Документ подписан простой электронной подписью
Информация о владельце:
ФИО: Локтионова Оксана Геннадьевна
Должность: проректор по учебной работе
Дата подписания: 08.09.2026 07:46:05
Уникальный программный ключ:
0b817ca911e6668abb13a5d426d39e5f1c11eabbf73e943df4a4851fda56d089

МИНОБРНАУКИ РОССИИ

Федеральное государственное бюджетное
образовательное учреждение высшего образования
«Юго-Западный государственный университет»
(ЮЗГУ)

Кафедра иностранных языков

УТВЕРЖДАЮ
Проректор по учебной работе
_____ О. Г. Локтионова
«___» _____ 2021г.

COMPUTER AND IT TECHNOLOGIES: HISTORY AND DEVELOPMENT

(PART I)

Методические указания для практических занятий и самостоятельной работы по дисциплине «Иностранный язык» для студентов специальностей 02.03.03, 09.03.01, 09.03.02, 09.03.03, 09.03.04, 10.03.01, 11.03.02, 11.03.03, 12.03.04, 10.05.02, 30.05.03

Курск 2021

УДК 378.147: 811.111

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Computer and IT Technologies: History and Development (Part I): методические указания для практических занятий и самостоятельной работы по дисциплине «Иностранный язык» для студентов специальностей 02.03.03, 09.03.01, 09.03.02, 09.03.03, 09.03.04, 10.03.01, 11.03.02, 11.03.03, 12.03.04, 10.05.02, 30.05.03 / Юго-Зап. гос. ун-т; сост.: В. В. Махова. – Курск, 2021. – 35 с.: – Библиогр.: с. 35.

Цель методических указаний сформировать у студентов базовый тезаурус и начальные навыки работы с профессионально-ориентированными текстами. Методические указания основаны на оригинальных материалах, задания ориентированы на активное обучение английскому языку и формирование понятийного аппарата по специальности.

Методические указания соответствуют требованиям ФГОС ВО дисциплины «Иностранный язык» по направлениям подготовки 02.03.03, 09.03.01, 09.03.02, 09.03.03, 09.03.04, 10.03.01, 11.03.02, 11.03.03, 12.03.04, 10.05.02, 30.05.03.

Методические указания предназначены преподавателям и студентам специальностей 02.03.03, 09.03.01, 09.03.02, 09.03.03, 09.03.04, 10.03.01, 11.03.02, 11.03.03, 12.03.04, 10.05.02, 30.05.03 очной и заочной форм обучения для практических занятий и самостоятельной работы по дисциплине «Иностранный язык» (английский).

Текст печатается в авторской редакции

Подписано в печать 30.08.21. Формат 60x84 1/16
Усл. печ. л. 2. Уч.-изд. л. 1,8. Тираж 100 экз. Заказ 1004. Бесплатно.
Юго-Западный государственный университет.
305040, г. Курск, ул. 50 лет Октября, 94.

UNIT I. COMPUTERS IN OUR EVERYDAY LIFE

I. Match these titles with the texts below.

Using computers in banks ☐
Computers in education ☐
Organizing the races using computer technology ☐
Controlling air traffic ☐

1. Computers can help students perform mathematical operations and solve difficult questions. They can be used to teach courses such as computer-aided design, language learning, programming, mathematics, etc.

PCs (personal computers) are also used for administrative purposes: for example, schools use databases and word processors to keep records of students, teachers and materials.

2. Race organizers and journalists rely on computers to provide them with the current positions of riders and teams in both the particular stages of the race and in the overall competition.

Workstations in the race buses provide the timing system and give up-to-the-minute timing information to TV stations. In the press room several PCs give real-time information on the state of the race. Computer databases are also used in the drug-detecting tests for competitors.

3. Computers store information about the amount of money held by each client and enable staff to access large databases and to carry out financial transactions at high speed. They also control the automatic cash dispensers which, by the use of a personal coded card, dispense money to clients.

4. Airline pilots use computers to help them control the plane. For example, monitors display data about fuel consumption and weather conditions.

In airport control towers, computers are used to manage radar systems and regulate air traffic.

On the ground, airlines are connected to travel agencies by computer. Travel agents use computers to find out about the availability of flights, prices, times, and many other details.

II. When you read texts like these, you don't always need to understand every word. But there are words which you can guess from the context. Look at these words. Are they nouns (*n*), verbs (*v*) or adjectives (*adj*)?

1 workstation	2 data	3 perform	4 automatic
5 monitor	6 financial	7 store	8 connected

III. In texts 1-4 (exercise I) find the words with the meanings given below, and match these words with their meanings.

a) information
b) execute (do)
c) connected with money
d) keep (save)
e) powerful computer usually connected to a network
f) linked
g) self-acting, mechanical
h) screen
i) massive
j) program used for text manipulation

IV. Look at text 1-4 again and discuss these questions.

1. How are/were computers used in your university?
2. What other areas of study would benefit from the introduction of computers?

V. Write a list of as many uses of the computer, or computer applications, as you can think of.

VI. Now read the text below and underline any applications that are not in your list.

What can computers do?

A computer is a device that can follow a set of instructions – or a program. Computers can follow any program written in the right code, and modern computers can run many, seemingly at the same time. They are the most versatile tools ever invented. A musician can create a music album with a computer without playing a note and then share it with the world at the touch of a button, while a tighter jet can make impossible turns thanks to computers.

Computers and microchips have become part of our everyday lives: we visit shops and offices which have been designed with the help of computers, we read magazines which have been produced on computer, and we pay bills prepared by computers. Just picking up a telephone and dialing a number involves the use of a sophisticated

computer system, as does making a flight reservation or bank transaction.

We encounter daily many computers that spring to life the instant they're switched on (e.g. calculators, the car's electronic ignition, the timer in the microwave, or the programmer inside the IV set), all of which use chip technology.

What makes your computer such a miraculous device? Each time you turn it on, it is a tabula rasa that, with appropriate hardware and software, is capable of doing anything you ask. It is a calculating machine that speeds up financial calculations. It is an electronic filing cabinet which manages large collections of data such as customers' lists, accounts, or inventories. It is a magical typewriter that allows you to type and print any kind of document − letters, memos or legal documents. It is a personal communicator that enables you to interact with other computers and with people around the world. If you like gadgets and electronic entertainment, you can even use your PC to relax with computer games.

Computers have changed the way we live, and in the future, they will change it in ways we cannot yet imagine.

Language work: Articles

Study these nouns:

a supermarket *technology* *a computer* *money*

Supermarket and *computer* are countable nouns. We say *a supermarket* and *supermarkets*.

Technology and *money* are uncountable nouns. They have no plural and you cannot use them with *a* or *an*.

Study this paragraph:

Computers have many uses.

In shops a computer scans the price of each item.

Then the computer calculates the total cost of all the items.

We use a plural noun with no article or an uncountable noun when we talk about things in general.

Computers have many uses. Information technology is popular.

We use *a/an* when we mention a countable noun for the first time.

In shops *a computer* scans the price of each item.

When we mention the same noun again, we use *the*

The computer calculates the total cost.

We use *the* with countable and uncountable nouns to refer to specific things.

The price of each item. *The* total *cost* of all the items.

VII. Here are some common nouns in computing. Divide them into countable and uncountable nouns.

1) capacity
2) data
3) device
4) disk
5) drive
6) memory
7) monitor
8) mouse
9) software
10) speed

VIII. Fill in the gaps with *a/an* or *the* where necessary.

The Walsh family have [1] … computer at home. Their son uses [2] … computer to help with [3] … homework and to play [4] … computer games. Their student daughter uses [5] … computer for [6] … projects and for [7] … email. All [8] … family use it to get [9] … information from [10] … Internet.

Help box

The Present Simple Passive is formed with

am/is/are + past participle/V_{III}, *e.g.:*

*1) This program **is written** in a special computer language.*

*2) Programs and data **are** usually **stored** on disks.*

Remember the word ***data*** takes a singular verb (3rd person sing.) when it refers to the information operated on in a computer program, *e.g.: The **data is** processed.*

IX. Look at the *HELP BOX* and then fill in the blanks in the sentences with the correct form of the verbs in brackets.

Example Houses ..... (design) with the help of computers.

