

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ
РЕСПУБЛИКИ КАЗАХСТАН

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**INFORMATION TECHNOLOGY,
ITS DEVELOPMENT AND USAGE**

PART I

Рекомендовано Научно-методическим советом университета
в качестве учебного пособия

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Учебное пособие нацелено на подготовку студентов к самостоятельной работе со специальной литературой, обучение устным формам общения по научной тематике на материале предложенных текстов, системное развитие коммуникативных способностей студентов, расширение их активного и пассивного лексического запаса.

Пособие состоит из 2 юнитов, каждый из которых включает в себя ориентированный на познавательные потребности обучаемых оригинальный текст и систему упражнений, способствующие усвоению и запоминанию специальных терминов по компьютерным технологиям, грамматические правила, характерные для научно-технических текстов, глоссарий специальных технических терминов, в состав которого включен лексический минимум, необходимый для изучения курса информатики, краткий словарь сокращений и условных обозначений с элементами толкования.

Учебное пособие предназначено для студентов высших и учебных заведений, обучающихся по специальностям: Информационные технологии (5В070400 «Вычислительная техника и программное обеспечение», 5В070300 «Информационные системы», 5В060200 «Информатика», 5В010020 «Системы информационной безопасности»).

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ВВЕДЕНИЕ

Учебное пособие нацелено на подготовку студентов к самостоятельной работе со специальной литературой, обучение устным формам общения по научной тематике на материале предложенных текстов, системное развитие коммуникативных способностей студентов, расширение их кругозора, активного и пассивного лексического запаса.

Пособие состоит из 2 юнитов, причем каждый юнит содержит ориентированные на познавательные потребности обучаемых оригинальный текст, систему упражнений к нему, а также дополнительные тексты для перевода и последующего обсуждения.

Тексты по проблемам информационных технологий и сервиса взяты из современных научных и научно-популярных изданий (энциклопедий, монографий, интернета, журналов и газет) и проводятся без адаптации. Исходными посылками при отборе текстов, предназначенных для чтения, перевода и реферирования были актуальность темы, рассматриваемой английским автором, познавательность и увлекательность изложения материалов.

Система упражнений каждого урока связана с содержанием основного текста и специальной лексикой, вводимой в основном тексте данного раздела, а также с текстами предыдущих разделов.

Структура разделов и последовательность развертывания учебной информации однотипны, что облегчает усвоение материала и понимания задач, поставленных в упражнениях. Юниты рекомендуется изучать в том порядке, в каком они представлены в книге, причем желательным является сохранение последовательности выполнения упражнений в юнитах, так как материал дан в возрастающей степени сложности. Многие упражнения могут быть выполнены в письменном виде, что также представляется значимым,

поскольку письмо является необходимым условием формирования навыков грамотной, правильной речи на иностранном языке.

После завершения работы над основным текстом и следующими за ним упражнениями обучаемые могут обратиться к дополнительным текстам, тематически развивающим основной текст и приведенным в конце каждого юнита. Их можно использовать для чтения и перевода дома и в аудитории, а также для последующего обсуждения, прочитанного в аудитории.

PART 1
UNIT I

Text 1. Read the text and do the assignments.

Information Technology

Information Technology (IT) is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware". IT deals with the use of electronic computers and computer software to convert, store, protect, process, transmit and retrieve information securely.

Recently it has become popular to broaden the term to explicitly include the field of electronic communication so that people tend to use the abbreviation ICT (Information and Communications Technology). It is common for this to be referred to as IT & T in the Australasia region, standing for Information Technology and Telecommunications.

In the United Kingdom education system, information technology was formally integrated into the school curriculum when the National Curriculum was devised. It was quickly realized that the work covered was useful in all subjects. In the US many space music videos are very popular. With the arrival of the Internet and the broadband connections to all schools, the application of IT knowledge, skills and understanding in all subjects became a reality. This change in emphasis has resulted in a change of name from Information Technology to Information and Communication Technology. ICT in education can be understood as the application of digital equipment to all aspects of teaching and learning. It is present in almost all schools and is of growing influence.

The growth of use of Information and Communications Technology and its tools in the field of Education has seen tremendous growth in the recent past. Technology has entered the classroom in a big way to become part of a teaching and learning process.

Today, the term "information technology* has ballooned to encompass many aspects of computing and technology, and the term is

more recognizable than ever before. The information technology umbrella can be quite large, covering many fields.

Computer professionals are often called IT specialists or Business Process Consultants, and the division of a company or university that deals with software technology is often called the IT department. Other names for the latter are information services (IS) or management information services (MIS), managed service providers (MSP). IT professionals perform a variety of duties that range from installing applications to designing complex computer networks and information databases. A few of the duties that IT professionals perform may include data management, networking, engineering computer hardware, database and software design, as well as the management and administration of entire systems.

Exercises

A. Comprehension

1.1. Answer these questions:

- a) What does IT deal with?
- b) How has the term been recently broadened?
- c) Why was the use of Information and Communications Technology and its tools in the field of Education grown in the recent past? What way?
- d) What are the duties that IT professionals perform?

1.2. Define the term «information technology».

B. Vocabulary

1.3. Give Russian equivalents of the following expressions:

1.4. Translate these words and word combinations into English:

разработка	ввод в эксплуатацию
преобразовывать	аппаратура
оборудование	хранить
сохранять подключение к сети	отдел
отделение	огромный
громадный	потрясающий

база данных	разрабатывать детально
подробно охватывать	отыскивать
извлекать компьютерные программы	программное обеспечение
обработать цифровой	числовой
передавать	применение
использование	безопасно
надежно	целый
взятый в целом	устанавливать

1.5. Translate these words and word combinations into English:

өңдеу	эксплуатацияға кіру
түрлендіру	аппаратура
құрылғы	сақтау
желіге қосылуды сақтау	бөлім
бөлімше	үлкен
ауқымды	керемет
мәліметтер базасы	бөлшектеп өңдеу
жүйелеп қамту	іздеу
компьютерлік бағдарламаларды бөліп алу	бағдарламамен қамтамасыз ету
сандық өңдеу	сандық
беру	қолдану
пайдалану	қауіпсіз
сенімді	толық
жалпылама алынған	орнату

1.6. Find synonyms of the following expressions among the words and word combinations of the previous exercises:

- keep, deposit, save;
- spread, pass on, send out, conduct, transfer;
- use, function, adaptation, treatment;
- firmly, steadily, safely;
- extract (from), elicit (from), evoke (from), take/draw out;
- handle, work (up), elaborate, adapt, sort out;
- transform, change, turn, converse;
- particularly, in full, elaborately, comprehensively;
- embrace, cover, include, take in;
- carrying out, execution, realization, operation;
- department; office; section;

- l) whole, full, complete;
- m) work out, invent, develop, create, set up;
- n) great, enormous, vast, immense, colossal, huge.

1.7. *Use each of the words/expressions from Exercise 1 in the sentences from the text.*

Supplementary text № 1

Reading and Discussion

1. *Read the text. Mention the points of difference between the texts in the way of defining information technology». Answer the questions:*

- a) What does Information Technology include?*
- b) What are the examples of Information Technology?*

Summarize the text using the words given below.

Information Technology means the use of hardware, software services, and supporting infrastructure to manage and deliver information using voice, data, and video.

To further define information technology and what should be included as far as the IT budget, the following information is provided:

Information Technology includes:

- all computers with a human interface
- all computer peripherals which will not operate unless connected to a computer or network
- all voice, video and data networks and the equipment, staff and purchased services necessary to operate them
- all salary and benefits for staff whose job descriptions specifically include technology functions, i.e. network services, applications development, systems administration
- all technology services provided by vendors or contractors
- operating costs associated with providing information technology
- all costs associated with developing, purchasing, licensing or maintaining software

Agencies may wish to include other costs at their discretion. For example, an agency may wish to include digital cameras in their IT

budget even though they can be operated stand-alone. Data entry personnel may be included if they are considered part of the technology staff. Costs that are excluded above may be included if they are an integral part of a computer applications or would be difficult to break out because the costs are included with other information technology costs.

Examples of Information Technology:

- Telephone and radio equipment and switches used for voice communications.
- Users' PCs and software.
- Server hardware and software used to support applications such as electronic mail/group ware, file and print services, database, application/ web servers, storage systems, and other hosting services.
- "Open/integrated" computer systems that monitor or automate mechanical or chemical processes and also store information used by computer applications for analysis and decision-making, such as the Metasys building management system.

Read and learn the new words:

peripherals	at the discretion of
purchased service	switch
subscription	staff
data entry	

2. Translate the words preceding the text. Read the text. Discuss the role of In-formation Technology in (1) business, (2) medicine, (3) science and engineering. Find the sentences with these words in the text and translate them.

affordable	keep records	similar	bill
track	supplies	one a small scale	point-of-sale terminal
receipt	fatigue	computerized axial imaging tomography	point-of-sale terminal
observations	power plant	magnetic resonance	imaging

Text 2. Read the text and give more information of your own Information Technology's Role Today

Every day, people use computers in new ways. Computers are increasingly affordable; they continue to be more powerful as information-processing tools as well as easier to use.

One of the first and largest applications of computers is keeping and managing business and financial records. Most large companies keep the employment records of all their workers in large databases that are managed by computer programs. Similar programs and databases are used in such business functions as billing customers; tracking payments received and payments to be made; and tracking supplies needed and items produced, stored, shipped, and sold. In fact, practically all the information companies need to do business involves the use of computers and information technology.

On a smaller scale, many businesses have replaced cash registers with point-of-sale (POS) terminals. These POS terminals not only print a sales receipt for the customer but also send information to a computer database when each item is sold to maintain an inventory of items on hand and items to be ordered. Computers have also become very important in modern factories. Computer-controlled robots now do tasks that are hot, heavy, or hazardous. Robots are also used to do routine, repetitive tasks in which boredom or fatigue can lead to poor quality work.

Information technology plays an important role in medicine. For example, a scanner takes a series of pictures of the body by means of computerized axial tomography (CAT) or magnetic resonance imaging (MRI). A computer then combines the pictures to produce detailed three-dimensional images of the body's organs. In addition, the MRI produces images that show changes in body chemistry and blood flow.

Using supercomputers, meteorologists predict future weather by using a combination of observations of weather conditions from many sources, a mathematical representation of the behavior of the atmosphere, and geographic data.

Computer-aided design and computer-aided manufacturing programs, often called CAD/CAM, have led to improved products in many fields, especially where designs tend to be very detailed. Computer programs make it possible for engineers to analyze designs of complex structures such as power plants and space stations.

2.1. Reproduce the text in English emphasizing the information not mentioned in the English texts. Use the words given at the bottom.

Что такое информационные технологии (ИТ)? В самом широком смысле ИТ – это совокупность методов обработки различного рода данных с целью более эффективного их использования. В каждой области человеческой деятельности существует специализированный набор ИТ.

Какова роль информационных технологий в современном мире? Мы можем встретить применение ИТ повсюду. Они настолько глубоко интегрированы в повседневную жизнь каждого человека, что мы порой не замечаем их присутствия. Большое значение ИТ приобретают в работе средств массовой информации, среди которых особенно выделяется Интернет.

Почему ИТ так распространены и разнообразны? В основе ИТ лежит информация. В основе человеческого общения – обмен информацией, поэтому ИТ так же разнообразны, как человеческие отношения. ИТ – неизбежность современного общества: кто лучше обрабатывает информацию, тот лучше ориентируется в мире.

Главный научно-исследовательский интерес к информационной технологии настоящего времени касается развития систем распознавания речи. Это один из аспектов всемирной программы исследования в области компьютеров «пятого поколения».

Другая важная разработка – интеграция информации и телекоммуникационных технологий (например, электронная почта). Разделение на информацию и коммуникационные технологии все более разрушается: фактически они теперь являются едиными коммуникационными технологиями.

Lexico-thematical vocabulary

заражение	infection
право доступа	access, right of access
устройство	appliance, device
местоположение	location
оборудование	equipment
упорядочивать	arrange, regulate
разделение на кого-л./что-л.	division (into)

2.2. Reproduce the text in English emphasizing the information not mentioned in the English texts. Use the words given at the bottom.

Информациялық технология дегеніміз не (АТ)? Ең көп мағынада АТ – бұл берілген тектегі әртүрлі мақсатта өңделіп жинақталған әдістердің жиынтығы. Әрбір ауқымында адамның қызмет саласына мамандандырылған АТ жинақталған.

Заманауи әлемде информациялық технологияның орны қандай? ИТ қолданылуын барлық жерден кездестіреміз. Олар адамның күнделікті өміріне тереңінен еніп алған, бір оларсыз жұмыс жасай алмаймыз. Көптеген ақпарат құралдарында, соның ішінде интернетпен жұмыс жасайтындар үшін үлкен маңызға ие.

Неге АТ әртүрлі және көпке тараған? АТ негізінде – ақпарат жатыр. Күнделікті өмірде адамдар сөйлесу арқылы ақпарат алмасады, сондықтан адамдардың қарым – қатынасы сияқты АТ да әртүрлі болып келеді. АТ-дан қазіргі қоғамды аластату мүмкін емес кім ақ өңдей алады, сол қазіргі өмірде дұрыс бағдарлана алады.

Қазіргі кезде ақпараттық технолгияға деген басты қызығушылық ғылыми зерттеу саласында, яғни тілді жетілдіріп, дамыту жүйесіне негіз-делген. Бұл компьютерлер аясында зерттеу бойынша «бесінші дәрежелі даму сатысының»

элементтік бағдарламалардың бір тармағы болып табылады. Басқа маңызды жасалынған жұмыс – ақпарат интеграциясы және телекоммуникация технологиясы (мысалы , электрондық пошта).

Lexico-thematical vocabulary

жұғу	infection
мүмкіндік алу	access, right of access
құрылғы	appliance, device
орналасқан жері	location
құрылғы	equipment
реттеу	arrange, regulate
бөліну бір нәрсеге/кімге	division (into)

2. 3. Talking points. Speak on the following themes.

- a) The concept of information technology and the reasons of its growing usage in many spheres of human activity.
- b) The components of Information Technology.

Text 3. Look through the text, answer the questions using the information from the text. History of information Technology

The term «information technology» evolved in the 1970s.

The history of information technology, however, predates the invention of the modern digital computer by many centuries. Machines for calculating fixed numerical tasks, such as the abacus, have existed since antiquity. Wilhelm Schickard built the first mechanical calculator in 1623. Charles Babbage designed a difference engine in Victorian times, and around 1900 the IBM corporation sold punch-card machines. However all of these machines were constrained to perform a single task, or at best, some subset of all possible tasks.

During the 1940s, as newer and more powerful computing machines were developed, the term computer came to refer to the machines rather than their human predecessors. As it became clear

that computers could be used for more than just mathematical calculations, the field of computer science broadened to study computation in general.

The basic concept of information technology, however, can be traced to the World War II alliance of the military and industry in the development of electronics, computers, and information theory. After the 1940s, the military remained the major source of research and development funding for the expansion of automation to replace manpower with machine power.

Since the 1950s, four generations of computers have evolved. Each generation reflected a change to hardware of decreased size but increased capabilities to control computer operations. The first generation used vacuum tubes, the second used transistors, the third used integrated circuits, and the fourth used integrated circuits on a single computer chip. Advances in artificial intelligence that will minimize the need for complex programming characterize the fifth generation of computers, still in the experimental stage.

The first commercial computer was the UNI VAC I, developed by John Eckert and John W. Mauchly in 1951. It was used by the Census Bureau to predict the outcome of the 1952 presidential election. For the next twenty-five years, mainframe computers were used in large corporations to do calculations and manipulate large amounts of information stored in databases. Supercomputers were used in science and engineering for designing aircraft and nuclear reactors and for predicting worldwide weather patterns. Minicomputers came on to the scene in the early 1980s in small businesses, manufacturing plants, and factories.

Exercises

A. Comprehension

3.1. Answer these questions:

- a) When did the term "information technology" evolve?
- b) Did the history of information technology begin with the invention of a computer?
- c) What made the field of computer science broaden to study computation in general?

d) How did the World War II influence information technology development?

e) How many generations of computers are known to have evolved since the 1950s? How did they differ?

f) What are John Eckert and John W. Mauchly famous for?

g) What were mainframe computers and supercomputers used for?

h) When did minicomputers come on to the scene? What were the spheres of their application?

3.2. *Summarize the text using the words from Vocabulary Exercises.*

B. Vocabulary

3.3. *Give Russian equivalents of the following words and expressions:*

manpower	constrain
outcome	nuclear reactor
perform a task	source
abacus	vacuum tube
broaden	
improvement	capabilities
predate	weather pattern
mainframe	trace
aircraft	artificial intelligence
predict	antiquity
subset	integrated circuit
decrease	advance

3.4. *Translate these words and word combinations into English and Kazakh:*

древность	улучшение, усовершенствование
Выполнить задание	количество
вакуумный прибор	ограничивать
уменьшать(ся)	расширять(ся)
основной источник	интегральная микросхема
восходить (к)	тип погоды

прогресс, достижение	результат
возможности	самолет
прогнозировать	предшествовать
счеты	ядерный реактор

a) The first commercial computer was used by the Census Bureau to ... the outcome of the 1952 presidential election.

b) Each generation reflected a change to hardware of decreased size but increased ... to control computer operations.

c) The history of information technology ... the invention of the modern digital computer by many centuries.

d) Supercomputers were used in science and engineering for designing aircraft and nuclear reactors and for predicting worldwide....

e) As it became clear that computers could be used for more than just mathematical calculations, the field of computer science ... to study computation in general.

f) Advances in ... that will minimize the need for complex programming characterize the fifth generation of computers, still in the experimental stage.

g) After the 1940s, the military remained the major ... of research and development funding for the expansion of automation to replace manpower with machine power.

h) Machines for calculating fixed numerical tasks, such as the abacus, have existed since

i) The first generation used the second used transistors, the third used and the fourth used integrated circuits on a single computer chip.

j) 10. For twenty-five years after 1952,... were used in large corporations to do calculations and manipulate large ... of information stored in databases.

3.5. Translate these words and word combinations into English and Russian:

ежелгі	жақсару
тапсырманы орындау	саны

ваккумды аспап	шектеу
механикалық есептегіштің азаюы	кеңею
негізгі бастау көзі	интегралды микросхема
мынаған кіреді	ауа-райының түрі
даму	нәтиже
мүмкіндік	ұшак
болжау	алдын ала болжау
есептер	ядролық реактор

3.6. *Complete the sentences with one of the given expressions and translate them.*

<i>predate</i>	<i>weather patterns</i>	<i>antiquity</i>
<i>artificial intelligence</i>	<i>capabilities</i>	<i>vacuum tubes</i>
<i>amounts</i>	<i>mainframe computers</i>	<i>broaden</i>
<i>integrated circuits</i>	<i>predict</i>	<i>source</i>

Supplementary text №2

Reading and Discussion

1. *Read the text. Characterize each era of information technology.*

History of Information Technology

The history of information technology can be divided into four broad eras: the experimental era, the hardware era, the software era, and the communications era.

Experimental Era: 1945–1960

The first computer, built in 1945, was the ED VAC (Electronic Discrete Variable Automatic Computer). A number of experimental machines and new technological developments led to the release of the IBM 1401 for the business user and the IBM 1620 for the scientist in 1959. The 1401 became a popular data processing

machine for business, and the 1620 provided the first computer experience for many students in universities and colleges.

Hardware Era: 1960 –1985

During this era, the driving force was the need to develop more powerful mainframe computers that could be applied to larger and more difficult problems. The major computer companies were IBM and the BUNCH (Burroughs, Univac, NCR, Control Data, and Honeywell). Operating systems were usually provided with the computer and were unique to each brand. Application programs were frequently custom-built by each customer. There were some software companies that sold software packages for common applications, such as accounting. This era came to a close after the introduction of the IBM Personal Computer in 1981.

Software Era: 1985 –1995

The personal computer changed the competitive environment in the industry. The owners of personal computers could not build their own software and had to rely on purchased applications. This opened up a large new market for software. Hardware improvements continued, but the new players were Intel and Motorola, the makers of microcomputer chips. The BUNCH were absorbed by various mergers and by 1990, even IBM was having difficulty. The important companies that everyone followed were usually software companies like Microsoft, WordPerfect, Lotus, and Borland. By the mid 1980's there were dozens of different word processors for sale.

Toward the end of this era most of the competitors were eliminated, sometimes very rapidly. Novell purchased WordPerfect for \$2.5 billion and resold it to Corel two years later for \$250 million. In another two years, Corel wrote off the whole investment. Customers showed a preference for common standards and were unwilling to buy software from anyone that was not an industry leader.

Communications Era: 1995-Present

The development of the World Wide Web in 1994 ushered in a new era of communications. In just a few years it has created a new paradigm for information exchange. We now see a new scramble of startup companies, mergers, and expansions as telephone companies, cable companies, entertainment companies, and new Internet service providers jockey for position. We can expect this to continue for

several years before the dust settles on some new arrangement of service providers. We will still see new innovations in hardware and software, but the most exciting developments will likely revolve around the communications area.

