, probably, inaccurate, obvious, rate, to answer, develop, mistake.

6. Give the opposite for:

To maximize, precise, minor, hardware, graphically oriented, single-tasking, slowly, difficult, output, advantage, to decrease, low-quality.

7. Match the pairs.

until	в случае
whereby	следовательно
in addition	пока…не
due to	кроме
via	посредством чего
consequently	через
however	благодаря
in the event	однако

8. Find examples of Complex Subject in the text. Translate them into Russian.

9. Translate the following sentences into Russian.

1. The operating system is considered to be the most important type of system software.
2. The system is expected to be loaded automatically into the RAM section when the computer is started up.
3. The MAC OS is said to combine the elegance of Macintosh and the power of UNIX.
4. OS/2 Warp appears to provide true multitasking, allowing the program to be divided into *threads*, many of which can run at the same time.
5. OS/2 Warp is considered to be the PC world's most technically sophisticated operating system.
6. UNIX proved to be the first successful multiuser, multitasking operating system.
7. Storage needs are certain to increase over time.
8. The data are supposed to have been lost.
9. Computers are likely to recognize human voice and handwriting in the immediate future.
10. All modern operating systems appear to run several processes simultaneously.

10. Make sentences with Complex Subject using verbs in brackets.
Translate into Russian.

1. Byte consists of bits (know). 2. The hard drive is a key component of the overall system performance (consider). 3. Notebook computers will be cheaper next year (be likely). 4. Printers vary greatly in performance and design (know). 5. These new devices will be tested very soon (expect). 6. Each process is run individually for a fixed period of time (suppose). 7. Optical mice have been replaced by mechanical ones (turn out). 8. The first automatic computers were unreliable (prove).

11. Translate into English using Complex Subject.

1. Известно, что операционная система – это базовая программа, управляющая компьютером.
2. Изучение команд UNIX считается трудным для начинающих пользователей.
3. Многозадачные операционные системы, как известно, могут выполнять несколько операций одновременно.
4. Про переносные компьютеры говорят, что они более удобны в использовании, чем стационарные.

5. Оказывается, графические операционные системы нуждаются в больших аппаратных ресурсах, чем командные ОС.

6. Вряд ли данная программа будет работать на этой платформе.

7. Windows Vista считается самой надежной и защищенной из всех существующих версий Windows.

8. Этот диск, наверное, поврежден.

12. Write 10 questions to the text.

Speaking

Discuss:

- *What are the general features of the operating system?*
- *What new types of operating systems are being developed now?*
- *What OS do you have on your PC? Does it perfectly suit your needs?*
- *In your view, what is an ideal operating system?*

Unit 7

Grammar focus: Revision (C Object, C Subject)

Find Complex Object or Complex Subject in the following sentences:

He wants you to help him.
He is expected to come.
She expected me to follow her advise.
He is said to live in Moscow.
Everybody thought him to be a real professional.
He was considered to be writing a new programme.
We didn't expect you to do this work so early.
The delegation is reported to have already arrived.
I knew him to be a good programmer.
They were believed to be on their way to Moscow.
I find him to be very witty.
He was expected to arrive in the evening.
Do you consider him a good student?
A car was heard to arrive.
Everybody found the film exciting.
She was seen to leave the house.
He forced his son to give up smoking.
The water seems to be boiling.
I haven't heard anyone call me.
He turned out to be a good engineer.

Word formation

Derive nouns from the following verbs:

To interfere, to duplicate, to replicate, to disrupt, to infect, to spread, to trick, to resemble, to design, to execute, to function, to instruct, to locate, to execute, to disrupt, to change, to operate, to attach, to spread, to use, to prepare, to prevent, to recover, to test.

Lexis

Explain the meaning of the following words:

Self-duplicating, to avoid detection, payload, malfunction, executable code, legitimate computer programmes, professional mainframe systems, viral programme, backup, legitimate source, antiviral software, scanning software, to update, on-access scanner, on-demand scanner, check summing software, to evade, heuristics, monitoring software, integrity-shell software, isolating computer, boot sector.

Reading

1. Read the text and answer the question: **Why is it necessary to protect your computer from viruses?**

Viruses

Virus (computer), self-duplicating computer program that interferes with a computer's hardware or operating system (the basic software that runs the computer). Viruses are designed to duplicate or replicate themselves and to avoid detection. Like any other computer program, a virus must be executed for it to function—that is, it must be located in the computer's memory, and the computer must then follow the virus's instructions. These instructions are called the payload of the virus. The payload may disrupt or change data files, display an irrelevant or unwanted message, or cause the operating system to malfunction.

How infections occur.

Computer viruses activate when the instructions—or executable code—that run programs are opened. Once a virus is active, it may replicate by various means and tries to infect the computer's files or the operating system. For example, it may copy parts of itself to floppy disks, to the computer's hard drive, into legitimate computer programs, or it may attach itself to e-mail messages and spread across computer networks by infecting other shared drives. Infection is much more frequent in PCs than in professional mainframe systems because programs on PCs are exchanged primarily by means of floppy disks, e-mail, or over unregulated computer networks.

Viruses operate, replicate, and deliver their payloads only when they are run. Therefore, if a computer is simply attached to an infected computer network or downloading an infected program, it will not necessarily become infected. Typically a computer user is not likely to knowingly run potentially harmful computer code. However, viruses often trick the computer's operating system or the computer user into running the viral program.

With the widespread use of e-mail and the Internet, viruses can spread quickly. Viruses attached to e-mail messages can infect an entire local network in minutes.

Anti-viral tactics.

Preparation and prevention.

Computer users can prepare for a viral infection by creating backups of legitimate original software and data files regularly so that the computer system can be restored if necessary. Viral infection can be prevented by obtaining software from legitimate sources or by using a quarantined computer to test new software—that is, a computer not connected to any network. However, the best prevention may be the installation of current and well-designed antiviral software. Such software can prevent a viral infection and thereby help stop its spread.

Virus detection.

Several types of antiviral software can be used to detect the presence of a virus. Scanning software can recognize the characteristics of a virus's computer code and look for these characteristics in the computer's files. Because new viruses must be analyzed as they appear, scanning software must be updated periodically to be effective. Other scanners search for common features of viral programs and are usually less reliable. Most antiviral software uses both on-demand and on-access scanners. On-demand scanners are launched only when the user activates them. On-access scanners, on the other hand, are constantly monitoring the computer for viruses but are always in the background and are not visible to the user. The on-access scanners are seen as the proactive part of an antivirus package and the on-demand scanners are seen as reactive. On-demand scanners usually detect a virus only after the infection has occurred and that is why they are considered reactive.

Antivirus software is usually sold as packages containing many different software programs that are independent of one another and perform different functions. When installed or packaged together, antiviral packages provide complete protection against viruses. Within most antiviral packages, several methods are used to detect viruses. Checksumming, for example, uses mathematical calculations to compare the state of executable programs before and after they are run. If the checksum has not changed, then the system is uninfected. Checksumming software can detect an infection only after it has occurred, however. As this technology is dated and some viruses can evade it, Checksumming is rarely used today.

Most antivirus packages also use *heuristics* (problem-solving by trial and error) to detect new viruses. This technology observes a program's behavior and evaluates how closely it resembles a virus. It relies on experience with previous viruses to predict the likelihood that a suspicious file is an as-yet unidentified or unclassified new virus.

Other types of antiviral software include monitoring software and integrity-shell software. Monitoring software is different from scanning software. It detects illegal or potentially damaging viral activities such as overwriting computer files or reformatting the computer's hard drive. Integrity-shell software establishes layers through which any command to run a program must pass. Checksumming is performed automatically within the integrity shell, and infected programs, if detected, are not allowed to run.

Containment and recovery.

Once a viral infection has been detected, it can be contained by immediately isolating computers on networks, halting the exchange of files, and using only write-protected disks. In order for a computer system to recover from a viral infection, the virus must first be eliminated. Some antivirus software attempts to remove detected viruses, but sometimes with unsatisfactory results. More reliable results are obtained by turning off the infected computer; restarting it from a write-protected floppy disk; deleting infected files and replacing them with legitimate files from backup disks; and erasing any viruses on the boot sector.

2.Translate the following words and word combinations into Russian:

1. potentially damaging viral activities

2. a write-protected floppy disk
3. to erase viruses on the boot sector
4. current and well-designed antiviral software
5. to predict the likelihood
6. the state of executable programs
7. common features of viral programs
8. to trick the computer's operating system
9. to follow the virus's instructions
10. to deliver the payloads

3. Translate the following words and word combinations into English:

1. обмен файлами
2. удалить выявленный вирус
3. антивирусное программное обеспечение
4. периодически обновлять
5. обеспечивать полную защиту от вирусов
6. определять присутствие вируса
7. загрузить инфицированную программу
8. напоминать вирус
9. излечиться от вируса
10. легитимный источник программного обеспечения

4. Insert the necessary preposition where it is needed:

1. to replace --- infected files --- legitimate files
2. Virus is a computer --- program that interferes --- a computer’s hardware.
3. A virus can attach itself --- e-mail messages.
4. Viruses often trick --- the computer user --- running the viral program.
5. Computer users can prepare --- a viral infection.
6. The best prevention can be the installation --- antiviral system.
7. Antiviral packages provide --- complete protection --- viruses.
8. It relies --- experience --- previous viruses.
9. Monitoring software is different --- scanning software.
10. Checksumming is performed --- automatically --- the integrity shell.

5. Change the sentences so you could use Complex Object or Complex Subject.

1.They say, that computer viruses grew more sophisticated in the 1990s.

2.Monitoring software is different from scanning software.

3.Computer users can prepare for a viral infection by creating backups of legitimate original software and data files regularly.

4.The payload may disrupt or change data files, display an irrelevant or unwanted message, or cause the operating system to malfunction.

5.Checksumming software can detect an infection only after it has occurred.

6. Find Complex Object or Complex Subject in each sentence.

1. A Trojan horse is a program that pretends to be something else.
2. A Trojan horse may appear to be something interesting and harmless, such as a game, but when it runs it may have harmful effects.
3. Like any other computer program, a virus must be executed for it to function.
4. The Love Bug is said to have infected 1 in every 5 PCs worldwide.

5. Viral infection is expected to be prevented by obtaining software from legitimate sources or by using a quarantined computer to test new software.

7. Answer the following questions:

1. What is a computer virus?
2. What are they designed for?
3. Where can viruses be located?
4. What is called "the payload of the virus"?
5. What can the payload do?
6. What can a computer virus do?
7. What are the ways of getting the infection?
8. How can a viral infection be prevented?
9. What types of antiviral software can be used to detect the presence of a virus?
10. What can scanning software do?
11. What is the difference between on-access scanners and on-demand scanners?
12. What is the difference between monitoring software and scanning software?
13. What is checksumming?
14. What does the word "heuristics" mean?
15. What does this technology do?
16. What must be done to help the computer system to recover from a viral infection?

UNIT 8

PROGRAMMING

Grammar focus. **Participles 1, 2. (Причастия настоящего и прошедшего времен.)**

Participle 1 (причастие настоящего времени) – неизменяемая неличная форма глагола, не имеющая форм абсолютного времени, падежа, числа и рода. Причастие 1 соответствует русскому причастию действительного залога настоящего времени с суффиксами **~ущ (~ющ)** *изучающий,* и **~ащ (~ящ)** *говорящий*.

Причастие 1 образуется от основы инфинитива при помощи суффикса ~ing : read – reading; play – playing; make – making; open – opening; travel – traveling; lie – lying.

E.g. *the man reading the manual – человек, читающий инструкцию.*
a falling star – падающая звезда
the boy playing the piano – мальчик, играющий на пианино
He smiled, leaving the room. – Он улыбнулся, покидая комнату.

Participle 2 (причастие прошедшего времени) правильных глаголов (regular verbs) образуется так же, как и форма прошедшего времени группы Indefinite, т.е. путем прибавления окончания ~ed с соответствующими орфографическими изменениями.

E.g. *call<u>ed</u> - названный*
employ<u>ed</u> – задействованный

finished – законченный

Причастие 2 неправильных глаголов (irregular verbs) образуется при помощи их 3 формы.

E.g. *written – написанный*

found – найденный

begun – начатый

taken - взятый

Причастие 2 очень часто употребляется в функции определения к существительному. Если причастие в функции определения не имеет при себе пояснительных слов, оно может стоять перед существительным, которое им определяется, например:

the discussed question = the question discussed обсужденный вопрос

they discussed the designed software – они обсудили разработанное программное обеспечение

she mentioned the e-mail sent a few minutes ago – она упомянула сообщение, посланное несколько минут назад.

1. Translate into Russian.

1. The symbol used are the usual ones. 2. This is the situation discussed in the paper. 3. He felt bored, looking through the papers. 4. He wrote about new drugs producing remarkable results. 5. I used the information stored on computer. 6. Computer science offers greatly varying programming languages. 7. The article was about the software making it easy to create colorful graphs. 8. Programmers working in a mainframe environment prepare instructions for a computer operator. 9. The book written by this scientist is of great use. 10. She was frowning, reading the letter received by her yesterday.

2. Open the brackets and insert the proper form of participles.

1. A fish (take) out of water cannot live. 2. Software designers (develop) a program must consider many factors. 3. A program (write) in a programming language must be translated into machine language. 4. (Sit) near the fire, he felt very warm. 5. She paused, (wait) for Myles to say something. 6. Computer memory is a mechanism (store) data for use by a computer. 7. The lawyer didn't consider the (give) explanation. 8.We learned the results (obtain) through these surveys.

3. Translate into English.

a) заканчивая работу; забытая история; растущие цены; усовершенствованная программа; написанное слово; падающие листья; поющие люди; картина, увиденная мною; переводя статью; упомянутые данные; зависящий от результата.

b) 1. Мальчик, бегущий мимо дома вдруг остановился. 2. Он упомянул программу, написанную специально для этой цели. 3. Лежа на диване, он читал книгу. 4. Она ничего не знала об информации, сохраненной не жестком диске. 5. вот письмо, полученное мною вчера. 6. Ни одна из существующих программ не ответила их требованиям.