*Houses **are designed** with the help of computers.*

1. Various terminals..... (connect) to this workstation.
2. A microcomputer..... (know) as PCs'.
3. Magazines ..... (typeset) by computers.
4. When a particular program is run, the data ..... (process) by the computer very rapidly.
5. A hard disk ..... (use) for thepermanent storage of information.
6. The drug-detecting test in the tour de France …… (support)by computers.
7. All the activities of the computer system ..... (coordinate) by the central processing unit.
8. In some modem systems information ..... (hold) in optical disks.

X. Match the places in *A* with the computer uses in *B*.

A	B
banks	control machines
factories	calculate the bill
homes	look after patients records and medicines
hospitals	Provide entertainment and information
shops	control our money

XI. Now fill in the gaps in this paragraph about computer uses.

Computers are now part of our everyday life. In shops they [1]…….. In factories they [2] ……. . In [3] …….. they look after patients records and medicines. When we have a bank account, a computer [4] …… . In our homes, computers [5] …….. .

XII. In pairs, choose one of the areas in the diagram below and discuss what computers can do in this area.

Useful words

Formula 1: racing car, car body, design, mechanical parts, electronic components, engine speed;

Entertainment: game, music, animated image, multimedia, encyclopedia;

Factories: machinery, robot, production line, computer-aided manufacturing software;

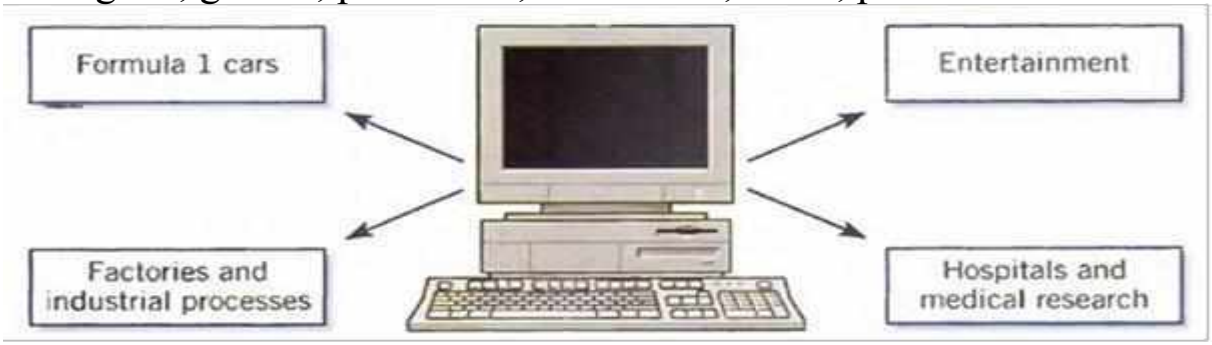
Hospitals: patients, medical personnel, database program, records, scanner, diagnose, disease, robot, surgery.

Useful constructions

Computers are used to ...

A PC can also be used for ...

Computers can help ..., make ..., control..., store ..., keep ..., provide ..., manage ..., give ..., perform ..., measure ..., test..., provide access to ... .



XIII. Now write a short paragraph summarizing your discussion.

Examples

In business, computers are used for financial planning, accounting and specific calculations.

In the office, computers are used to write letters and keep records of clients, suppliers and employees.

INTERESTING FACTS

1. Read the text quickly and say what this text is about.

For thousands of years, people have invented machines to simplify mathematical calculations. The abacus first appeared in Mesopotamia around 2700 B.C. Invented more than 4,000 years ago, the abacus is one of the oldest calculating devices. In some 19th-century Chinese abacus, beads represent specific numbers. The column on the extreme right stands for the number of ones in a number, the column to its left is tens, the next, hundreds, and so on. The user enters numbers by sliding the beads toward the crossbar. The abacus is used to represent numbers, and also to perform calculations including addition, subtraction, division, and multiplication.

The ancient Greeks built mechanical devices capable of solving particular mathematical problems and, by the 17th century, people were using craftsmanship, developed while building mechanical clocks, to make complicated calculating machines. For many centuries, these machines could do no more than give the answer to a particular equation.

In 1617, John Napier invented a set of square columns called Napier's bones. Each bone was divided into nine squares, with the top

9

square carrying a number between zero and nine. The squares below contained multiples of that number. Napier's bones helped perform multiplication and division. To multiply 548 by 5, for instance, a person would place these three bones on a board. The board had a column of nine squares on the left, marked 1-9. The user would then look at the squares on the bones that were next to the fifth position on the board. He or she would read the digits from left to right, adding the

digits within the slanting lines. In this case, the answer would read as 2,740.

In the 19th century, Charles Babbage came up with the idea of a machine that could do many kinds of calculation by following a whole series of instructions − which could be changed as required. In 1822, mathematician Charles Babbage built a prototype calculating machine. He used it to test out the working of a larger machine – Babbage's first Difference Engine − that he could not build due to a lack of funds. The engine used a system of gears to calculate tables of mathematical data.

British mathematician Alan Turing is regarded as the founder of computer science. He was key to refining the idea of an algorithm – a mathematical way of solving problems in a series of steps – and developing it into a system of rules for handling data in computers. Every computer program uses many algorithms to work. In the 1930s, Turing described how a device could read and change bits of data by following an algorithm. This 'Turing Machine', although only an idea, was able to show how computers might work.

In 1991, the London Science Museum followed Babbage's plans and built the second Difference Engine − which worked perfectly. Babbage also designed − but did not build − what is considered by many to be the first true computer. Babbage called this the Analytical Engine. As a result, he is often known as the father of computing.

2. Read the text again, find key words, then fill in the graph of the text for each device.

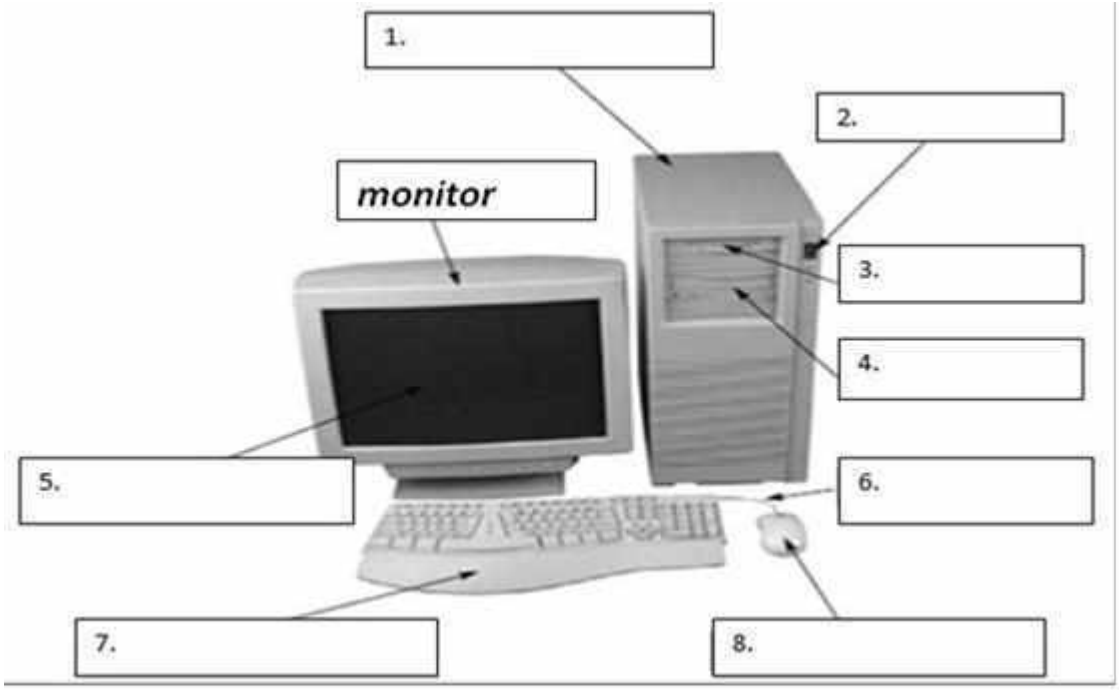
№	Period	Device	Characteristics	Use
1				
2				
3				
4				
5				
6				