Read and learn the new words:

customer

merger

rely (on)

unwilling

purchase

usher

eliminate

scramble

absorb

jockey

2. Name the era each of the sentences refers to:

a) During this era, the driving force was the need to develop more powerful mainframe computers that could be applied to larger and more difficult problems.

b) Toward the end of this era most of the competitors were eliminated, sometimes very rapidly, as customers showed a preference for common standards and were unwilling to buy software from anyone that was not an industry leader.

c) Operating systems were usually provided with the computer and were unique to each brand. Application programs were frequently custom-built by each customer.

d) A number of experimental machines and new technological developments led to the release of the IBM 1401 for the business user and the IBM 1620 for the scientist in 1959, and the 1620 provided the first computer experience for many students in universities and colleges.

e) This era came to a close after the introduction of the IBM Personal Computer in 1981.

f) In just a few years it has created a new paradigm for information exchange, caused by the development of the World Wide Web in 1994.

g) The BUNCH were absorbed by various mergers and by 1990, even IBM was having difficulty, whereas the important companies that everyone followed were usually software companies like Microsoft, WordPerfect, Lotus, and Borland.

Text 4. Read the text and say, what additional information have you known about operations of main computer`s devices.

Computer

It was probably the worst prediction in history. Back in the 1940s, Thomas Watson, boss of the giant IBM Corporation, reputedly forecast that the world would need no more than "about five computers". Six decades later and the global population of computers have now risen to something like one billion machines!

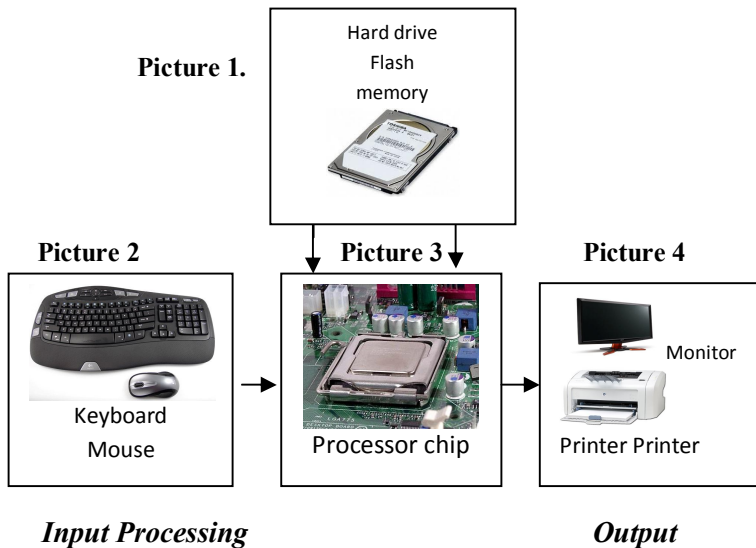
To be fair to Watson, computers have changed enormously in that time. In the 1940s, they were giant scientific and military behemoths commissioned by the government at a cost of millions of dollars apiece; today, most computers are not even recognizable as such: they are embedded in everything from microwave ovens to cellphones and digital radios. What makes computers flexible enough to work in all these different appliances? How come they are so phenomenally useful? And how exactly do they work?

A computer is an electronic machine that, processes information - in other words, an information processor: it takes in raw information (or data) at one end, stores it until it's ready to work on it, chews and crunches it for a bit, then spits out the results at the other end. All these processes have a name. Taking in information is called input, storing information is better known as memory, chewing information is also known as processing, and spitting out results is called output.

Imagine if a computer were a person. Suppose you have a friend who's really good at math. She is so good that everyone she knows posts their math problems to her. Each morning she goes to her letterbox and finds a pile of new math problems waiting for her attention. She piles them up on her desk until she gets around to looking at them. Each afternoon she takes a letter off the top of the pile, studies the problem, works out the solution, and scribbles the answer

on the back. She puts this in an envelope addressed to the person who sent her the original problem and sticks it in her out tray, ready to post. Then she moves to the next letter in the pile. You can see that your friend is working just like a computer. Her letterbox is her input; the pile on her desk is her memory; her brain is the processor that works out the solutions to the problems; and the out tray on her desk is her output.

Storage



Artwork caption: A computer works by combining input, storage, processing, and output. All the main parts of a computer system are involved in one of these four processes.

The first computers were gigantic calculating machines and all they ever really did was "crunch numbers": solve lengthy, difficult, or tedious mathematical problems. Today, computers work on a much wider variety of problems - but they are all still, essentially, calculations. Everything a computer does, from helping you to edit a photograph you've taken with a digital camera to displaying a web page, involves manipulating numbers in one way or another.

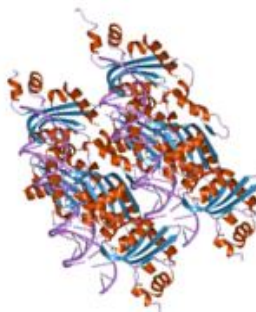
Suppose you're looking at a digital photo you just taken in a paint or photo-editing program and you decide you want a mirror

image of it (in other words, flip it from left to right). You probably know that the photo is made up of millions of individual pixels (coloured squares) arranged in a grid pattern (Picture 1). The computer stores each pixel as a number, so taking a digital photo (Picture 2) is really like an instant, orderly exercise in painting by numbers! To flip a digital photo, the computer simply reverses the sequence of numbers so they run from right to left instead of left to right. Or suppose you want to make the photograph brighter. All you have to do is slide the little «brightness» icon. The computer then works through all the pixels, increasing the brightness value for each one by, say, 10 percent to make the entire image brighter. So, once again, the problem boils down to numbers and calculations.

What makes a computer different from a calculator is that it can work all by itself. You just give it your instructions (called a program) and off it goes, performing a long and complex series of operations all by itself. Back in the 1970s and 1980s, if you wanted a home computer to do almost anything at all, you had to write your own little program to do it. For example, before you could write a letter on a computer, you had to write a program that would read the letters you typed on the keyboard, store them in the memory, and display them on the screen. Writing the program usually took more time than doing whatever it was that you had originally wanted to do (writing the letter). Pretty soon, people started selling programs like word processors to save you the need to write programs yourself.



Picture 1



Picture 2

Exercises

A. Comprehension

4.1. *Answer these questions:*

- a) What is a computer?
- b) What comparison of a computer is given in the text? In what way?
- c) How can a computer be characterized from the point of view of its constituent parts? Give brief characteristics of each one.
- d) Why is a computer said to simulate a calculator? How do they differ?
- e) What makes a computer powerful and flexible?

4.2. *Summarize the text using the words from Vocabulary Exercises.*

B. Vocabulary

4.3. *Give Russian equivalents of the following words and expressions:*

raw information	rise
flexible	screen
buinput	
permanent	chew
crunch	fair
solution	
appliance	embed
loudspeaker	output
tedious	share
ink-jet printer	pile up
huge	keyboard
flip	tricky
edit	hard-drive
orderly	get around to
tool	instant

4.4. Translate these words and word combinations into English:

Сотовый телефон	справедливый
спрессовывать (данные)	легко приспособляемый
решение	вставлять
постоянный	обдумывать
клавиатура	сложный
редактировать, создавать	струйный принтер
мгновенный	вернуться (к чему-л.) после перерыва
ввод, входной	аппарат, прибор
экран	увеличиваться в объеме, возрастать
огромный	жёсткий диск, дисковод, винчестер
скрывать	инструмент
разделять	утомительный
отображать зеркально	систематический
Акустическая система	делать, совершать

4.5. Translate these words and word combinations into English:

ұялы телефон	әділетті
ысып нығыздау (мәліметтер)	оңай бейімделгіш
шешім	қою
тұрақ	ойлану
пернетақта	қиын
өңдеу, құру	сұйық бояулы принтер
лезде	демалыстан кейін (бір нәрсеге) оралу
енгізу, кіру	аппарат, қондырғы
экран	көлем бойынша үлкею, өсу
өте үлкен	қатты диск, дисковод, винчестер
жасыру	құрал
бөлу	жалықтыратын
айна бейнелеу	жүйелік
акустикалық жйіе	істеу, жасау

4.6. *Find synonyms of the following expressions among the words and word combinations of the previous exercises:*

- a) monitor, display;
- b) complicated, difficult, complex;
- c) revise, check over, amend, improve, correct;
- d) boring, dull, monotonous; wearisome;
- e) device, implement, instrument;
- f) piece of equipment, machine;
- g) set in, insert, implant;
- h) way out, result, explanation;
- i) immediate, direct, instantaneous;
- j) go halves, divide, contribute to;
- k) enormous, massive, vast, gigantic;
- l) collect, amass, load;
- m) hide, conceal, put out of sight;
- n) adaptable, variable, compliant;
- o) just, fair-minded, rational;
- p) systematic, methodical, organized;
- q) enduring, lasting, eternal, stable.

Supplementary text № 3

Reading and Discussion

1. *Read the text and answer the questions:*

- a) *What distinction of the term «computer» can be made in its original and modern meanings?*
- b) *How do we call a list of instructions given to a computer?*
- c) *What are the types of instructions?*

Nowadays a computer is a machine which manipulates data according to a list of instructions.

Modern computers take numerous physical forms and are based on comparatively tiny integrated circuits and are millions to billions of times more capable while occupying a fraction of the space. Today, simple computers may be made small enough to fit into a wrist watch and be powered from a watch battery. Personal computers in various forms are icons of the information age and are what most people think of as «a computer». However, the most common form of computer in use today is by far the embedded computer.

Embedded computers are small, simple devices that are often used to control other devices – for example; they may be found in machines ranging from fighter aircraft to industrial robots, digital cameras, and even children's toys.

The ability to store and execute lists of instructions called programs makes computers extremely versatile and distinguishes them from calculators. The Church – Turing thesis is a mathematical statement of this versatility: any computer with a certain minimum capability is, in principle, capable of performing the same tasks that any other computer can perform. Therefore, computers with capability and complexity ranging from that of a personal digital assistant to a supercomputer are all able to perform the same computational tasks given enough time and storage capacity.

In most cases, computer instructions are simple: add one number to another, move some data from one location to another, send a message to some external device, etc. These instructions are read from the computer's memory and are generally carried out (executed) in the order they were given. However, there are usually specialized instructions to tell the computer to jump ahead or backwards to some other place in the program and to carry on executing from there. These are called «jump» instructions (or branches). Furthermore, jump instructions may be made to happen conditionally so that different sequences of instructions may be used depending on the result of some previous calculation or some external event. Many computers directly support subroutines by providing a type of jump that «remembers» the location it jumped from and another instruction to return to the instruction following that jump instruction.

Give corresponding translation of the given words below:

refer	previous
aid	subroutine
fit	skip
tiny	bug
wrist	benign
execute	malicious
versatility	intent
add	fault
conditionally	multiply

2. Reproduce the text in English. Use the words given at the bottom.

Компьютер (англ. *Computer* – «вычислитель») – машина для проведения вычислений. При помощи вычислений компьютер способен обрабатывать информацию по заранее определенному алгоритму. Кроме того, большинство компьютеров способны сохранять информацию и осуществлять поиск информации, выводить информацию на различные виды устройств выдачи информации. Свое название компьютеры получили по своей основной функции – проведению вычислений. Однако в настоящее время полагают, что основные функции компьютеров – обработка информации и управление.

Основные принципы: выполнение поставленных перед ним задач компьютер может обеспечивать при помощи перемещения каких-либо механических частей, движения потоков электронов, фотонов, квантовых частиц или за счет использования эффектов от любых других хорошо изученных физических явлений.

Наибольшее распространение среди компьютеров получили так называемые электронно-вычислительные машины, ЭВМ. Собственно, для подавляющего большинства людей, слова «электронно-вычислительные машины» и «компьютеры» стали словами-синонимами, хотя на самом деле это не так. Наиболее распространенный тип компьютеров – электронный персональный компьютер.

Архитектура компьютеров может непосредственно моделировать решаемую проблему, максимально близко (в смысле математического описания) отражая исследуемые физические явления. Так, электронные потоки могут использоваться в качестве моделей потоков воды при моделировании дамб или плотин. Подобным образом сконструированные аналоговые компьютеры были обычны в 60-х годах XX века, однако сегодня стали достаточно редким явлением.

В большинстве современных компьютеров проблема сначала описывается в математических терминах, при этом вся необходимая информация представляется в двоичной форме (в виде единиц и нулей), после чего действия по ее обработке сводятся к применению простой алгебры логики. Поскольку практически вся математика может быть сведена к выполнению

булевых операций, достаточно быстрый электронный компьютер может быть применим для решения большинства математических задач (а также и большинства задач по обработке информации, которые могут быть легко сведены к математическим).

Было обнаружено, что компьютеры все-таки могут решить не любую математическую задачу. Впервые задачи, которые не могут быть решены при помощи компьютеров, были описаны английским математиком Аланом Тьюрингом.

Get acquaintance with the new terminology:

алгоритм	algorithm
поток электронов	electron stream
квантовая частица	quantum particle
электронно-вычислительная машина	electronic computer
дамба	dam
плотина	dike
аналоговый компьютер	analogue computer
двоичный	binary
единица (натуральное число)	unit
булева операция	Boolean operation
ламповый индикатор	valve/tube indicator
составитель	compiler, author
высокоуровневый	higher-level, high-level
узкоспециализированный	highly tailored
управляющий компьютер	LCU control

3. Reproduce the text in English. Use the words given at the bottom.

Компьютер (ағыл. computer –"есептегіш") – есептеуге арналған машина. Есептегіш компьютер алдын ала берілген алгоритм көмегімен ақпаратты өндеуге қабілетті. Көптеген компьютерлер ақпараттарды сақтауға және ақпараттарды іздеуге қабілетті, ақпаратты қабылдайтын әртүрлі қондырғыларға ақпарат шығара алады. Өз атауын компьютерлер өзінің негізгі атқаратын функциясы – есептеп шығаруға байланысты алды. Бірақта, қазіргі таңда компьютердің негізгі қызметі - ақпаратты өндеу және басқару деп айтады.

Негізгі принциптері: алдына қойылған есепті компьютер механикалық бөлшектерінің ауысуының, кванттық бөлшектерінің, фотондардың, электрондар ағымының қозғалысы немесе басқада жақсы зерттелген физикалық құбылыстардың көмегімен есептеу.

Компьютерлердің арасында көптеп танылғаны электронды есептегіш деп аталатын машина, ЭЕМ. Шындығында, басым көптеген адамдар, "электронды есептегіш машина" мен "компьютер" деген сөздерді синонимдер дейді, негізінде олай болмасада. Көптеп таралған компьютердің түрі - электронды жеке компьютер.

Компьютерлер архитектурасы шешетін мәселені тікелей пішіндей алады, зерттелетін физикалық құбылыстарды барынша (математикалық сипаттама бойынша) жақын қамтып көрсетеді.

Осылайша, электронды ағындар судың ағындары бөгеттер немесе тоғаттардың пішіндеуіндегідей үлгілер ретінде қолданыла алады. Осыған ұқсас аналогты компьютерлер XX ғасырдың 60-ші жылдарында құрастырылған, дегенмен бүгін таңда бұл өте сирек құбылыс.

Қазіргі таңдағы компьютерлердің көпшілігіндегі мәселе берілген тапсырма бірінші математикалық терминдерде жазылады, бұл кезде барлық қажетті мәліметтер екілік формада көрінеді (бірліктер және нөлдер түрінде), осыдан кейін оны өңдеу әрекетіде қарапайым логика алгебрасы қолданылады. Мүмкін, түгелдей дерлік математика булелік операцияларды орындауға арналғандықтан, жылдам электронды компьютерді көптеген математикалық тапсырмаларды (сонымен қатар, математикалыққа жеңіл болатын мәліметтерді өңдеуге арналған көптеген тапсырмаларды) шешуге қолданған жеткілікті шығар.

Алайда, компьютерлердің барлық математикалық есептерді шеше алмайтындығы мәлім болды. Алғашқы рет компьютерлер шеше алмайтын математикалық есептер ағылшын математигі Алан Тьюрингпен жазылды.

Орындалған тапсырмалардың нәтижесі қолданушыға әртүрлі мәліметтерді енгізу-шығару шамды индикаторлар, принтерлер, мониторлар немесе т. б. секілді құрылғылар арқылы ұсынылуы мүмкін.

Алғашқы қолданушылар және әсіресе балалар көбіне компьютердің қарапайым машина және көрсеткен сөзді компьютер

өздігінен "ойлай" немесе "түсіне" алмайды деген идеяны қиыншылықпен қабылдайды. Компьютер тек бағдарламамен тапсырылған сызықтар мен түстерді енгізу-шығару құрылғыларының көмегімен механикалық түрде бейнлейді. Адамның миы экрандағы бейнеленген үлгіні, санды немесе сөзді өзі түсінеді және оған тура немесе кері мән береді.

Read and learn new words :

алгоритм	algorithm
электрондардыңағыны	electron stream
кванттық бөлшек	quantum particle
электрондыесептегіш машина	electronic computer
бөгет	dam
тоған	dike
аналогты компьютер	analogue computer
екілік	binary
бірлік (табиғи сан)	unit
Буле операциясы	Boolean operation
шамды индикатор	valve/tube indicator
құрастырушы	compiler, author
жоғары деңгейлі	higher-level, high-level
аз бағытта мамандандырылған	highly tailored
бақылаушы компьютер	LCU control

4. Talking points. Speak on the given themes.

- a) The definition of a computer, its origin and constituent parts.
- b) Computer programming.
- c) Computer usage.

Text 5. Analyze the text and do all the assignments.

Types of Computers

The types of computers range from the Hybrid to the Analog types. The computers you come across in the daily course of your day range from laptops, palmtops and towers, to desktop computers,

to name a few. But the very word “computers” reminds one of the desktop computers used in the offices or homes. Different categories of computers have been devised in keeping with our varied needs.

According to the classification based on operational principle the types of computers: analogue and hybrid.

Analog Computers: The analog computer is almost an extinct type of computer these days. It is different from digital computer in respect that it can perform numerous mathematical operations simultaneously. It is also unique in terms of operation as it utilizes continuous variables for the purpose of mathematical computation. It utilizes mechanical, hydraulic, or electrical energy or operation.

Hybrid computers: These types of computers are, as the name suggests, a combination of both Analogue and Digital computers. The Digital computers which work on the principle of binary digit system of “0” and “1” can give very precise results. But the problem is that they are too slow and incapable of large scale mathematical operation. In the hybrid types of computers the Digital counterparts convert the analog signals to perform Robotics and Process control.

Apart from this, computers are also categorized on the basis of physical structures and the purpose of their use. Based on capacity, speed and reliability they can be divided into three categories of computers:

1. The Mainframe Computer – These are computers used by large organization like meteorological surveys and statistical institutes for performing bulk mathematical computations. They are core computers which are used for desktop functions of over one hundred people simultaneously.

2. The Microcomputer – These are the most frequently used computers better known by the name of “Personal computers”. This is the type of computer meant for public use. Other than Desktop Computer the choice ranges as follows:

Personal Digital Computer



Hand-held (HPC)
Fig. 1



PDA
Fig. 2



Tablet PC
Fig. 3



Laptop
Fig. 4



Desktop
Fig. 5



Workstation
Fig. 6



Tower
Fig. 7

A desktop* is a PC that is not designed for portability. The expectation with desktop systems is that you will set the computer up in a permanent location. Most desktops offer more power, storage and versatility for less cost than their portable brethren.

Laptops*, also called notebooks, are portable computers that integrate the display, keyboard, a pointing device or trackball, processor, memory and hard drive all in a battery-operated package slightly larger than an average hardcover book.

Palmtops, more commonly known as Personal Digital Assistants (PDAs)*, are tightly integrated computers that often use flash memory instead of a hard drive for storage. These computers usually do not have keyboards but rely on touch screen technology for user input. Palmtops are typically smaller than a paperback novel, very lightweight with a reasonable battery life. A slightly larger and heavier version of the palmtop is the handheld computer.

A tablet PC* is a notebook or slate-shaped mobile computer, first introduced by Pen Computing in the early 90s with their Pen Go Tablet Computer and popularized by Microsoft. Its touch screen or graphics tablet/screen hybrid technology allows the user to operate the computer with a stylus or digital pen, or a fingertip, instead of keyboard or mouse. The form factor offers a more mobile way to interact with a computer. Tablet PCs are often used where normal

notebooks are impractical or unwieldy, or do not provide the needed functionality.

A workstation* is a desktop computer that has a more powerful processor, additional memory and enhanced capabilities for performing a special group of task, such as 3D Graphics or game development.

3. The Mini computer – Mini computers like the mainframe computers are used by business organization. The difference being that it can support the simultaneous working of up to 100 users and is usually maintained in business organizations for the maintenance of accounts and finances.

Yet another category of computer is the Super Computers. It is somewhat similar to mainframe computers and is used in economic forecasts and engineering designs. Today life without computers is inconceivable. Usage of different types of computers has made life both smooth and fast paced.

Exercises

A. Comprehension

5.1. *Answer these questions:*

a) Which types of computers are there in terms of the classification based on operational principle? Characterize each one.

b) How can computers be classified according to the principle of physical structures and the purpose of their use? Speak on the three types.