4. Open the brackets and insert the proper form of participles.

1. Leyland mentioned the microcomputer (design) to control the ratios.
2. She wrote about her income (vary) considerably from one month to the next.
3. This is a basic type of programming languages (understand) directly by a computer.
4. I mentioned programming languages (write) to address different computing problems.
5. The article focused on laser beams (employ) to make the computer chips.
6. Do you have any evidence (support) these claims?
7. Look at the man (speak) to the Chairman. Do you know him?

8. Candidates will have to give a presentation on a (give) topic.

Word and phrase study. (Revision)

1. Form nouns from the following verbs and translate them into Russian:
-ance: to allow, to occur
-ion/tion/sion: to execute, to contribute, to transit, to appropriate, to expand
-ment: to arrange, to require

2. Form adverbs from the following adjectives, using the suffix *~ly* and provide their translation. (E.g.: *strong – strongly)*
simple, repeated, direct, rapid, common, primary, increasing, previous, inherent, main.

3. Form the past tense (as well as past participle forms) for the following regular verbs and mind the spelling when adding *~ed*.
to dry, to play, to decide, to turn, to study, to execute, to plan, to scan, to base, to argue

Lexis

4. Read and memorize the pronunciation of the following words.
Sequence, environment, routine, aware, occur, ensure, appropriate, debug, centralized, manual, various, financial, actual, efficiency, primarily, spreadsheet

5. Translate the following word combinations into Russian.
Extraordinary capabilities, to debug a program, sequence of instructions, work environment, to modify a program, a section of code, routine, to fix a problem, mainframe environment, packaged software, database management, compiled instructions

6. State the part of speech of the following words and translate into Russian:
To involve – involving – involvement; to complete – completion – complete; to distinct – distinction – distinctive; to contribute – contribution; to educate – educational – education; to require – requirement; to occur – occurrence.

Reading
1. Read and translate the text. Find the participles 1, 2.

Programmer

Computer programs are simply lists of instructions for the computer to execute. These can range from just a few instructions which perform a simple task, to a much more complex instruction list including also tables of data. Many computer programs contain millions of instructions, and many of those instructions are executed repeatedly. Computers do not gain their extraordinary capabilities through the ability to execute complex instructions. Rather, they do millions of simple instructions arranged by people known as programmers.

Programmer is an individual who writes and debugs computer programs—the sometimes lengthy sequences of instructions that determine the work performed by a computer. Depending

on the size of the project and the work environment, a programmer might work alone or as part of a team, be involved in part or all of the process from design through completion, or write all or a portion of the program.

Many programmers update, repair, modify, and expand existing programs. When making changes to a section of code, called a routine, programmers need to make other users aware of the task that the routine is to perform. They do this by inserting comments in the coded instructions so that others can understand the program.

Programmers test a program by running it to ensure that the instructions are correct and that the program produces the desired outcome. If errors do occur, the programmer must make the appropriate change and recheck the program until it produces the correct results. This process is called testing and debugging. Programmers may continue to fix these problems throughout the life of a program. Programmers working in a mainframe environment, which involves a large centralized computer, may prepare instructions for a computer operator who will run the program. Programmers also may contribute to a manual for persons who will be using the program.

Programmers in software development companies may work directly with experts from various fields to create software—either programs designed for specific clients or packaged software for general use—ranging from games and educational software to programs for desktop publishing and financial planning. Programming of packaged software constitutes one of the most rapidly growing segments of the computer services industry.

In some organizations, particularly small ones, workers commonly known *as programmer-analysts* are responsible for both the systems analysis and the actual programming work. Advanced programming languages and new object-oriented programming capabilities are increasing the efficiency and productivity of both programmers and users. The transition from a mainframe environment to one that is based primarily on personal computers (PCs) has blurred the once rigid distinction between the programmer and the user. Increasingly, adept end users are taking over many of the tasks previously performed by programmers. For example, the growing use of packaged software, such as spreadsheet and database management software packages, allows users to write simple programs to access data and perform calculations.

Computer programming (often simply programming or coding) is the craft of writing a set of commands or instructions that can later be compiled and/or interpreted and then inherently transformed to an executable that an electronic machine can execute or "run". Programming requires mainly logic, but has elements of science, mathematics, engineering, and — many would argue — art.

2. Explain the meaning of the following:

1.The transition from a mainframe environment to one that is based primarily on personal computers (PCs) has blurred the once rigid distinction between the programmer and the user.
2.Programmers also may contribute to a manual for persons who will be using the program.
3.Programming requires mainly logic but has elements of art.

3. Convert the following into passive:

1.Many computer programs contain millions of instructions.
2.The programmers updated and modified these programs.
3.Programmers will contribute to a manual for users of the program.
4.Problems with the mirrors blurred the telescope's view.
5.The debuggers have allowed users to download source code in real-time.
6.A new furnace had given them increased efficiency and more heat output.

7.Advanced programming languages are increasing the productivity of both programmers and users

8. A good manager will involve everyone in the decision-making process.

4. Answer the following questions:

1. What has the transition from a mainframe environment to the one based primarily on personal computers (PCs) lead to?
2. How do programmers test programs?
3. What is debugging?
4. What for do programmers insert comments in the coded instructions?
5. What is the practical application of spreadsheet and database management software packages?

Revising

1. Translate the following sentences into English replacing the object clauses by Complex Object.

Я хочу (желаю, хотел бы):

- чтобы вы осознавали опасность этого шага
- чтобы они видоизменили команду
- чтобы он компилировал программу
- чтобы она решила эту проблему
- чтобы они обновили информацию

2. Convert the following into passive:

1. Many computer programs contain millions of instructions
2. The programmers updated and modified these programs.
3. Programmers will contribute to a manual for users of the program.
4. Problems with the mirrors blurred the telescope's view.
5. The debuggers have allowed users to download source code in real-time.
6. A new furnace had given them increased efficiency and more heat output.
7. Advanced programming languages are increasing the productivity of both programmers and users
8. A good manager will involve everyone in the decision-making process.

3. Match the following:

to contribute to increase to expand to access to decrease

1. to become larger in number, amount, price, value etc
2. to reduce something, especially by a fairly small amount or number
3. to become bigger and spread around
4. to get the right or ability to log on to a computer system or use a computer program
5. to help to make something happen

UNIT 9

Grammar focus: Participles

	VOICE ASPECT	ACTIVE	PASSIVE
PARTICIPLE I	**INDEFINITE**	***Playing*** ***Standing***	***Being played***
	PERFECT	***Having played*** ***Having stood***	***Having been played***
PARTICIPLE II			***Played***

Функции причастий:

Обстоятельство (соответствующее русскому деепричастию)

- I spent most of the time answering questions.
- Having finished the work, he4 left the laboratory.
- Not knowing the address, we couldn't write to him.
- While working on my report, I read a number of interesting articles.
- Finishing the work he could notice the changes.
- Having executed the instruction, the program failed.
- Buying a computer, you should be very careful.
- When entering the Internet, I always find a lot of interesting information.

Обстоятельство (соответствующее придаточному предложению)

- Being asked he couldn't answer anything.
- Well done the device will work properly.
- Though never built Babbage's analytical machine was the basis for today's computers.
- Having been coded the instruction was transmitted to the central processing unit.
- When written in a symbolic language programs require the translation into the machine language.
- Having been rechecked the program produced the correct result.
- When archiving, ARJ doesn't sort filenames.
- When designing your site, think about whether it needs to be interactive or informational.

1. Translate the following word-combinations using participles.

Recorded information; recording information; doing the work; having received the telegram; the army defeated; the conference being held now; a falling star; the situation discussed in the paper; the man reading the manual; the article having been referred to; to produce the desired outcome; having modified the program; the program being updated; depending on the manufacturer; being tested by the programmer.

2. Translate into English.

Заканчивая работу; люди, ожидающие вас; забытая история; строящийся дом; применяемые методы; отладив программу; зависящий от результата; дорога, которую

недавно отремонтировали; переводя статью; эксперимент, который сейчас проводится; проверив результаты; будучи опытным специалистом; человек, занимающийся научными исследованиями.

3. Replace the infinitives in brackets by the appropriate form of the participle.
1. She stayed (lock) in her room, (refuse) to come downstairs. 2. He has a good practical knowledge of the language, (work) as an interpreter for many years. 3. The new methods (use) in the building of houses proved to be more effective. 4. They went out (see) by no one. 5. I was terribly disappointed (discover) that he had lied to me. 6. The number of apartment houses (build) for the population of our city is rapidly growing. 7. He had an accident (drive) to work. 8. (Show) in, he was asked to wait for a while. 9. The problem (discuss) now is of utmost importance. 10. The lawyer didn't consider the (give) explanation to be convincing.

4. Translate into English.
1. Они быстро шли, оживленно разговаривая о чем-то. 2. Вот список студентов, участвующих в конференции. 3. Конференция, проходящая сейчас в университете, посвящена проблемам ядерной физики. 4. Ученый, написавший эту статью, сделает доклад на конференции. 5. Прочитав письмо, он положил его в ящик стола. 6. она провела все утро за уборкой квартиры. 7. Так как он прожил в Лондоне много лет, он знал город хорошо. 8. Мы хорошо провели время, купаясь и загорая на солнце.

5. Open the brackets using the proper form of a participle as an adverbial modifier.
1. Be careful while (cross) the street. 2. (read) the book, he went to the library. 3. (prescribe) the medicine, the doctor went away. 4. The new method, (apply), failed. 5. She paused, (wait) for Miles to say something. 6. He cut himself (shave). 7. (leave) alone, I went on with my work. 8. I lost my way, (show) the wrong directions. 9. (finish) our work, we went home. 10. When (compile) the program, I got some errors. 11. The (do) work was well paid for. 12. (examine) by the customs, the goods were let through.

Word study

1. **Fill in the blanks**:

Verb	Noun	Adjective
to vary		
	sophistication	
to differ		
		definite
	specification	

2. **Read and guess the meaning of the international words.**

Instr`uction, grammar, interpret`tation, `model, punctuation, design, add`ress, `category

3. Translate the following word combinations into Russian:
Artificial language, sequence of instructions, multiple ways, degree of versatility, scientific applications, highly portable, commonly employed programming language, to manipulate data, linguistic sophistication, imperative programming language, to hit the market, to be currently available, object-oriented programming.

4. State the type of the used participles:
An *executed* instruction / *varying* types of languages / a *broken* glass / languages *written* by them / *classified* languages / a *falling* star / a *fixed* problem / a *performed* operation /

5. Find the equivalents:
a) 1. fall into 2. for instance 3 still 4. whilst 5. strictly speaking 6. such as 7. even
8. highly 9. . including
b) 1. принадлежать (к классу, категории)2. пока 3. в том числе 4. даже 5. все еще 6. такой как 7. очень, в высшей степени 8 строго говоря. 9. например

Reading

1. Read the text.

Programming languages

Programming Language, in computer science, is an artificial language used to write a sequence of instructions (a computer program) that can be run by a computer. Similar to natural languages, such as English, programming languages have a vocabulary, grammar, and syntax. However, natural languages are not suited for programming computers because they are ambiguous, meaning that their vocabulary and grammatical structure may be interpreted in multiple ways. The languages used to program computers must have simple logical structures, and the rules for their grammar, spelling, and punctuation must be precise.

Computer science offers programming languages varying greatly in their sophistication and in their degree of versatility. Here we come to mention programming languages written to address a particular kind of computing problem or for use on a particular model of computer system. For instance, programming languages such as Fortran and COBOL were written to solve certain general types of programming problems—Fortran for scientific applications, and COBOL for business applications. Although these languages, designed to address specific categories of computer problems, are highly portable, meaning that they may be used to program many types of computers.

Other languages, such as machine languages, are designed to be used by one specific model of computer system, or even by one specific computer in certain research applications. The most commonly employed programming languages are highly portable and can be used to effectively solve diverse types of computing problems. Languages like C, PASCAL, and BASIC fall into this category.

Language structure and components.

Programming languages use specific types of statements, or instructions, to provide functional structure to the program. A statement in a program is a basic sentence expressing a simple idea—its purpose is to give the computer a basic instruction. Statements define the types of data allowed, how data are to be manipulated, and the ways that procedures and functions work. Programmers use statements to manipulate common components of programming languages, such as variables and *macros* (mini-programs within a program).

Programming languages can be classified as either *low-level languages* or *high-level languages*. Low-level programming languages, or machine languages, are the most basic type of programming languages understood directly by a computer. Machine languages differ depending on the manufacturer and model of computer. High-level languages are programming languages that must first be translated into a machine language before they can be understood and processed by a computer. Examples of high-level languages are C, C++, PASCAL, and Fortran. *Assembly languages* are intermediate languages that are very close to machine language and do not have

the level of linguistic sophistication exhibited by other high-level languages, but must still be translated into machine language.

Examples of computer programming languages in an almost evolutionary order.

1. **FORTRAN** is a general-purpose, procedural, imperative programming language that is especially suited to numeric computation and scientific computing. Originally developed by John Backus of International Business Machines Corporation (IBM) in the 1950s for scientific and engineering applications.
2. **C** is a compiled procedural, imperative programming language made popular as the basis of Unix.
3. **Pascal** is a general-purpose structured language named after the famous mathematician and philosopher Blaise Pascal. It was very popular during the '80s and '90s. Whilst popularity of Pascal itself has waned (its principal use is in teaching of programming); languages derived from it (such as Object Pascal) are still in use.
4. **BASIC** (Beginner's All purpose Symbolic Instruction Code), typically seen as a language for learning programming, was invented by John Kemeny and Thomas Kurtz of Dartmouth College. It became the most widely used language when microcomputers first hit the market, in the 70s and '80s. Many dialects of BASIC have been produced.
5. **C++** is a compiled programming language based on C, with support for object-oriented programming. It is one of the most widely used programming languages currently available. C++ was developed by Bjarne Stroustrup and was based on the programming language C. C++ retains the syntax and many familiar functions of C, but also adds various concepts associated with other programming paradigms, such as classes.
7. **Java** is an object oriented interpreted programming language. It has gained popularity in the past few years for its ability to be run on many platforms, including Solaris, Linux, Microsoft Windows, Mac OS and other systems. It was developed by Sun Microsystems.
8. **The Delphi Language** is the name of the Object Pascal derivative that is the primary language of later versions of Borland's Delphi Studio integrated development environment.
9. **Python** is an interpreted, dynamically typed, object-oriented language that has some unique syntax features (like the significance of indentation). Though strictly speaking an interpreted language, its usage domain follows that of Java and C#.
10. **PHP** is a newer programming language with focus on web design. It has a C-like syntax.