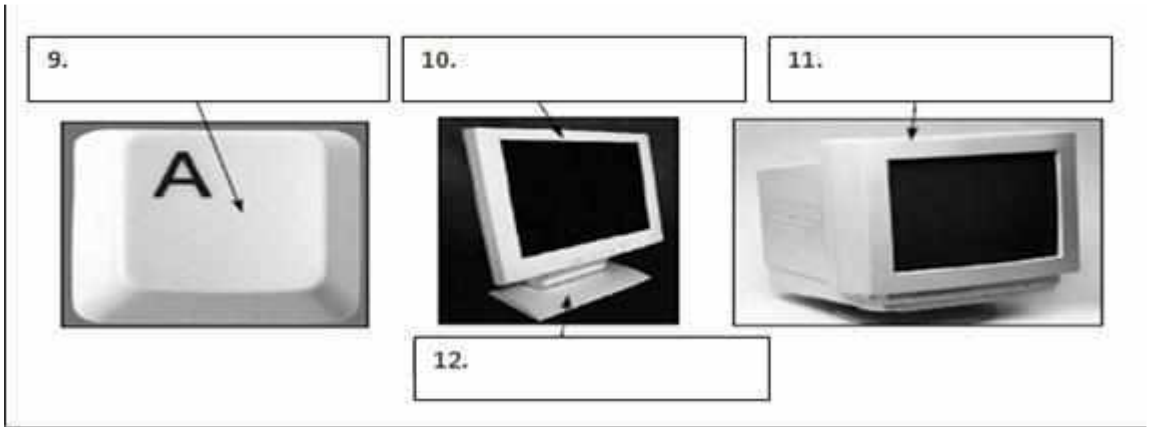
3. Retell the text using the graph.

TEST YOURSELF

1. The workstation. Fill in the boxes.

a) CD drive / DVD drive
b) CRT monitor
c) flat panel monitor
d) floppy disk drive
e) key
f) keyboard
g) mouse
h) power button
i) screen
j) stand
k) tower
l) wire/cable
m) monitor
h) power button





UNIT II. CONFIGURATION

I. **Answer the following questions.**

1. How can you describe a computer?
2. What are the main things in a computer?

II. Read the text and check your ideas.

What is a computer?

Computers are electronic machines which can accept data in a certain form, process the data and give the results of the processing in a specified format as information. Three basic steps are involved in the process. *First*, data is fed into the computer's memory. *Then,* when the program is run, the computer performs a set of instructions and processes the data. *Finally,* we can see the results (the output) on the screen or in printed form (see the diagram on the next page).

Information in the form of data and programs is known as ***software***, and the electronic and mechanical parts that make up a computer system are called ***hardware***. A standard computer system consists of three main sections: the central processing unit (CPU), the main memory and the peripherals.

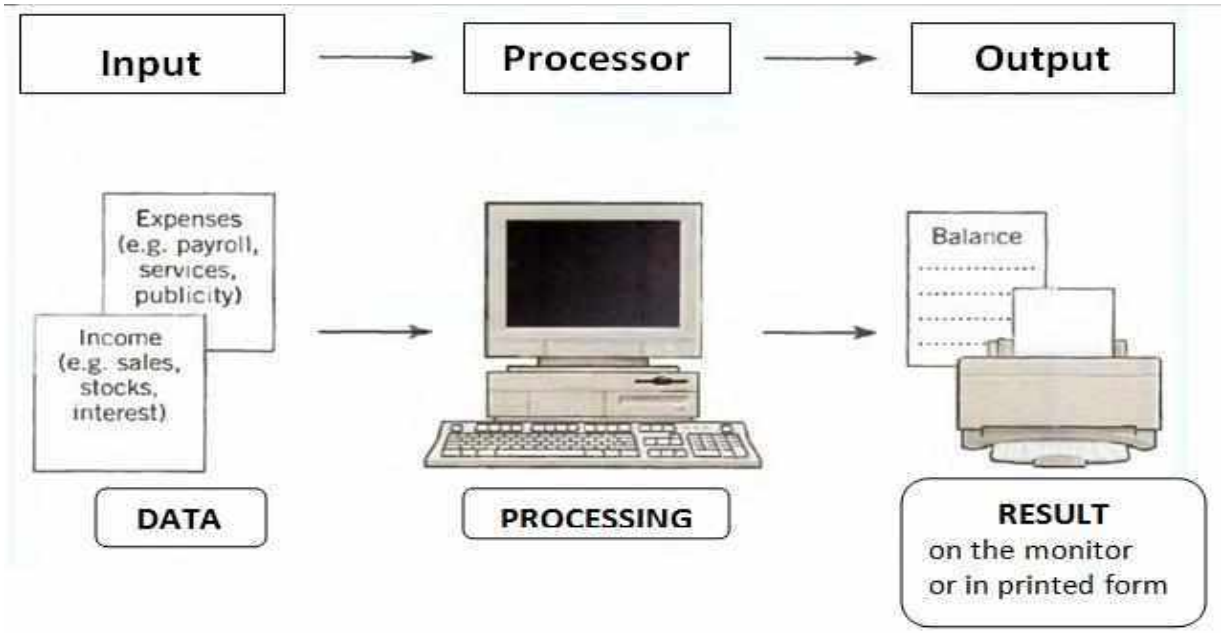
Perhaps the most influential component is the ***central processing unit***. Its function is to execute program instructions and coordinate the activities of all the other units. In a way, it is the 'brain' of the computer. The ***main memory*** holds the instructions and data which are currently being processed by the CPU. The ***peripherals*** are the physical units attached to the computer. They include storage devices and input/output devices.

Storage devices (floppy hard or optical disks) provide a permanent storage of both data and programs. ***Disk drives*** are used to handle one or more floppy disks. ***Input devices*** enable data to go into the computer's memory. The most common input devices are the ***mouse*** and the ***keyboard***. ***Output devices*** enable us to extract the finished product from the system. For example, the computer shows the output on the ***monitor*** or prints the results onto paper by means of a ***printer***.

On the rear panel of the computer there are several ports into which we can plug a wide range of peripherals − modems, fax machines, optical drives and scanners.

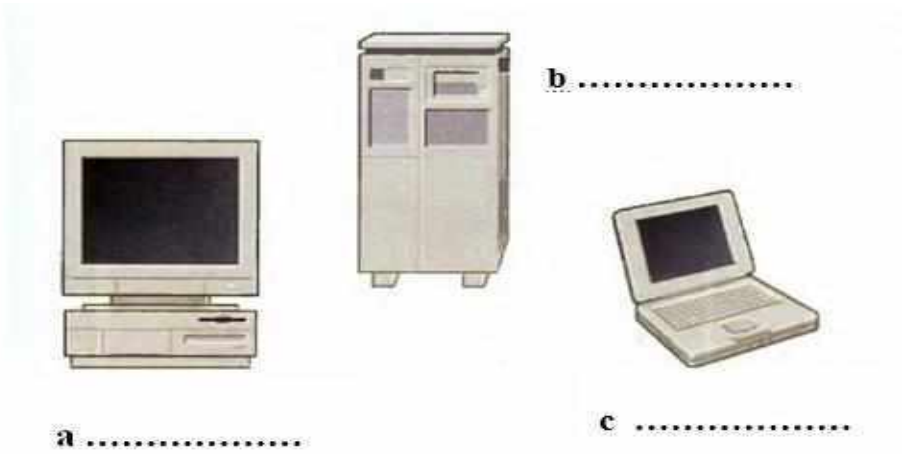
These are the main physical units of a computer system, generally known as the ***configuration***.

III. How can you describe this diagram?



IV. Label the pictures with the words in the box.

microcomputer (portable) microcomputer (desktop PC) mainframe



V. Study these details of different types of computers. Find the answers to these questions. Which type of computer is:

1) the most common?
2) small enough for a pocket?
3) the most common portable?
4) used by many people at the same time?
5) used like mainframes?
6) also called a handheld computer?
7) the most powerful?
8) not suitable for a lot of typing?

Types of computer	Notes
Mainframes	Large, powerful, expensive. Multi-user systems − used by many people at the same time. Used for processing very large amounts of data. The most powerful mainframes are called supercomputers.
Minicomputers	Used like mainframes. Not as big, powerful or expensive as mainframes. Less common now because microcomputers have improved.
Microcomputers or Personal computers (PCs)	The most common type of computer. Smaller, cheaper, and less powerful than mainframes and minicomputers.