5.2. *Summarize the text using the words from Vocabulary Exercises.*

B. Vocabulary

5.3. *Give Kazakh and English equivalents of the following words and expressions:*

Give Kazakh equivalents

Give English equivalents

robotics	наблюдение, обозрение, обзор
frequently	настольный компьютер

tablet	основная масса, большая часть чего-л.
reliability	основной, базовый
incapable	немыслимый
come across	исходя из, на основе
simultaneously	устаревший, вышедший из употребления
in respect that	зачастую, часто
Personal Digital Assistant	наводить на мысль, говорить о, означать
laptop	крупный масштаб
precise	встретиться с кем-л., натолкнуться на чего-л.
variable	надежность
extinct	одновременно, совместно
core	неспособный к чему-л., на что-л.
desktop	карманный компьютер
largescale	учитывая, принимая во внимание
bulk	переменная (величина)
fast pace	робототехника
in terms of	персональный цифровой секретарь
smooth	определенный
survey	
inconceivable	
palmtop	
handheld PC	
suggest	

5.4. Give English, Russian equivalents of the following words and expressions:

Give English equivalents

Give Russian equivalents

нақты	tower
айқындалған	robotics
зерделеу, шолу, барлау	frequently
үстел үсті компьютері	tablet
негізгі масса, бір заттың үлкен бөлігі	reliability
негізгі, базалық	incapable
ақылға сыймайтын	come across
бір заттың негізінде	in respect that
ескірген, қолданыстан шыққан	Personal Digital Assistant
жиі, үзбей	laptop

ойға келтіру, айту, білдіру	variable
ірі масштабты	extinct
біреумен кездесу, бір затқа ұрыну	core
беріктік	large scale
бір мезгілде, бір шақта; қабілетсіз	bulk
қалта компьютері	in terms of
ескеріле, ескере отыру	survey
ауыспалы (өлшем)	inconceivable
робототехника	palm top
дербес сандық хатшы	handheld PC

5.5. *Choose the most suitable words from those given in brackets without consulting the text. Translate the sentences into Russian.*

a) The analogue computer is almost (a precise, an extinct) type of computer these days.

b) The digital computers are too slow and (inconceivable, incapable) of large scale mathematical operation.

c) Based on speed and (capacity, large scale, reliability) they can be divided into three categories of computers.

d) Mainframe computers are (core, bulk) computers which are used for desktop functions of over one hundred people (simultaneously, frequently).

e) Mini computers can support the (simultaneous, smooth) working of up to 100 users.

f) The Super Computer is somewhat similar to mainframe computers and is used in economic (forecasts, surveys).

g) Usage of different types of computers has made life both smooth and (inconceivable, fast paced).

5.6. *Find the word not belonging to the given synonymic group. Explain your choice.*

a) survey, review, investigation, analysis, solution, consideration, evaluation;

b) suggest, imply, indicate, hint, bring to mind, predate, evoke;

c) bulk, majority, greater part, almost all, lion's share, substance, merger;

d) extinct, obsolete, entire, out of date, dead, vanished;

e) come across, fall upon, encounter, happen upon, eliminate;

- f) in respect that, taking into account/consideration, in view of, in lieu of, with regard to;
- g) simultaneously, explicitly, all together, at the same time, at once;
- h) smooth; effortless, easy, calm, quiet, tranquil, tremendous, placid;
- i) precise, exact, accurate, entire, particular, clear-cut, fixed;
- j) reliability, durability, improvement, strength, reliableness;
- k) fast paced, rapid, quick, prompt, swift, affordable;
- l) frequently, often, regularly, normally, habitually, conditionally, repeatedly.

Supplementary text №4

Reading and Discussion

1. Read the text. While reading insert the missing name of a computer type. Ask your group-mates some questions to cover the basic characteristics of each computer type given in the text. Note the points of difference between the two English texts.

hefty drive stylus wearable handle

There is a computer for every use under heaven, or so it seems. Let's look at the kinds of computers that there are, based on general performance levels.

... computers for personal use come in all shapes and sizes, from tiny PDAs (personal digital assistant) to hefty PC (personal computer) towers. More specialized models are announced each week – trip planners, expense account pads, language translators.

When talking about PC computers, most people probably think of the ... type, which are designed to sit on your desk. (Bet you figured that one out!) The tower and the smaller mini-tower style cases have become popular as people started needing more room for extra drives inside. Repairmen certainly appreciate the roominess inside for all the cables and circuit boards and their knuckles.

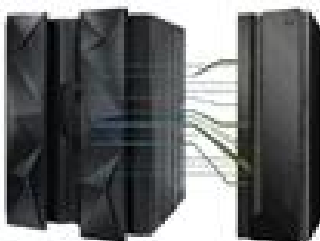
A workstation is part of a computer network and generally would be expected to have more than a regular desktop PC of most everything, like memory, storage space, and speed.

The market for the smallest PCs is expanding rapidly. Software is becoming available for the small types of PC like the ... (PPC) and ... (HPC). This new software is based on new operating systems like

Windows CE (for Consumer Electronics). You may find simplified versions of the major applications you use. One big advantage for the newer programs is the ability to link the small computers to your home or work computer and coordinate the data. So you can carry a tiny computer like a PalmPilot around to enter new phone numbers and appointments and those great ideas you just had. Then later you can move this information to your main computer.

With a Tablet PC you use an electronic stylus to write on the screen, just like with a pen and paper, only your words are in digital ink. The Tablet PC saves your work just like you wrote it (as a picture), or you can let the Hand Recognition (HR) software turn your chicken-scratches into regular text.

... is the workhorse of the business world and is the heart of a network of computers or terminals which allows hundreds of people to work at the same time on the same data. It requires a special environment – cold and dry.



Picture 1. Workstation

2. *Translate the text without a dictionary in English and Kazakh. Use the words given at the bottom.*

Весь спектр современных вычислительных систем можно разделить на три больших класса: миникомпьютеры и микрокомпьютеры, мейнфреймы, суперкомпьютеры. В настоящее время вычислительные системы различают прежде всего по функциональным возможностям.

Основными признаками миникомпьютеров (или персональных компьютеров) и микрокомпьютеров являются шинная организация системы, высокая стандартизация

аппаратных и программных средств, ориентация на широкий круг потребителей. Персональные компьютеры могут быть настольными и портативными.

Миникомпьютеры занимают промежуточное положение между большими вычислительными машинами и микрокомпьютерами, и они играют роль серверов, к которым подключаются десятки и сотни терминалов или микрокомпьютеров. Миникомпьютеры используются в крупных фирмах, государственных и научных учреждениях, учебных заведениях, компьютерных центрах для решения задач, с которыми не способны справиться микрокомпьютеры, и для централизованного хранения и переработки больших объемов информации. Основными производителями миникомпьютеров являются фирмы Ай-Ти-энд-Ти (AT&T), Интел (Intel), Хьюлетт – Паккард (Hewlett-Packard), Digital Equipment.

Мейнфреймы – это универсальные большие компьютеры общего назначения. Изначально мейнфреймы были предназначены для обработки огромных объемов информации. Наиболее крупный производитель мейнфреймов – фирма Ай-Би-Эм (IBM). Мейнфреймы отличаются исключительной надежностью, высоким быстродействием, очень большой пропускной способностью устройств ввода и вывода информации. К ним могут подсоединяться тысячи терминалов или микрокомпьютеров пользователей. Мейнфреймы используются крупнейшими корпорациями, правительственными учреждениями, банками. С расцветом микрокомпьютеров и миникомпьютерных систем значение мейнфреймов сократилось. Стоимость мейнфреймов относительно высока: один компьютер с пакетом прикладных программ оценивается минимум в миллион долларов. Несмотря на это, они активно используются в финансовой сфере и оборонном комплексе, где занимают от 20 до 30 % компьютерного парка, так как использование мейнфреймов для централизованного хранения и обработки достаточно большого объема информации обходится дешевле, чем обслуживание распределенных систем обработки данных, состоящих из сотен и тысяч персональных компьютеров.

шина	wire
пропускная способность	(carrying) capacity
объем информации	Information content
приложение	application
сделка	bargain

3. *Translate the text without a dictionary in English and Russian. Use the words given at the bottom.*

Заманауи есептеуіш жүйе спектрін үш үлкен класқа бөлуге болады: миникомпьютерлер мен микрокомпьютерлер, мейнфреймдер және суперкомпьютерлер. Қазіргі уақытта есептеуіш жүйелерді ең алдымен атқарымдық мүмкіндіктеріне қарай ажыратады.

Миникомпьютер (немесе дербес компьютерлер) мен микрокомпьютерлердің басты белгілері жүйенің тегершікті ұйымдастырылуы, аппараттық және программалау жүйесінің жоғары стандартталуы, көпшілік тұтынушыларға сай келуі. Десбес компьютерлер үстел үсті немесе портативті болуы мүмкін.

Миникомпьютерлер үлкен есептеуіш машиналар мен микро-компьютерлер ортасындағы аралық жағдайда болады және олар өздеріне ондаған не жүздеген терминалдар мен микрокомпьютерлер қосыла алатын сервер рөлін атқарады. Миникомпьютерлерді ірі фирмаларда, мемлекеттік және ғылыми мекемелерде, оқу орындарында, компьютер орталықтарында микрокомпьютерлер шеше алмаған тапсырмаларды орындау үшін және үлкен көлемді ақпараттарды орталықтан сақтандырып, өңдеу мақсатында қолданады. Миникомпьютерлерді негізгі өндіру фирмаларына Ай-Ти-энд-Ти (AT&T), Интел (Intel), Хьюлетт-Паккард (Hewlett-Packard), Digital Equipment жатады.

Мейнфреймдер – бұл ортақ қолданыстағы универсалды үлкен компьютерлер. Мейнфреймдер бастапқыдан үлкен көлемді ақпараттарды өңдеу үшін жасалған. Мейнфреймдердің ең ірі өндірушісі – Ай-Би-Эм фирмасы. Мейнфреймдер өздерінің беріктігімен, жоғары іс әрекеттілігімен,

қолданушылардың енгізу және шығару құрылғыларының өте үлкен өткізгіштік қасиетімен ерекшеленеді. Оларға қолданушылардың мыңдаған терминалдары мен микрокомпьютерлері қосыла алады. Мейнфреймдерді ірі корпорациядарда, үкіметтік мекемелерде, банктерде қолданады. Микрокомпьютерлер мен миникомпьютерлер жүйелері шығуымен мейнфреймдердің мағынасы қысқарды. Мейнфреймдердің құны салыстырмалы жоғары: программалар пакетімен жабдықталған бір компьютер минимум миллион долларға бағаланады. Бұған қарамастан оларды қаржы саласында және қорғаныс кешендерінде белсенді пайдаланады, компьютерлік парктің 20 дан 30 пайызға дейінгі орнын алады, себебі олар үлкен көлемді ақпаратты сақтау мен өңдеуде жүздеген және мыңдаған дербес компьютерлерден құралатын жүйелік өңдеуден тиімді болып табылады.

Суперкомпьютерлер секундына минимум жүз миллиондаған операцияларды орындауын талап ететін бағдарламалармен жұмыс жасауға арналған. Осындай зор көлемді есептеулер аэродинамика, метеорология, жоғары энергиялы физикада, геофизика салаларындағы тапсырмаларды орындауда қажет. Суперкомпьютерлер біржадағы үлкен көлемді келісім шарттарды өңдеу мақсатында қаржы саласында қолданысқа ие. Олар жоғары құнымен ерекшеленеді – 15 миллион доллардан астам, сондықтан мұндай машиналарды сатып алу шешімі мемлекеттік деңгейде қабылданады, ұсталған суперкомпьютерлерді сату жүйесі де қалыптасқан.

тегершік	wire
өткізу қасиеті	(carrying) capacity
ақпарат көлемі	information content
қосымша	application
келісім-шарт	bargain

4. *Summarize all the information concerning the types of computers and make a detailed report on this topic.*

Text 6. Read the text and do all their assignments.

Programming Languages

Programming languages provide various ways of specifying programs for computers to run. Unlike natural languages, programming languages are designed to permit no ambiguity and to be concise. They are purely written languages and are often difficult to read aloud. They are generally either translated into machine language by a compiler or an assembler before being run, or translated directly at run time by an interpreter. Sometimes programs are executed by a hybrid method of the two techniques. There are thousands of different programming languages – some intended to be general purpose, others useful only for highly specialized applications.

Programming Languages:

ists of programming languages	Timeline of programming languages, Categorical list of programming languages, Generational list of programming languages, Alphabetical list of programming languages, Non-English-based programming languages
Commonly used Assembly languages	ARM, MIPS, x86
Commonly used High level languages	BASIC, C, C++, C#, COBOL, Fortran, Java, Lisp, Pascal
Commonly used Scripting languages	Bourne script, JavaScript, Python, Ruby, PHP, Perl

While it is possible to write computer programs as long lists of numbers (machine languages) and this technique was used with many early computers, it is extremely tedious to do so in practice, especially for complicated programs. Instead, each basic instruction can be given a short name that is indicative of its function and easy to remember – mnemonic such as ADD, SUB, MULT or JUMP. These mnemonics are collectively known as a computer's assembly languages. Converting programs written in assembly language into something the computer can actually understand (machine language) is usually done by a computer program called an assembler. Machine languages and the assembly languages that represent them

(collectively termed low-level programming languages) tend to be unique to a particular type of computer. For instance, an ARM architecture computer (such as may be found in a PDA or a hand-held videogame) cannot understand the machine language of an Intel Pentium or the AMD Athlon 64 computer that might be in a PC.

Though considerably easier than in machine language, writing long programs in assembly language is often difficult and error prone. Therefore, most complicated programs are written in more abstract high-level programming languages that are able to express the needs of the computer programmer more conveniently (and thereby help reduce programmer error). High level languages are usually “compiled” into machine language (or sometimes into assembly language and then into machine language) using another computer program called a compiler. Since high level languages are more abstract than assembly language, it is possible to use different compilers to translate the same high level language program into the machine language of many different types of computers. This is part of the means by which software like video games may be made available for different computer architectures such as personal computers and various video game consoles.

Exercises

A. Comprehension

6.1. Answer these questions:

- a) What is the difference between natural and programming languages?
- b) How can programming languages be translated into machine languages?
- c) How can machine language be defined?
- d) What does a computer’s assembly language correspond to?
- e) Are machine languages and the assembly languages that represent them identical for all types of computers? Why?
- f) How can assembly languages be collectively termed?
- g) What is the name of other types of programming languages? Give three basic characteristics to them.

6.2. Summarize the text using the words from Vocabulary Exercises.

B. Vocabulary

6.3. Give English and Kazakh equivalents of the following words and expressions:

функционировать	intend
компилятор, транслятор	timeline
краткий, сжатый, лаконичный	reduce
предназначать, планировать (что-л.)	assembler
подверженный (ошибками)	console
давать возможность, допускать	run
указывающий, показывающий	ambiguity
понижать, сокращать	concise
неопределенность, неясность	timeline
временная последовательность	complicated
мнемоника, мнемотехника	compiler
пульт (управления)	prone
разрешать	permit
показательный	indicative
мнемонический	mnemonic

6.4. Give English and Russian equivalents of the following words and expressions:

жұмыс істеу	intend
кұрастырушы, таратушы	timeline
қысқа, қысылған, ықшамды	reduce
арнау, жоспарлау (бір нәрсені)	assembler
шалдыққан (қателерге)	console
мүмкіндік беру	run
бағыттаушы, көрсетуші	ambiguity
түсіру, қысқарту	concise
белгісіздік, көмескілік	timeline
уақытша ретгілік	complicated
мнемоника, мнемотехника	compiler
(басқару) құрылғысы	prone
рұқсат беру	permit
көрсетілетін	indicative
мнемоникалық	mnemonic

6.5. *Choose the most suitable words from those given in brackets without consulting the text. Prove your choice. Translate the sentences into Russian.*

a) Programming languages provide various ways of specifying programs for computers to (input, run).

b) Each basic instruction can be given a short name that is (indicative of, similar to) its function and easy to remember – mnemonic such as ADD, SUB, MULT or JUMP.

c) Some programming languages are (constrained, intended) to be general purpose, others useful only for highly specialized applications.

d) To write computer programs as long lists of numbers is extremely tedious in practice, especially for (embedded, complicated) programs.

e) Converting programs written in assembly language into something the computer can actually understand is usually done by a computer program called a (compiler, assembler).

f) Writing long programs in assembly language is often difficult and (benign, error prone).

g) Usage of different compilers to translate the same high level language program into the machine language of many different types of computer is part of the means by which software like video games may be made available for different computer architectures such as personal computers and various video game (consoles, screens).

Supplementary text №5

Reading and Discussion

1. *Study the words given at the bottom and explain their meanings. Read the text. Define each kind of high-level languages (advantages, drawbacks, examples). State main ideas in Russian.*

Every program ultimately has to be executed as a stream of bytes that are instructions in your computer's machine languages. But human beings don't deal with machine language very well; doing so has become a rare, black art even among hackers.

There are several different kinds of high-level languages. In order to talk about these, you'll find it useful to bear in mind that the source code of a program (the human-created, editable version)

has to go through some kind of translation unto machine code that the machine can actually run.

1. Compiled languages

The most conventional kind of language is a compiled language. Compiled languages get translated into runnable files of binary machine code by a special program called (logically enough) a compiler. Once the binary has been generated, you can run it directly without looking at the source code again.

(Most software is delivered as compiled binaries made from code you don't see.)

Compiled languages tend to give excellent performance and have the most complete access to the OS, but also to be difficult to program in.

C, the language in which UNIX itself is written, is by far the most important of these (with its variant C++).

There used to be many other compiler languages, but most of them have either gone extinct or are strictly research tools. If you are a new UNIX developer using a compiled language, it is overwhelmingly likely to be C or C++.

2. Interpreted languages

An interpreted language depends on an interpreter program that reads the source code and translates it on the fly into computations and system calls. The source has to be re-interpreted (and the interpreter present) each time the code is executed.

Interpreted languages tend to be slower than compiled languages, and often have limited access to the underlying operating system and hardware. On the other hand, they tend to be easier to program and more forgiving of coding errors than compiled languages.

Many UNIX utilities, including the shell and BC and SED and AWK, are effectively small interpreted languages. BASICs are usually interpreted. So is Tcl. Historically, the most important interpretive language has been LISP (a major improvement over most of its successors). Today, UNIX shells and the Lisp that lives inside the Emacs editor are probably the most important pure interpreted languages.

ultimately; deal with; rare; black art; UNIX; kernel; relic; distinguish; compiled languages; source code; OS (=operating

system); interpreted language; utility; shell; BC (binary code); SED (smoke-emitting diode); AWK; BASIC; Tcl; P-code language (pseudocode); Python; Perl

2. Divide the text into parts and give the title to each of them in English and Kazakh. Reproduce the text in English, Kazakh emphasizing the new information not mentioned in the previous texts and points of difference in presentation the facts.

Язык программирования – формальная знаковая система, предназначенная для записи программ. Программа обычно представляет собой некоторый алгоритм в форме, понятной для исполнителя (например, компьютера). Язык программирования определяет набор лексических, синтаксических и семантических правил, используемых при составлении компьютерной программы. Он позволяет программисту точно определить то, на какие события будет реагировать компьютер, как будут храниться и передаваться данные, а также какие именно действия следует выполнять над этими данными при различных обстоятельствах.

Создатели языков по-разному толкуют понятие «язык программирования». К наиболее распространенным утверждениям, признаваемым большинством разработчиков, относятся следующие:

Функция: язык программирования предназначен для написания компьютерных программ, которые применяются для передачи компьютеру инструкций по выполнению того или иного вычислительного процесса и организации управления отдельными устройствами.

Задача: язык программирования отличается от естественных языков тем, что предназначен для передачи команд и данных от человека компьютеру, в то время, как естественные языки используются для общения людей между собой. В принципе можно обобщить определение «языки программирования» – это способ передачи команд, приказов, четкого руководства к действию; тогда как человеческие языки служат также для обмена информацией.

3. Divide the text into parts and give the title to each of them in English and Russian. Reproduce the text in English, Russian

emphasizing the new information not mentioned in the previous texts and points of difference in presentation the facts.

Бағдарламалау тілі – бағдарлама жазуға арналған формальды белгілер жүйесі. Әдетте бағдарлама орындаушыға түсінікті күйдегі кейбір алгоритм болып табылады (мысалы, компьютер). Бағдарламалау тілі компьютерлік бағдарламалар құрастыруда қолданылатын лексикалық, синтаксистік және семантикалық ережелер жиынтығымен анықталады. Ол бағдарламашыға компьютердің қандай жағдайларға әсер ететінін, мәліметтердің қалай сақталып және берілуін, сонымен қатар осы мәліметтер әр түрлі жағдайларда қандай әрекеттермен орындалуын дәл анықтауға мүмкіндік береді.

Тілдерді құрастырушылар «бағдарламалау тілі» түсінігін әр түрлі талқылайды. Көпшілік құрастырушылардың қолдауына ие болған анықтама-ларға төменгілер жатады:

Атқарым: бағдарламалау тілі компьютерге есептік процестердің қолда-нылу ережелерін беруге және жекеленген құралдарды басқаруда қолданыла-тын компьютерлік бағдарламалар жазуға арналған.

Тапсырма: бағдарламалау тілі табиғи тілдерден ерекшелігі бұйрықтар мен мәліметтерді адамнан компьютерге жеткізуінде, ал табиғи тілдерді адамдар өзара қарым - қатынаста қолданылады. «Бағдарламалау тілі» анықта-масын былай толықтыруға болады - ол іске асыруға арналған әмірлер, бұйрықтар, тура басқармаларды жеткізу тәсілі; ал адамзат тілі сонымен қатар ақпарат алмасуда қызмет етеді.

4. Talking points. Speak on the given themes.

1. Programming languages: definition, ways of designing, function, classification.
2. High-level languages.

Text 7. Read the text and ask questions about main trends in the computer systems development.

Computer Hardware

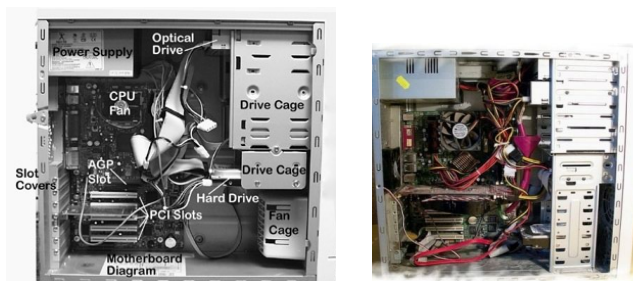
Part I. What is computer hardware?