2. Give the English for:

1. подходящий, пригодный. 2. похожий. 3. степень многосторонности. 4. применение в области бизнеса. 5. широко применяемый. 6. универсальный язык. 7. обрести популярность. 8. среда разработки

3. Answer the following questions:

1. What is a compiled programming language?
2. What is an object-oriented programming language?
3. What languages were written for scientific and business applications?
4. Why can’t natural languages be used for programming computers?

5. What advantages do the most commonly employed programming languages possess according to the text?
6. What defines the types of data allowed? How?
7. What for do programmers use statements?

4. Open the brackets using proper forms of a participle.

1. (vary) greatly, programming languages are offered by computer science.
2. (write) a sequence of instructions, he paused to check the (do) work.
3. (use) on a particular model of computer system, the programming languages proved to be suited for.
4. (run) by the computer, the program suddenly failed.
5. (solve) diverse types of computing problems, the programming language proved to be highly effective.

5. Translate into English using the proper form of a participle.

1. Полученное вчера известие взволновало всех. 2. Некоторые вопросы, которые затрагиваются в докладе, заслуживают внимания. 3. Купив билеты, мы решили навестить друзей. 4. Люди, ожидавшие вас, только что ушли. 5. К сожалению, я не смог посетить проходившую тогда конференцию. 6. После просмотра фильма мы пошли домой. 7. Когда правило объяснили еще раз, оно показалось совсем легким. 8. Вот письмо, полученное мною вчера. 9. Поспав два часа, я чувствовал себя отдохнувшим. 10. Выходя из автобуса, он поскользнулся и упал.

6. Translate the proverbs and sayings.

Money saved is money gained.
A trouble shared is trouble halved.
Entering or leaving room with ladies don't rush before them. Remember the golden rule for every gentleman: "Ladies first".
Among the things most often opened by mistake is the mouth.

7. Match the following.

ambiguous portable certain suited for artificial sophisticated

1. very advanced, and better designed or more skillfully made than other things of the same type, and often working in a complicated way
2. designed to be light or compact enough to carry or move easily from place to place
3. appropriate, fitting something in order to meet requirements or circumstances
4. having more than one possible meaning, so that it is not clear which meaning is intended
5. definitely known, fixed, or settled
6. made by human beings rather than occurring naturally

<u>Speaking</u>

In pairs, discuss the development and future of the programming languages listed above.

Unit 10

Grammar focus: **Absolute Participial Constructions** (Независимый причастный оборот)

На русский язык независимый причастный оборот переводится:

1. Придаточным обстоятельственным предложением, вводимым союзами *когда, после того как, так как, если* и пр.

All preparations being made, they started the experiment.
(Когда все приготовления были сделаны, они начали эксперимент.)

The day being warm, we opened the window.
(Так как день был теплый, мы открыли окна.)

Weather permitting, we'll be able to get there on Monday.
(Если позволит погода, мы сможем добраться туда в понедельник.)

2. Простым предложением в составе сложносочиненного предложения путем бессоюзного соединения или вводимого союзами *причем, и, а.*

The article deals with high-level programming languages, **particular attention being paid to C language.**
(Статья посвящена высокоуровневым языкам программирования, причем особое внимание уделено языку С.)

3. Некоторые независимые причастные обороты начинаются предлогом *with.* На русский язык такие обороты переводятся таким же способом, что и независимые причастные обороты без предлога.

With the experiments having been carried out, they started new investigations.
(После того как были проведены эксперименты, они начали исследования.)

1. Read the following:

His story told, he leaned back and sighed. – *Когда его история была рассказана,* он откинулся назад и вздохнул.
She stood silent, *her lips pressed together.* – Она стояла молча, *плотно сжав губы.*
The hour being late, she hastened home. – *Так как время было поздним,* она поспешила домой.
His search being vain, he logged off. – *Так как его поиски были безуспешными,* он вышел из сети.
This material being a dielectric, no current can flow through it. – *Так как этот материал является диэлектриком,* он не пропускает ток.
Any moving object can do work, *the quantity of kinetic energy depending on its mass and velocity.* – Любой движущийся объект может совершать работу, *при этом объем кинетической энергии зависит от его массы и скорости.*
The hard disk being damaged, a lot of data was lost. – *Так как жесткий диск был поврежден*, много информации было утеряно.
The electrons move with varying velocities, *their velocity depending on the temperature and nature of the material.* – Электроны движутся с различной скоростью, *при этом их скорость зависит от температуры и природы материала.*

We downloaded new firmware, *this version offering new features.* – Мы загрузили новую прошивку, *версия которой содержала большее кол-во новых функций.*

2. Translate into Russian.

1. **The vessel being pretty deep in the water** and **the weather being calm** there was but little motion.
2. **Their research revealing nothing**, Clyde and she walked to a corner.
3. The next morning, **it being Sunday**, they all went to the library.
4. We started about five, **Smith having informed us** that the way be long.
5. The CPU controls the operation of the entire system, **commands being issued to other parts of the system.**
6. **It being pretty late**, they decided to postpone the visit.
7. **The conference being over**, the stand up-meal came next.
8. **Remarkable results having being produced by the new drugs,** we were contented.
9. **Poisonous gases being produced by improperly burned fuel,** the air has been polluted.
10. **The information from the survey having been processed by computer**, the results surprised us.
11. Then they heard the noise of the plane, **its shadow passing over the open glade.**
12. **The Internet being large**, it has lots of types of server computers dishing out information.
13. **The virtual tour including multimedia displays**, we can be shown how the market works.
14. **Adequate IT support being not resorted to**, it's no wonder you lose so much time through computer problems.
15. **Andy having bothered trying to fix things that go wrong on his computer,** the problem was finally left to the techies.
16. **His first job being a systems analyst,** he reorganized the way the store's stock was recorded.
17. **The program being remarkably user-friendly**, it can be learned by anyone.
18. **The file having been deleted by mistake**, we were hindered in our work.
19. **The latest sports scores being continuously scrolled on the screen,** sports fans might learn them any time.
20. I double-clicked on an icon to launch the application, **my eyes fixed on the screen.**
21. **An electron leaving the surface**, the metal becomes positively charged.
22. **With the program having been compiled,** they tested and corrected it.
23. **The situation being favourable,** they bought the shares.

Reading

1. **Read the text and think of the main functions of the Internet.**

Internet

Internet is a computer-based global information system. The Internet is composed of many interconnected computer networks. *Each network may link tens, hundreds, or even thousands of computers, enabling them to share information with one another* and to share computational resources such as powerful supercomputers and databases of information. *The Internet has made it possible for people all over the world to communicate with one another effectively and inexpensively*. Unlike traditional broadcasting media, such as radio and television, the Internet does not have a centralized distribution system. Instead, an individual who has Internet access can communicate directly with anyone else on the Internet, make information available to others, find information provided by others, or sell products with a minimum overhead cost.

The Internet has brought new opportunities to government, business, and education. Governments use the Internet for internal communication, distribution of information, and automated tax processing. *In addition to offering goods and services online to customers, businesses use the Internet to interact with other businesses*. Many individuals use the Internet for communicating through electronic mail (e-mail), reading news, researching information, shopping, paying bills, and banking. *Educational institutions use the Internet for research and to deliver courses and course material to students*.

Uses of the internet. Media and entertainment companies use the Internet for online news and weather services and to broadcast audio and video, including live radio and television programs. Online chat allows people to carry on discussions using written text. Instant messaging enables people to exchange text messages in real time. *Scientists and scholars use the Internet to communicate with colleagues, perform research, distribute lecture notes and course materials to students, and publish papers and articles*. Individuals use the Internet for communication, entertainment, finding information, and buying and selling goods and services.

How the internet works. The term *Internet access* refers to the communication between a residence or a business and an ISP that connects to the Internet. Access falls into two broad categories: dedicated and dial-up. With dedicated access, a subscriber's computer remains directly connected to the Internet at all times through a permanent, physical connection. Most large businesses have high-capacity dedicated connections; small businesses or individuals that desire dedicated access choose technologies such as digital subscriber line (DSL) or cable modems, which both use existing wiring to lower cost. A DSL sends data across the same wires that telephone service uses, and cable modems use the same wiring that cable television uses. In each case, *the electronic devices that are used to send data over the wires employ separate frequencies or channels that do not interfere with other signals on the wires*. Thus, a DSL Internet connection can send data over a pair of wires at the same time the wires are being used for a telephone call, and cable modems can send data over a cable at the same time the cable is being used to receive television signals. The user usually pays a fixed monthly fee for a dedicated connection. In exchange, the company providing the connection agrees to relay data between the user's computer and the Internet.

All *information* is transmitted across the Internet in small units of data called packets. Software on the sending computer divides a large document into many packets for transmission; software on the receiving computer regroups incoming packets into the original document. Similar to a postcard, each packet has two parts: a packet header specifying the computer to which the packet should be delivered, and a packet payload containing the data being sent. The header also specifies how the data in the packet should be combined with the data in other packets by recording which piece of a document is contained in the packet.

Electronic mail, or e-mail, is a widely used Internet application that enables individuals or groups of individuals to quickly exchange messages, even if they are separated by long distances. A user creates an e-mail message and specifies a recipient using an e-mail address, which is a string consisting of the recipient's login name followed by an @ (at) sign and then a domain name. E-mail software transfers the message across the Internet to the recipient's computer, where it is placed in the specified mailbox, a file on the hard drive. The recipient uses an e-mail application to view and reply to the message, as well as to save or delete it. Because e-mail is a convenient and inexpensive form of communication, it has dramatically improved personal and business communications.

Although the World Wide Web is the most popular application, other Internet applications are widely used. For example, the *Telnet* application enables a user to interactively access a remote computer. Telnet gives the appearance that the user's keyboard and monitor are connected directly to the remote computer. For example, a businessperson who is visiting a location that has

Internet access can use Telnet to contact their office computer. Doing so is faster and less expensive than using a dial-up modem.

The future of the Internet. Several technical challenges must be overcome if the Internet is to continue growing at the current phenomenal rate. The primary challenge is to create enough capacity to accommodate increases in traffic. *Internet traffic is increasing as more people become Internet users and existing users send greater amounts of data*. If the volume of traffic increases faster than the capacity of the network increases, congestion will occur, similar to the congestion that occurs when too many cars attempt to use a highway.

Another challenge involves IP addresses. Although the original protocol design provided addresses for up to 4.29 billion individual computers, the addresses have begun to run out because they were assigned in blocks. Researchers developed technologies, such as Network Address Translation (NAT), to conserve addresses. NAT allows multiple computers at a residence to "share" a single Internet address.

Other important questions concerning Internet growth relate to government controls, especially taxation and censorship. Because the Internet has grown so rapidly, governments have had little time to pass laws that control its deployment and use, impose taxes on Internet commerce, or otherwise regulate content.

Increasing commercial use of the Internet has heightened security and privacy concerns. With a credit or debit card, an Internet user can order almost anything from an Internet site and have it delivered to their home or office. Companies doing business over the Internet need sophisticated security measures to protect credit card, bank account, and social security numbers from unauthorized access as they pass across the Internet

2. Paraphrase the italicized sentences using the Absolute Participial Construction.

3. Paraphrase the following sentences using the Absolute Participial Construction.

1. **As the front door was open**, she could see straight through the house.
2. Frank had no desire to work in the lab, **for it was to his mind the most boring place**.
3. **As the situation was urgent,** we had to go ahead.
4. **When the greetings were over,** the Dean seated himself on the panel.
5. We set off, **the rain was still coming down heavily.**
6. Dinner was served on the terrace, **as it was very close in the room.**
7. **There was in fact nothing to wait for,** and we got down to work.
8. A test satellite was launched from Cape Canaveral, **people's eyes were fixed on**
9. Hackers broke into the Pentagon's security system last night and **left a gibing message**.
10. **As discussions are conducted entirely by email**, the only software needed is your standard mail program.

4. Translate into English using the Absolute Participial Construction.

1. Так как было очень поздно, собрание было закрыто.
2. Так как все было готово, она решила отдохнуть.
3. Если условия позволят, мы обсудим это по конференц-связи.
4. Письмо было послано еще неделю назад, но я так и не получил ответ.
5. Песни были скачаны из Интернета, и он удовлетворенно вздохнул.
6. Он закончил работу, при этом файл был сохранен в другой директории.
7. Когда солнце зашло, сразу стало темно.
8. Мы пойдем на каток, если погода будет хорошей.
9. Когда текст был отсканирован, она отредактировала его.

10. Экзамен был чрезвычайно сложным, и надежда на успешную сдачу стремилась к нулю.

Revising

1. Use the proper form of infinitive.

a) The new version of the software seemed (retrieve) digital information successfully.
b) Thousands are known (execute) for this crime by now!
c) Each path is coded (show) the level of difficulty.
d) It was awful (wait) for you in the rain the whole evening.
e) You are required by law (wear) a seat belt.
f) We will not be able (execute) the programs without more funding.

2. Turn into passive:

a) Regulations require that students attend at least 90% of the lectures.
b) New drugs are producing remarkable results
c) He had searched the Web for cheap flights by that time.
d) Shoppers will send in their orders by computer and pick up their goods later.
e) She has stored standard letters on floppy discs.
f) We found a really good bar near the hotel.
e) Space exploration provides a symbol of national pride.

3. Match the following:

to search to enter to hack into to cut and paste to click on to drag to select to save to scroll to delete to copy to highlight

1. to put information into a computer by pressing the keys
2. to make a file, program etc that is exactly the same as another one
3. to make a computer keep the work that you have done in its memory or on a disk
4. to remove a piece of information from a computer's memory
5. to use the mouse to choose words or pictures on a computer screen, usually making them change color
6. to move up or down through a document on a computer
7. to look for information on a computer or on the Internet
8. to press a button on a mouse in order to choose something on the screen and make the computer perform a particular action
9. to remove a piece of information from one place in a computer program or document and put it in a different place instead
10. to mark words in a computer document in a different color so that you can see them easily or to separate it from the rest of the document
11. to move something on a computer screen by pulling it along with the mouse
12. to secretly and often illegally find a way to reach the information on someone else's computer system so that you can use, change, or damage it

4. Open the brackets using the verbs from ex.3.

1. To delete a block of text, _____ it and then press Del.
2. _____ down to see when the website was last updated.
3. _____ the files into a new folder.
4. To find a book on our site, you can _____ by author, title or subject.
5. When you _____ your credit card information – be sure it is safe.