Types of portable	Notes
Laptop	About the size of a small typewriter. Less common now because smaller and lighter portables are available.
Notebook	About the size of a piece of writing paper. The most common type of portable.
Subnotebook	Not quite as big as notebooks. Can fit into a jacket pocket.
Handheld or Palmtop	Small enough to fit into the palm of one hand. Not easy to type with because of their size. Often used as personal organizers.

VI. Complete the text below with the words in the box.

systems memory task terminals desktop CAD applications

The first microcomputers, also known as [1]..... PCs were for single users only, and this clearly distinguished them from minicomputers. Another important difference was that ‘minis’ were much more powerful than ‘micros’: they could execute more than one [2]..... simultaneously and were used as file servers for [3]..... and workstations. However, modern microcomputers have operating [4]..... and network facilities that can support many simultaneous users. Today, most personal computers have enough [5]..... to be used for word processing and business [6]..... . Some PCs can even handle multitasking and [7]..... applications. As a result, the division between ‘minis’ and ‘micros’ is now disappearing.

Language work: Comparison

Study this comparison of three types of computer:

	Mainframes	Minicomputers	Microcomputers
Size	+ + +	+ +	+
Power	+ + +	+ +	+
Cost	+ + +	+ +	+

We compare things using adjectives in two ways.

1 We can compare one type of computer with another.

Minicomputers are bigger than microcomputers.
Mainframes are more expensive than microcomputers.

For negative comparisons, we can say:

Microcomputers are not as big as minicomputers.
Microcomputers are not as powerful as mainframes.

2 We can compare mainframes to all other types of computer.

Mainframes are the biggest computers.
Mainframes are the most powerful computers.
Mainframes are the most expensive computers.

With short adjectives (big, small, fast), we add *-er* and *-est*: *faster, the fastest*

With longer adjectives (powerful, expensive), we use *more/less* and *the most/the least* before the adjective

more powerful, the most powerful.

Remember these two exceptions: *good − better − the best,*
bad − worse − the worst

VII. Choose the correct adjective. Then fill in the gaps with the correct form of the adjective.

1) *light/heavy* Laptops are [1]…….. than desktop computers, but [2]…… than notebooks.
2) *large/small* The mainframe is the [3]…… type of computer. A minicomputer is [4]…….. than a microcomputer.
3) *common/good* Personal computers are [5]…….. than mainframes but mainframes are [6]……..……. than personal computers at processing very large amounts of data.
4) *powerful/expensive* Minicomputers are [7]……... than mainframes but they are also [8]…… .
5) *fast/cheap* New computers are [9]……..…. and sometimes [10] ……..…. than older machines.

6) *powerful/expensive* Laptops are often [11]…….. than PCs but they are not as [12]…… .

VIII. Problem-solving. In pairs, decide what sort of computer is best for each of these users.

1. John Willring is a salesperson and he spends a lot of time visiting customers. He wants a computer to carry with him so he can access data about his customers and record his sales.
2. Pal Nye is a personnel officer. She needs a computer to keep staff records and to keep a diary of appointments. She also needs a computer for writing letters.
3. The University of the North needs a computer to look after its accounts, its network, the records of all students and stall, and to help with scientific research.
4. The James family want a computer for entertainment, writing letters, the Internet, and for calculating tax.

USEFUL FACTS

1. Read the text quickly and say what this text is about.

In the 1960s and 1970s, computers rapidly became smaller and cheaper, thanks to two key electronic developments – the integrated circuit and the microprocessor. Each spurred the growth of a whole new generation of computers. The shrinking sizes and falling prices of computers changed the way people viewed these machines. Eventually, they appeared in schools and in homes. Computers changed from mysterious machines used only in some offices and laboratories to devices that were familiar though still new and exciting.

The world's first integrated circuit (IC) was invented in 1958. It does the same job as a set of electronic components wired together, but in an IC, the parts are all built into the same unit and made of the same kind of material called a semiconductor. A single IC can contain many transistors. These circuits are tough, compact, reliable, and can be mass-produced. ICs led to the development of smaller and more powerful machines, sometimes known as third-generation computers. These included cheap, compact machines called minicomputers.

In the 1960s, minicomputers, such as the PDP-8, were developed as commercial computers. The first PDP-8s had individual transistors,

but later versions used ICs. The PDP-8 went on sale in 1965 and was carefully designed to cost as little as possible. Its efficient design, along with its smaller size, made it very successful compared to other computers of the time and more than 5,000 units were sold.

The Commodore Personal Electronic Transactor (PET) was introduced in 1977 and was one of several microcomputers that came to be used widely in offices. At the time, most newly purchased computers required both time and skill to be set up, but the PET was ready to use as soon as it was plugged in. Its separate numeric keypad was unusual for the time and made it easier to enter data for scientific and business applications. It also quickly became a popular computer for home and school use.

In 1981, the British Broadcasting Corporation (BBC) used a microcomputer in a TV series called ***The ComputerProgramme.*** Microcomputers were machines that used microprocessors and were part of the fourth generation of computers. Originally called the Acorn Proton, this computer was renamed the BBC Micro and was used in British schools in the 1980s. To display its output, users plugged it into a normal TV or specially made computer monitor (screen).

During the 1960s, ICs became miniaturized until hundreds of transistors fit on a single piece, or chip, of silicon. These compact ICs became known as microchips. In 1971, Intel released its 4004 chip that performed the functions of a computer's central processing unit and was called a microprocessor. By 2010, microprocessors were driving every computer and contained as many as 2 billion transistors.

After microprocessors, the next leap forward in computer miniaturization was the development of portable laptops, or notebooks. These were all-in-one systems that incorporated many components,

including the CPU, display, keyboard, and even speakers. The big challenge in developing laptops was to make screens that were small and light and that did not drain the batteries too quickly. The development of liquid crystal display (LCD) screens solved these problems. They use power very efficiently. The development of cheap and powerful laptops since the 1980s has given people the freedom to use computers almost anywhere.

2. **Read the text again, find key words, and then make a graph of the text.**
3. **Retell the text using the graph.**

TEST YOURSELF

1. Rearrange the letters to make things which can be part of a workstation.

tucmepor	*computer*
trirpen	*p*
nasecnr	*s*
kesd	*d*
hacir	*c*
nopelethe	*t*

2. Choose the suitable word or phrase.

1. The mouse moves on a _____.
   a) mouse mat **b)** mouse carpet **c)** mouse table
2. TV and computer screens are usually measured in _____.
   a) feet **b)** miles **c)** inches
3. Before you start work, _____ the height of your chair.
   a) adjust **b)** change **c)** rearrange
4. To get sound from your computer, plug in a pair of _____.
   a) loudhailers **b)** loudspeakers **c)** loud voices
5. The computer is connected to the telephone line via a _____.
   a) module **b)** modem **c)** mod
6. You can increase the functions or performance of a computer with an _____.
   a) extension card **b)** exploding card **c)** expansion card
7. Mobile phones and PDAs can communicate with PCs via _____.
   a) Bluebeard ®**b)** Blueberry ®**c)** Bluetooth ®

8. There's a spare _____ in the workstation…
   a) electric hole **b)** power point **c)** electrical opening
9. … so you can plug in your mobile phone _____.
   a) charger **b)** power **c)** electrification
10. SD cards can be read in a computer's _____.
   a) storage reader **b)** memory reader **c)** card reader

3. Use the terms the box and match them with the appropriate explanation or definition below.

a software **b** peripheral devices **c** monitor **d** floppy disk
e hardware **f** input **g** port **h** output **i** central processing unit

1. The brain of the computer ☐
2. Physical parts that make up a computer system ☐
3. Programs which can be used on a particular computer system ☐
4. The information which is presented to the computer ☐
5. Results produced by a computer ☐
6. Hardware equipment attached to the CPU ☐
7. Visual display unit ☐
8. Small device used to store information. Same as 'diskette' ☐
9. Any socket or channel in a computer system into which an input/output device may be connected ☐

UNIT III. INSIDE A COMPUTER

I. Read the advertisement and translate the technical specifications into your own language.

Ulysses 2001

✓ *Intel 500 MHz Pentium III microprocessor*
✓ *64 megabytes of RAM, upgradable to 768*
✓ *9 GB hard disk*
✓ *Comes with Microsoft Windows*

Try to answer these questions.