Computer hardware is the physical part of a computer, including its digital circuitry, as distinguished from the computer

software that executes within the hardware. The hardware of a computer is infrequently changed, in comparison with software and hardware data, which are «soft» in the sense that they are readily created, modified or erased on the computer. Firmware is a special type of software that rarely, if ever, needs to be changed and so is stored on hardware devices such as read-only memory (ROM) where it is not readily changed (and is, therefore, «firm» rather than just «soft»).

Most computer hardware is not seen by normal users. It is in embedded systems in automobiles, microwave ovens, electrocardiograph machines, compact disc players, and other devices. Personal computers, the computer hardware familiar to most people, form only a small minority of computers 1 Typical PC hardware

A typical personal computer consists of a case or chassis in a tower shape (desktop) and the following parts:



Picture 1. Computer Case

The CPU (Central Processing Unit) is the 'brain' of the computer.

It's typically a square ceramic package plugged into the motherboard, with a large heat sink on top (and often a fan on top of that heat sink).

All instructions the computer will process are processed by the CPU. There are many «CPU architectures», each of which has its own characteristics and trade-offs. The dominant CPU architectures used in personal computing are x86 and PowerPC. x86 is easily the most popular processor for this class of machine (the dominant manufacturers of x86 CPUs are Intel and AMD). The other architectures are used, for instance, in workstations, servers or

embedded systems CPUs, contain a small amount of static RAM (SRAM) called a cache. Some processors have two or three levels of cache, containing as much as several megabytes of memory.

Part II. Examples of Computer hardware

Computer case – also known as a computer chassis, tower, system unit, cabinet, base unit or simply case is the enclosure that contains most of the components of a computer (usually excluding the display, keyboard and mouse).

Power Supply– all computers have some sort of power supply. This converts the supply voltage (AC 110 or 220V) to different voltages such as DC 5V, 12V and 3.3V. These are needed inside the computer system by nearly every component inside the computer.

Motherboard – the Motherboard (also called Mainboard) is a large, thin, flat, rectangular fiberglass board (typically green) attached to the case. The Motherboard carries the CPU, the RAM, the chipset and the expansion slots (PCI, AGP – for graphics, ISA, etc.).

RAM – Random Access Memory (RAM) is a memory that the microprocessor uses to store data during processing. This memory is volatile (loses its contents at power-down).

AGP Cards– most graphic cards produced from about 1998-2004 were AGP (Accelerated Graphics Port) cards. They are placed in a certain slot on the mainboard with an extra high data transfer rate. The interface was invented to keep the graphics card away from the PCI bus, which was starting to become too constrained for modern graphics cards.

PCI Cards – the Peripheral Component Interconnect, or PCI Standard (in practice almost always shortened to PCI), specifies a computer bus for attaching peripheral devices to a computer motherboard.

PCI Express Cards/Slots – the PCI Express standard was created to replace both AGP and PCI slots. Unlike previous PC expansion interfaces, rather than being a bus it is structured around point-to-point serial links called lanes.

Storage – Optical media – Compact Disks (CDs) and the similar-looking DVDs – are completely immune to magnetic fields. Flash memory is also immune to magnetic fields. Sometimes one can distinguish between «fixed media» (the hard drive) that is more or less permanently mounted inside the computer case, and removable media (just about every other kind of media) that is easy to pull from computer and put into another computer.

Hard Drive – A hard drive consists of one or more magnetic platters or disks and a read arm with two electromagnetic coils for each disk. Each hard disk is divided into many sectors, each containing a certain amount of data. As of now, it is the cheapest and most common way to store a lot of data in a small space.

CD-ROM Drive, DVD-ROM Drive, BD-ROM Drive – A CD-ROM holds about 700 MB of data, and DVD disk holds about 5 GB of data. The media resembles a small, somewhat flexible plastic disc. Any scratch or abrasion on the data side of the disc can lead to it being unreadable. Blu-ray is a high-density optical disc format for the storage of digital information, including high-definition video. The disc has the same dimensions as a standard DVD or CD.

Other Removable Media:

Flash Memory– Some common types of Flash memory cards are Compact Flash, Secure Digital (SD), and xD. There are other formats which have fallen into deprecation, such as Smartmedia and MultiMedia Card (MMC).

Exercises

A. Comprehension

7.1. *Define the term 'computer hardware'.*

7.2. *Answer these questions:*

- a) *What parts does a typical personal computer consist of?*
- b) *Where is the data processed and turned into commands directed at the rest of the computer?*
- c) *How is the case of most modern computers designed?*
- d) *How is power supplied to a computer?*
- e) *How does the motherboard look like and function?*

- f) *What is RAM needed for?*
- g) *What kinds of cards are known to you? Describe each one.*
- h) *What are the media of storing information? Enumerate all of them with brief characteristics.*

7.3. Complete the sentences with the following expressions.

<i>compact disc</i>	<i>Blue-ray</i>	<i>central processing unit</i>
<i>USB flash drive</i>	<i>CD-ROM drive</i>	<i>computer fan</i>
<i>floppy disk</i>	<i>random access memory</i>	
<i>DVD-RAM drive</i>	<i>solid-state drive</i>	<i>digital versatile disc</i>
<i>HD DVD</i>	<i>Hard disk</i>	<i>tape drive</i>

a) ... *performs most of the calculations which enable a computer to function, sometimes referred to as the «brain» of the computer.*

b) ... *is used to lower the temperature of the computer; a fan is almost always attached to the CPU, and the computer case will generally have several fans to maintain a constant airflow. Liquid cooling can also be used to cool a computer, though it focuses more on individual parts rather than the overall temperature inside the chassis.*

c) ... *is fast-access memory that is cleared when the computer is powered-down. RAM attaches directly to the motherboard, and is used to store programs that are currently running.*

d) ... *is the most common type of removable media, inexpensive but has a short life-span.*

e) ... *a device used for reading data from a CD.*

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

g) ... *is a device used for rapid writing and reading of data from a special type of DVD.*

h) ... *is a high-density optical disc format for the storage of digital information, including high-definition video.*

i) ... is a high-density optical disc format and successor to the standard DVD. It was a discontinued competitor to the Blue-ray format.

j) ... is an outdated storage device consisting of a thin disk of a flexible magnetic storage medium.

k) ... is a flash memory data storage device integrated with a USB interface, typically small, lightweight, removable, and rewritable.

l) ... is a device that reads and writes data on a magnetic tape, usually used for long term storage.

m) ... is for medium-term storage of data.

n) ... is a device similar to hard disk, but containing no moving parts.

7.4. *Summarize the text using the words from Vocabulary Exercises.*

B. Vocabulary

7.5. *Give Russian equivalents of the following words and expressions:*

fan	case	connector	socket
coil	lane	slot	bunch
heat sink	mainboard	mother board memory	chassis
designation	platter	multithreaded	application
deprecation	rugged	in-between	immune
planar	Backward-compatible		transparent
backup	mount	glow	supersede
plug	erase		

7.6. *Find the word belonging to the given synonymic group among the words and word combinations from the previous exercise:*

- a) resistant, protected, unaffected, safe, untouchable;
- b) framework, skeleton, hulk, carcass, armature, bodywork;
- c) twist, curl, spool, spiral;
- d) set up, launch, arrange, organize, board;
- e) title, name, description, label, term;
- f) gathering, group, cluster, lot;
- g) intermediate, intervening, meanwhile;

- h) force out, crowd out, oust, eject, displace replace, substitute;
i) plate, disc;
j) flat, plain, level;
k) disapproval, disapprobation, blame;
l) see-through, visible, translucent, clear as crystal;
m) shine, glimmer, flush, flame;
n) path, track, way;
o) reserve, doubling, standby;
p) thermal diffuser/scatterer;
q) rough, uneven, harsh, rocky;
r) ventilator, cooler;
s) remove, wipe away, rub out, obliterate;
t) connect up, attach;
u) power point, plug, outlet;
v) hole, opening, niche, gap, window;
w) bond, fastener, coupler, adjuster.

7.7. Translate the words/expressions into English:

разъем	гнездо
вытеснять	неровный
шероховатый	скопление
связка	устанавливать
монтировать	собирать
гиперпотоковость	совместимый назад
соединитель	разъем
обозначение	маркировка
вентилятор	подключат
вставлять в разъем	многопоточное приложение
стирать	удалять
корпус [ПК]	системный блок
переходный	промежуточный
плоский	материнская плата
светиться	сверкать
катушка	дорожка (на магнитном носителе информации)
обмотка	запасной
резервный	дублирующий
неуязвимый	невосприимчивый
прозрачный	дисковод для гибких дисков
просвечивающий	бежевый

теплоотвод	память материнской платы
корпус	блок
каркас	гнездо
розетка	

7.8. Translate the words/expressions into English:

тіркеуіш	ұяшық
ығыстыру	тегіс емес
кедір-бұдыр	жиналып қалу
байланыс	орнату
жөндеу	жинау
гиперағындылық	бірлесіп артқа кету
қосқыш	тіркеуіш
шартты белгі	таңбалау
желдеткіш	қосып
тіркеуішке қыстырту	көп тасқынды қосымша
өшіру	жою
[ЖК] корпусы	жүйелік блок
аумалы-төкпелі	аралық
жазық	аналық тақтайша
жарқырау	жылтырау
катушка	(мәліметтің магнитті сақтаушысында) тармақ
орам	қордағы
резервтегі	қайталайтын
дарымайтын	қабылдамайтын
мөлдір	иілгіш дисктер үшін дисковод
жарық түсірі	ақшыл
жылу қайтарғыш	аналық тақтайшаның жады
корпус	блок
қаңқа	ұя
розетке	

Supplementary text № 6

Reading and Discussion

1. Study the words and explain their meanings. Read the text. Determine the word 'peripherals'. Enumerate the types of the peripherals and speak on them. Point out the information that was new for you.

<i>CRT</i>	<i>LCD</i>	<i>GUI</i>	<i>LED</i>
	<i>DSL</i>		
<i>Pad</i>	<i>cyan</i>	<i>magenta</i>	<i>broadband rodent</i>

Information technology in Kazakhstan

Kazakhstan today conducts the national strategy, which is aimed at introducing information technologies (IT), supporting all kinds of innovation. Today, all modern and most successful states actively integrate IT. Kazakhstan cannot be considered competitive by the state without a corresponding increase in various mining areas, especially in the development of the IT industry.

All modern analysts note that IT represents the most powerful engine not only increasing the labor activity and employment, but also national development. The IT industry has become the country's most important and key factor in building a "smart" state of the economy. For this reason, at the present time the intensive task is executed on the introduction of high technology, as well as maintaining innovation. The successful development of industry is carried out with priority given to the development of IT industry. In our time, the IT industry is the most dynamic industry, which owes expansion through the total penetration of all modern IT technologies in various state business processes.

Under the IT industry, you should understand the joint efforts of the following three factors: the development of special software, the provision of high quality of IT services, and the sale and production of various IT equipment including personal computers, servers, and numerous peripherals. There are several sectors in the modern IT industry, ranging from computer production, production of communication equipment, software design, and telecommunications, and microelectronics. Today Kazakhstan is committed to conducting IT developments, covering all of the above sectors.

IT is a class of fields related to technology management and processing of huge flow of information using computer technology.

According to the definition adopted by UNESCO, the IT is a complex of interrelated scientific, technological, engineering, studying methods of efficient organization of the work of the people involved in the processing and storage of information using

computer technology and methods of organization and interaction with people and production equipment, their practical application, as well as associated social, economic and cultural problems. The main features of the modern IT are as follows:

- computer processing of information;
- storage of large amounts of information on native media;
- information transfer at any distance in the shortest time.

Modern material production and other activities increasingly require information service, processing huge amounts of information. Universal technical means of processing any information is a computer that acts as an amplifier of the intellectual capabilities of man and society as a whole, and means of communication using computers. Computer is used for communication and information transfer. The emergence and development of computers is a necessary part of the process of informatization of society.

Vocabulary

conduct	поведение, ведение, управление
introducing	представление
supporting	поддерживать
consider	учитывать, рассматривать
employment	занятость, служба, работа
development	развитие
intensive	интенсивный
joint	совместный
to execute	выполнять
flow	поток, течение
expansion	расширение
software	программное обеспечение
related	связанный
processing	обработка
involved	вовлеченный
interaction	взаимодействие
equipment	оборудование
application	применение
transfer	передача
storage	хранение
peripherals	периферийные устройства
interrelated	взаимосвязанный
amplifier	усилитель

2. Answer the following questions.

- a) What is the aim of national strategy of Kazakhstan?
- b) According to modern analysts, what does Information Technology increase?
- c) What industry has become the country's most important and key factor in building a "smart" state of the economy?
- d) How is the development of the IT industry carried out?
- e) What is Information Technology?
- f) What are the sectors of modern IT industry?
- g) How many sectors of IT Kazakhstan are committed to develop?
- h) What is Information Technology according to UNESCO?
- i) What are the main features of modern IT?
- j) Why is the development of IT important for society?

3. Give Russian equivalents of the following words and expressions.

- | | |
|----------------------------|------------------------------|
| a) technology | m) microelectronics |
| b) economic | n) present time |
| c) communication equipment | o) carry out |
| d) industry | p) mining areas |
| e) computer technologies | q) computer production |
| f) methods | r) provision |
| g) field of study | s) execute |
| h) processing | t) labor activity |
| i) interaction | u) intellectual capabilities |
| j) successful | v) emergence |
| k) development | w) information transfer |
| l) include | x) technical means |
| | y) adopt |

4. Translate these words and combinations of words into English.

- | | |
|--------------------|-------------------------|
| a) инновации | p) огромный |
| b) развитие | q) хранение данных |
| c) представлять | r) обработка информации |
| d) по этой причине | s) современный |
| e) динамическое | t) медиа |

- | | |
|------------------------------|---------------------------------|
| f) расширение | u) эффективная организация |
| g) полное проникновение | v) интеллектуальные возможности |
| h) в настоящее время | w) огромные количества |
| i) ключевой фактор | x) усилитель |
| j) компьютерное оборудование | y) необходимый процесс |
| k) качественный | z) основные особенности |
| l) представлять | aa) научный |
| m) программное обеспечение | bb) требовать |
| n) производство | |
| o) телекоммуникации | |

5. Complete the sentences and translate them.

- a) Information technology is a class of fields related to technology management and using computer technology.
- b) Computers are used for and information transfer.
- c) Today, all modern and most successful state actively information technology.
- d) The IT industry has become the country's most important and in building a "smart" state of the economy.
- e) There are several sectors in the modern it industry, ..., production of communication equipment, software design, and to telecommunications, and microelectronics.
- f) The emergence and development of computers is a necessary part of the process of
- g) In our time, the IT industry is....., which owes its expansion only total penetration of all modern it technologies in various state business processes.
- h) Kazakhstan cannot be considered competitive by the state without a corresponding, especially the development of the IT industry.
- i) Information technology represents the most powerful engine not only, but also national development.
- informatization of society
 - increase labor activity and employment
 - processing of huge flow of information

- the most dynamic industry
- key factor
- ranging from computer production
- communication
- increase various mining areas
- integrate into your system

5. Using your own words describe what is information technology and its use in modern society. What is your opinion on this topic? Write four-five sentences.

Glossary of unit 1

application — қолдану, қолданбалы есеп, іске асыру-
1) применение, использование,

употребление; 2) *компьют.* прикладная задача

affordable — арзан баға, біркелкі баға — доступный по цене, умеренной стоимости

bill — тіркеу — регистрировать; вносить в список,

computerized axial [æksiəl] **tomography** — рентгенді компьютерлі —

томографиялық зерттеу — рентгеновское компьютерно-томографическое исследование, компьютерная томография

convert — конверсиялау, қалпын өзгерту преобразовывать, конвертировать

devise — жетілдіру, ойластыру — разрабатывать, продумывать (планы, идеи); выдумывать, изобретать;

digital — сандық- цифровой, числовой электронды,

division — бөлім — секция, отдел, отделение (в учреждении и т. п.)

database — мәліметтер базасы — база данных

at the discretion of — қарастыруға — на усмотрение

data entry — мәліметтерді еңгізу — ввод данных

explicitly — жете, айқын, толығырақ, түсінікті — 1) детально, подробно; 2) ясно, недвусмысленно

encompass — қамту — охватывать, окружать

entire — бүтін, толық — полный, целый, взятый в целом

fatigue — қажығандық, шаршағандық — усталость, утомление

hardware (= HW, HAV) — жабдық құралдар, жабдықпен қамтамасыз ету — аппаратные средства, аппаратура, оборудование, аппаратное обеспечение

onhand — ұйғарымда — имеющийся в распоряжении, на руках

implementation — жүзеге асыру, өткізім, еңгізу — 1) реализация, внедрение, ввод в действие, ввод в эксплуатацию; 2) разработка

on a large (grand)/small scale — үлкен/ кіші масштабта — в большом/маленьком масштабе

in lieu [lɪu:] **of** — орнына — вместо

keep records — есеп жүргізу — вести учет

magnetic resonance imaging — магнитті — резонанстық интроскопия — (диагностическая) магнитно-резонансная интроскопия

networking — желіге біріктіру, желіге қосу, желіні құрастыру — объединение в сеть; создание сети; подключение к сети

observations — бақылау мәліметтері — данные наблюдения

process — өңдеу-обработывать

peripherals — сыртқы құрылымдар, сыртқы жабдықтар — периферийное оборудование, периферия; внешнее оборудование, внешние устройства

purchased service — төленген қызмет — оплаченная услуга

point-of-sale terminal — кассалық терминал — кассовый терминал

power plant — электр станциясы — электростанция

receipt — түбіртек — квитанция

retrieve — шығару, іздеу — отыскивать, извлекать

software — компьютер бағдарламалары, бағдарламалық камтамасыз ету — компьютерные программы, программное обеспечение,

store — сақтау, есте сақтау — запоминать, хранить, сохранять;

switch — ауыстырып-қосқыш; ток аударғыш- коммутатор, переключатель

spreadsheet — үлкен форматты кесте — крупноформатная таблица

subscription — жазылым — подписка (напр., на электронные публикации в интернете)

staff — штат — штат

similar — ұқсас — подобный (to); похожий, сходный

supplies — тауарлар — товары

securely — сенімді, қауіпсіз, қатерсіз — 1) в безопасности, безопасно; 2) надежно, не рискуя, без риска

transmit — тапсыру — передавать

tremendous — орасан зор — огромный, гигантский, громадный; потрясающий

track — бақылау — отслеживать, контролировать

vendor — жабдықтаушы, өндіруші, сатушы — поставщик, производитель, продавец

UNIT II

Text 1. Read the text and do the assignments.

Peripherals

I/O is the means by which a computer receives information from the outside world and sends results back. Devices that provide input or output to the computer are called peripherals. On a typical personal computer, peripherals include input devices like the keyboard and mouse, and output devices such as the display and printer. Hard disk drives, floppy disk drives and optical disc drives serve as both input and output devices. Computer networking is another form of I/O.

Often, I/O devices are complex computers in their own right with their own CPU and memory. A graphics processing unit might contain fifty or more tiny computers that perform the calculations necessary to display 3D graphics. Modern desktop computers contain many smaller computers that assist the main CPU in performing I/O.

Peripherals are components which allow humans to interface with computers.

Display Device

Display devices include computer monitors and other display devices. CRTs and LCDs are common. LCDs are a more recent development, and are gradually replacing CRTs as they become more affordable. LCD's in addition to being lighter also use less energy and generate less heat.

Sound Output

Sound output includes internal or external speakers and headphones.

Mouse

A mouse is a user interface device that can enable different kinds of control than a keyboard, particularly in GUIs. It was developed at the Xerox PARC (Palo Alto Research Center) and adopted and made popular with the Apple Mac. Today, nearly all modern operating systems can use a mouse. Most mice (sometimes

the plural is 'mouses' to prevent confusion with the rodent) are made from plastic, and may use a ball to track movement, a LED light, or a laser. Today you can get a wireless mouse that allows you to easily give a presentation without being tied to a desk. These mice are usually LED or Laser based tracking.

Exercises

1.1. *Answer the questions. Have a talk with your groupmate.*

- a) What is I/O?*
- b) What does personal computer peripherals include?*
- c) Give examples of computer peripherals.*
- d) What is computer display?*
- e) Which company developed the mouse?*

Text 2. *Read the text and do the assignments.*

Connectors and Cables

There are many different types of connectors and cables in personal computers, and this section will address as many as the various editors deem relevant.

Internal Connectors

Several types of cables are used to connect components together inside the case, providing power and a path for data. These include:

Motherboard Power Connector: This connector is designed especially to move electricity from the power supply to the motherboard. Older computers use the AT power connections, with two six-pin connectors lined up side by side. ATX motherboards use a single connector with 20 pins arranged in two rows of 10.

Power Connectors for Drives: Hard drives, optical drives, and, increasingly, high-end video cards use a 4-wire power connection, of which several are available from a power supply. Floppy drives use a smaller connector.

40- and 80-pin IDE Cables: These cables are used by hard drives and optical drives to transfer data to and from the motherboard.

34-pin Floppy Cables: These are used to connect floppy drives to floppy disk connectors on the mainboard/motherboard.

External Connectors

Without connections to the rest of the world, a computer would just be a fancy paperweight. Numerous connectors are used to make a computer useful.