6. _____ 'next' when you have finished filling out the form.
7. It's easier if you just _____ the information from one page to another.
8. Somebody _____ the company's central database.
9. I was _____ the picture into the new file (remove it and then make it appear in a new file).
10. You can _____ on the Internet for the names of dealers in your area, they are easy to find

Unit 11

Grammar focus: Revision (Participle 1, 2, Abs. Part. Construction)

1. Translate these sentences into Russian, paying attention to the participles.

1.Translating the article he looked up into the dictionary. Having translated the article he put the dictionary on the shelf.

2. Giving that explanation the teacher pointed to the diagram. Having given the explanation the teacher began to ask the pupils.
3. Returning home I called on my old friend. Having returned home I saw my old friend waiting for me.
4. Writing the report he looked through many books. Having written the report he gave it to his teacher.
5. My work having been finished, I left the office.
6. The film being very popular, it was difficult to get the tickets.
7. The moon being bright, we could see the path.
8. He went to the door and opened it, there being no one in the corridor.
9. All the preparations having been finished, the pioneers went on a hike.
10. It was very dark, there being no stars in the sky.
11. The sun having set, the tourists reached the place of their destination.
12. The meeting being over the concert began.
13. The girl writing on the blackboard is our monitor. Everything written here is correct.
14. The house surrounded by tall trees is very beautiful.
15. The tasks done by the students are very easy.

2. Form sentences according to the model:

To come home – to begin to do his lessons
Having come home, he began to do his lessons.
1.to finish work – to go to the cinema
2.to read a newspaper – to give it to his brother
3.to arrive in Moscow – to go to see her friends
4.to lose a pen – to buy a new one
5.to receive a telegram – to go home at once
6.to enter the room – to greet everybody
After he had passed all his exams he went to see his parents.
Having passed all his exams he went to see his parents.
1.After he had taken off his hat and coat, he went upstairs.
2.As she had read much on this question she wrote a very interesting article.

3.After she had arranged everything, she went home.
4.As he had lived in England for several years, he knew English very well.
5.As I had lost the key, I couldn't enter the room.
6.After he had returned from the expedition he made a very interesting report.

3. Translate into English

1.Перейдя через мост, он увидел маленькую деревню.
2.Закончив работу, они смогли отдохнуть.
3.Получив письмо от своей сестры, он решил поехать в Москву.
4.Повернув налево, мы увидели большую площадь.
5.Обсудив все детали написанного доклада, мы отправили его по электронной почте.
6.Купив новое платье, она пошла показать его своей сестре.
7.Написав письмо, он пошел на почту.
8.Приехав в Москву, они пошли в Большой Театр.
9.Читая книгу, он отмечал наиболее интересные отрывки.
10. Вернувшись домой, он увидел что ужин уже готов.

<u>Word formation</u> (Revision)

Add these prefixes to the words below and guess the meaning of the newly-formed words.

tele -

action, automatic system, camera, casting, center, college, command, compass, computing, conference, connection, consultation, control, teledetection, education, film, forum, mail, manipulation, meeting, message, monitoring, post, presence, program, service, view.

multi -

-address, cell, -bit, channel, -charge, -circuit, -component, -digit, -electron beam tube, -engine, -level, -microprocessor structure, -net, -purpose, -accelerator -effect, access, aspect search, bag filter, beam, camera shooting, cassette video tape recorder, chip.

sub -

acid, address, agent, algebra, alpine, antarctic forest, antenna, architecture, area, system, atmospheric, atomic, branch, case, cell, center, chain, channel, circuit, class, code, collection, committee, complex, component, concept, conscious, continent, contract, control, covering, culture, cycle.

ge(o) –

active, botanical, centric, chemical, chronological, corona, demographic marketing, dynamics, electric, graphic, information system, kinetic energy, logic, magnetic disturbance, physical equipment, politics, stationary orbit, system, techniques, tectonic.

<u>Lexis</u>

1.Remember the pronunciation of the following words.

Telecommunication, instantly, recipient, entertainment, copper, fiber, facsimile, satellite, cellular, evolve, coaxial, subscriber, visible, ionosphere, geostationary, geosynchronous, synchronicity, rotation, numerous.

2.Give the Russian equivalents to the following words.

Device, to transmit, instantly, remote, outer space, to provide, to convert, medium, wire-based, destination, copper wire, broadcast, image, variety, flexibility, facility, coaxial, amplifier, frequency, efficiently, network, to determine.

3.Translate the following phrases into English:

Определить географическое расположение, высококачественный сигнал, отдаленные территории, достигнуть места назначения, микроволновое радио, беспроводной, высокоскоростной Интернет, доступ, отправлять и получать сообщения.

Reading

1. Read the text "Telecomunications" and say, what is the most widespread means of telecommunications today and why.

TELECOMMUNICATIONS

Telecommunications – are the devices and systems that transmit electronic or optical signals across long distances. Telecommunications enables people around the world to contact one another, to access information instantly, and to communicate from remote areas. Telecommunications usually involves a sender of information and one or more recipients linked by a technology, such as a telephone system, that transmits information from one place to another. Telecommunications enables people to send and receive personal messages across town, between countries, and to and from outer space. It also provides the key medium for delivering news, data, information, and entertainment.

Telecommunications devices convert different types of information, such as sound and video, into electronic or optical signals. Electronic signals typically travel along a medium such as copper wire or are carried over the air as radio waves. Optical signals typically travel along a medium such as strands of glass fibers. When a signal reaches its destination, the device on the receiving end converts the signal back into an understandable message, such as sound over a telephone, moving images on a television, or words and pictures on a computer screen.

Telecommunications messages can be sent in a variety of ways and by a wide range of devices. The messages can be sent from one sender to a single receiver (point-to-point) or from one sender to many receivers (point-to-multipoint). Personal communications, such as a telephone conversation between two people or a facsimile (fax) message (Facsimile Transmission), usually involve point-to-point transmission. Point-to-multipoint telecommunications, often called broadcasts, provide the basis for commercial radio and television programming.

How telecommunications work.

Transmitting the signal.

Telecommunications systems deliver messages using a number of different transmission media, including copper wires, fiber-optic cables, communication satellites, and microwave radio. One way to categorize telecommunications media is to consider whether or not the media uses wires. Wire-based (or wireline) telecommunications provide the initial link between most telephones and the telephone network and are a reliable means for transmitting messages. Telecommunications without wires, commonly referred to as wireless communications, use technologies such as cordless telephones, cellular radio telephones, pagers, and satellites. Wireless communications offer increased mobility and flexibility. In the future some experts believe that wireless devices will also offer high-speed Internet access.

Wires and cables.

Wires and cables were the original medium for telecommunications and are still the primary means for telephone connections. Wireline transmission evolved from telegraph to telephone service and continues to provide the majority of telecommunications services. Wires connect

telephones together within a home or business and also connect these telephones to the nearest telephone switching facility.

Other wireline services employ coaxial cable, which is used by cable television to provide hundreds of video channels to subscribers. Much of the content transmitted by the coaxial cable of cable television systems is sent by satellite to a central location known as the headend. Coaxial cables flow from the headend throughout a community and onward to individual residences and, finally, to individual television sets. Because signals weaken as distance from the headend increases, the coaxial cable network includes amplifiers that process and retransmit the television signals.

Radio Waves.

Wireless telecommunications use radio waves, sent through space from one antenna to another, as the medium for communication. Radio waves are used for receiving AM and FM radio and for receiving television. Cordless telephones and wireless radio telephone services, such as cellular radio telephones and pagers, also use radio waves. Telephone companies use microwaves to send signals over long distances. Microwaves use higher frequencies than the radio waves used for AM, FM, or cellular telephone transmissions, and they can transmit larger amounts of data more efficiently. Microwaves have characteristics similar to those of visible light waves and transmit pencil-thin beams that can be received using dish-shaped antennas. Such narrow beams can be focused to a particular destination and provide reliable transmissions over short distances on Earth. Even higher and narrower beams provide the high-capacity links to and from satellites. The high frequencies easily penetrate the ionosphere (a layer of Earth's atmosphere that blocks low-frequency waves) and provide a high-quality signal.

Communications satellites.

Communications satellites provide a means of transmitting telecommunications all over the globe, without the need for a network of wires and cables. They orbit Earth at a speed that enables them to stay above the same place on Earth at all times. This type of orbit is called geostationary or geosynchronous orbit because the satellite's orbital speed operates in synchronicity with Earth's rotation. The satellites receive transmissions from Earth and transmit them back to numerous Earth station receivers scattered within the receiving coverage area of the satellite. This relay function makes it possible for satellites to operate as "bent pipes"—that is, wireless transfer stations for point-to-point and point-to-multipoint transmissions. Communications satellites are used by telephone and television companies to transmit signals across great distances. Ship, airplane, and land navigators also receive signals from satellites to determine geographic positions.

2. What is the Russian for:

To access information instantly, to provide the key medium, copper wire, strands of glass fibers, the receiving end, fiber-optic cables, wire-based telecommunications, initial link network, cellular radiotelephones, telephone switching facility, the medium for communication, coaxial cable, High-capacity links to and from satellites, reliable transmission, AM and FM radio, to operate as "bent pipes", a wide range of devices, headend.

3. What is the English for:

На дальние расстояния, доставлять новости, преобразовывать информацию, сообщение посланное по факсу, обеспечить основу для, спутник связи, надежные способы передачи сообщений, беспроводной телефон, возросшая мобильность, основные средства связи, посылать сигнал на дальние расстояния, высокие частоты, передавать большое

количество данных, проникать в ионосферу, по всему земному шару, сеть проводов, действовать синхронно с вращением Земли, зона приема сигнала спутника, многочисленный.

4. Translate into English, using Participle 1, 2 or Absolute Participial Construction:

1.Программист проверяет программу в действии, чтобы удостовериться, что все команды заданы верно и в конце достигается необходимый результат.

2. Получив сигнал с Земли, спутники передают его назад на многочисленные приемные станции, расположенные в зоне распространения сигнала спутника.

3. Когда сигнал достигает места назначения, устройство на принимающей стороне преобразует сигнал в сообщение, которое можно понять.

4. Телекоммуникационные системы передают информацию, используя медные провода, оптико-волоконный кабель, спутники связи и микроволновое радио.

5. Наиболее широко применяемые языки программирования довольно доступны и могут эффективно использоваться для решения различных проблем.

5. Translate into Russian:

1. Wireless telecommunications use radio waves, sent through space from one antenna to another, as the medium for communication.

2. Point-to-multipoint telecommunications, often called broadcasts, provide the basis for commercial radio and television programming.

3. Computer science offers programming languages varying greatly in their sophistication and in their degree of versatility.

4. Much of the content transmitted by the coaxial cable of cable television systems is sent by satellite to a central location known as the headend.

5. Having penetrated the ionosphere, the high frequencies provide a high quality signal.

6. Answer the questions:

1.What are telecommunications?

2.What devices can be used for contacting people?

3.Can there be any limits in distances while transmitting information from one place to another?

4.What types of information telecommunications devices can convert?

5.How can signals travel along a medium?

6.What is the difference between wireless and wireline transmission devices?

7.What wire-based transmission devices do you know?

8.Why is wireless telecommunications so popular nowadays?

9.What are the strong points of communications satellite's transmission?

10. In what spheres can communications satellites be used?

<u>Speaking</u>

1. Draw a plan of the text and tell a few words about the main telecommunications devices.

2. In dialogs discuss the positive and negative parts of telecommunications.

Unit 12

<u>Grammar focus:</u> Gerund.

Герундий (Gerund) является неличной формой глагола, соединяющей в себе свойства существительного и глагола. Герундий образуется путем прибавления суффикса –ing к основе глагола. В русском языке соответствующей формы глагола нет. На русский язык герундий может переводиться как

- существительное (отглагольное) (*Reading is useful*)
- деепричастие (*On arriving in Moscow I …)*
- глагол (*Stop talking*)
- целое придаточное предложение (*She knows of his being here*)

Если перед герундием стоит притяжательное местоимение или существительное в притяжательном падеже, то при переводе на русский язык они превращаются в подлежащее придаточного предложения.

I heard of Michael's living in Moscow.

I know of her being free today.

Если подлежащее выражено герундием с относящимися к нему словами, то обычно такие герундиальные обороты переводятся на русский язык придаточным предложением.

His being appointed to the post of director was quite unexpected.

Your taking part in this work is desirable.

Герундий, как и глагол, называет действие и имеет категории перфекта и залога.

To translate

Герундий / *Зал*	*Действительный*	*Страдательный*
Неперфектный	translating	being translated
Перфектный	having translated	having been translated

We spoke of inviting our friends to the cinema.

We spoke of being invited to the cinema.

We are proud of having invited an honored teacher to our Conference.

The children were proud of having been invited to the evening party.

Герундий обладает следующими чертами существительного:

1.может использоваться с притяжательными и указательными местоимениями

Her reading is good.

This reading is not up to the mark.

2.может использоваться с существительными в притяжательном падеже

Mary's reading is good today.

3.может употребляться с предлогом

On returning home he met Kate.

She was ashamed of having failed her exam.

Герундий также может использоваться в сочетаниях:

There is no use going there.

There is no sense in doing that.

Герундий широко употребляется в функции прямого дополнения, особенно после ряда глаголов:

To burst out, to avoid, to deny, to enjoy, to excuse, to forgive, to give up, to postpone, to start, to keep, can't help, to mind, to hate, to like, to feel like, to suggest, to remember, to need, to want, to be worth doing, to work, to appreciate, to practice, to admit, to finish, to postpone, to quit, to escape, to imagine, to consider.

Герундий в качестве дополнения употребляется с глаголами, имеющими предложное управление:

To accuse of, to approve of, to complain of, to speak of, to suspect of, to think of, to be tired of, to depend on, to insist on, to rely on, to agree to, to look forward to, to be sorry for, to thank for, to feel like, to look like, to prevent from, to succeed in, to object to, to take part in, to be ashamed of, to be surprised at, to be capable of, to be good at, to be sure of, to be afraid of, to be interested in, to hear of, to be fond of, to be pleased at \ with.