1. What is the main function of a microprocessor?
2. What unit of frequency is used to measure processor speed?
3. What does RAM' stand for?

II. Read the text below. What is the main idea of the text?

What's inside a microcomputer?

The nerve centre of a microcomputer is the central processing unit or CPU. This unit is built into a single microprocessor chip – an integrated circuit − which executes program instructions and supervises the computer's overall operation. The unit consists of three main parts:

1) the **control unit**, which examines the instructions in the user's program, interprets each instruction and causes the circuits and the rest of the components − disk drives, monitor, etc. − to be activated to execute the functions specified;

2) the **arithmetic logic unit** (ALU), which performs mathematical calculations (+, −, etc.) and logical operations (and, or, etc.);

3) the **registers**, which are high-speed units of memory used to store and control information. One of these registers is the program counter (PC) which keeps track of the next instruction to be performed in the main memory. Another is the instruction register (IR) which holds the instruction that is currently being executed (see Fig. 1.)

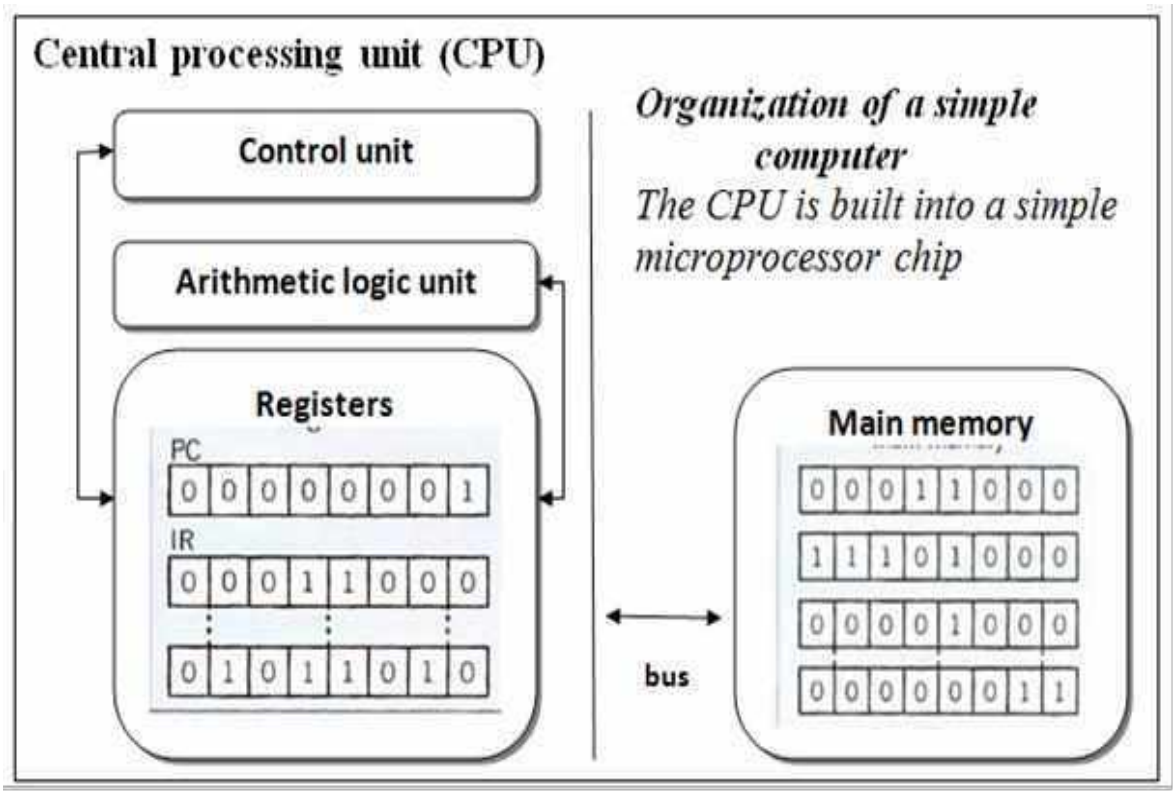


Figure 1

One area where microprocessors differ is in the amount of data − the number of bits − they can work with at a time. There are 8, 16, 32 and 64-bit processors. The computer's internal architecture is evolving so quickly that the new 64-bit processors are able to address 4 billion times more information than a 32-bit system.

The programs and data which pass through the central processor must be loaded into the **main memory** (also called the **internal memory**) in order to be processed Thus, when the user runs an application, the microprocessor looks for it on secondary storage devices (disks) and transfers a copy of the application into the RAM area. RAM (random access memory) is temporary, i.e. its information is lost when the computer is turned off. However, the ROM section (read only memory) is permanent and contains instructions needed by the processor.

Most of today's computers have internal **expansion slots** that allow users to install adapters or expansion boards. Popular adapters include high-resolution graphics boards, memory expansion boards, and internal modems.

The power and performance of a computer is partly determined by the speed of its microprocessor. A **clock** provides pulses at fixed intervals to measure and synchronize circuits and units. The clock speed is measured in MHz (megahertz) and refers to the frequency at which pulses are emitted. For example, a CPU running at 500 MHz (500 million cycles per second) is likely to provide a very fast processing rate and will enable the computer to handle the most demanding applications.

Figure 2

The new generation of processors

Figure 2 shows the 600 MHz Alpha microprocessor from Digital, with a 64-bit RISC implementation (Reduced Instruction Set Computing) architecture, providing lightning-fast performance.

Other popular platforms are Intel s Pentium, Apple, IBM and Motorola's PowerPC, Sun's SuperSPARC, Silicon Graphics/Mips R10000 and R5000.

III. Decide if the sentences are true (T) or false (F), and rewrite the false ones to make them true.

1. The CPU directs and coordinates the activities taking place within the computer system. ☐
2. The arithmetic logic unit performs calculations on the data. ☐
3. 32-bit processors can handle more information than 64-bit processors. ☐
4. A chip is an electronic device composed of silicon elements containing a set of integrated circuits. ☐
5. RAM, ROM and secondary storage are the components of the main memory. ☐
6. Information cannot be processed by the microprocessor if it is not loaded into the main memory. ☐
7. 'Permanent' storage of information is provided by RAM (random access memory). ☐
8. The speed of the microprocessor is measured in megahertz. One MHz is equivalent to one million cycles per second. ☐

Language work: Making instructions

Note how we make simple instructions in English.

Add the memory. Don't touch the contacts.

We can show the order of Instructions by numbering them (*1,2, 3, etc.*)or by using sequence words like these:

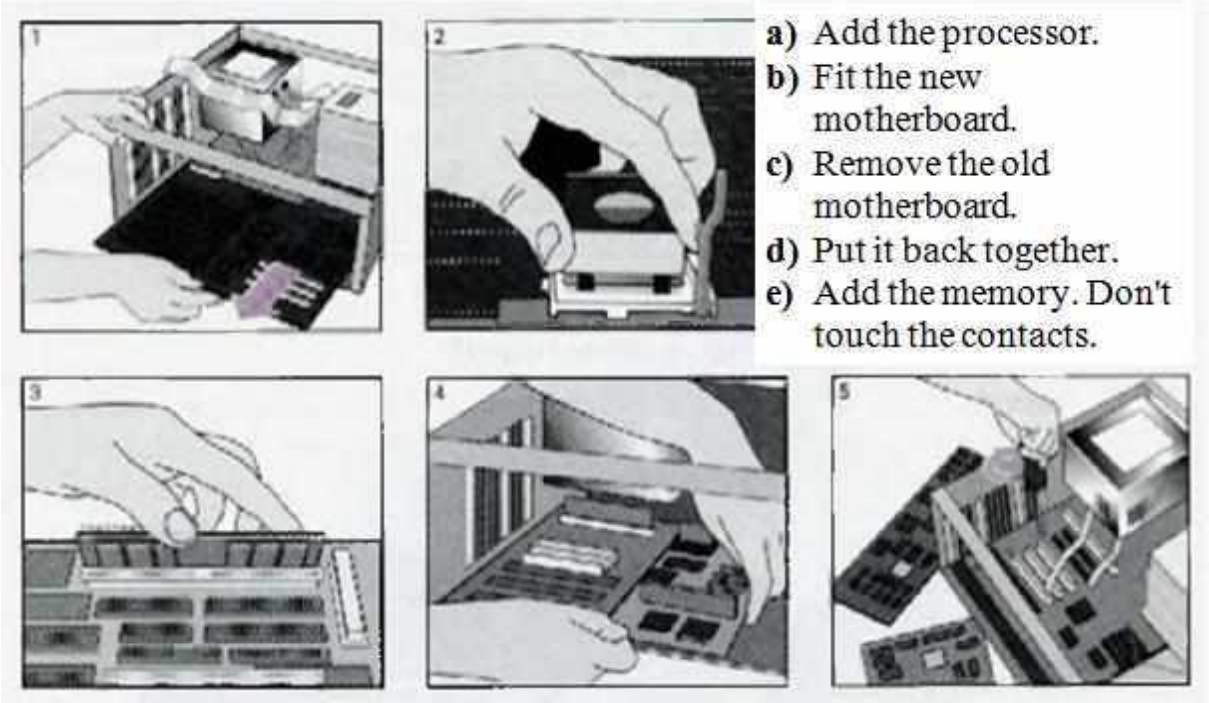
First, ... Then ... Next ... After that. ... Finally....