AT Keyboard Connector: This connector is found on older computers, this connector is large and round with five pins.

PS/2 Connector: This connector is currently the most popular for connecting both the keyboard and mouse. Note that older mice once used serial ports (defined below), and newer mice frequently use the Universal Serial Bus (USB).

VGA Connector: This connector has 3 rows of 5 pins each, and is used to connect the computer to the display screen.

Parallel Port (DB-25): This connector is commonly used to interface with printers, and can also transfer between computers. It has been mostly replaced by USB.

Serial Port (DB-9): This 9-pin connector is used to connect all sorts of devices, but is being replaced by USB. It has been used in the past to connect mice and transfer data between computers.

Universal Serial Bus (USB): This relatively recent connector can connect the computer to almost anything. It has been used for storage devices, printers, sound, mice, keyboards, cameras, and even networking. USB 2.0 allows transfer speeds of up to 480 Mbps.

high end, AT, VGA, FireWire, camcorder.

Exercises

2.1. Give the Russian equivalents to the following words and phrases. Recollect the sentences of the text where they were used:

storage devices	interface	transfer data
to provide power	motherboard	available

2.2. Complete the following sentences:

- a) There are many different types of...
- b) Older computers use...
- c) Floppy drives use...
- d) Numerous connectors...
- e) It has been used for...

Supplementary text № 7

Reading and Discuss

1. Translate the text without a dictionary. Give a short summary.

Microprocessors are miniaturized devices that often implement stored program CPUs.

Vacuum tube-based computers were in use throughout the 1950s, but were largely replaced in the 1960s by transistor-based devices, which were smaller, faster, cheaper, used less power and were more reliable. These factors allowed computers to be produced on an unprecedented commercial scale. By the 1970s, the adoption of integrated circuit technology and the subsequent creation of microprocessors such as the Intel 4004 caused another leap in size, speed, cost and reliability. By the 1980s, computers had become sufficiently small and cheap to replace simple mechanical controls in domestic appliances such as washing machines. Around the same time, computers became widely accessible for personal use by individuals in the form of home computers and the now ubiquitous personal computer. In conjunction with the widespread growth of the Internet since the 1990s, personal computers are becoming as common as the television and the telephone and almost all modern electronic devices contain a computer of some kind.

A **motherboard** is the «body» or mainframe of the computer, through which all other components interface, the central or primary printed circuit board (PCB) making up a complex electronic system, such as a modern computer. It is also known as a mainboard, base-board, system board, planar board, or, on Apple computers, a logic board, and is sometimes abbreviated casually as mobo.



Picture 1. Motherboard

Most motherboards produced today are designed for so-called IBM-compatible computers, which held over 96% of the global personal computer market in 2005. Motherboards for IBM-compatible computers are specifically covered in the PC motherboard article.

A motherboard, like a backplane, provides the electrical connections by which the other components of the system communicate, but unlike a backplane also contains the central processing unit and other subsystems such as real time clock, and some peripheral interfaces.

A typical desktop computer is built with the microprocessor, main memory, and other essential components on the motherboard. Other components such as external storage, controllers for video display and sound, and peripheral devices are typically attached to the motherboard via edge connectors and cables, although in modern computers it is increasingly common to integrate these «peripherals» into the motherboard.

2. *Translate the extract in writing/ Use a dictionary if necessary.*

A motherboard, like a backplane, provides the electrical connections by which the other components of the system communicate, but unlike a backplane also contains the central processing unit and other subsystems such as real time clock, and some peripheral interfaces.

A typical desktop computer is built with the microprocessor, main memory, and other essential components on the motherboard. Other components such as external storage, controllers for video display and sound, and peripheral devices are typically attached to the motherboard via edge connectors and cables, although in modern computers it is increasingly common to integrate these «peripherals» into the motherboard.

3. *Read the given combinations and remember them:*

<i>transistor-based devices</i>	<i>external storage</i>
<i>unprecedented commercial scale</i>	<i>to integrate</i>
<i>subsequent creation of microprocessors</i>	<i>central processing</i>

*domestic appliances
widespread growth*

*unit
printed circuit board
motherboard*

4. Reproduce the text into English .

Накопители

Накопители могут быть внешними и внутренними. Накопитель можно рассматривать как совокупность носителя и привода. Различают накопители со сменным и несменным носителями. В зависимости от типа накопителя различают накопители на магнитной ленте и дисковые. Накопители на магнитной ленте бывают двух видов:

накопители, работающие в стартстопном режиме на полудюймовых девятидорожечных лентах;

стримеры, работающие в потоковом инерционном режиме.

Накопитель на магнитной ленте — это устройство последовательного доступа, накопители на дисках — это устройства произвольного доступа. По способу записи и чтения информации на накопителе дисковые накопители делят на:

магнитные;

оптические;

магнитооптические.

Среди дисковых выделяют:

накопители на гибких магнитных дисках;

накопители на гибких оптических дисках;

накопители на несменных жестких дисках винчестера;

накопители на сменных жестких дисках;

накопители на сменных гибких дисках, использующие эффект Бернулли;

накопители на магнитооптических дисках;

накопители на оптических дисках с однократной записью и многократным чтением WORM;

накопители на оптических компакт-дисках CDROM.

5. Reproduce the text into English.

Жинақтағыштар

Жинақтағыштар ішкі және сыртқы болуы мүмкін. Жинақтаушыны привод тасушы ретінде қарастыруға болады. Жинақтауыштар ауысатын және ауыспайтын тасушылармен ажыратылады. Жинақтағыштар түріне байла-нысты магнит таспалы және таспалы болып бөлінеді. Магнит таспалы жинақтағыштар екі түрлі болады:

стартстоп тәртібінде жартыдүймдік тоғыз жолды таспалар жұмыс істейтін жинақтағыштар;

ағынды инерциондық тәртібінде жұмыс істейтін стримерлер.

Магнит таспалы жинақтағыш – бұл біртіндеп рұқсаттың құрылымы, жинақтағыштар – бұл кез келген рұқсаттың құрылымы. Ақпаратты оқу және

жазу жағынан жинақтағыштар үшке бөлінеді:

магниттік;

оптикалық;

магнит оптикалық.

Таспалардың арасында ерекшелінеді:

солқылдақ магнитті таспалар негізіндегі жинақтағыштар;

солқылдақ оптикалық таспалар негізіндегі жинақтағыштары;

винчестері ауыспайтын қатты таспалар негізіндегі жинақтағыштары;

ауысатын қатты таспалар негізіндегі жинақтағыштары;

Бернулли әсерін қолданатын ауыспалы иілгіш таспалар негізіндегі жинақтағыштар;

магнитооптикалық таспалар негізіндегі жинақтағыштары;

бір рет жазылатын және WORM бірнеше рет оқылатын оптикалық таспалар негізіндегі жинақтағыштар;

CD ROM оптикалық тығыз- таспалар негізіндегі жинақтағыштары.

6. Talking points: Speak on the following themes:

1. Computer hardware: general characteristics.
2. Integral to the function of computer components.
3. Storage media for non-volatile data.

4. Components which allow humans to interface with computers.
5. Connectors and cables.

Text 3. Read the text and think of compiling computer software. Computer Software

Computer software is a general term used to describe a collection of computer programs, procedures and documentation that perform some task on a computer system. The term includes application software such as word processors which perform productive tasks for users, system software such as operating systems, which interface with hardware to provide the necessary services for application software, and middleware which controls and co-ordinates distributed systems.

The term "software" is sometimes used in a boarder context to describe any electronic media content which embodies expressions of ideas such as film, tapes, records, etc.

Computer software is so called to contrast with computer hardware, which encompasses the physical interconnections and devices required to store and execute (or run) the software. In computers, software is loaded into RAM and 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 processors instructions (object code), which change the state of the computer from is 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 1958. 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 his 1935 essay 'Computer Numbers'.

Exercises

A. Comprehension

3.1. *Define the term "computer software".*

3.2. *Answer these questions:*

- a) Who was the term first used by?
- b) How do computer hardware and software correlate?
- c) What major classes are software systems divided into?

Describe each one.

- d) How does computer operate?

3.3. Say which of the following statements are true or false. Correct the false ones.

a) Computer software encompasses the physical interconnection and devices required to store and execute (or run) the program.

b) The purpose of system 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.

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

d) Libraries may include standard routines that are common to many programs.

e) Application software often comes bundled with the computer and you will usually have the ability to change it on a PC.

f) User software includes spreadsheet templates, word processor macros, scientific simulations, and scripts for graphics and animations.

g) Instructions may be performed sequentially, conditionally, or iteratively.

3.4. *Summarize the text using the words from Vocabulary Exercises.*

B. Vocabulary

3.5. Give Russian equivalents of the following words and expressions:

suite	routine	precede
clipboard	ingenuity	middleware
ordered	retailer	debugger
template	arbitrary	stand-alone
iteratively	bundle	encompass
extract	insulate	paste

3.6. Find the word belonging to the given synonymic group among the words and word combinations from the previous exercise:

- a) cleverness, inventiveness, skill, creativity;
- b) try, attempt, make an effort;
- c) random, chance, subjective;
- d) insert, attach, fix, stick;
- e) set, group, collection;
- f) supplied complete/as complete (with), furnish(with), deliver factory-assembled;

3.7. Translate the words/expressions into English:

предшествовать	вставить
произвольный	упорядоченная последовательность
случайный	извлекать
розничный торговец	шаблон, трафарет
многократно	разрабатывать
связующее ПО	адаптировать
отделять	буфер обмена
подпрограмма	пытаться, стараться
автономный	отладчик
охватывать	поставлять комплектно
(программный) комплект	изобретательность

3.8. Translate the words/expressions into English:

алдын ала болу	бір ізділік
бұрын болып өту	жүйелік
кездейсоқ, кез-келген	реттілік

бөлшектеп сататын саудагер	алу
бірнеше рет	үлгі
БҚ-ны байланыстыратын	трафарет
бөлу	әзірлеу
ішкі бағдарлама	бейімдендіру
автономдық	алмасу буфері
қамту	тырысу
комплект (бағдарламалық)	дұрыстаушы
қою	жинақы жеткізу

C. Reading and Discussion

3.9. *Study the words and explain their meanings. Read the text. Determine the expression 'software quality'. Enumerate software quality factors and characterize them.*

measure	source code	consequences
conventions	update	consistency
notation	maintainability	evaluation
robustness	vague	withstand
authentication	encryption	relevant

Text 4. Read the text and give a short summary.

Software Quality

In the context of software engineering, software quality measures how well software is designed (quality of design), and how well the software conforms to that design (quality of conformance), although there are several different definitions.

One of the problems with Software Quality is that "everyone feels they understand it". In addition to the definitions above by Dr. Roger S. Pressman, other software engineering experts have given several definitions.

A definition in Steve McConnell's Code Complete similarly divides software into two pieces: internal and external quality characteristics. External quality characteristics are those parts of a product that face its users, where internal quality characteristics are those that do not.

Another definition by Dr. Tom De Marco says: "A product's quality is a function of how much it changes the world for the better". This can be interpreted as meaning that user satisfaction is more important than anything in determining software quality.

Another definition, coined by Gerald Weinberg in *Quality Software Management: Systems Thinking*, is "Quality is value to some person". This definition stresses that quality is inherently subjective different people will experience the quality of the same software very differently. One strength of this definition is the questions it invites software teams to consider, such as "Who are the people we want to value our software?" and "What will be valuable to them?"

Source code quality

To a computer, there is no real concept of "well-written" source code. However, to a human, the way a program is written can have some important consequences for the human maintainers. Many source code programming practices which stress readability and some language-specific conventions are aimed at the maintenance of the software source code, which involves debugging and updating. Other issues also come into considering whether code is well written such as the logical structuring of the code into more manageable sections.

Readability

Ease of maintenance, testing, debugging, fixing, modification and portability

Low complexity

Low resource consumption: memory, CPU

Number of compilation or lint warnings

Exercises

A. Comprehension

4.1. *Define the term Software Quality.*

4.2. *Answer these questions:*

- a) what does Software Quality measure?*
- b) give the definitions of the Software Quality?*
- c) what are Source code qualities?*
- d) what style guides, are aimed at?*

C. Vocabulary

4.3. Give the Russian equivalents to the next words and word expressions:

measures	software
engineering	internal and external characteristics
be interpreted	product's quality
be valuable	well-written
face	human maintainers

Text 5. Read the text. Divide it into parts and give the title to each of them. Make a summary of the text.

Software Reliability and Testing

An important facet of software quality is software reliability. It is defined as "the probability of failure-free operation of a computer program in a specified environment for a specified time".

One of reliability's distinguishing characteristics is that it is objective, measurable, and can be estimated, whereas much of software quality consists of subjective criteria. This distinction is especially important in the discipline of Software Quality Assurance. These measured criteria are typically called software metrics.

With software embedded into many devices today, software failure has caused more than inconvenience. Software errors have even caused human fatalities. The causes have ranged from poorly designed user interfaces to direct programming errors. An example of a programming error that lead to multiple deaths is discussed in Dr. Leveson's paper. This has resulted in requirements for development of some software types. In the United States, both the Food and Drug Administration (FDA) and Federal Aviation Administration (FAA) have requirements for software development.

The need for a means to objectively determine software quality comes from the desire to apply the techniques of contemporary engineering fields to the development of software. That desire is a result of the common observation, by both lay-persons and specialists, that computer software does not work the way it ought to. In other words,

software is seen to exhibit undesirable behavior, up to and including outright failure, with consequences for the data which is processed, the machinery on which the software runs, and by extension the people and materials which those machines might negatively affect. The more critical the application of the software to economic and production processes, or to life-sustaining systems is, the more important is the need to assess the software's reliability.

Regardless of the criticality of any single software application, it is also more and more frequently observed that software has penetrated deeply into most every aspect of modern life through the technology we use. It is only expected that this infiltration will continue, along with an accompanying dependency on the software by the systems which maintain our society. As software becomes more and more crucial to the operation of the systems on which we depend, the argument goes, it only follows that the software should offer a concomitant level of dependability. In other words, the software should behave in the way it is intended, or even better, in the way it should.

The circular logic of the preceding sentence is not accidental – it is meant to illustrate a fundamental problem in the issue of measuring software reliability, which is the difficulty of determining, in advance, exactly how the software is intended to operate. The problem seems to stem from a common conceptual error in the consideration of software, which is that software in some sense takes on a role which would otherwise be filled by a human being. This is a problem on two levels. Firstly, most modern software performs work which a human could never perform, especially at the high level of reliability that is often expected from software in comparison to humans. Secondly, software is fundamentally incapable of most of the mental capabilities of humans which separate them from mere mechanisms: qualities such as adaptability, general-purpose knowledge, a sense of conceptual and functional context, and common sense.

Exercises

A. Comprehension

5.1. *Pair work. Have a talk with your partner about this theme.*

5.2. *Try to find the software errors in the text.*

B. Vocabulary

5.3. Translate the next English words and word expressions into your native language:

software	embedded into
reliability	programming error
failure-free	outright failure
measurabl	filled by
be estimated	mental capabilities

Text 6. Read the text and answer the questions:

- What are the rights that software license gives the user?*
- Why is the issue of software patents controversial? State your opinion concerning hacker ethic.*

Ethics and Rights for Software Users

License. Software license gives the user the right to use the software in the licensed environment, some software comes with the license when purchased off the shelf, or an OEM license when bundled with hardware. Other software comes with a free software license granting the recipient the rights to modify and redistribute the software. Software can also be in the form of freeware or shareware.

Patents. The issue of software patents is controversial. Some believes that they hinder software development, while others argue that software patents provide an important incentive to spur software innovation.

Being a new part of society, the idea of what rights users of software should have is not very developed. Some, such as the free software community, believe that software users should be free to modify and redistribute the software they use. They argue that these rights are necessary so that each individual can control their computer and so that everyone can cooperate, if they choose, to work together as a community and control the direction that software progresses in. Others believe that software authors should have the power to say what rights the user will get.

The former philosophy is somewhat derived from the "hacker ethic".

Hacker ethic refers to the values and philosophy that are

standard in the hacker community. The early hacker culture and resulting philosophy originated at the Massachusetts Institute of Technology (MIT) in the 1950s and 1960's. The term 'hacker ethic' is attributed to journalist Steven Levy as described in his book titled 'Hackers Heroes of the Computer Revolution, written in 1984.

While some tenets of hacker ethic were described in other text like 'Computer Lib/Dream Machines' (1974) by Theodor Nelson Levy appears to have been the first to document and historicize both the philosophy and the founders of the philosophy.

As Levy stated in the preface the general tenets or principles of hacker ethic include:

Sharing

Openness

Decentralization

Free access to computers

World Improvement

According to Levy's account, sharing was the norm and expected within the non-corporate hacker culture. The principle of sharing stemmed from the atmosphere and resources at MIT. During the early days of computers and programming (when computers were the size of whole rooms), the hackers at MIT would develop a program and share it.

If the hack was particularly good, then the program might be posted on a board somewhere near one of the computers. Other programs that could be built upon and improved were saved to tapes and added to a drawer of programs - readily accessible to all the other hackers. At any time, a fellow hacker might reach into the drawer, pick out the program, and begin adding to it or "bumming" it to make it better (bumming refers to the process of making the code more concise so that more can be done in fewer instructions).

Exercises

A. Comprehension

6.1. Reproduce the text in English, emphasizing the information not mentioned in the English text.

Программное обеспечение (ПО) – наряду с аппаратными средствами, важнейшая составляющая информационных технологий, включающая компьютерные программы и данные,

предназначенные для решения определенного круга задач и хранящиеся на машинных носителях. Программное обеспечение представляет собой либо данные для использования в других программах, либо данные для использования в других программах, либо алгоритм, реализованный в виде последовательности инструкций для процесса.

В компьютерном жаргоне часто используется слово «*софт*» от английского «*software*», которое в этом смысле впервые применил в статье American Mathematical Monthly математик из Принстонского университета Джон Тьюки (John W. Tukey) в 1958 г. В области вычислительной техники и программирования программное обеспечение — это совокупность всей информации, данных и программ, которые обрабатываются компьютерными системами.

Классификация ПО

1. По способу распространения (доставка, оплаты, ограничения в использовании):

Commercial Software, Freeware, Shareware, Abandonware, Adware, Free Software, Careware ...

2. По назначению ПО разделяется на системное, прикладное и инструментальное.

Системное программное обеспечение — это комплекс программ, которые обеспечивают управление компонентами компьютерной системы, такими как процессор, оперативная память, каналы ввода-вывода, сетевое и коммуникационное оборудование и т.п. Системное программное обеспечение реализует связь аппаратного программного обеспечения, выступая как «межслойный интерфейс», с одной стороны которого аппаратура, а с другой — приложения пользователя. В состав системного программного обеспечения входят: операционные системы, среды программирования (компиляторы, трансляторы, компоновщики, загрузчики, отладчики, текстовый редактор, библиотеки подпрограмм), утилиты, системы управлений файлами и системы управления базами данных.

Кроме системного программного обеспечения принято выделять прикладное программное обеспечение, которое призвано решать прикладные задачи пользователя.

6.2. Read the text and agree or disagree with the statement:

- a) Кроме системного программного обеспечения принято выделять прикладное программное обеспечение, которое призвано решать прикладные задачи пользователя.
- b) По назначению ПО разделяется на системное, прикладное и инструментальное.
- c) Суть программного патента противоречива.
- d) Особенно хороши...
- e) Доступны хакерам.
- f) Составить код.

Text 7. Read the text and put key questions to the text trying to embrace all the main areas of the text.

Memory Management and Networking

Among other things, a multiprogramming operating system kernel must be responsible for managing all system memory which is currently in use by programs. This ensures that a program does not interfere with memory already used by another program. Since programs time share, each program must have independent access to memory.

Cooperative memory management, used by many early operating systems assumes that all programs make voluntary use of the kernel's memory manager, and do not exceed their allocated memory. This system of memory management is almost never seen anymore, since programs often contain bugs which can cause them to exceed their allocated memory. If a program fails it may cause memory used by one or more other programs to be affected or overwritten. Malicious programs or viruses may purposefully alter another program's memory or may affect the operation of the operating system itself. With cooperative memory management it takes only one misbehaved program to crash the system.

Memory protection enables the kernel to limit a process' access to the computer's memory. Various methods of memory protection exist, including memory segmentation and paging. All methods require some level of hardware support (such as the 80286 MMU) which doesn't exist in all computers.

In both segmentation and paging, certain protected mode registers specify to the CPU what memory address it should allow a

running program to access. Attempts to access other addresses will trigger an interrupt which will cause the CPU to re-enter supervisor mode, placing the kernel in charge. This is called a segmentation violation or Seg-V for short, and since it is usually a sign of a misbehaving program, the kernel will generally kill the offending program, and report the error.

Windows 3.1-ME had some level of memory protection, but programs could easily circumvent the need to use it. Under Windows 9x all MS-DOS applications ran in supervisor mode, giving them almost unlimited control over the computer. A general protection fault would be produced indicating a segmentation violation had occurred, however the system would often crash anyway.

Exercises

A. Comprehension

7.1. Read the text and agree or disagree with the statements:

a) Memory protection enables the kernel to limit a process' access to the computer's memory.

Cooperative memory management, used by many early operating systems assumes that all programs make voluntary use of the kernel's memory manager, and do not exceed their allocated memory.

b) Pair work. Have a talk with your groupmate on the above given theme.

Text 8. Read the text carefully, give more information if you can.

File System Support in Modern Operating Systems

All operating systems include support for a variety of file systems.