Exercises

1.Change the sentences like in the example.

When I returned home I found that the mail had not been delivered.
On (after) returning home I found that the mail had not been delivered.

1.After I had read the book I went to bed.
2.When I saw his pale disturbed face I realized that something had gone wrong.
3.When he arrived in the town he sent a telegram to his relatives.
4.After he has looked through the article he found many typing mistakes.
5.When she had checked the students' papers she singled out some typical mistakes.
6.After she had copied the telephone number she tried to memorize it.
7.When they received that letter they realized that it was necessary to take urgent steps.

He is sorry that he has done it (for)
He is sorry for having done it.

1.He was sure that he had seen him somewhere. (of)
2.She is glad that she has written this letter (of).
3.I remember that I have been asked about it before.
4.I was disappointed because they had refused to help me (at).
5.Excuse me that I didn't call you up yesterday (for).

Having translated the text, the student gave his translation to the teacher.
After translating the text, the student gave his translation to the teacher. (you can use prepositions on / after)

1.Having come home, I started working at once.
2.Having slept for about an hour, she was awakened by a loud voice.
3.Having graduated from the University, he went to England.
4.Having played with his toys, the boy put them into the box.
5.Having lived in this town for many years, we knew it very well.

2.Translate into Russian.

1.Without thinking long, he agreed to our offer.
2."You can't go home without finishing this task," said the teacher.
3.I can't tell you the whole story without reading it up to the end.
4.This article is difficult. You can't translate it without using the dictionary.
5.He went there without telling his friends about it.
6.She couldn't speak with him without quarrelling.
7.We knew of Mark Twain having written many humorous stories.
8.His leaving Moscow did not mean that he was disappointed in his work.
9.Her helping us showed that she was a good friend.
10. He forgot about her having studied at the University.
11. You know of his having lost his job.
12. He remembered having worked on a ship for some years.
13. The man understood that his getting the job depended on his answer.
14. He thanked the girl for her coming so soon.
15. The teacher insisted on this being done at once. After walking a short distance he came to the center of the town's business area.

3.Translate into English using Gerund.

1.Беседа с ним занимает обычно около часа.
2.Я пошел домой, надеясь на встречу с братом.
3.Мы были очень удивлены, что он сделал это задание.
4.Она пожаловалась на плохое самочувствие.
5.Перед тем как уйти, мы поблагодарили доктора за то, что он дал хороший совет.

Telecommunications systems.

Lexis

1.Practice the reading of the following words:

Broadband, modulate, teletype, telex, inexpensive, terminal, graphics, frequency, amateur, microwave, bounce, secure, triangulation, teleconference, terrestrial, installation, altitude, triangulation, civilian, visually, convergence, consumer, equipment, requirement, option, identification, voice mail.

2.Translate into Russian

A network of cables, point-to-point communication, stable, reliable, analog mode, a telephone network, to bounce, amateur radio operator, convergence, resemble, switching station, fiber-optic cable, to evolve, broadband connection, wireline (wireless) methods, to receive, to deliver, facsimile transmission, satellite plate, data requirements, to transmit a signal, to convert a signal.

Reading

What means of connection between people do you know?
What means of connection do you use: frequently \ sometimes \ never?

Read the text and answer the question: What means of connection between people are most popular nowadays and why?

Individual people, businesses, and governments use many different types of telecommunications systems. Some systems, such as the telephone system, use a network of cables, wires, and switching stations for point-to-point communication. Other systems, such as radio and television, broadcast radio signals over the air that can be received by anyone who has a device to receive them. Some systems make use of several types of media to complete a transmission. For example, a telephone call may travel by means of copper wire, fiber-optic cable, and radio waves as the call is sent from sender to receiver. All telecommunications systems are constantly evolving as telecommunications technology improves. Many recent improvements, for example, offer high-speed broadband connections that are needed to send multimedia information over the Internet.

Telephone.

The telephone network also uses both wireline and wireless methods to deliver voice communications between people, and data communications between computers and people or other computers. The part of the telephone network that currently serves individual residences and many businesses operates in an analog mode, uses copper wires, and relays electronic signals that are continuous, such as the human voice. Digital transmission via fiber-optic cables is now used in some sections of the telephone network that send large amounts of calls over long distances. However, since the rest of the telephone system is still analog, these digital signals must be converted back to analog before they reach users. The telephone network is stable and reliable, because it uses its own wire system that is powered by low-voltage direct current from the telephone company. Telephone networks modulate voice communications over these wires. A complex system of network switches maintains the telephone links between callers. Telephone networks also use microwave relay stations to send calls from place to place on the ground. Satellites are used by telephone networks to transmit telephone calls across countries and oceans.

Teletype, Telex, and Facsimile Transmission.

Teletype, telex, and facsimile transmission are all methods for transmitting text rather than sounds. These text delivery systems evolved from the telegraph. Teletype and telex systems still exist, but they have been largely replaced by facsimile machines, which are inexpensive and better able to operate over the existing telephone network. The Internet increasingly provides an even more inexpensive and convenient option. The teletype, essentially a printing telegraph, is primarily a point-to-multipoint system for sending text. The teletype converts the same pulses used by telegraphs into letters and numbers, and then prints out readable text. It was often used by news media organizations to provide newspaper stories and stock market data to subscribers. Telex is primarily a point-to-point system that uses a keyboard to transmit typed text over telephone lines to similar terminals situated at individual company locations.
Facsimile transmission now provides a cheaper and easier way to transmit text and graphics over distances. Fax machines contain an optical scanner that converts text and graphics into digital, or machine-readable, codes. This coded information is sent over ordinary analog telephone lines through the use of a modem included in the fax machine. The receiving fax machine's modem demodulates the signal and sends it to a printer also contained in the fax machine.

Radio

Radios transmit and receive communications at various preset frequencies. Radio waves carry the signals heard on AM and FM radio, as well as the signals seen on a television set receiving broadcasts from an antenna. Radio is used mostly as a public medium, sending commercial broadcasts from a transmitter to anyone with a radio receiver within its range, so it is known as a point-to-multipoint medium. However, radio can also be used for private point-to-

point transmissions. Two-way radios, cordless telephones, and cellular radio telephones are common examples of transceivers, which are devices that can both transmit and receive point-to-point messages.

Personal radio communication is generally limited to short distances (usually a few kilometers), but powerful transmitters can send broadcast radio signals hundreds of kilometers. Shortwave radio, popular with amateur radio enthusiasts, uses a range of radio frequencies that are able to bounce off the ionosphere. This electrically charged layer of the atmosphere reflects certain frequencies of radio waves, such as shortwave frequencies, while allowing higher-frequency waves, such as microwaves, to pass through it. Amateur radio operators use the ionosphere to bounce their radio signals to other radio operators thousands of kilometers away.

Television

Television is primarily a public broadcasting medium, using point-to-multipoint technology that is broadcast to any user within range of the transmitter. Televisions transmit news and information, as well as entertainment. Commercial television is broadcast over very high frequency (VHF) and ultrahigh frequency (UHF) radio waves and can be received by any television set within range of the transmitter.

Televisions have also been used for point-to-point, two-way telecommunications. Teleconferencing, in which a television picture links two physically separated parties, is a convenient way for businesspeople to meet and communicate without the expense or inconvenience of travel. Video cameras on computers now allow personal computer users to teleconference over the Internet. Videophones, which use tiny video cameras and rely on satellite technology, can also send private or public television images and have been used in news reporting in remote locations.

Cable television is a commercial service that links televisions to a source of many different types of video programming using coaxial cable. The cable provider obtains coded, or scrambled, programming from a communications satellite, as well as from terrestrial links, including broadcast television stations. The signal may be scrambled to prevent unpaid access to the programming. The cable provider electronically unscrambles the signal and supplies the decoded signals by cable to subscribers. Television users with personal satellite dishes can access satellite programming directly without a cable installation. Personal satellite dishes are also a subscriber service. Fees are paid to the network operator in return for access to the satellite channels.

Most television sets outside of the United States that receive programming use different types of standards for receiving video signals. The European Phase Alternative Line standard generates a higher-resolution picture than the sets used in the United States, but these television sets are more expensive. Manufacturers now offer digital video and audio signal processing, which features even higher picture resolution and sound quality. The shape of the television screen is changing as well, reflecting the *aspect ratio* (ratio of image height to width) used for movie presentation.

Global positioning and Navigation systems.

The United States Global Positioning System (GPS) and the Russian Global Orbiting Navigation Satellite System (GLONASS) are networks of satellites that provide highly accurate positioning information from anywhere on Earth. Both systems use a group of satellites that orbit around the north and south poles at an altitude of 17,500 km (10,900 mi). These satellites constantly broadcast the time and their location above Earth. A GPS receiver picks up broadcasts from these satellites and determines its position through the process of triangulation. Using the time information from each satellite, the receiver calculates the time the signal takes to reach it. Factoring in this time with the speed at which radio signals travel, the receiver calculates its

distance from the satellite. Finally, using the location of three satellites and its distance from each satellite, the receiver determines its position.

GPS services, originally designed for military use, are now available to civilians. Handheld GPS receivers allow users to pinpoint their location on Earth to within a few meters. One type of navigational tool used in automobiles integrates a GPS receiver with an intelligent compact disc player capable of displaying road maps and other graphical information. Upon receiving the GPS location data, the CD player can pinpoint the location visually on one of the road maps contained on disc.

Personal computers.

Personal computers use telecommunications to provide a transmission link for the delivery of audio, video, text, software, and multimedia services. Many experts believe that the convergence of these services will generate consumer demand for new generations of high-speed, broadband networks. Currently, the delivery of most of these audio, video, and text services occurs over existing telephone connections using the Internet. Some computers connect directly to the digital portion of the telephone network using the Integrated Services Digital Network (ISDN) or Digital Subscriber Lines (DSL), but this requires special equipment at user locations. Telephone and cable television companies must also make upgrades to their lines so that they can handle high-speed data transmission. In many locations companies and individuals with high-speed data requirements now have the option of securing DSL service from telephone companies and cable modem service from cable television companies.

Electronic mail, or e-mail, is a key attraction of the Internet and a common form of computer telecommunications. E-mail is a text-based message delivery system that allows information such as typed messages and multimedia to be sent to individual computer users. Local e-mail messages (within a building or a company) typically reach addressees by traveling through wire-based internal networks. E-mail that must travel across town or across a country to reach the final destination usually travels through the telephone network.

Instant messaging is another key feature of computer telecommunications and involves sending text, audio, or video data in real time. Other computer telecommunications technologies that businesses frequently use include automated banking terminals and devices for credit card or debit card transactions. These transactions either bill charges directly to a customer's credit card account or automatically deduct money from a customer's bank account.

Voice Over Internet Protocol (VOIP)

Voice Over Internet Protocol (VOIP) is a method for making telephone calls over the Internet by sending voice data in separate packets, just as e-mail is sent. Each packet is assigned a code for its destination, and the packets are then reassembled in the correct order at the receiving end. Recent technological improvements have made VOIP almost as seamless and smooth as a regular telephone call.

In February 2004 the Federal Communications Commission (FCC) ruled that VOIP, like e-mail and instant messaging, is free of government regulation as long as it involves communication from one computer to another. The FCC did not rule on whether VOIP software that sends voice data from a computer directly to a regular telephone should be regulated. Such services became available in the early part of the 21st century and are expected to become widely available. They require a broadband connection to the Internet but can reduce telephone charges significantly while also offering for free additional services such as call waiting, caller identification, voice mail, and the ability to call from your home telephone number wherever you travel.

3. Translate into English

1.выполнить передачу сигнала
2.отправить информацию через Интернет
3.цифровой канал передачи информации
4.передавать сигнал на различных частотах
5.электрически заряженные слои атмосферы
6.система доставки сообщений
7.сократить стоимость телефонных переговоров
8.отсылать информацию в форме голосовых сообщений
9.разработанный для использования в военных целях
10. передавать печатный текст по телефонной линии

4.Translate into Russian

1.to broadcast radio signals over the air
2.to relay electronic signals
3.to provide a transmission link
4.to bounce off the ionosphere
5.short wave frequencies
6.analog mode
7.commercial broadcasts
8.broadband networks
9.to prevent unpaid access to the programming
10. widely available

5. Insert the necessary preposition.

1.to make use … something
2.to travel … means … copper wire
3.to send calls … place … place
4.they were replaced … fax machines
5.it is a system … sending texts
6.to convert a text … digital code
7.they are examples … transceivers
8.the expense or inconvenience … travel
9.to teleconference … the Internet
10. to rely … satellite technology
11. fees are paid … return… access … the channel
12. standards … receiving video signals
13. ratio… image height … width
14. to provide information … anywhere … Earth
15. to orbit around the poles …an altitude …17.500 km
16. A GPS receiver picks …broadcasts…satellites
17. GPS services are available … civilians
18. to pinpoint location … …. a few meters
19. to connect directly … the digital network
20. to become free … government regulation

6. Translate the following sentences into Russian and find Gerund in it:

1. Providing a cheaper and easier way of transmitting text and graphics over air – is the main task of modern fax machines.
2. Radio is capable of transmitting and receiving communications at various preset frequencies.
3. Amateur radio enthusiasts are fond of using a range of radio frequencies that are able to bounce off the ionosphere.

4. Teleconferencing, in which a television picture links two physically separated parties, is a convenient way for businesspeople to meet and communicate without the expense or inconvenience of travel.

5. Videophones, which use tiny video cameras and rely on satellite technology, can also send private or public television images and have been used in news reporting in remote locations.

6. Manufacturers now offer digital video and audio signal processing, which features even higher picture resolution and sound quality.

7. One type of navigational tool used in automobiles integrates a GPS receiver with an intelligent compact disc player capable of displaying road maps and other graphical information.

8. Upon receiving the GPS location data, the CD player can pinpoint the location visually on one of the road maps contained on disc.

9. Connecting directly to the digital portion of the telephone network using the Integrated Services Digital Network (ISDN) or Digital Subscriber Lines (DSL) requires special equipment at user locations.

10. In many locations companies and individuals with high-speed data requirements now have the option of securing DSL service from telephone companies and cable modem service from cable television companies.

11. Local e-mail messages (within a building or a company) typically reach addressees by traveling through wire-based internal networks.