IV. Study these instructions for virus-checking a disk. Fill in the gaps with verbs from the list. Use *Don't* where appropriate.

click	exit	put	select	start

1. _____ the disk into the drive.
2. _____ the virus checking program.
3. _____ the drive to be checked.
4. _____ the Find button.
5. _____ the program until the check is complete.
6. _____ 'Yes' or 'No' for checking another disk.

V. Study these instructions for replacing the motherboard in a PC. Match the instructions to each picture using the table above. The pictures are in the correct order.



VI. Study these instructions for formatting a disk in Microsoft Windows. Write the instructions in the correct order (1—6), using sequence words. You will have to use one of the words more than once..

a) ☐ Select ‘OK’ to start formatting the disk.

b) ☐ Choose ‘Format’ from the drop-down menu.

c) ☐ Click the Start button.

d) [*1*] Put the disk into the driver.

e) ☐ Choose the formatting options you require.

f) ☐ Click the ‘OK’ button when formatting is complete.

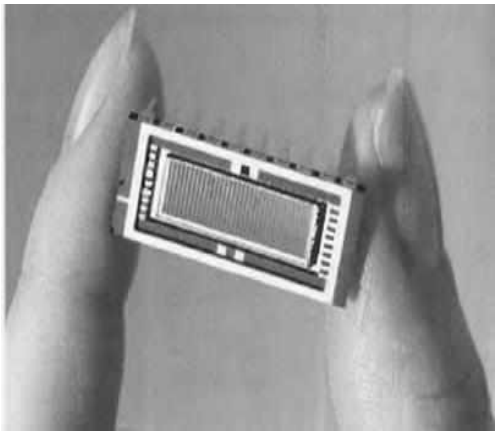
VII. Read the text and complete it with the phrases in the box.

a) All the information stored in the RAM is temporary
b) Microcomputers make use of two types of main memory
c) ROM chips have 'constant' information
d) the size of RAM is very important

Main Memory: RAM and ROM

The main memory of a computer is also called the 'immediate access store', as distinct from any storage memory available on disks. (1)..... : RAM and ROM, both contained in electronic chips connected to the main board of the computer.

RAM stands for 'random access memory' and is the working area of the computer, that is, the basic location where the microprocessor stores the required information. It is called 'random access' because the processor can find information in any cell or memory address with equal speed, instead of looking for the data in sequential order.



(2) .....,
so it is lost when the machine is turned off. Therefore, if we want to use this information later on, we have to save it and store it on a disk. When running an application, the microprocessor finds its location in the storage device (the floppy or hard disk) and transfers a temporary copy of the application to the RAM area. Consequently, (3)..... if we want to increase the performance of a computer when several applications are open at the same time or when a document is very complex.

The RAM capacity can sometimes be expanded by adding extra chips. These are usually contained in single in-line memory modules or SIMMs, which are installed in the motherboard of the computer.

We can designate a certain amount of RAM space as a **cache** in order to store information that an application uses repeatedly. A RAM cache may speed up our work, but it means that we need enough internal memory or a special cache card.

ROM is an acronym for 'read only memory, which implies that the processor can read and use the information stored in the ROM chip, but cannot put information into it. (4) ....., including instructions and routines for the basic operations of the CPU. These instructions are used to start up the computer, to read the information from the keyboard, to send characters to the screen, etc. They cannot be changed and are not erased when the power is turned off. For this reason, the ROM section is also referred to as **firmware**.

VIII. Answer these questions

1. What are the main parts of the CPU?
2. What is RAM?
3. What memory section is also known as 'firmware'?
4. What information is lost when the computer is switched off?
5. What is the typical unit used to measure RAM memory and storage memory?
6. What is the meaning of the acronym SIMM?
7. What is a megahertz?
8. What is the ALU? What does it do?
9. What is the abbreviation for 'binary digit'?
10. How can we store data and programs permanently?

Language work: *Help box*
Relative Clauses

We can define people or things with a restrictive (defining) clause.

We use the relative pronoun '**who**' because it refers to a person. We could also use '**that**'.

We use the relative pronoun '**which**' because it refers to a thing, not a person. We could also use 'that'.

- *The teacher **who** is responsible for the computer centre has just arrived.*
- *The microprocessor is a chip **which** processes the information provided by the software.*

Relative pronouns can be left out (∨) when they are not the subject of the relative clause.

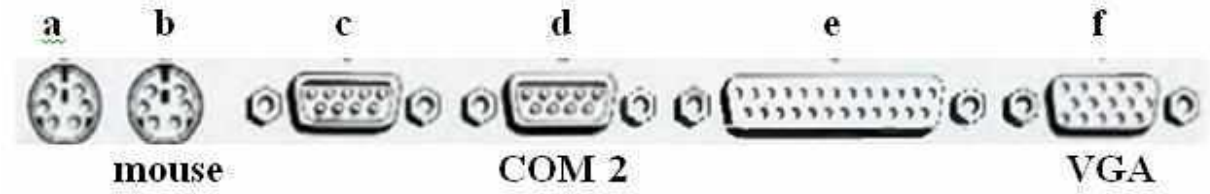
- *The computer ∨ we saw at the exhibition runs at 600 MHz.*

IX. Using the *Help box* complete the sentences below with suitable relative pronouns. Give alternative options if possible.

1. That's the CPU …… I'd like to buy.
2. The microprocessor is a chip …… processes data and instructions.
3. The microprocessor coordinates the activities …… take place in the computer system.
4. Last night I met someone …… works for GM as a computer programmer.
5. A co-processor is a silicon chip …… carries out mathematical operations at a very high speed. .
6. A megahertz is a unit of frequency ……. is used to measure processor speed.
7. Here's the floppy disk …… you lent me.

X. Problem-solving. Study these ports at the back of a desktop PC. With the help of the text below, match these labels to the correct ports.

1 keyboard	**2** COM 1	**3** parallel port	**4** video port	**5** serial ports



Desktop PC ports and connectors

External devices connect to ports at the back of the computer.

Different types of port are used for each device. Most computers have: 1 keyboard port, 1 video port, 2 serial ports, 1 parallel port.

Some also have a mouse port.

The mouse port and the keyboard port look exactly the same but they have labels to avoid confusion. If there is no mouse port, a serial mouse must be used. This connects with one of the serial ports. You can use the other one for a modem. The serial ports often have the labels COM 1 and COM 2.

The monitor connects to the video (VGA) port. The printer uses the larger parallel port.

USEFUL FACTS

1. **Read the text. What is the text about?**

Opening up a computer reveals a baffling array of electronic circuitry, but every computer has the same basic components. At the heart of the machine is the central processing unit (CPU), which controls most of its functions. In the 1970s, CPUs were first miniaturized onto a microchip called a microprocessor. Since that time, silicon-based chips also form the main memory of a computer-random access memory (RAM), which the CPU uses constantly when working. Computers also have long-term memory in the form of a storage device, such as a hard disk drive. Input and output devices allow interaction with the user, while a computer's sensitive electronics require a smooth and constant power supply.