Modern file systems comprise a hierarchy of directories. While the idea is conceptually similar across all general-purpose file systems, some differences in implementation exist. Two noticeable examples of this are the character used to separate directories, and case sensitivity.

Unix demarcates its path components with a slash (/), a convention followed by operating systems that emulated it or at

least its concept of hierarchical directories, such as Linux, Amiga OS and Mac OS X. MS-DOS also emulated this feature, but had already also adopted the CP/M convention of using slashes for additional options to commands, so instead used the backslash (\) as its component separator. Microsoft Windows continues with this convention; Japanese editions of Windows use Γ, and Korean editions use citation needed. Versions of Mac OS prior to OS X use a colon (:) for a path separator. RISC OS uses a period (.).

Unix and Unix-like operating systems allow for any character in file names other than the slash (including line feed (LF) and other control characters). Unix file names are case sensitive, which allows multiple files to be created with names that differ only in case. By contrast, Microsoft Windows file names are not case sensitive by default. Windows also has a larger set of punctuation characters that are not allowed in file names.

File systems may provide journaling, which provides safe recovery in the event of a system crash. A journaled file system writes information twice: first to the journal, which is a log of file system operations, then to its proper place in the ordinary file system. In the event of a crash, the system can recover to a consistent state by replaying a portion of the journal. In contrast, non-journaled file systems typically need to be examined in their entirety by a utility such as fsck or chkdsk. Soft updates are an alternative to journaling that avoids the redundant writes by carefully ordering the update operations. Log-structured file systems and ZFS also differ from traditional journaled file systems in that they avoid inconsistencies by always writing new copies of the data, eschewing in-place updates.

Exercises

8.1. *Read the text and state the main ideas in Russian.*

Text 9. **Read the text and do the given assignments.**

Graphical User Interfaces

Most modern computer systems support graphical user interfaces (GUI), and often include them. In some computer systems,

such as the original implementations of Microsoft Windows and the Mac OS, the GUI is integrated into the kernel.

While technically a graphical user interface is not an operating system service, incorporating support for one into the operating system kernel can allow the GUI to be more responsive by reducing the number of context switches required for the GUI to perform its output functions. Other operating systems are modular, separating the graphics subsystem from the kernel and the Operating System. In the 1980s UNIX, VMS and many others had operating systems that were built this way. Linux and Mac OS X are also built this way. Modern releases of Microsoft Windows such as Windows Vista implement a graphics subsystem that is mostly in user space, however versions between Windows NT 4.0 and Windows Server 2003's graphics drawing routines exist mostly in kernel space. Windows 9x had very little distinction between the interface and the kernel.

Many computer operating systems allow the user to install or create any user interface they desire. The X Window System in conjunction with GNOME or KDE is a commonly-found setup on most Unix and Unix-like (BSD, Linux, Minix) systems. A number of Windows shell replacements have been released for Microsoft Windows, which offer alternatives to the included Windows shell, but the shell itself cannot be separated from Windows.

Numerous Unix-based GUIs have existed over time, most derived from X11. Competition among the various vendors of Unix (HP, IBM, Sun) led to much fragmentation, though an effort to standardize in the 1990s to COSE and CDE failed for the most part due to various reasons, eventually eclipsed by the widespread adoption of GNOME and KDE. Prior to open source-based tool kit and desktop environments, Motif was the prevalent toolkit/desktop combination (and was the basis upon which CDE was developed).

Graphical user interfaces evolve over time. For example, Windows has modified its user interface, almost every time a new major version of Windows is released, and the Mac OS GUI changed dramatically with the introduction of Mac OS X in 2001.

Exercises

A. Comprehension

9.1. Write the missing words in these sentences:

a) Many computer operating systems the user to install or create any user interface they desire.

b) A number of Windows shell replacements for Microsoft Windows, which offer alternatives to the included Windows shell, but the shell itself cannot be separated from Windows.

c) Most modern computer systems graphical user interfaces (GUI), and often include them.

9.2. Read the text and divide it into parts. Give the title to each of them. Make a one-sentence summary of each part of the text.

B. Vocabulary

9.3. In the text find the synonyms to the following words and phrases:

to allow

to require

to install

derived from

due to

widespread

distinction

Text 10. Read the text and highlight the unknown words.

Security

A computer being secure depends on a number of technologies working properly. A modern operating system provides access to a number of resources, which are available to software running on the system, and to external devices like networks via the kernel.

The operating system must be capable of distinguishing between requests which should be allowed to be processed, and others which should not be processed. While some systems may simply distinguish between «privileged» and «non-privileged», systems commonly have a form of requester identity, such as a user name. To establish identity there may be a process of authentication. Often a username must be quoted, and each username may have a

password. Other methods of authentication, such as magnetic cards or biometric data, might be used instead. In some cases, especially connections from the network, resources may be accessed with no authentication at all.

In addition to the allow/disallow model of security, a system with a high level of security will also offer auditing options. These would allow tracking of requests for access to resources (such as, «who has been reading this file?»).

Internal security, or security from an already running program is only possible if all possibly harmful requests must be carried out through interrupts to the operating system kernel. If programs can directly access hardware and resources, they cannot be secured. Microsoft Windows has been heavily criticized for many years for Window's inability to protect one running program from another. To remedy this, Microsoft has added limited user accounts and more secure logins in recent years, however, most people still operate their computers using Administrator accounts, which negates any possible internal security improvements brought about by these changes. It is only with the release of Vista, that even Administrator accounts have certain restrictions. Regardless, these measures can and are circumvented by the users.

Linux and UNIX both have two tier security, which limits any system-wide changes to the root user, a special user account on all UNIX-like systems. While the root user has unlimited permission to affect system changes, programs as a regular user are limited only in where they can save files, and what hardware they can access. This limits the damage that a regular user can do to the computer while still providing them with plenty of freedom to do everything but affect system-wide changes. The user's settings are stored in an area of the computer's file system called the user's home directory, which is also provided as a location where the user may store their work, similar to My Documents on a windows system. Should a user have to install software or make system-wide changes, they must enter the root password for the computer, which allows them to launch certain programs as the root user.

External security involves a request from outside the computer, such as a login at a connected console or some kind of network connection. External requests are often passed through device drivers to the operating system's kernel, where they can be passed onto applications, or carried out directly. Security of operating systems has long been a concern because of highly sensitive data held on computers, both of a commercial and military nature. The United States Government Department of Defense (DoD) created the Trusted Computer System Evaluation Criteria (TCSEC) which is a standard that sets basic requirements for assessing the effectiveness of security. This became of vital importance to operating system makers, because the TCSEC was used to evaluate, classify and select computer systems being considered for the processing, storage and retrieval of sensitive or classified information.

Exercises

A. Comprehension

10.1. *Read the text and answer the question: Which OS implementation made computers variable in capabilities and price?*

10.2. *Put key questions on the text trying to embrace all the main areas of the text*

10.3. *Discuss the questions.*

B. Vocabulary

10.4. *What do the following words from the text mean?*

remedy

tier

damage

TCSEC

intrusion

threaten

sandbox

auditing

negate

password

settings

firewall

detection

breach

tamper

bypass

C. Reading and Discussion

10.5. *Read the text and agree or disagree with the statements:*

a) Internal security, or security from an already running program is only possible if all possibly harmful requests must be carried out through interrupts to the operating system kernel.

b) To establish identity there may be a process of authentication.

c) If programs can directly access hardware and resources, they cannot be secured.

Text 11. Read the text and give a short summary.

History of Operating Systems

The first computers did not have operating systems. By the early 1960s, commercial computer vendors were supplying quite extensive tools for streamlining the development, scheduling, and execution of jobs on batch processing systems. Examples were produced by UNI VAC and Control Data Corporation, amongst others.

MS-DOS provided many operating system-like features, such as disk access. However many DOS programs bypassed it entirely and ran directly on hardware.

The operating systems originally deployed on mainframes, and, much later, the original microcomputer operating systems only supported one program at a time, requiring only a very basic scheduler. Each program was in complete control of the machine while it was running. Multitasking (timesharing) first came to mainframes in the 1960s.

In 1969-70 UNIX first appeared on the PDP-7 and later the PDP-11. It soon became capable of providing cross-platform time sharing using preemptive multitasking, advanced memory management, memory protection, and a host of other advanced features. UNIX soon gained popularity as an operating system for mainframes and minicomputers alike.

IBM microcomputers, including the IBM PC and the IBM PC XT could run Microsoft Xenix, a UNIX-like operating system from the early 1980s. Xenix was heavily marketed by Microsoft as a multi-user alternative to its single user MS-DOS operating system. The CPUs of these personal computers could not facilitate kernel

memory protection or provide dual mode operation, so Microsoft Xenix relied on cooperative multitasking and had no protected memory.

The 80286-based IBM PC AT was the first computer technically capable of using dual mode operation, and providing memory protection.

Classic Mac OS, and Microsoft Windows 1.0-3.11 supported only cooperative multitasking (Windows 95, 98, &ME supported preemptive multitasking only when running 32 bit applications, but ran legacy 16 bit applications using cooperative multitasking), and were very limited in their abilities to take advantage of protected memory. Application programs running on these operating systems must yield CPU time to the scheduler when they are not using it, either by default, or by calling a function.

Windows NT's underlying operating system kernel which was designed by essentially the same team as Digital Equipment Corporation's VMS, a UNIX-like operating system which provided protected mode operation for all user programs, kernel memory protection, preemptive multi-tasking, virtual file system support, and a host of other features.

Classic Amiga OS and Windows 1.0-*ME* did not properly track resources allocated by processes at runtime. If a process had to be terminated, the resources might not be freed up for new programs until the machine was restarted.

The Amiga OS did have preemptive multitasking.

Exercises

A. Comprehension

11.1. *Agree or disagree with the following statements:*

- a) Operating systems could be found as early as the first computer appeared.
- b) The first operating systems were installed in microcomputers with multitasking.
- c) Computer became technically capable of using dual mode operation from the early 1980s.
- d) The KRONOS and later the NOS operating systems, which were timesharing use.

B. Vocabulary

11.2. *Read the text and determine the most distinctive features of each operating system using the words at the bottom.*

streamline	batch
deploy	scheduler
cross-platform	yield
terminate	span
crucial	descendant
chat	successor
profitable	abandon
derivative	

11.3. *Which of the given words are adjectives? adverbs? nouns? verbs?*

11.4. *Translate the extract in writing. Use a dictionary if necessary.*

The operating systems originally deployed on mainframes, and, much later, the original microcomputer operating systems only supported one program at a time, requiring only a very basic scheduler. Each program was in complete control of the machine while it was running. Multitasking (timesharing) first came to mainframes in the 1960s.

11.5. *Translate the following combinations:*

commercial computer vendors	facilitate kernel memory
to supply extensive tools	provide dual mode operation
advanced memory management	provide memory protection
memory protection	properly track resources
host of advanced features	dual mode operation

Text 12. Read the text and give a short summary.

Modern Operating Systems

Microsoft Windows

The Microsoft Windows family of operating systems originated as an add-on to the older MS-DOS operating system for the IBM PC. Modern versions are based on the newer Windows NT kernel that was originally intended for OS/2 and borrowed from VMS. Windows

runs on x86, x86-64 and Itanium processors. Earlier versions also ran on the DEC Alpha, MIPS, Fairchild (later Intergraph) Clipper and PowerPC architectures (some work was done to port it to the SPARC architecture).

As of June 2008, Microsoft Windows holds a large amount of the worldwide desktop market share. Windows is also used on servers, supporting applications such as web servers and database servers. In recent years, Microsoft has spent significant marketing and research & development money to demonstrate that Windows is capable of running any enterprise application, which has resulted in consistent price/performance records and significant acceptance in the enterprise market.

The most popular version of the Microsoft Windows family is Windows XP, released on October 25, 2001.

In November 2006, after more than five years of development work, Microsoft released Windows Vista, a major new operating system version of Microsoft Windows family which contains a large number of new features and architectural changes. Chief amongst these are a new user interface and visual style called Windows Aero, a number of new security features such as User Account Control, and few new multimedia applications such as Windows DVD Maker.

Plan 9

Ken Thompson, Dennis Ritchie and Douglas McIlroy at Bell Labs designed and developed the C programming language to build the operating system Unix. Programmers at Bell Labs went on to develop Plan 9 and Inferno, which were engineered for modern distributed environments. Plan 9 was designed from the start to be a networked operating system, and had graphics built-in, unlike Unix, which added these features to the design later. Plan 9 has yet to become as popular as Unix derivatives, but it has an expanding community of developers. It is currently released under the Lucent Public License. Inferno was sold to Vita Nuova Holdings and has been released under a GPL/MIT license.

Unix and Unix-Like Operating Systems

Ken Thompson wrote B, mainly based on BCPL, which he used to write Unix, based on his experience in the MULTICS project. B was replaced by C, and Unix developed into a large, complex

family of inter-related operating systems which have been influential in every modern operating system.

The Unix-like family is a diverse group of operating systems, with several major sub-categories including System V, BSD, and Linux. The name «UNIX» is a trademark of The Open Group which licenses it for use with any operating system that has been shown to conform to their definitions. «Unix-like» is commonly used to refer to the large set of operating systems which resemble the original Unix.

Exercises

A. Comprehension

12.1. *Translate the following combinations into Russian and explane their meaning*

add(-)on	enterprise application
inaccurate	NeXTI
dead-line	dedicated
lawsuit	unencumbered

12.2. *Read the given combinations and remember them.*

large amount	web servers and database servers
significant marketing	research & development
significant acceptance	enterprise market
consistent price	new multimedia applications
distributed environments expanding	community of developers

12.3. *Translate the text into English without a dictionary.*

Операционная система (ОС) – базовый комплекс компьютерных программ, обеспечивающий управление аппаратными средствами компьютера, работу с файлами, ввод и вывод данных, а также выполнение прикладных программ и утилит.

При включении компьютера операционная система загружается в память раньше остальных программ и затем служит платформой и средой для их работы. Помимо вышеуказанных функций ОС может осуществлять и другие, например, предоставление пользовательского интерфейса, сетевое взаимодействие и т. п.

С 1990-х гг. наиболее распространенными операционными системами для персональных компьютеров и серверов являются ОС семейства Microsoft Windows и Windows NT, Mac OS и Mac OS X, системы класса UNIX, и Unix-подобные (особенно GNU/Linux).

Существуют две группы определений ОС: «совокупность программ, управляющих оборудованием» и «совокупность программ, управляющих другими программами». Обе они имеют свой точный технический смысл, который, однако, становится ясен только при более детальном рассмотрении вопроса о том, зачем нужны операционные системы.

Есть приложения вычислительной техники, для которых ОС излишни. Например, встроенные микрокомпьютеры содержатся сегодня во многих бытовых приборах, автомобилях (иногда по десятку в каждом), сотовых телефонах и т. п. Зачастую такой компьютер постоянно исполняет лишь одну программу, запускающуюся по включении. И простые игровые приставки, также представляющие собой специализированные микрокомпьютеры, могут обходиться без ОС, запуская при включении программу, записанную на вставленном в устройство «картридже» или компакт-диске. (Многие встроенные компьютеры и даже некоторые игровые приставки на самом деле работают под управлением своих ОС.)

Операционные системы, в свою очередь, нужны, если: вычислительная система используется для различных задач, причем программы, исполняющие эти задачи, нуждаются в сохранении данных и обмене ими. Из этого следует необходимость универсального механизма сохранения данных; в подавляющем большинстве случаев ОС отвечает на нее реализацией файловой системы. Современные ОС, кроме того, предоставляют возможность непосредственно «связать» вывод одной программы с вводом другой, минуя относительно медленные дисковые операции.

12.4. Talking points. Speak on the following themes:

- a) An operating system: its definition and technology.
- b) Memory management and networking.
- c) File system support.

12.5. *Translate the extract in writing. Use a dictionary if necessary:*

Ken Thompson, Dennis Ritchie and Douglas McIlroy at Bell Labs designed and developed the C programming language to build the operating system Unix. Programmers at Bell Labs went on to develop Plan 9 and Inferno, which were engineered for modern distributed environments. Plan 9 was designed from the start to be a networked operating system, and had graphics built-in, unlike Unix, which added these features to the design later. Plan 9 has yet to become as popular as Unix derivatives, but it has an expanding community of developers. It is currently released under the Lucent Public License. Inferno was sold to Vita Nuova Holdings and has been released under a GPL/MIT license.

12.6. *Put key questions on the text trying to embrace all the main areas of the text.*

12.7. *Discuss the questions.*

Supplementary text № 7

Development of Technologies of Kazakhstan

The path of the economy, driven by innovation, not limited to one particular model – is that the country must develop its own model, based on its own experiences and discoveries.

Kazakhstan is making efforts to promote innovation in science and business, but the country faces the challenge of expansion and introduction of new instruments.

Successful technology commercialization process can significantly increase the economic competitiveness of the country in the long term through a systematic approach, with the use of targeted interventions and support programs.

Knowledge and innovation has long been recognized as the key competitive factors of economic growth and poverty reduction. Often associated with information technology or technological gadgets (smart-phones, tablets etc), the reality innovation covers a lot more and play an important role for discoveries in science, medicine, pharmacy and other fields.

Currently in Kazakhstan is tested a new model of promoting innovation and commercialization of technologies in the framework

of the Project on commercialization of technologies implemented by the Ministry of education and science of the Republic of Kazakhstan with the support of the World Bank. In November 2013, the project organized a high-level seminar titled "Innovative economy in Kazakhstan: model of technology commercialization", which presented early successes of the project and discussed the way of the country's transition to an innovative economy.

The results of the two most successful research projects were presented in details to the audience:

1. The project for the development of filter materials that can filter out physical materials, as well as the smallest bacteria and viruses. The project already has agreements with commercial organizations for the implementation of filters for drinking water in several countries.

2. The project for the development of fast pharma-cogenetic test to determine the exact individual dosages. Scientists already have the order of the Ministry of health of the Republic of Kazakhstan.

Open Quotes

We presented the progress of the research groups of the project, showing the real potential of Kazakhstan, and it is obvious that the country needs more such successful projects. Moreover, the growing success must be transformed into the conventional role models, especially for young people. New examples are creating a new history of the country!

Close Quotes

Kazakhstan is moving towards the development of information and communication technologies.

As reported on the official website of the Prime Minister of Kazakhstan Pm.kz, in the first 9 months of 2011, the Internet speed is increased by 2 times, rates of wholesale through the Internet increased by 65%, the growth of Internet users reached 34%. Number of users of Kazakhstan segment of the Internet has grown to 6.5 million people, the number of domain names - up to 62 thousand, the number of sites to display Kazakhstan - to 12.3 million.

Currently, the cities of Astana and Almaty introduced mobile technology 3G, high-speed broadband internet along with digital

satellite TV broadcasts were made available to the rural population of the country.

1. Answer the following questions.

a) Is Kazakhstan making any efforts to promote innovation in science and business?

b) Does the country face the challenge of expansion and introduction of new instruments?

c) Can technology commercialization process significantly increase the economic competitiveness of the country in the long term through a systematic approach?

d) How often do the knowledge and innovation associate with Information Technology and technological gadgets?

e) When did the project organize a high-level seminar titled “Innovative economy in Kazakhstan”?

f) Why were the results of the research presented in detail to the audience?

g) The growing success must be transformed into the conventional role models, mustn't it?

h) How big is the increase of users of Kazakhstan segment of Internet?

i) Which cities of Kazakhstan introduced mobile technology 3G?

j) Why is the development of technologies one of the most important factors in improving the competitiveness of Kazakhstan's economy?

Vocabulary

particular	особый, специфичный
experience	опыт
to make efforts	предпринимать попытки
to promote	содействовать
introduction	введение
significantly	значительно
approach	подход
reduction	сокращение
framework	рамка
to implement	выполнять

transition	переход
research	исследование
agreement	соглашение
discovery	открытие
challenge	вызов, проблема
knowledge	знание
growth	рост
implement	осуществлять, выполнять
transition	переход
audience	аудитория
filter	фильтровать
potential	потенциальный
conventional	обычный, традиционный
broadband internet	широкополосный интернет
rural	сельский

2. Give Russian equivalents of the following words and expressions.

- | | |
|------------------------|-----------------------|
| 1) path | 14) gadget |
| 2) limited | 15) promote |
| 3) particular model | 16) commercialization |
| 4) make effort | 17) title |
| 5) experience | 18) transition |
| 6) discovery | 19) smallest bacteria |
| 7) term | 20) agreement |
| 8) through | 21) drinking water |
| 9) intervention | 22) obvious |
| 10) approach | 23) quote |
| 11) pharmacy | 24) high-speed |
| 12) systematic | 25) transform |
| 13) competitive factor | |

3. Translate these words and combination of words into English.

- | | |
|--------------|-------------|
| 1) вебсайт | 16) спутник |
| 2) увеличить | 17) отчет |

- | | |
|-----------------------|------------------------|
| 3) скорость, темп | 18) цифровой |
| 4) скорость интернета | 19) ранний |
| 5) успех | 20) представить проект |
| 6) определить | 21) научное открытие |
| 7) материал | 22) основываясь на |
| 8) физический | 23) медицина |
| 9) рост | 24) банк |
| 10) модель | 25) бедность |
| 11) исследование | 26) цель |
| 12) проект | 27) подход |
| 13) министерство | 28) поддержка |
| 14) нуждаться | 29) обсуждать |
| 15) доза | 30) опыт |

4. Complete the sentences and translate them.

a) projects with high innovation potential in the field of biotechnology, nanotechnology and building materials have opened the event.

b) Knowledge and innovation has long been recognized as and poverty reduction.

c) The results of the two most successful research projects were presented in details to the

d) In reality innovation covers a lot more and plays an in science, medicine, pharmacy and other fields.

e) Successful technology can significantly increase the economic competitiveness of the country.

f) Kazakhstan is the development of information and communication technologies.

g) Currently, the cities of Astana and Almaty introduced mobile technology 3G, high-speed broadband internet along with were made available to the rural population of the country.

h) In November 2013, the project organized a high-level seminar titled "..... in Kazakhstan".

i) Kazakhstan is making efforts to promote innovation in science and business, but the country faces of new instruments.