12. Voice Over Internet Protocol (VOIP) is a method for making telephone calls over the Internet by sending voice data in separate packets, just as e-mail is sent.

Speaking

Answer the questions on the text:

– Make a list of modern means of connection between people. Can you add something?

– Which means of connection are more often used by you and your colleagues? Why?

Choose one of the items and think of some additional advantages (or disadvantages) of this means of connection for people. Discuss these advantages (disadvantages) with the group (or in dialogs).

UNIT 13

Grammar focus: Conditionals

1. Future.

Use *future conditional* sentences to talk about what will happen under certain conditions. The *if* clause states the condition. The result clause states the result.
Use the Simple Present Tense in the *if* clause.
Use the Future with *will* or *be going to* in the result clause.
You can also use a *modal* in the result clause.

BE CAREFUL! Even though the *if* clause refers to the future, use the Simple Present Tense.

If you ring me up, I will tell you something.
If Baker wins the election, he'll raise taxes.
If Smith wins, he's going to improve housing.
If you want to vote, you must register.

If and *unless* can both be used in conditional sentences, but their meaning are very different.
Use *unless* to state a negative condition.

If you help her, you'll get a good experience.
Unless you help her, you won't get a good experience.

2. Present (Unreal)

Use *present unreal conditional* sentences to talk about unreal, untrue, imagined, or impossible conditions and their results.
The *if* clause presents the unreal condition.
The result clause presents the unreal result of that condition.

Use the Simple Past Tense in the *if* clause.
Use Future-in-the-Past Simple Tense (*would + base form* of the verb) in the result clause.

If I had more time, I would travel.
She would tell you if she knew the answer.
If I were rich, I would buy a yacht.

3. Past (Unreal)

Use *past unreal conditional* sentences to talk about past conditions and results that never happened.
The *if* clause presents the unreal condition.
The result clause presents the imagined result of that condition.

Use the Past Perfect Tense in the *if* clause.
Use Future-in-the-Past Perfect Tense (*would have + past participle*) in the result clause.

If the film had won an Oscar, it would have become famous right away.
I would have told her the news if I had seen her yesterday.
If you had been free I would have come to see you.

You can use *modals* in the result clause.

If George had gone to college, he might have become an architect.
If we had received the message, we could have helped you.

1. Open the brackets and provide the three types of the conditionals considered above.
E.g. If you (to be) busy, I (to leave) you alone.

If you <u>are</u> busy, I<u>'ll leave</u> you alone.
If you <u>were</u> busy, I <u>would leave</u> you alone.
If you <u>had been</u> busy, I <u>would have left</u> you alone.

1. If I (to get) a ticket, I (to go) to the theater. 2. If my niece (to return) earlier, we (to give) her the present. 3. If no one (to come) to help, we (to be) obliged to do the work ourselves. 4. If you (to save) the files, the computer (not to delete) them automatically. 5. They (not to fire) their employees if they (to perform) the duties outlined in their contracts. 6. If the spacecraft (to send) back more data about Jupiter's atmosphere, the research (to be) feasible.

2. Open the brackets.
If it (rain), we'll have to stay at home. 2. If he (work) hard, he would have achieved great results. 3. If computer programmers were not in great demand, good ones (get) earn a very high salary. 4. He would have had a great trouble with his computer if the things (fix) by the techies. 5. His vocabulary will increase greatly if he (read) fifty pages a day. 6. If the Internet wasn't slow and unreliable sometimes, users often (complain) of it. 7. If computer technology didn't advance so rapidly, we (can-*negative*) call it advance itself. 8. If the project hadn't eaten up time and money it (seem) to be getting nowhere fast. 9. If she (give) me their address I will write to them. 10. I'll join him for the trip if he (want) me to. 11. She would me a much better student if she (not to be) so absent-minded. 12. He never (phone) you if I hadn't reminded him to do that. 13. You will never finish your work if you (waste) your time like that. 14.If the license had been clearly displayed in the car windscreen, the police (not to cavil) at him. 15. Together we will compile an article for publication if the necessary material (find – *find*).

3. Open the brackets.
1. If she (ask) me yesterday, I would certainly have told the truth about it. 2. If he (return) home within two weeks he will catch this event. 3. They (take) measures if they had known it before. 4. We (be) able to execute the programs if they were well funded. 5. If that society hadn't been that backward and cruel, people (be) executed for homosexuality and adultery. 6. She wouldn't have been so upset if her boss's laptop (not to be) stolen from her car. 7.I would feel better if I (not to share) my workstation with two other people in the office. 8. The budget will be safer if the company (not to spend) millions of dollars replacing outdated computer hardware. 9. We would have arrived in time if we (not to miss) the train. 10. If I knew the result now I (phone) her immediately. 11. Investments (be) increased if the company develops interactive software for schoolchildren. 12. If this product does not give complete satisfaction, the complaint (lodge) to the manufacturer.

4. Make up conditional sentences.
1. You did not ring me up, so I didn't know you were in trouble. If _____.
2. You left the child alone in the room, so he hurt himself. If _____.

3. He is an excellent specialist but I cannot ask his advice as I'm not acquainted with him. If _____.
4. You can purchase insurance on-line tomorrow but the inquiry must be sent properly. If _____.
5. In 1998 the business was acquired by a Dutch company, that's why the shares are valid no longer. If _____.
6. We will not go to see them as it's too late. If _____.
7. The pavement was so slippery that I fell and broke my leg. If _____.
8. He is busy and doesn't come to us. If _____.
9. Yesterday I bought a modern graphic card so I can play Heroes V now. If _____.
10. John recommends me to install Windows Vista which requires RAM 2 GB. If _____.

Reading.

Jobs in Computing

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

Software Engineer / Designer
Producers the programs which control the internal operations of computers. Converts the system analyst's specification to a logical series of steps. Translates these into appropriate computer language. Often compiles programs from libraries or sub-programs, combining these to make up a complete systems program. Designs, tests, and improves programs for computer-aided design and manufacture, business applications, computer networks, and games.

Computer Salesperson
Advises potential customers about available hardware and sells equipment to suit individual requirements. Discusses computing needs with the client to ensure that a suitable system can be supplied. Organizes the sale and delivery and, if necessary, installation and testing. May arrange support or training, maintenance, and consultation. Must have sufficient technical knowledge.

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

Computer Systems Analyst Programmer

Creates the software programs used by computers. May specialize in the internal operating systems using low level computer language, or in applications programs. May specialize in one aspect of the work, e.g. programming, systems design, systems analysis, or cover them all. May support the system through advice and training, providing user manuals, and by helping users with any problems that arise.

Hardware Engineer

Researches, designs, and develops computers, or parts of computers and the computerized element of appliances, machines, and vehicles. Also involved in their manufacture, installation, and testing. May specialize in different areas: research and development, design, manufacturing. Has to be aware of cost, efficiency, safety, and environmental factors, as well as engineering aspects.

Network Support Person

Maintains the link between PCs and workstations connected in a network. Uses telecommunications, software, and electronic skills, and knowledge of the networking software to locate and correct faults. This may involve work with the controlling software, on the wiring, printed circuit boards, software or microchips on a file server, or on cables either within or outside the building.

Language work: Job requirements

1. Study some of the requirements for the job of Computer Network Support Person.

Essential

1. Diploma in computing or telecommunications engineering
2. Good communication skills to discuss requirements with users
3. Deductive ability for analyzing faults
4. Able to work quickly under pressure
5. Normal colour vision to follow colour-coding of wires

Desirable

6 Interest in technology to keep up with new developments

7 Physically fit for lifting, carrying, and bending

We ran describe the essential requirements like this.
*They **must have** a diploma in computing or telecommunications engineering.*
*They **must have** normal colour vision.*

We can describe the desirable requirements like this.
*They **should have** an interest in technology.*
*They **should be** physically fit.*

2. Study the requirements for a Computer Technical Salesperson. Decide which are essential and which are desirable. Then describe each requirement using *must have/be* or *should have/be.*

1 a certificate or diploma in computing

2 experience in the computer industry
3 able to put technical ideas into everyday language
4 able to persuade and negotiate
5 a qualification in marketing
6 a thorough understanding of the product
7 a driving licence
8 a high level of communication skills
9 patient, persistent, and diplomatic
10 able to work away from home

3. Finish the sentences.

1. The company will install a new computer system….
2. If I had fit new locks after the burglary….
3. The information from the survey will be processed by computer if ….
4. I would have got the program to work on my computer if …..
5. All children will become computer literate while they are in school if ….
6. If all access devices were not hardware based….
7. If the emergency services had been equipped properly….
8. The rooms will be equipped with video cameras if….
9. If the police officers had been equipped with batons and riot shields….
10. The factory will employ over 2000 people if….

Revising

1. **Say "True" or "False". If "False" then what?**

1. The central processing unit is made up of three components.
2. The control unit directs the flow of information within the processor.
3. The processor cannot operate on any information if that information is not in main storage.
4. Secondary memory and internal memory are located in the same place in the computer system.
5. Only after the data has been processed by the CPU can results be transmitted to an output device.
6. FORTRAN is very wordy and therefore not as sufficient a computer language as COBOL in solving scientific problems.
7. Software packages are not written in high-level languages.
8. An example of an application program is calculating the stress on a roof.

2. **Match the following:**

to surf the Web to download to equip to retrieve to upload to scan

1. to read something quickly in order to find a particular piece of information
2. to get back something after you have put it somewhere
3. to copy a file from the Internet onto your own computer
4. to copy something from your computer onto the Internet
5. to look at information on the Internet, especially when you look quickly in order to find something that interests you
6. to provide a person, group, or organization with the things they need for a particular kind of activity or work

3. Open the brackets using Active or Passive.

1. The letter announced that the yacht (find) at last.
2. Arthur entered his room to find that nothing (change) by the family in it since his departure.
3. Today we (employ) to look at ways of reducing waste.
4. Russell (work) as a software developer for Microsoft for eight years by now.
5. Many Web sites (offer) software for converting computer keyboards.
6. The major problem with the QWERTY keyboard is that it needs to (learn).
7. Acc. to the contract, the body scanners (update) in two months free of charge.
8. The report said that Lloyd's phone calls (intercept) by the police which furthered his arrest.
9. The videos (package) up two hours ago, ready for distribution.
10. Your computer (deliver) between 9.00 a.m. and 2.00 p.m tomorrow.
11. The changes (affect) local authorities across the board.
12. The NASA committee (back) off proposals for new landing craft.
13. The search (provide) the police with several vital clues.

4. Word-building.

Look at the word in brackets following each sentence. Complete each sentence by the correct form of the words in brackets.

1. Nobody really believed his _____ (explain).
2. There is an enormous _____ of animals in the Amazon. (vary)
3. The flat was very _____ , with large rooms and a big balcony. (space)
4. The toxic gases from that factory are very _____ to plants and wildlife. (harm)
5. He works as a computer _____. (program)
6. The increase in _____ had created lots of new jobs. (invest)
7. There is a clear _____ between lawful protest and illegal strike action. (distinct)
8. There is no _____ basis for such policies. (science)
9. A computer has a wide range of _____ for businesses. (apply)
10. This will provide the information necessary to examine establishment of the ____ with public sector science. (link)

5. Choose the best word and fill in the gaps.

profession vocation trade work occupation career employment

1. The _____ is really interesting but the pay's lousy.
2. Please write your name, address, and _____ in the spaces below.
3. The scandal destroyed his _____ as a politician.
4. He was quite young when he decided he had a religious _____.
5. Are you in full-time _____ , Mr. Edwards?
6. A big demand for accountants in the 1980s brought many graduates to enter the _____ .
7. Most of the men had worked in skilled _____ such as carpentry or printing.

Supplementary reading

Text 1

Nanotechnology

Nanotechnology is the creation and use of materials or devices at extremely small scales. These materials or devices fall in the range of 1 to 100 nanometers (nm). One nm is equal to one-billionth of a meter (.000000001 m), which is about 50,000 times smaller than the diameter of a human hair. Scientists refer to the dimensional range of 1 to 100 nm as the nanoscale, and materials at this scale are called nanocrystals or nanomaterials.

The nanoscale is unique because nothing solid can be made any smaller. It is also unique because many of the mechanisms of the biological and physical world operate on length scales from 0.1 to 100 nm.

At these dimensions materials exhibit different physical properties; thus scientists expect that many novel effects at the nanoscale will be discovered and used for breakthrough technologies.

A number of important breakthroughs have already occurred in nanotechnology. These developments are found in products used throughout the world. Some examples are catalytic converters in automobiles that help remove air pollutants, devices in computers that read from and write to the hard disk, certain sunscreens and cosmetics that transparently block harmful radiation from the Sun, and special coatings for sports clothes and gear that help improve the gear and possibly enhance the athlete's performance. Still, many scientists, engineers, and technologists believe they have only scratched the surface of nanotechnology's potential.

Nanotechnology is in its infancy, and no one can predict with accuracy what will result from the full flowering of the field over the next several decades. Many scientists believe it can be said with confidence, however, that nanotechnology will have a major impact on medicine and health care; energy production and conservation; environmental cleanup and protection; electronics, computers, and sensors; and world security and defense.

Nanotechnologists are intrigued by the possibility of creating humanmade devices at the molecular, or nanoscale, level. That is why the field is sometimes called molecular nanotechnology.

Some nanotechnologists are also aiming for these devices to self-replicate—that is, to simultaneously carry out their function and increase their number, just as living organisms do. To some early proponents of the field, this aspect of nanotechnology is the most important. If tiny functional units could be assembled at the molecular level and made to self-replicate under controlled conditions, tremendous efficiencies could be realized. However, many scientists doubt the possibility of self-replicating nanostructures.

Text 2

Computer Animation

is creation of the illusion of motion by viewing a succession of computer-generated still images. Prior to the advent of computers, animation was accomplished by filming hand-drawn or painted sequences on plastic or paper, called cels, one frame at a time. Computers were first used to control the movements of the artwork and the camera. Now computers create the artwork and simulate the camera.

Computer animation can be used to create special effects and to simulate images that would be impossible to show with nonanimation techniques, such as a spacecraft flying by the planet Saturn.

Computer animation can also produce images from scientific data, and it has been used to visualize large quantities of data in the study of interactions in complex systems, such as fluid dynamics, particle collisions, and the development of severe storms. These mathematically based models use animation to help researchers see relationships that might otherwise be overlooked. Computer animation has also been used in legal cases to reconstruct accidents.