All computers work in the same way. When a user feeds data into them by an input device, the central processing unit (CPU), often a microprocessor, stores it in the memory. A program running in the memory then sends instructions to the CPU, which retrieves the data, processes it according to these instructions, and sends the results back to the memory. When required, the CPU transfers the processed data back to the user via an output device.

The electronic components of a computer run on a lot of electrical power and so generate heat. These parts are made of circuits that are sensitive to changes in temperature, and if they get too hot, the parts stop working properly. Devices called heat sinks help to get rid of this heat. Heat sinks take the form of metal fans that radiate heat away from the electronic parts to the air. A fan installed in the computer speeds up the cooling process by forcing warm air away from the fins, helping cooler air take its place.

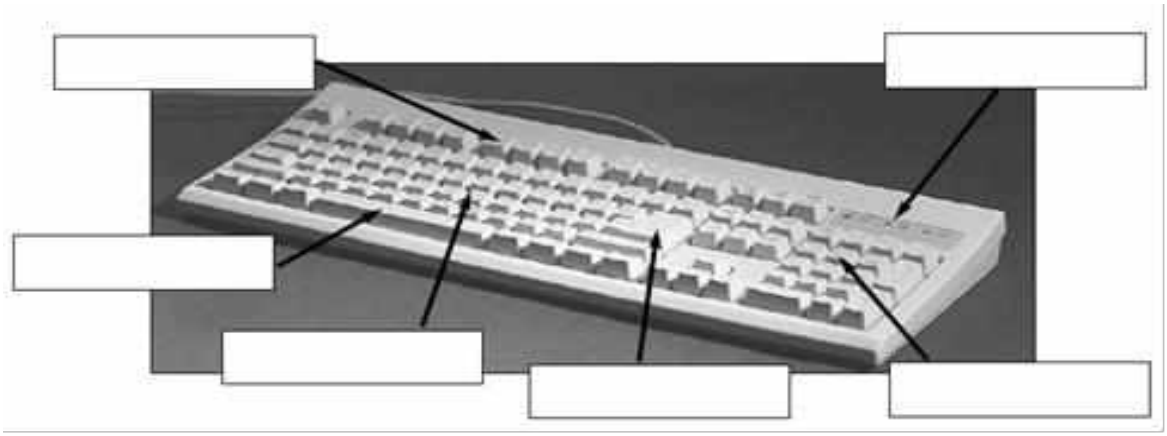
1. **Read the text again, find key words, and then make a graph of the text. Entitle the text.**

2. **Retell the text using the graph.**

TEST YOURSELF

1. The keyboard. Fill in empty boxes with the words below.

space bar alphabet keys calculator keys function keys return key (or enter key) indicator lights

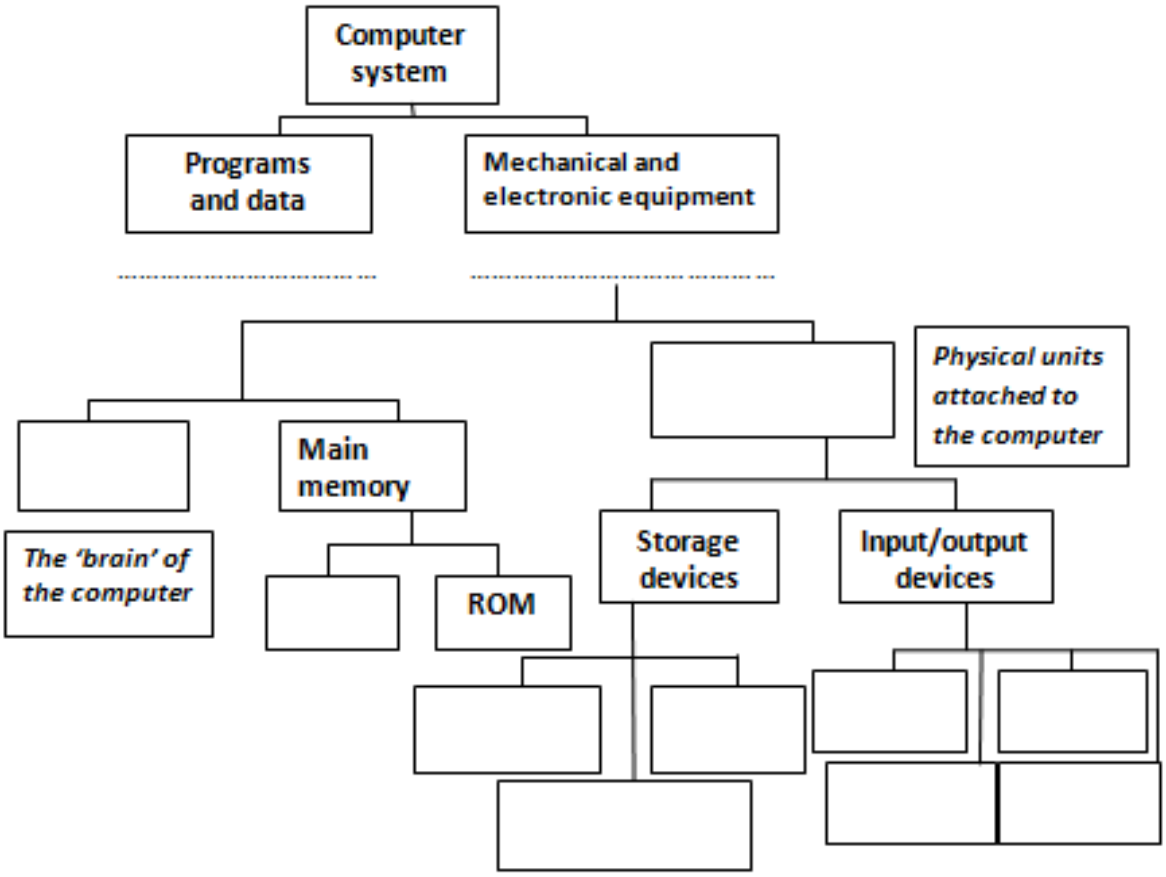


2. Finish the sentences with a suitable word or phrase.

shift key alt key control key escape key delete key tab key caps lock key backspace key standard keyboard ergonomic keyboard key in (or type in) enter data input

1. To go back one space, hit the _____.
2. To change to capital letters, press the _____.
3. To change the capital letters permanently, hit the _____.
4. To insert a tabulation, press the _____.
5. To activate the "Ctrl" functions, press the _____.
6. To activate the "alt" functions, hit the _____.
7. To stop the computer doing something, you can press the _____.
8. Select the text you want to remove, and hit the _____.
9. Please _____ your password.
10. It took me two hours to _____ all that text.
11. A keyboard is a _____ device.
12. Do you have a _____? No. I have a special _____. It's better for my arms and back.

3. Label this diagram with the correct terms.



UNIT IV. UNITS OF MEASUREMENT

I. Try to answer these questions.

1. How many digits does a binary system use? What is a 'bit'?

2. What is the difference between binary notation and the decimal system? Give some examples.

3. What is a collection of eight bits called?

4. One kilobyte (1K) equals 1.024 bytes *(kilo-:* one thousand, *mega-*: one million, *giga-*: one thousand million). Can you work out the value of these units?

1 megabyte = …… bytes = 1.024 kilobytes

1 gigabyte = ... bytes =1. 024 megabytes

5. What does the acronym 'ASCII' stand for? What is the purpose of this code?

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

Units of memory

Bits - basic units of memory

Information is processed and stored in computers as electrical signals. A computer contains thousands of electronic circuits connected by switches that can only be in one of two possible states: ON (the current is flowing through the wire) or OFF (the current is not flowing through the wire). To represent these two conditions we use **binary notation** in which 1 means ON and 0 means OFF. This is the only way a computer can 'understand' anything. Everything about computers is based upon this binary process. Each 1 or 0 is called a **binary digit** or **bit.**

Bytes and characters

1s and 0s are grouped into eight-digit codes that typically represent characters (letters, numbers and symbols). Eight bits together are called a byte. Thus, each character in a keyboard has its own arrangement of eight bits. For example. 01000001 for the letter A, 01000010 for B and 01000011 for C.