- audience
- digital satellite TV broadcasts
- commercialization process
- a key competitive factors of economic growth
- moving towards
- innovative economy
- the challenge of expansion and introduction
- exhibition of research
- important role for discoveries

Glossary of unit 2

predate — алдында болу; алдын ала болу, бұрын болып өту — предшествовать

abacus [æbəkəs] — көнелік, ескілік — счеты; абак(а) antiquity — древность, старина

punch-card machine — есептегіш тескіш машина —

1) перфоратор; 2) счетно-перфорационная машина

constrain — шек қойып отыру, шектеп отыру — ограничивать; вынуждать

perform a task — тапсырманы орындау — выполнить задание

subset — қысқаша түрі, желі — 1) сокращенный вариант;

сокращенная версия; 2) модем; 3) подгруппа

broaden — кеңейтілу, ұлғайтылу — расширять(ся)

trace — белгілі мәлімет көзіне шығу немесе өткен мерзімге — проследживать(ся); восходить к определенному источнику или периоду в прошлом (to, back to)

source — мәлімет көзі — источник

manpower — жұмысшы күші, адамның бұлшық ет күші — мускульная сила человека; рабочая сила

decrease — азайту, қысқарту — уменьшать(ся), убывать, сокращать(ся)

capabilities — мүмкіндіктер — (потенциальные) возможности

vacuum tube — вакуум құралы – вакуумный прибор

integrated circuit ['sə:kit] (**IC**) — интегралды микросхема — интегральная микросхема, ИС, микросхема

advance — жетістік — прогресс, достижение

artificial intelligence — жасанды ақыл — искусственный интеллект

predict — болжау, күні бұрын айту — предсказывать; прогнозировать; упреждать

outcome — нәтиже — исход, итог, последствие, результат

mainframe (=mainframecomputer) — басты есептеуіш орталығының компьютері — мэйнфрейм; главный компьютер вычислительного центра

amount — көлем, мөлшер — величина, количество

aircraft — тікұшақ — самолет; авиация

nuclear reactor — ядролық реактор — ядерный реактор

weather pattern — синоптикалық ахуал, ауа райы түрі —

1) синоптическая ситуация; 2) тип погоды

improvement — жақсару — улучшение, усовершенствование; исправление; развитие (on, over, upon)

customer — тапсырыс беруші, сатып алушы — заказчик, покупатель; клиент

rely (on) — тәуелді болу, үміттену — 1) зависеть;

2) полагаться, надеяться; доверять

purchase — сатып алу — покупать, закупать (приобретать что-л. за деньги)

eliminate — жою — уничтожать, ликвидировать

absorb — өз санына қосу, жұту — поглощать; включать в свое число, присоединять

merger — бірігу; қосылу — слияние, объединение (коммерческое, промышленное и т. п.)

unwilling — бейімсіз; ынтасыз — нерасположенный, несклонный

usher — көрсету; ұсыну — представлять, вводить

scramble — күрес — схватка, борьба (за овладение чем-л.)

jockey — айналып жұмыс істеу — действовать в обход; действовать хитрыми методами

Grammar

Conditionals: true, real and unreal always true (zero conditional) if X happens, Y happens

These sentences describe what always happens in certain circumstances eg scientific facts.

present simplepresent simple

*When I **press** the switch, the light **comes** on.*

real conditions (conditional 1) if X happens, Y will happen

These sentences describe what the speaker thinks will possibly happen as a consequence of a real situation.

present simplewill future

*If we **do not deal** with the global warming problem, temperatures **will rise**.*

*If we **leave** now, **we'll catch** the bus. If we **don't leave** now, we **won't catch** it.*

In informal speech, we often use *going to* instead of *will*.

*if you **don't take** an umbrella, you're **going to get** wet.*

We also use *might* or *can / could* in place of *will*. **See Unit 25**

We can also use imperatives in real conditions.

*If you **don't know** a word, **look it up** in the dictionary.*

Sentences beginning *If you will...* are only used when **will** means **insist**, or is used as a polite form.

*If you **will stay up** so late, then of course you'll feel tired.* (insist)

*If you **will wait** here, I'll see if the manager is ready.* (polite)

unless

Unless means *only if not*. We use it when we say that if something does not happen, something else will happen.

***Unless we deal with** the global warming problem, average temperatures **will rise**.*

provided, as long as + present simple

Provided and *as long as* mean *only if*.

***Provided / as long as** we reduce energy consumption, we can slow down global warming.*

in case + present simple

This describes a possible situation we want to be prepared for. *Take an umbrella in case it rains.*

unreal conditions (conditional 2) if X happened, Y would happen

These sentences describe what the speaker thinks would happen in an imaginary situation.

past simple *would* + verb

If you were on Venus, you would see the Sun rise in the west,

*What **would happen if the Earth stopped turning?***

*If the Earth **didn't have** a Moon, there **wouldn't be** any tides.*

The past simple tense we use in an if-sentence does not describe past time, but unreal time. We also use *might* or *could* in place of *would*.

See Unit 25.

if I were you

We give advice with *If I were you.*

*I **wouldn't do** that, **if I were you.** or **If I were you, I wouldn't do** that.*

real or unreal?

This depends on the situation of the speaker, or what the speaker is thinking.

For example, we're in the classroom. There are some heavy tables. I think a friend is going to lift them. I give a warning.

*'If you **try** to lift those tables on your own, you'll **hurt** yourself.'*

Same situation. Nobody is thinking of lifting the tables. I make a comment. *'Those tables look heavy! If you tried to lift them, you'd hurt yourself.'*

.....

1. Complete the answers using the word or words in capitals.

a. What happens when you heat water to 100°C?

If you

BOIL

b. What does water turn into when you boil it?

STEAM

If you

c. What happens when you cool the steam?

TURNS BACK

If you

d. What happens when you heat a piece of metal?

EXPANDS

If you

e. What happens when you freeze a piece of metal?

CONTRACTS

If you.....

f. What happens when you freeze water?

EXPANDS

If you.....

2. Use the words to complete an /f-sentence about solutions to environmental problems.

Solution A-recycle paper, metal and glass

a. everyone / recycle paper / companies / not cut down so many trees
if everyone recycles companies wont cut down so many trees.

b. everyone / recycle metal and glass / we not waste valuable resources

c. everyone / recycle paper, metal and glass / we not produce so much rubbish

Solution B - turn off lights, don't drive so much, insulate your house

d. everyone / turn off unwanted lights / save a lot of electricity

e. everyone / walk or cycle / not waste so much oil and petrol

f. everyone / insulate their houses / not waste so much energy for heating

Solution C - use renewable energy

g. countries use more wind and water power, not depend so much on power stations

h. countries use power stations less, cause less air pollution.

Use the prompts to complete the question. Then choose the most likely answer. Check the factual answers on page 208.

A. what / happen if you / travel through the Earth to the other side?

What would happen if you traveled through the Earth to the other side?

B. what / happen if the Earth suddenly stop / going round?

.....

C. what / happen if we not / have a Moon?

.....
D. what / happen if all the ice at the poles / melt?

.....
E. what / happen if there be / no more electricity?

.....
F. what / happen if aliens receive / messages from Earth and decide /
to visit us?

.....
a. A You would fly out the other side into space.

b. A We would enjoy longer and warmer days

c. A There would not be any ocean tides.

d. A Sea levels would fall

e. A The universe would no longer exist.

f. A They wouldn't know exactly where we were.

B. This would be impossible because the Earth's core is hot.

B. It would start moving in the opposite direction

B. The levels would stay the same.

B. People would use candles for light and fires for heat.

B. They wouldn't arrive for millions of years, as they would be so far
away.

C. You would fall to the centre and then stop.

C. Evenif the. Earth stopped, we would keep moving!

C. The Sun would grow stronger.

C. Sea levels would rise.

C. The world would be a safer place.

C. They wouldn't understand our messages anyway.

4A. Rewrite each sentence so that it contains **unless** or **as long**
a sand begins as shown.

a. If you don't train hard, you won't succeed in sport.

You wont succeed in sport unless you train hard.

b. If you train regularly, you can improve your performance.

You can improve.....

c. If you enjoy your sport, it doesn't really matter whether you
succeed or not.

It doesn't really matter.....

- d.** If you don't eat and sleep properly you won't develop as an athlete.
You won't

4B. Rewrite each sentence so that it contains **in case**.

- e.** Take a spare pair of running shoes, because it's possible that you will need them.

Take a spare pair of running shoes.....

- f.** Take a waterproof coat with you because it's possible that it will rain.

Take a waterproof coat with you

- g.** Take a warm jumper because it's possible that you will get cold when you stop.

Take a warm jumper.....

- h.** Take a first-aid kit because it's possible that someone will get injured.

Take a first-aid kit.....

5. Use the words to complete the conditional if -sentence. Use an always true, real or unreal conditional to suit the meaning.

- a.** Scientists are planning a way of writing extremely small letters, using xenon (Xe) atoms. If you (use).....used this system, you (be able) to write ten copies of the Bible on the area of a postage stamp.

- b.** Humans are among the few animals to have colour vision. If you (be) a horse, for example, you (see).....everything in black and white.

- c.** The brain works in two parts, the left side and the right side. Scientists can put one side of the brain to sleep, and see what happens. For example, if they (turn off)..... .. the right side of the patient's brain, the patient (not be able).....to sing, because musical ability comes from the right side of the brain.

- d.** Beetles are one of the most numerous species on the planet. In fact, if other insects and animals (not eat) beetles, in about a year and a half the beetle population (weigh) as much as the whole Earth!

- e.** Parts of the body send messages to other parts of the body when they have to do things.

For example, if you (not have) enough water in your body the brain (let) you know that you need more, by making you feel thirsty.

f. If you (look) inside your own eye at the images there, they (be) upside down, and they (be).....moving.

g. If you (smoke), chemical changes (take place) in your cells, which do not receive enough oxygen and die.

h. The world's oceans contain huge amounts of salt. In fact, if you (remove) all the salt from the oceans, you (be able) to use it to build a wall about 300km wide and a kilometre tall all around the Earth!

conditionals: impossible past, wishes impossible or past conditions (conditional 3) if X had happened, Y would have happened

These sentences describe what the speaker thinks would have happened as a consequence of a situation which is in the past, so is impossible to change.

*On 18 June 1815 the Coalition Army under Wellington and Blucher defeated Napoleon **would have + verbpast perfect***

*and the French army. But what would have happened if Napoleon had won the battle? **would have + verb***

The history of Europe would certainly have been different.

*I'm sorry I didn't talk to you yesterday, but I simply didn't see you! **If I'd seen you, I would have said hello.** We also use *might have* or *could have* in place of *would have*. See **Unit 25**.*

past condition with a result in the present

if X had happened, Y would be different

We often think about past events, and their effects on the present.

If Chris **hadn't gone** to the hospital, he **wouldn't be** alive today.

wishes

- about the present

When we use *wish* to make a wish about the present, we use the *unreal past simple*, **as in** an unreal conditional sentence. We can also use *could/ was able to*.

***I wish I knew** more about European history.*

(= If I knew more about it now, I would be happier.)

*/ **wish I could** swim *zeziy* fast*

-wishes about the past

When we use *wish* to make a wish about the past, we use the past perfect, as in an impossible past conditional sentence.

/ **wish I had been** present at the battle of Waterloo.

(= If I had been present at the battle of Waterloo, i would have been happy!)

- wishes with would

We also use *wish* with *would* when we want someone to do something or not to do something. This often because we think it is a bad habit.

/ **wish you wouldn't** keep staring at me!

I wish Pete would phone.

-if only We can use *if only* to make a stronger kind of wish about the present or the past. **If only I knew** more about European history **I If only I had studied** harder!

Complete the sentence using the verbs in brackets.

a. If Alexander the Great (march). .. had marched..... west instead of east, he (conquer) the whole of Europe.

b. If more Vikings (go).....to North America, the Viking settlements (succeed)

c. If the ancient Egyptians (build).....bigger boats, they (cross).....the Atlantic and (land).....in America.

d. If a storm (not hit) Bartolomeu Dias' s ship off the coast of Africa in 1487, they (not arrived) in the Indian Ocean by accident.

e. If Cheng Ho and other Chinese explorers (continue) further on their voyages, they (sail) up the west coast of Africa and reached Europe in the early 15th century.

f. If Columbus (not read) about Marco Polo's trip to China, he (not try) to sail there by crossing the Atlantic.

g. If Columbus (sail) east in 1492, he (reach)..... China or Japan.

h. If the Aztecs (not think) that Cortes and his men were gods, the Spaniards n'ot conquer). Mexico so easily.

i. If Lewis and Clark (not find) a way across America from St Louis to the Pacific in 1806, thousands of settlers (not make) the journey in later years to settle in the central and western parts of North America.

j. If Charles Darwin (not take) a voyage to South America between 1831 and 1836, he (not write) his famous book *The Origin of Species*, which argued that living creatures evolved over millions of years.

2. Use the information to make an impossible past conditional sentence which has a result in the present.

a. Columbus 1492: 'Don't worry men, I've brought a map with me, so I know exactly where we are.. If I hadn't brought a map. ..., we..... lost!'

b. Galileo 1640: 'I've explained my new ideas to the Church, but now I'm in trouble! If

I , I[c Marco Polo 1300: 'It's true, I have exaggerated and made up some of the descriptions in the book about my travels. I suppose that's why people don't believe the true things. If

I.....

..... , perhaps more people

d. Mrs Abraham Lincoln, April 1865: 'We went to the theatre last night, and now my poor husband the President is dead, shot by a political opponent.

If we.....he.....alive today!'

e. Leonardo da Vinci, 1518: 'I've done a lot of things in my life, but perhaps I haven't spent enough time on my paintings. I didn't always manage to finish them, I'm afraid. If I....., more of them.

f. Napoleon, 1820, in exile on the island of St Helena: 'Looking back, I can see that invading Russia was a mistake. Without that, perhaps I wouldn't have lost the war.

If I

.....Russia, perhaps I

.....Emperor of France!'

4. Complete the wish-sentence with the verb in brackets.

a. What on earth is the answer to this problem! (know)

I wish I knew the answer to this problem.

b. Unfortunately, I haven't got a calculator, (have) I .

.....
c. The trouble is, I don't really understand the problem, (understand)

I

d. And my teacher never explains things to me.
(explain).....

e. I think I'd prefer to be in a different class, (be)

.....
f. In fact, I'd rather do French instead,

(do).....

g. I love France - it would be great to live there!

(live).....

h. But at the moment I have to my homework!

(have to do).....

5. Complete the with-sentence with the information provided.

a. Juliet: 'Considering what happened later,
meeting Romeo was a mistake.

I wish i hadn't met him!

b. Christopher Columbus Sailing to America was a mistake perhaps
and it would have been better to stay at home!

I.....at home!

c. Harry Potter Learning to be rather dangerous. Deciding to go a
wizard school was a mistake!

I school!

d. Marco Polo It was great being in china. Perhaps it would have
been better to stay there and not come home to Italy.

I wish China.

e. Newton: 'Actually the story of the apple falling on my head is true
and I can tell you it really hurt ! Sitting under the apple tree was a big
mistake!'

I tree!

f. Helen of Troy: 'I didn't really like Paris very much .

Running away with him was a mistake.'

I with him !

g. Dr Frankenstein; This monster is causing a lot of trouble . Making him was a mistake.

I him!

h. Archimedes : 'Jumping out of my bath and running down the street shouting 'I've found it!' was a great idea. But it was a mistake not to put some clothes on first!"

f. Helen of Troy: 'I didn't really like Paris very much. Running away with him was a mistake.'

I.....clothes on !

6. Rewrite the sentence as a complaint, using *wish* with *would* or *wouldn't*. Use contractions.

a. You never hand your work in on time! I wish you'd hand your work in on time

b. You always make so many mistakes! I !

c. You always drop litter on the floor! I !

You never pay attention! I..... !

e. You always talk during the test! I..... !

f. You never listen to what I'm saying! I !

g. You always interrupt people! I..... !

h. You always throw things across the room! I !

i. You never behave! I !

j. You always make so much noise! I..... !

the passive and its uses

Use **be** + **past participle** to form the passive.

present simple active

present simple passive

present continuous active

present continuous passive

past simple active

past simple passive

present perfect active

present perfect passive

will active

will passive

We find oil and gas beneath the ground or sea.

Oil and gas are found beneath the ground or sea.

The police **are questioning** two men.

Two men are being questioned by the police.

Teachers **trained** Aztec boys to fight

Aztec boys were trained to fight.

Tourism has harmed some countries.

Some countries have been harmed by tourism.

We will choose a new class representative on Monday.

A new class representative will be chosen on Monday.

Use the passive

- to move important information (the object of the active sentence) to the beginning. *Two men are being questioned by the police.*

- when we want to be impersonal and not mention the name of the person who performs the action. We often use the passive in scientific or technical processes.

Oil and gas are found beneath the ground or sea.

- when it is obvious who performed the action, eg teachers, or we do not want to use a general

subject eg *people, they.*

*Aztec boys **were trained** to fight*

*Two missing children **have been found safe** and well. 9*

-more often in formal speech and writing than \n everyday speech.

transitive and intransitive

Verbs which have an object are called transitive verbs; verbs without an object are intransitive. Only transitive verbs can be made passive.

transitive subject verb object / *lost my wallet on the way to school.*

intransitive / *swim* – *every day* Use *by*

• when it is important to know the 'agent' or person who performed the action

Some countries have been harmed by tourism.

• only when it is really necessary.

The two men were arrested, (by the police – this is obvious)

Use *with*

• for objects which perform actions.

The game was played with a ball of solid rubber.

Complete the sentence with the past simple passive form of the verb in brackets.

a. In ancient times, fires (light) were lit to use smoke as a signal over long distances.

- b. Morse code (invent).....by an American called Samuel Morse.
- c. The world's first television images (show) to scientists in Scotland in 1926.
- d. Radios (use) to broadcast coded messages during the Second World War.
- e. The World Wide Web (design) originally to make it easier for nuclear physics researchers to communicate.
- f. Buying books and CDs over the Internet (make)..... popular by the company Amazon.
- g. The first mobile phones with cameras (sell) in Japan.
- n. Vinyl albums and tapes (replace) by CDs, which are now being replaced by mp3.
- I. The first English dictionary (wrote) by Robert Cawdrey in 1604.
- j. The first mass-produced cars (introduce)..... by the Ford company in the USA.

2. Read the text and underline all the subject, verb and object structures. Then rewrite the text using present simple passive verbs. Leave out any unnecessary words.

How a toy car is made In the factory, they use a computer to plan the exact shape of the car. They then feed this computer program into a machine, and produce a plastic prototype. Then they produce the actual toy cars in a factory abroad. As far as construction is concerned, they make the bodies of the cars from plastic. They add small electric motors to the cars, and then they paint them. They also attach licence plates. Quality control inspects the cars and then they wrap them and pack them into cardboard boxes. They ship the cars to Britain.

- a. As a first step a computer is used to plan the exact shape of the car.
- c. The actual
- d. The bodies.....
- e. Small
- Licence.....
- f. At the next stage
- g. Finally,..... Britain.

3. Rewrite the sentence using a present perfect passive with *by*.

Leave out any unnecessary words.

a. Cheaper air travel has made possible the global expansion in tourism.

The global expansion in tourism has been made possible by cheaper air travel..

b. Countries all over the world have experienced a growth in tourism.

c. Millions of tourists have visited the popular Mediterranean resorts since the 1970s.

d. Recently tourists have chosen more distant locations in Africa, Asia and South America.

e. Mass tourism has badly affected some countries.

f. International companies have built large hotels on unspoilt coastline.

g. These developments have disturbed local wildlife.

h. Tourists have damaged coral reefs and other habitats.

i. Such developments have also displaced local people.

j. Some governments have developed the idea of ecotourism to counteract some of these problems.

4. Rewrite each sentence so that it does not contain the words someone or *people*.

a. Someone built ships with sails more than 5,000 years ago.

Ships with sails were built more than 5000 years ago.

b. Someone constructed a hot –air balloon in 1783.

c. People developed the steam ship in the 19th century.

d. Someone opened the first successful passenger railway in 1830.

e. People started the first passenger airlines after the First World War.

5. Rewrite each sentence so that it includes the agent *by*.

f. The Chinese probably printed the first books more than a thousand years ago.

.....
g. The Remington company sold the first modern typewriters in the 1870s.

.....
h. Edison recorded the first words on a gramophone record in 1877.

.....
I. The Lumiere brothers created the first modern cinema in France in 1895.

j. Valdemar Poulsen invented the tape recorder in 1899.
.....

relative clauses

These come after relative pronouns *who I whom* for people, *which I that* for things, whose for possession. Relative clauses can refer to the subject of the sentence or the object. They behave in different ways. In object clauses, it is possible to leave out the relative pronoun *which I that*.