How computer animation works. In traditional frame-by-frame animation, the illusion of motion is created by filming a sequence of hand-painted cels and then playing the images back at high speeds, typically 14 to 30 frames per second. In computer animation, the art is created using computer programs, frame by frame, and then recorded, edited, and played back.

Another computer animation technique is real-time animation, in which the frames are created using a computer and then immediately displayed on a computer monitor. This technique eliminates the interim step of digitally recording the images; however, real-time animation currently does not produce high quality or richly detailed results. It is best suited for creating simple animations for video games.

Image rendering. The process of creating a realistic three-dimensional scene is called rendering. The computer is given a detailed description of the objects that comprise the scene, along with the specifications of the camera.

To create photographiclike images, the computer must calculate the viewers' perspective of the image, the visible objects and surfaces; add shading, by determining the available light on each surface; add reflections and shadows; provide surfaces with textures, patterns, and roughness to make objects appear more realistic; add transparency of objects; and remove surfaces hidden by other objects.

Once the objects and lights in a three-dimensional scene are rendered, the animator specifies their movement within the scene as well as the motions of the camera. Key frames synchronize the movement of the objects just as in the computer-assisted model, and the in-between frames must be created.

Text 3

Neural network

Neural network a computer program that operates in a manner analogous to the natural neural network in the brain. The theoretical basis of neural networks was developed in 1943 by the neurophysiologist Warren McCulloch of the University of Illinois and the mathematician Walter Pitts of the University of Chicago. In 1954 Belmont Farley and Wesley Clark of the Massachusetts Institute of Technology succeeded in running the first simple neural network. The primary appeal of neural networks is their ability to emulate the brain's pattern-recognition skills. Among commercial applications of this ability, neural networks have been used to make investment decisions, recognize handwriting, and even detect bombs.

A distinguishing feature of neural networks is that knowledge is distributed throughout the network itself rather than being explicitly written into the program. The network then learns through exposure to various situations. Neural networks are able to accomplish this because they are built of processing elements (artificial neurons) grouped into layers, as shown in the figure of a simple feedforward network. The input layer of artificial neurons receives information from the environment, and the output layer communicates the response; between these layers may be one or more “hidden” layers (with no direct contact with the environment), where most of the information processing takes place.

The output of a neural network depends on the “weights” of the connections between neurons in different layers. Each weight indicates the relative importance of a particular connection. If the total of all the weighted inputs received by a particular neuron surpasses a

certain threshold value, the neuron will send a signal to each neuron to which it is connected in the next layer. Neural networks may be used, for example, to process loan applications, in which the inputs may represent loan application data and the output whether or not to grant a loan.

Two modifications of this simple feedforward neural network account for the growth of commercial applications. First, a network can be equipped with a feedback mechanism, known as a back-propagation algorithm, that enables it to adjust the connection weights back through the network, training it in response to representative examples. Second, recurrent neural networks can be developed, involving signals that proceed in both directions as well as within and between layers, and these networks are capable of vastly more complicated patterns of association. (In fact, for large networks it can be extremely difficult to follow exactly how an output was determined.)

Training neural networks typically involves supervised learning, where each training example contains the values of both the input data and the desired output. As soon as the network is able to perform sufficiently well on additional test cases, it can be used to classify new cases.

In contrast, certain neural networks are trained through unsupervised learning, in which a network is presented with a collection of input data and given the goal of discovering patterns—without being told what specifically to look for. Such a neural network might be used, for example, to discover clusters of customers in a marketing database during a process known as data mining.

Text 4

Cryptography. History & usage.

For centuries, cryptography has been used to keep secrets. In traditional symmetric single-key cryptography, a message (the "plaintext") is transformed using a key, into another form (the "ciphertext") from which the plaintext cannot be recovered without knowing the key (or, in reality, from which it is very difficult to recover the plaintext without knowing the key). Two people who both know the key can communicate securely even through an insecure channel as long as the key is kept secret; an attacker intercepting a ciphertext message cannot determine its plaintext content, lacking the key.

Converting a plaintext message into the corresponding ciphertext is called "encryption". Converting ciphertext into plaintext by use of the key is "decryption". Converting ciphertext into plaintext without using the key is part of "cryptanalysis", the science of code-breaking.

A related use of cryptography is the production of modification-detection codes, also known as cryptographic checksums or cryptographic hashes. A modification-detection code is a small number (typically between 16 and 128 bits long) which is derived by an algorithm from a large dataset, in such a way that it is very difficult to find another different dataset for which the algorithm produces the same small number.

One important use of modification-detection codes, as suggested by the name, is to determine whether or not a file has changed, without having to maintain a complete copy of the file for later comparison. By storing only the much smaller modification-detection code corresponding to the original state of the file, it is possible to verify (with high probability) that the file is unchanged at a later time, by re-executing the algorithm and verifying that the result is the same as the stored value. Verifying that a dataset has not changed is often referred to as verifying the "integrity" of that data.

In recent years, asymmetric cryptographic algorithms have appeared, in which different keys are used for encryption and decryption, and someone knowing only the decryption key cannot feasibly determine the encryption key. This has made digital signature technology possible: if I generate a pair of keys, keep the encryption key to myself, and reveal the decryption

key to the world, I can now produce a message, encrypt it with the secret encryption key, and publish it.

Others can verify that the message was indeed produced by me (or at least by someone who knows my secret encryption key), by using the publicly-available decryption key to decrypt the message. In practice, asymmetric cryptographic algorithms are very slow, and real digital-signature systems usually involve computing a cryptographic hash of the message and encrypting that smaller piece of data using the asymmetric encryption key; but that is a detail.

Let's survey modern cryptographic algorithms and how they are used in various popular communication protocols. The best-known asymmetric cryptosystem, used for both secrecy and digital signing, is probably PGP.

As the Net and the Web move into more central positions in the life of the world, the functions that cryptography provides (including secrecy, integrity, and digital signatures) become more important, and cryptographic functions can be found in more places, doing more things.

From e-mail to cellular communications, from secure Web access to digital cash, cryptography is an essential part of today's information systems. Cryptography helps provide accountability, fairness, accuracy, and confidentiality. It can prevent fraud in electronic commerce and assure the validity of financial transactions. It can prove your identity or protect your anonymity. It can keep vandals from altering your Web page and prevent industrial competitors from reading your confidential documents. And in the future, as commerce and communications continue to move to computer networks, cryptography will become more and more vital.

Cryptographic functions have always been present in computer systems, but they have usually been relegated to a few obscure utility programs, function calls, or extra-cost add-ons. We are now starting to see rich cryptographic functions incorporated into end-user operating systems and widely-deployed applications. It is obvious, that nowadays power and ubiquity of cryptography for the battle against computer viruses is increasing.

All anti-virus programs use it, and cryptography plays a great role in the design of present and future security systems that can help us make our computers resistant to viruses. But the relationship between cryptography and virus prevention is anything but simple. Since the beginning of the computer virus problem, people have proposed solutions involving some form of cryptography; but encryption can also make virus prevention more difficult, by providing viral hiding places inside the objects that it protects. So, encryption technology has pluses and minuses.

Text 5

Radio Astronomy

Radio Astronomy is a branch of astronomy in which celestial objects and astrophysical phenomena are studied by examining their emission of electromagnetic radiation in the radio portion of the spectrum.

Principles of radio astronomy. Cosmic radio emission, insofar as is known, comes entirely from natural processes, although from time to time radio telescopes are also used to search (so far unsuccessfully) for possible sources of radio emission from extraterrestrial intelligence. Several physical mechanisms are recognized that produce the observed radio emission.

Types of emission. Because of the random motions of electrons, all bodies emit thermal, or heat, radiation characteristic of their temperature. Careful measurements of the intensity and spectrum of emissions are used to calculate the temperature of distant celestial bodies, such as the planets in the Earth’s solar system, as well as of hot clouds of ionized gas located throughout the Galaxy.

Radio astronomy measurements, however, are often concerned with the much more intense nonthermal emission arising from charged particles such as electrons and positrons moving through weak galactic and intergalactic magnetic fields. When the particle energy is so high that its velocity is close to the speed of light, the radio emission from these "ultra-relativistic" particles is referred to as synchrotron radiation, a term borrowed from the high-energy physics laboratory, where this type of radiation was first discovered.

Both the synchrotron (nonthermal) and thermal radio sources radiate over a wide range of wavelengths. By contrast, a third category of matter—excited atoms, ions, and molecules—radiate at discrete wavelengths characteristic of the atom or molecule and the state of excitation. Wide-range radio emission is referred to as continuum emission, and discrete radio emission as line emission.

Radio telescopes. Radio wavelengths are relatively long, extending from about 1 mm (about 0.04 in) to more than 1 km (about 0.6 mi), and radio telescopes must be extremely large in order to focus the incoming signals to produce a sharp radio image. The world's largest stationary radio telescope, Arecibo Observatory in Puerto Rico, is a bowl-shaped dish 305 m (1000 ft) in diameter. The largest fully steerable parabolic dish-type antennas are 50 to 100 m (about 165 to 330 ft) in diameter, and they have a resolution of about 1 arc minute, equivalent to that of the unaided human eye at optical wavelengths. Incoming radio waves are focused by the parabolic surface onto a small horn antenna that leads to an extremely sensitive radio receiver.

Even higher resolutions may be achieved if individual antenna elements are spaced thousands of kilometers apart. With these spacings it becomes impractical to send the signals from each antenna directly to a common point. Instead, separate broadband tape recordings are made at each antenna, and the individual tapes are then shipped to a central processing facility. This technique of very long baseline interferometry (VLBI) involves using atomic clocks at each telescope to synchronize the individual recordings to an accuracy of better than one-millionth of a second.

Cosmology. Because radio galaxies and quasars are such powerful radio sources, they can be detected from a great distance. Because of the long time it takes for signals to reach the Earth from distant radio sources, radio astronomers are able to see the universe as it appeared more than 10 billion years ago, or far back in time toward the origin of the universe—the so-called big bang. Unfortunately, determining the distance to a radio source is not possible from radio measurements alone, so that distinguishing between a powerful distant source and a relatively weak nearby one is impossible. The distance may be determined only if that source is optically identified with a galaxy or quasar that has a measurable redshift. Nevertheless, from studies of the statistical distribution of large numbers of radio sources, it appears that when the universe was only a few billion years old, the number of intense radio sources was much greater and their dimensions smaller.

Text 6

Skylab

Skylab is the first American space station. In 1973 the National Aeronautics and Space Administration (NASA) launched the 100-ton Skylab module into orbit around the earth from the Kennedy Space Center in Cape Canaveral, Florida. Each of the three crews of Skylab astronauts was launched separately in an Apollo command and service module (CSM), and they stayed in Skylab for periods of 28, 59, and 84 days, respectively. The Skylab astronauts proved that it was feasible for humans to live and work in a weightless environment for extended stays without suffering ill effects. Astronauts also made key repairs to Skylab in space, paving the way for future repairs of satellites from the space shuttle. In addition, the Skylab astronauts successfully completed experiments on solar physics, earth observations, and crystal growth in zero gravity.

Spacecraft and supporting systems. The main portion of the Skylab space station was the 27 m (89 ft) long orbital workshop. This two-story structure was constructed inside the converted second stage of a Saturn 1B rocket. One workshop floor provided living quarters for the crew and was divided into four sections: the sleep compartment, the waste-management compartment, the wardroom, and the experiment work area. The second floor was devoted to other scientific experiments that required large areas or needed external views. Solar arrays provided electrical power and were located on opposite ends of the long workshop.

Skylab's Apollo telescope mount (ATM) was the first manned solar observatory put into space. It was composed of eight integrated telescopes that studied the sun's corona, or wispy-looking outer atmosphere (*see* Sun). The ATM had its own solar arrays to use as independent power sources and its own guidance and control system.

The multiple docking adapter (MDA) was a cylindrical structure about 5.2 m (about 17 ft) long and 3 m (10 ft) in diameter that was used to link the Apollo CSM to Skylab. The MDA enabled the transfer of astronauts, equipment, power, and electrical signals between the CSM and Skylab. The MDA had two docking ports, hatches designed to lock with the Apollo CSM. One port was used for normal operations while the second acted as a backup.

Positioned between the MDA and orbital workshop areas was the airlock module, which provided an area for the crew to perform space walks, or extravehicular activities (EVAs), outside the space station. This module also contained control panels for electrical power, temperature control, telecommunications, data handling, and data recording.

Mission highlights. During the launch of the unmanned Skylab on May 14, 1973, a protective meteorite shield was ripped off, damaging the solar power arrays and causing the temperature within Skylab to soar. The crew of the first manned Skylab mission (Skylab 2) was originally scheduled for launch on May 15, 1973, but it was delayed until May 25, 1973, while NASA engineers devised possible repair scenarios. After a rendezvous with Skylab, the crew erected a makeshift parasol to act as a heat shield that reduced Skylab's internal temperature to a habitable level. The crew of Skylab 2 proved that astronauts could perform tasks in space that could not have been managed by machines.

The second Skylab crew (Skylab 3) of Alan LaVern Bean, Owen Garriott, and Jack Robert Lousma was launched on July 28, 1973. While on board Skylab, the team conducted many more scientific experiments than had been planned. They observed and photographed severe weather situations on the earth, logged many hours of solar viewing, and accomplished numerous biomedical experiments. Among the biology studies was an experiment designed to learn if weightlessness would affect the way a spider builds its web. The crew also completed three EVA sessions to make further repairs to Skylab hardware and to tend to experiments and film canisters from the cameras photographing the earth.

After the Skylab 4 crew splashed down in the Pacific Ocean in their CSM, the Skylab module stayed unoccupied in orbit for over five years. It reentered the atmosphere in July 1979, disintegrating from the heat of friction. NASA technicians steered its reentry to the Indian Ocean, but some Skylab debris hit remote areas of Australia—no one was injured. Overall, NASA considered the Skylab program to be highly successful and to have provided many lessons applicable to further human missions in space.

Text 7

Beaming in on a deadly disease

Michael Pollitt
The_Guardian

In the past, Karen Kirkby didn't think about people with cancer. The physicist, at the University of Surrey's Ion Beam Centre, likes to work with teams of charged sub-atomic particles like protons that travel at millions of miles an hour.

But then cancer entered her life, changed her views and has since taken her scientific research into new directions. "I wasn't really that interested in cancer until several of my very good friends got cancer I got very angry," Kirkby says

A chance discussion with a clinician skilled in x-ray radiotherapy then showed how her 20-year expertise with ion beams might help make a real difference for cancer sufferers. Her anger has now been harnessed into a determination to develop new charged particle beam therapies for cancer treatment. And the clinicians she regularly meets are equally passionate about their work, helping to inspire her even more.

Kirkby now heads an Engineering and Physical Sciences Research Council funded UK network on the biomedical applications of ion beams it brings together expertise from a wide range of disciplines, enabling people like physicists, clinicians, and molecular biologists to share knowledge and work together towards a common goal.

This network of like-minded scientists along with her new research interests, has also led to a new collaboration between the university's ion beam centre and the Gray Cancer Institute Backed by the Wolfson Foundation, the £1 2m research project will see the opening of the world's first vertical nano-irradiation and analysis facility by June 2007.

Understanding radiation

The 2Gm-long experimental beam fine - which is not suitable for treating cancer patients - is designed to produce a 10 nanometer diameter scanning ion beam to focus onto individual cellular structures Not only will it help understand the way radiation affects living cells, but it will also map them in 3D and even see reactions between drugs and radiation.

It will be capable of scanning 100,000 cells per hour. "Protons are the favoured route but we want to look at the effects on cells of other ions," Kirkby says. "We can then compare the effects of protons with the heavier ions."

A proton is a positively charged hydrogen ion, just one of a range of heavier ions up to neon in the periodic table that the new beam line - a synchrotron -will produce at different energies The objective is to destroy cancerous tissue without harming anything else - one of the drawbacks with conventional x-rays.

A phenomenon known as the Bragg Peak means that the ion's destructive energy is dissipated onto a pre-selected target - the cancerous cells - leaving other tissues unaffected Although using proton therapy is not new for cancer treatment, the beam line will break fresh ground in trying to find novel treatment strategies.

Using actual data from experiments, computational research will construct virtual tumours and help devise treatment strategies including low doses for hypersensitive cells and examine phenomena such as the bystander effect - irradiate one cancerous cell and its neighbours may die too.

"We are doing the basic research That will underpin the next generation of proton therapy," Kirkby says "f would hope that we will be making some significant discoveries jn the next three years I really believe that this is something that could enhance life for a lot of people "

Cancer specialist Professor Bleddyn Jones of University Hospital Birmingham wishes he already had a more powerful proton therapy machine. As a consultant in clinical oncology and applied radiobiology, he has a woman patient in her 40s with a recurrent chondrosarcoma of the skull base - a rare and aggressive cancer of cartilage that's already undergone eight hours of neurosurgery.

Therapy facilities need funding

Jones and his co-author on several articles, oncologist Neil Burnet of Addenbrookes Hospital in Cambridge, are trying hard to convince the UK government to fund new proton therapy facilities. Planned research work at the Surrey ion beam centre will underpin any new clinical centre with an excellent understanding of the basic science.

A report prepared by a group of experts - including Jones and Burnet - for The Department of Health's National Radiotherapy Advisory Group in April calls for two new purpose-built proton therapy centers in this country. Although capital costs are high, this is offset by a likely 30-year operating life.

The report also includes a detailed breakdown of serious cancer types affecting around 1,900 patients a year who would benefit from safer proton therapy. And depending on clinical trials, treatment for other cancers might substantially increase patient demand.

The report is now in the hands of Professor Michael Richards, National Cancer Director at the Department of Health - the government's cancer czar "The National Radiotherapy Advisory Group is currently considering the case for high energy proton therapy," says Richards, who hopes To report to ministers on priorities for future development in the autumn. "This is being considered alongside other aspects of radiotherapy including the need for increased capacity of standard radiotherapy."

As the government decides what to do, the research at Surrey University into next-generation proton therapy will become increasingly important. Jones reckons that physics will enable biology as focussed nanobeams offer a better way to understand the mechanisms of radiation at cellular levels. This will help take advantage of the earlier detection of cancers, thanks to improved medical imaging. "If you find a small cancer with a high degree of confidence, that puts the onus back on physics or surgery to eradicate it," Jones says.

But using physics rather than surgery depends on having the right proton therapy facilities available. Time has all but run out for the government's decision as estimates show that several thousand cancer patients will require expensive treatment abroad.

To avoid the problems facing Britain's cancer sufferers, building new proton therapy centres seems very well justified.

Text 8

Cyberspace

Like the Land of Oz, cyberspace was originally the invention of a writer, the science-fiction novelist William Gibson. While Oz remains the domain of a wizard and a little girl from Kansas, however, cyberspace has leapt off the page to become a subject of wide public interest and debate. As both a dream and a reality, it has sparked renewed discussion about the social and economic assumptions underlying our present means of communication, as well as the role of technology in our lives. By the beginning of 1995, there was a growing consensus that cyberspace had become a region that could significantly affect the structure of our economies, the development of our communities, and the protection of our rights as free citizens.

Gibson's cyberspace, as described in his book *Neuromancer* (1984) and several later novels, was an artificial environment created by computers. Unlike a motion picture, which presents moving images on a flat surface, a cyberspatial environment would convey realistic detail in three dimensions and to all five senses. It would also allow for a degree of face-to-face intimacy between people in remote places. In one of Gibson's novels, for instance, a woman "meets" a mysterious financier outside a cathedral in Barcelona, Spain, though in fact she is sitting alone in an office in Brussels.

Research continues into ways of realizing this type of cyberspatial experience, which has come to be known as virtual reality. By 1994 virtual reality machines had begun to appear in

amusement parks and shopping malls, though a full experience of Gibson's vision has so far been frustrated by the crude state of the technology and by the physical disorientation, bordering on nausea, that some machines provoke. Moreover, users of virtual reality devices are usually communicating not with others but only with the computer.

Cyberspace as a present reality has come to be associated primarily with networks of computers linked through telephone lines. The biggest and most familiar of these, the Internet, was developed in the 1970s to assist U.S. military and academic research. As recently as 1990, the Internet was almost unknown to the general public. By the end of 1995, however, the network had absorbed millions of users with no affiliations to defense institutions or universities. The volume of exchanges between these users, who numbered at least 20 million-30 million in 1995, surpassed 30 terabytes per month, or enough information to fill 30 million books of 700 pages each. For many of those involved in these exchanges--and for millions more who have no experience of computer networks--cyberspace and the Internet have become nearly synonymous terms.

The Internet is a hybrid medium, combining aspects of the printing press, the telephone, the public bulletin board, and the private letter. It also permits crude radio, and television transmission without the physical plant required by conventional broadcasting. Indeed, some commentators have predicted that the Internet or a successor network will eventually absorb the functions of television, telephone, and conventional publishing. They speak of an "information superhighway," a term coined in 1992 by then senator Al Gore, Jr., to refer to a unified, interactive system of electronic communication.

The prospect of such a system, with the capacity to deliver an unprecedented range of informational services to the home, school, or office, has provoked a flurry of strategic alliances between major commercial interests in the telephone, software-programming, and entertainment industries. By 1995 the business world was beginning to regard the largely noncommercial Internet as the electronic equivalent of China: a huge, ever-growing, and virtually untapped market.

For some commentators, however, the social implications of cyberspace far outstrip its commercial potential. Unlike television, which beams its messages to a passive and isolated audience, the Internet depends upon its users to supply and share content and to act cooperatively to aid its dispersal. Since resource sharing and mutual aid are age-old traits of successful social groupings, some Internet advocates argue that the medium may help repair a social fabric badly weakened by television. They claim that cyberspace encourages the formation of "virtual communities," without hindrance from national or geographic boundaries.

They also view the Internet as the harbinger of a renaissance in free speech. Since the network gives everyone the tools to become a publisher, they say, cyberspace offers a potent means of freeing public discourse from the control of private newspaper companies and broadcasters.

Text 9

Microsoft Corporation

Microsoft Corporation is the leading developer of personal-computer software systems and applications. The company also publishes books and multimedia titles and offers electronic mail services. It has sales offices throughout the world but does virtually all of its research and development at its corporate headquarters in Redmond, Washington, U.S.

In 1975 Bill Gates and Paul G. Allen, two boyhood friends from Seattle, converted BASIC, a popular mainframe programming language, for use on an early personal computer (PC), the Altair.

Shortly afterward Gates and Allen founded Microsoft, deriving the name from the words "microcomputer" and "software." During the next few years they refined BASIC and developed other programming languages. In 1980 International Business Machines Corporation (IBM) asked Microsoft to produce the essential software, or operating system, for its first personal computer, the IBM PC. Microsoft purchased an operating system from another company, modified it, and renamed it MS-DOS (Microsoft Disk Operating System). MS-DOS was released with the IBM PC in 1981.

Microsoft deepened its position in operating systems with its Windows graphical command program, whose third version, released in 1990, gained a wide following. By 1993, Windows 3.0 and its subsequent versions were selling at a rate of one million copies per month, and nearly 90 percent of the world's PCs ran on a Microsoft operating system. In 1995 the company released Windows 95, which for the first time fully integrated MS-DOS with Windows and effectively matched in ease of use Apple Computer's Macintosh OS. It also became the leader in productivity software such as word-processing and spreadsheet programs, outdistancing long-time rivals Lotus and WordPerfect in the process.

By the mid-1990s Microsoft, which became a publicly owned corporation in 1986, had become one of the most powerful and profitable companies in American history. However, its rapid growth in a fiercely competitive and fast-changing industry spawned resentment and jealousy among rivals, some of whom complained that the company's practices violated U.S. laws against unfair competition. Microsoft and its defenders countered that, far from stifling competition and technical innovation, its rise had encouraged both and that its software had consistently become less expensive and more useful. Partly because of its stunning success in PC software, Microsoft was slow to realize the commercial possibilities of network systems and the Internet. In 1993 it released Windows NT, a landmark program that tied disparate PCs together and offered improved reliability and network security. Sales were initially disappointing, but by 1996 Windows NT was hailed as the likely standard for PC networking, challenging Novell's NetWare.

By 1996 Microsoft was bundling Explorer with Windows OS and had begun the process of integrating Explorer directly into Windows. In response, Netscape accused Microsoft of violating its 1995 consent decree and sued; these efforts helped to persuade the U.S. Department of Justice to reopen a broad investigation of Microsoft.

In 1999, following a trial that lasted 30 months, a judge found Microsoft in violation of the Sherman Antitrust Act and ordered the breakup of the company. In 2001 an appeals court overturned the breakup order but still found the company guilty of illegally trying to maintain a monopoly.

Text 10

Bill Gates

Bill Gates was born in 1955, American business executive, who serves as chairman and chief software architect of Microsoft Corporation, the leading computer software company in the United States. Gates cofounded Microsoft in 1975 with high school friend Paul Allen. The company's success made Gates one of the most influential figures in the computer industry and, eventually, one of the richest people in the world.

Born in Seattle, Washington, Gates attended public school through the sixth grade. In the seventh grade he entered Seattle's exclusive Lakeside School, where he met Allen. Gates was first introduced to computers and programming languages in 1968, when he was in the eighth grade. Soon afterward, Gates, Allen, and other students convinced a local computer company to

give them free access to its PDP-10, a new minicomputer made by Digital Equipment Corporation. In exchange for the computer time, the students tried to find flaws in the system.

Gates spent much of his free time on the PDP-10 learning programming languages such as BASIC, Fortran, and LISP. In 1972 Gates and Allen founded Traf-O-Data, a company that designed and built computerized car-counting machines for traffic analysis. The project introduced them to the programmable 8008 microprocessor from Intel Corporation.

While attending Harvard University in Cambridge, Massachusetts, in 1975, Gates teamed with Allen to develop a version of the BASIC programming language for the Altair 8800, the first personal computer. They licensed the software to the manufacturer of the Altair, Micro Instrumentation and Telemetry Systems (MITS), and formed Microsoft (originally Micro-soft) to develop versions of BASIC for other computer companies. Gates decided to drop out of Harvard in his junior year to devote his time to Microsoft. In 1980 Microsoft closed a pivotal deal with International Business Machines Corporation (IBM) to provide the operating system for the IBM PC personal computer. As part of the deal, Microsoft retained the right to license the operating system to other companies. The success of the IBM PC made the operating system, MS-DOS, an industry standard.

Microsoft's revenues skyrocketed as other computer makers licensed MS-DOS and demand for personal computers surged. In 1986 Microsoft offered its stock to the public; by 1987 rapid appreciation of the stock had made Gates, 31, the youngest ever self-made billionaire. In the 1990s, as Microsoft's Windows operating system and Office application software achieved worldwide market dominance, Gates amassed a fortune worth tens of billions of dollars.

Alongside his successes, however, Gates was accused of using his company's power to stifle competition. In 2000 a federal judge found Microsoft guilty of violating antitrust laws and ordered it split into two companies. An appeals court overturned the breakup order in 2001 but upheld the judge's ruling that Microsoft had abused its power to protect its Windows monopoly.

In 1998 Gates appointed an executive vice president of Microsoft, Steve Ballmer, to the position of president, but Gates continued to serve as Microsoft's chairman and chief executive officer (CEO).

In 2000 Gates transferred the title of CEO to Ballmer. While remaining chairman, Gates also took on the title of chief software architect to focus on the development of new products and technologies.

Bill Gates's (quotations)

1. "A digital nervous system enables a company to do information work with far more efficiency, depth, and creativity."
2. "A fundamental new rule for business is that the Internet changes everything."
3. "In the digital age you need to make knowledge workers out of every employee possible."
4. "Information flow is the lifeblood of your company because it enables you to get the most out of your people and learn from your customers."
5. "You know you have built an excellent digital nervous system when information flows through your organization as quickly and naturally as thought in a human being...It's business at the speed of thought."
6. "The Internet is becoming the town square for the global village of tomorrow."
7. "Educators who embrace PCs as a new teaching tool and learning tool will be agents of change."
8. "Digital tools magnify the abilities that make us unique in the world: the ability to think, the ability to articulate our thoughts, the ability to work together to act on those thoughts."

Р.М. Васильева, Т.Н. Папушкина.

ENGLISH FOR COMPUTING

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