*Glaciers are rivers of ice **which** form in cold climates on mountains. The amount of fresh water **(that)** glaciers contain is greater than all other lakes and rivers on Earth*

Subject:*which form in cold climates* This refers to **glaciers**, the subject of **form**.

Object:*that glaciers contain* This refers to **water**, the object of **contain**.

Note that in a subject clause there is never a subject pronoun after the relative pronoun.

*Glaciers are rivers of ice. **They** form in cold climates on mountains.*

*Glaciers are rivers of ice **which** they form in cold climates on mountains. **subject: who or that***

Use *who / that* to refer to people in subject relative clauses. When we refer to a named person we generally use *who*, and *that* in informal speech and writing.

*Charles Dickens was the novelist **who** wrote David Copperfield.
Louis Agassiz was the first scientist who argued that there had been an Ice Age in the past.*

subject: which or that

Use *which I that* to refer to things in subject relative clauses.

*Last week I bought a new computer **which** is much faster than the old one. In 1840 Agassiz published Etudes sur les glaciers **which***

was the first book to describe the movements of glaciers and the way they changed the landscape.

subject: whose

Use *whose* to refer to things belonging to people. *That was the man **whose** car was stolen. Louis Agassiz had a son, Alexander, **whose** main interest was mining.*

omitting the relative pronoun

When you omit the relative pronoun in an object clause, you might also need to omit the verb after it.

*The photos (**which were**) used on the web site are fascinating.*

*The glaciers (**which were**) described in the book are in danger of melting.*

object: who, that, whom or zero

Use *who I whom / that* in an object relative clause when we refer to people. *Whom* is used in formal language, or after a preposition.

*He /s one of the scientists **who / whom I that I** admire most* It is possible to leave out the relative pronoun in this kind of sentence.

He is one of the scientists I admire most.

object: which, that or zero

Use *which I that* in an object relative clause when we refer to people.

*This is Pickwick Papers, one of the first books **which / that** Dickens wrote.* It is possible to leave out the relative pronoun in this kind of sentence.

Abbreviations

1. handheld PC (HPC) — қалта компьютері — карманный компьютер, компьютер, на котором выполняется операционная система Windows CE

2. PDA (Personal Digital Assistant) — персональді сандық секретарь — персональный цифровой секретарь (тип сверхлегкого миниатюрного ПК с ЖК-экраном, клавиатурой и/или рукописным вводом)

3. OS (= operating system) — операциялық жүйе — операционная система, OS outcome — нәтиже – исход, итог, последствие, результат

4. SED (smoke-emitting diode) — түтін шығаратын аспап — дымоизлучающий диод (диод, сгоревший в результате неправильного включения, выпустив наружу свой «магический дым», обеспечивавший его работоспособность)

5. AWK — UNIX-қа арналған бағдарламалау тілі — язык программирования для UNIX, названный по имена мего авторов (AlV. Aho, PeterJ. Weinberger и BrianW. Kernighan). Основан на синтаксисе языка Си имеет несколько версий.

6. Tel (Tool Command Language) — аспапты әмірлі тіл — инструментальный командный язык.

7. LISP (list processing language) — Лисп тізімін өңдейтін тіл — язык обработки списков Лисп.

8. P-code language (pseudocode) — жалған белгілер жүйесі — псевдокод (язык, напоминающий язык программирования и используемый для описания структуры программы)

9. Perl (= PERL) (PracticalExtractionandReportLanguage) — жеңіл,өзінше түсіндіру тілі,тиімді,түсінікті тіл — язык Perl свободно распространяемый интерпретируемый язык. Создан Ларри Уоллом (Larry Wall) в 1986 г. Обычно используется для создания динамически генерируемых Web-страниц. Используется также системными администраторами и Web-мастерами для работы и изменения текстов, файлов и процессов.

10. AMD (Advanced Micro Devices) — Микро-процессаларды өндіруші – компания және оған тәуелді саудалық марка, компания-производитель микропроцессоров и принадлежащая ей торговая марка

11. ALU (ArithmeticLogicUnit) — арифметика-логикалық құрылым — арифметико-логическое устройство».

12. operand (= OPD) — нысан (әрекеттер), операнд (машиналы команда орындалатын нысан немесе программалаудың тілінің операторы) — объект (действия), операнд (объект, над которым выполняется машинная команда, или оператор языка программирования)

13. FPGA (Field Programmable Gate Array) — программаланатын венти́лдік матрица, негіздік матрицалық кристалл, БМК (бағдарламаны қолданушыныңөзінің жұмысы арқылы өзгертілген винтелдік матрицаның түрі) — программируемая вентиля́ная матрица, базовый матричный кристалл, БМК (тип вентиля́ной матрицы, которая может быть запрограммирована самим пользователем).

14. value (= VAL) — мағына — значение.

15. pi — тұрақты π саны, 3,1415926535897932 мәніне жақын — число π , константа, равная приблизительно 3,1415926535897932.

16. Hyper(-)Threading (HT) — гиперпотокоты (Pentium 4 процессорында іске асырылған жаңа технологияның аты. Ол процессордың шығырының мүмкіндіктерін пайдаланады, оның жұмысын 30% өндіреді. Осының көмегімен ДК екі жұмысты бір мезетте орындайды немесе бірпроцессорлы жүйеден қарағанда тезірек атқарады. Операциялық жүйе үшін бұл процессор екеу сияқты көрінеді.) — гиперпотоковость (название новой технологии, реализованной в процессоре Pentium 4. Она использует возможности незадействованных регистров и блоков процессора, позволяя ему работать до 30 % производительнее. Благодаря этому настольный ПК может выполнять два разных приложения одновременно или одно приложение, но быстрее, чем однопроцессорная система. Для операционной системы этот процессор выглядит как два.)

17. CRT (cathode-raytube) — электрды-сәулеліcrunch — ұнтақтау — перемалывать; сильно сжимать, спрессовывать (данные) flexible — икемді — податливый, легко приспособляемый; гибкий

18. LCD (Liquid-Crystal Display) — сұйық кристалды (СК) экран — жидкокристаллический (ЖК) экран

19. GUI (GraphicalUserInterface) — пайдаланушының сызбалы интерфейсі кеміргіштік — графический интерфейс пользователя, ГИП (произносится goo-ee).

20. LED (Light Emitting Diode) — сәулелі диод, сәулелідиодты индекатор (аз ұлданылатын электронды құрал, электронды ток арқылы өткендегі шағылысатын сәуле) — светo (излучающий) диод, светодиoд, светодиoдный индикатор (малопотребляющий электронный прибор, излучающий свет при прохождении через него электрического тока)

21. DSL (digital subscriber line) — цифрлық абоненттің сандық сызығы — цифровая абонентская линия.

22. VGA (Video Graphics Array) — адаптер (контекст бойынша), жазу-сызу, қалып VGA — (по контексту) адаптер, графика, стандарт VGA.

23. FireWire — құрсым FireWire (атауы; жоғары жылдамдықтың дәйекті жергілікті құрсымының фирманың Apple P1394. FireWire берілістің жылдамдығын до 400 Мбит/с камсыздандырады, P&P қолдайды, түрлі құрылымдарды арқылы бір тіркеуішті қосу арқылы қосылады) — шина FireWire (название высокоскоростной последовательной локальной шины P1394 фирмы Apple. FireWire обеспечивает скорость передачи до 400 Мбит/с, поддерживает P&P, а также позволяет подсоединять несколько различных устройств через один разъем)

24. AT (Advanced Technology) — озық (озық, еңқазіргі) технология — передовая (прогрессивная, самая современная) технология.

25. PrintedCircuitBoard (PCB) — печетты плата — печатная плата.

26. backplane (= B/P) — жүйелік плата (ДК үшін) — системная плата (для ПК).

27. timesharing (=timesharing) (TS) — разделение времени, режим разделения времени (метод организации одновременно многотерминального доступа многих пользователей к однопроцессорному или многопроцессорному компьютеру (вычислительному ресурсу) — уақыт ажырату, уақыт ажырату режимі (көптеген қолданушыларға бір уақыттағы немесе көп процессорлық компьютерге бір уақыттық көптерминалды рұқсат әдісі(есептеуіш-қор)

28. Linux (LinuxUnix) — OCLinuxPC еркін туындайтын (коммерциялық емес) іске асырылуы — ПК және басқа платформалардың жиынтығы. Атау — атом ядросы жайлы жұмыс істеген финдық бағдарламашы Линуса Торвальдс атынан шыққан) (Linux Benedict Torvalds) ОС Linux (произносится lee-nucks) (свободна распространяемая (некоммерческая) реализация ОС Linux на PC-совместимых ПК и множестве других платформ. Название происходит от имени финского программиста Линуса Торвальдса (Linux Benedict Torvalds).

29. Торлық жүйелердің SNA (Systems Network Architecture) архитектурасы, SNA желі- SNA (Systems Network Architecture) — архитектура сетевых систем, сеть SNA.

30. DECnet хаттамасы (DDCMP протоколы бойынша DEC компьютерлерді байланыстыратын DEC компаниясының желілік архитектура үшін саудалық кіршені) — протокол DECnet (торговая марка для сетевой архитектуры компании DEC, позволяющей связывать компьютеры DEC по протоколу)

31. MS-DOS / Microsoft DOS (disk operating system) – Майкрософт ДОС (дисковая операционная система) — Mac OS (Macintosh Operating System) көшіріп алу, еліктеу — Power Macintosh ПК үшін Apple Computer фирмасының операциялық жүйесінің атауы. Бірінші нұсқасы 1984 жылы пайда болды. 2001 жылы жаңа нұсқасы шықты.

32. CP/M (Control Program for Microprocessors) — операционная система CP/M (популярная в 80-х годах ОС для 8-и 16-разрядных ПК (разработчик Garry Kidall). Дала начало множеству других систем: MP/M–80, CP/M–86 и др.) — CP/Моперациялық жүйесі (80 жылдары ОС көптеп таралды және 16 разрядты ЖБ)

33. UDF (Universal Disk Format) — Файловая системама UDF — файловая системама, поддерживаемая Windows 2000. Создана ассоциацией OSTA (Optical Storage Technology Association) для обмена данными между DVD и CD. Основана на стандарте ISO 13346. – UDF құжаттық жүйесі. Windows 2000 ұстайтын құжаттық жүйе. DVD және CD арасында мәліметтер жіберу үшін OSTA ассоциасынан құрылған. ISO 13346 стандартынан құрылған.

34. NTFS (New Techonology File System, NT File System) — файловая система NTFS — файловая система Windows NT и Windows 2000, поддерживающая объектно-ориентированные приложения, рассматривая файлы как объекты с атрибутами, определенными пользователями или системой. Подразумевает также метод логической разметки диска, управления дисковой памятью и организации доступа к файлам. NTFS обеспечивает все возможности файловых систем FAT и HPFS без их ограничений — NTFS құжаттық жүйесі. Объектінің бағдарлаған қосымшаны ұстайтын, құжаттарды нақтылы қолданушылармен жүйесі, атрибуттары бар объект ретінде қарастыратын Windows NT және Windows 2000 құжаттық жүйесі. Сонымен бірге дискті жар мен құжатқа рұқсатты ұйымдастыруда басқарудың логикалық белгілерінің әдісімен түсіндіріледі. NTFS – FAT және HPFS файлдық жүйелерінің олардың шектеулерсіз барлық мүмкіндіктерін қамтамасыз етеді.

35. FAT (File Allocation Table) — таблица размещения файлов, таблица FAT в MS-DOS (FAT12, FAT16, FAT—16) и Windows 95/98/ME (FAT32, FAT—32) — таблица для динамического распределения дискового пространства под файлы — құжаттарды орналастыру кестесі, MS-DOS тағы (FAT12, FAT16, FAT—16) және Windows 95/98/ME (FAT32, FAT—32) — құжат асты дисктік аяларды динамикалық бөлу кестесі.

36. HFS (hierarchical file system) — иерархическая файловая система — иерархиялық файлдық жүйе.

37. VMS (Virtual Memory System) — ОС VMS — ОС, VAX компьютерлері үшін 1976 жылы жасалған, Digital Equipment Corp. содан соң Alpha-жүйесіне көшірілді. Оған POSIX қолдауы қосылды және жүйенің атауы Open VMS өзгертілді.

38. KDE (K Desktop Environment) — графический пользовательский интерфейс фирмы Corel — Corel фирмасының график түріндегі қолданбалы интерфейсi.

39. COSE (Common Open Environment) — общая открытая среда программных средств — программалық құралдың ортақ ашық ортасы.

40. CDE — 1) Concurrent Design Environment — среда параллельного (комплексного) проектирования, система CDE

(САПР фирмы Mentor Graphics); 2) Common Desktop Environment — коллективная среда настольных вычислительных средств.

41. Motif — Стандарт на графический интерфейс пользователя (ГИП, GUI) для ОС UNIX, рекомендуемый. Создан на базе систем DECWindows (DEC), Common XInterface (HP) и look and feel (Microsoft) жүйесінің базасында 1988 жылы шығарылды.

42. TCSEC (Trusted Computer (System) Security Evaluation Criteria) — BTCSEC изложены единые для МО США требования к обеспечению безопасности компьютерных систем и порядок определения их классов защищенности. TCSEC стандарты, Қызғылт сары кітап — МО США (Dod Computer Security Center) компьютерлік қауіпсіздік ортасынан шығарылған және 1983 жылдың 15 тамызында расталған құжат. TCSEC-та АҚШ МО үшін жалпыға бірдей компьютердің жүйелердің қауіпсіздігін қамтамасыз етуге талаптар және олардың қорғау класын анықтау реті берілген.

43. NEXT (near-end crosstalk) — перекрестные помехи на ближнем конце — жақын шетіндегі жабылмалы бөгеттер.

44. truecolor (= True Color) — точная (реалистичная) цветопередача — дәл (реалистік) түс жіберу

45. PNG (Portable Network Graphics) – переносимая сетевая графика, графический формат PNG – алып жүруге болатын торлық кесте, график түрінде PNG қалып.

46. RGB (RedGreenBlue) — палитра «зеленый, красный, синий», основная палитра, используемая в программировании и компьютерной графике — «жасыл, қызыл, көк» палитра, бағдарламалауда және компьютерлік графикада қолданылатын негізгі палитра.

47. PCX-формат PCX, PCX-файл — распространенный формат графических файлов для цветных растровых изображений, разработанный корпорацией Zsoft для пакета Paintbrush. Изображение сжимается до 1:1,5. Максимальный размер файла 64 000 на 64 000 точках. Поддерживается подавляющим большинством графических редакторов — PCX форматы, PCXқұжаты Paintbrush пакетіне арнап шығарылған Zsoft корпорациясы түрлі түсті растрлық суреттер үшін таралған

графикалық құжаттардың форматы. Сурет 1:1,5 дейін сығылады. Құжаттың максимал мөлшері 64 000 нүктелерде 64 000. График түрінде редактордың басым көпшілігі қолданылады.

48. FF — 1) (form feed) — перевод страницы, прогон страницы; управляющий символ, используемый при печати на принтере для перехода к новой странице, код; 2) (flip-flops)-триггер — бетті аудару, беттер жолы; жаңа бетке өту үшін принтерде мөр қолданатын нышан бағдарлаушысы, код.

49. JPEG (Joint Photography Experts Group) — (произносится «джейпег») 1) объединенная группа экспертов в области фотографии; 2) разработанный данной группой метод сжатия изображений и соответствующий графический формат — 1) Фотосурет облысында сарапшылардың біріккен тобы; 3) осы топпен игерілген суреттердің қысу әдісі және соған байланысты график түрі

50. WYSIWYG («What You See! What You Get») — режим (принцип) WYSIWYG (произносится «визивиг») — «Что видишь, то и получаешь» — в текстовых процессорах и настольных издательских системах — режим полного графического соответствия печатного варианта изображению редактируемого документа на экране — тәртіп (қағида) — тәртіпке мәтіндік процессорларда және столға қоятын баспа жүйелердегі, қалқада редакцияланатын құжатқа суретке баспа вариантқа толық график түрінде сәйкестік тәртібі.

51. HTML (Hypertext Markup Language) — язык гипертекстовой разметки, язык разметки гипертекста, язык HTML — гипермәтіндік белгінің тілі, гипермәтіннің белгі тілі, HTML тілі

52. MathML= Mathematical Markup Language — Математический Markup Язык — Математикалық Markup тілі.

53. CSV(comma-separated values) — значения, разделенные запятыми; формат CSVформат файла, в котором значения данных разделены запятыми. Используется для импорта данных в электронные таблицы и БД. — Үтірлермен ажыратылған мән; мәндер үтірлермен ажыратылған файлдың CSV қалыбы қалып. Осы электрондық кестелерге импорт үшін қолданылады.

54. EBCDIC (extended Binary Coded Decimal interchange Code) — расширенный двоично-десятичный код обмена информацией – мәліметпен айырбастың ұлғаймалы екілік-ондық коды.

55. NT–1) (New Technology) «новая технология» (краткое название 32-разрядной ОС Windows NT корпорации Microsoft); 2) (Network Termination) окончное оборудование в сетях ISDN может быть двух типов: NT1и NT2. NT1 располагается между сетью ISDN и терминальным оборудованием, допуская подключение до 8 терминальных устройств — 1) «жаңа технология (Microsoft корпорациясының 32-разрядты ОС Windows NT қысқаша атауы); 2) Isdn желісіндегі шеткі жабдық екі түрлі болуы мүмкін: NT2 және NT1. NT1 8 терминал құрылымдарға дейін қосуға рұқсат ете отырып ISDN желісімен және терминал жабдықпен арасында орналасады.

56. ICL (incoming line) — 1) входящая линия; 2) входная шина-1) кіретін сызық; 2) кіретін шина.

57. COM–1) (Component Object Model) модель компонентных объектов Microsoft (стандартный механизм, включающий интерфейсы, с помощью которых одни объекты предоставляют свои сервисы другим, является основой многих объектных технологий, в том числе OLE и ActiveX); 2) (computer outpur microfilm) машинный микро фильм — 1) Microsoft Компоненттік объектердің үлгісі (Интерфейстер қосатын үйреншікті тетік, оның көмегімен бір объект басқа объектке өз сервистерін ұсынады); 3) Машина микрофильмі.

58. Extract-Transform-Load (ETL) — технология извлечения, преобразования и загрузки данных — шығару, өрнектеу және деректі жүктеу технологиясы.

59. Time-Division Multiplexing (TDM) — временное мультиплексирование (уплотнение)- уақытша мульти плекстеу (тығыздау).

60. ADSL (Asymmetrical Digital Subscriber Line, Asymmetrical DSL) — асиметричная цифровая обонентская линия, асиметричная DSL — асимметриялық сандық абоненттік желі, асимметриялық DSL.

61. HDLC (High-level Data Link Control) – высокоуровневое управление каналом передачи данных, протокол HDLC-ақпарат

тасымалдаушы арналарды жоғары дәрежеде басқару, HDLC протоколы.

62. Kbps (=kbps6 kbit/s) (kilobits per second) — килобит в секунду, кбит/килобит секундына, кбит/с.

63. IETF (internet Engineering Task Force) — целевая группа инженерной поддержки internet, комитет по инженерным вопросам (проблемам) internet-internet-ті инжинерлік қолдауға арналған мақсатты топ.

64. RFC (Reguests for comments RFCs) — «Рабочее предложение» (серия документов IETF, начатая в 1969 году и содержащая отчеты, проекты интернет-протоколов и связанную с ними информацию) — Жұмыс ұсынысы (IETF құжаттар топтамасы, бастауын 1969 ж алатын, интернет – хаттамалардың есептемелерін, жобаларын және солармен байланысты ақпараттарды құрайды.

БИБЛИОГРАФИЧЕСКИЙ СПИСОК

1. Jeremy Comfort. "English for the telecommunication industry" – Oxford University Press, 2000.
2. John Mac Evan. Basic English for computing – Oxford University Press, 2003.
3. Ломаченко Н. Л., Толмачёв А. Я. Computer Science. – Казань: Казанский университет, 2004.
4. Агабекян И. П., Коваленко П. И. "Английский язык для технических ВУЗ-ов" – Ростов на Дону, 2002.
5. Kevin Manton. "First insights into business Pre-Intermediate" – Pearson Education Limited, Longman, 2000.
6. Зайцева Л. П., Бух М. А. Микроэлектроника: настоящее и будущее. – М., 1980.
7. Infotech. English for computer users.
8. Кутькова А. С. Человек – компьютер – будущее. – М., 1987.
9. Michael Harris, David Mover, Anne Siczorsinska. Opportunities Upper-Intermediate – Pearson Education Limited, Longman, 2002.
10. Полякова Т. Ю. Английский язык для диалога с компьютером. – М.: Высшая школа, 1998.
11. Bruner, Jerome (editor). Learning about learning. – Washington, DC, United States Government Printing Office, 1966.
12. Caroll, John B. Language, Thought and Reality: Selected Writings of Benjamin Lee Whorff – Cambridge, MA: M.I.T. Press, 1956.
13. Fanselow, Jogh F. and Crymes, Ruth H (editors). Teachers of English to speakers of other languages. – Washington, DC.
14. Полякова Т. Ю., Синявская Е. В., Тынкова О. И. Английский язык для инженеров. – М.: Высшая школа, 2010.
15. Michael Harris, David Mover, Anne Siczorsinska. Opportunities Pre-Intermediate – Pearson Education Limited, Longman, 2006.
16. American Council of the Teaching of Foreign Languages (ACTEL), 1986.
17. Bateson, Gregory. Steps to an Ecology. – New York, 1982.
18. Berns, Margie S. Functional approaches to computer teaching, 2010.

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