The ASCII code

The majority of computers use a standard system for the binary representation of characters. This is the American Standard Code for Information Interchange, known popularly as 'ASCII' (pronounced 'ask-key'). There are 256 different ways of combining 0 and 1 bits in a byte. So they can give us 256 different signals. However, the ASCII code only uses128 bytes to represent characters. The rest of the bytes are used for other purposes.

The first 32 codes are reserved for characters such as the Return key; Tab, Escape, etc. Each letter of the alphabet, and many symbols (such as punctuation marks), aswell as the ten numbers, have ASCII representations. What makes this system powerful is that these codes are standard.

Kilobytes, megabytes and gigabytes

In order to avoid astronomical figures and sums in the calculation of bytes, we use units such kilobytes, megabytes and gigabytes. One kilobyte is 1,024 bytes (2^{10}) and it is represented as KB or more

informally as K. One megabyte is equivalent to 1,024 KB, and one gigabyte is 1, 024 MB.

We use these units (KB, MB, GB) to describe the RAM memory, the storage capacity of disks and the size of any application or document.

Language work: Word building

The table gives some prefixes commonly used in computer science. Knowing the meaning of these prefixes will help you understand new words.

Prefix	*Meaning*	*Examples*
deci-	ten	decimal, decimalize, decibel
hexadeci-	sixteen	hexadecimal
kilo-	one thousand (1,000) (1,024 in binary: 2^{10})	kilocycle,kilogram(me), kilowatt
mega-	large; one million	megahertz, megalith, megaton
giga-	very large, one thousand million	gigantic, gigabyte
mini-	small	minibus, minimum, minimize
micro-	very small	microfilm, microphone, microwave
bi-	two	bidirectional, bidimensional, binary
tri-	three	tripartite, tricycle, trilingual
multi-	many	multi-racial,multi-user, multitasking
mono-	one	monologue, monosyllable, monolingual

III. Explain these expressions, taking into account the prefixes and root word.

Example: the binary system −*the binary system is a notation which uses two digits: 0 and 1.*

1) a minicomputer
2) a microcomputer
3) the decimal system
4) the hexadecimal system
5) a multi-user configuration
6) a bidimensional chessboard
7) a tricycle
8) a monochrome computer
9) a CPU with *64* MB of RAM
10) a document of 3 kilobytes

IV. Read the questions and the text, and study the diagrams.

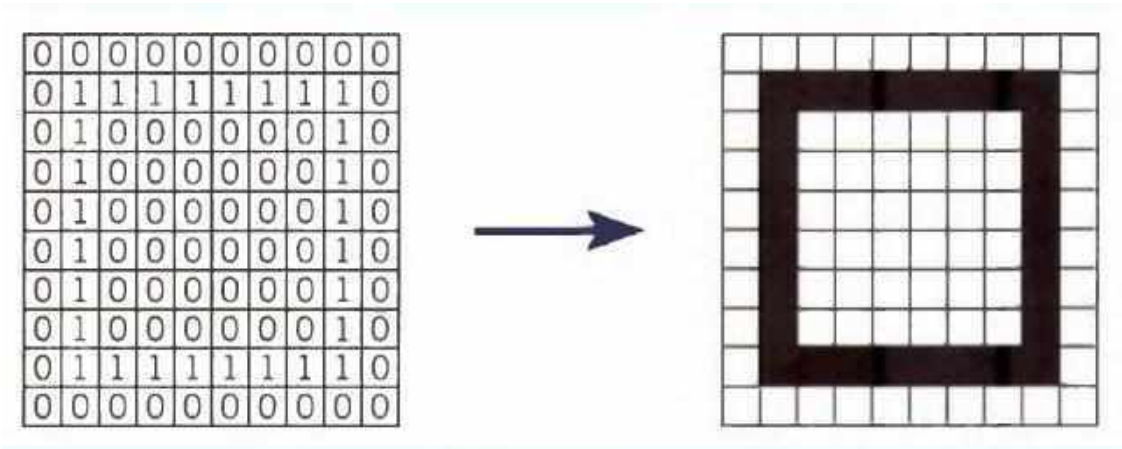
Did you know that ...

1) bits can also be used to code pictures?
2) the information displayed on the computer screen corresponds, dot by dot, with bits held in the main memory?
3) on colour systems, if you have 8 bits per primary colour, the palette of your computer can obtain 16.7 million colours?

Each tiny dot on the screen of a computer is called a picture element or pixel. Images and text are formed by combining a large number of **pixels**.

In a bit-mapped display, the dots displayed on the screen correspond, pixel by pixel, with bits in the main memory of the computer. The bits are held in an area of the memory called the 'refresh buffer' and are stored in groups that represent the horizontal and vertical position of the pixels on the screen and whether the pixels are on or off.

On monochrome systems, one bit in this map represents one pixel on the screen and can be either 'on' or 'off' (black or white).



Refresh buffer (memory) **Display**

On colour systems, each pixel is a certain combination of the three primary colours: red, green and blue. The total number of colours which can be shown on the screen is called the colour palette. The size of this palette depends on the graphics adaptor, a separate video card that converts the bits into visual signals. A graphics adaptor with 1 bit per primary colour can generate up to 8, or 2^3 colours, as you can see from the table below. A graphics adaptor with 8 bits per primary colour can generate 16.7 million or $(2^3)^8$ colours.

Colour	*Red*	*Green*	*Blue*
black	*0*	*0*	*0*
blue	*0*	*0*	*1*
green	*0*	*1*	*0*
cyan	*0*	*0*	*1*
red	*1*	*0*	*0*
magenta	*1*	*0*	*1*
yellow	*1*	*1*	*0*
white	*1*	*1*	*1*

One bit per primary colour

V. Using the information in the passage and the illustrations, match the terms in the box with the appropriate explanation or definition.

a pixel	**b** bit	**c** bit-mapped display
d primary colours		**e** palette

The menu of colours available on a graphics system; its size depends on the hardware. ☐

Red, green and blue (RGB) in computers ☐

The smallest element of a display surface ☐

A display on the screen which corresponds, pixel by pixel, with bits stored in memory cells. ☐

The acronym for binary digit'; one of the digits (0 and 1) used in binary notation. ☐

USEFUL FACTS

1. Read the text. What is the text about?

In the early years of computing, almost every machine was faster and more powerful than those that existed before. By the 1960s, people were building computers of many kinds, with characteristics that various users wanted cheapness, compactness, reliability, or high speed. From then on, the computers that were designed for the highest possible speeds became known as supercomputers. The phrase 'super computing'

was coined long before the first electronic computers were made: it was first used in 1929 by the *New York World* newspaper to describe tabulating machines made by IBM for Columbia University.

While ordinary CPUs process numbers one by one, supercomputers process data much faster by chopping up a big task into chunks of data to be processed at the same time. They usually do this in one of two ways − vector processing or distributed memory processing. Vector processors run their program on many chunks of data at once, applying each step of the program in sequence. In distributed memory processing, several PC-like machines called nodes work together on the same task, each node running a complete program on a larger chunk of data. They are coordinated via high-speed connections so that together they complete the whole task. Today, most supercomputers use distributed memory, whereas ultra-fast graphics chips use vector processing.

Unlike home computers, most supercomputers today are specially built for specific customers and are often designed to perform one particular task. These tasks almost always involve a great deal of number crunching-running complex mathematical calculations on enormous sets of data. Supercomputer speeds are measured in floating point operations per second (FLOPS). A floating point operation is a simple problem with decimals. Today's supercomputers have speeds of several petaFLOPS – one petaFLOP is 1 quadrillion FLOPS.

Engineers use supercomputers to design efficient cars. The computers predict how the shapes of the cars will affect the drag caused by the air that flows over them when they move. This helps engineers to understand how to reduce drag as much as possible, in order to cut fuel consumption.

2. **Read the text again, find key words, and then make a graph of the text. Entitle the text.**

3. **Retell the text using the graph.**

TEST YOURSELF

1. **Processor and memory. Fill in the gaps in the text with the words below.**

chips	dual core	megabytes	megahertz
motherboard	processor	speed	upgraded

The ‘brain’ of a computer is the [1]_____. Most of these are made by Intel and AMD, and are sometimes referred to as [2]‘_____’. The fastest processors are [3]_____, which means that there are two processors working together. The [4] _____ of a processor is measured in [5]_____, which is usually written as MHz.

A computer’s memory is measured in [6]_____. If a computer has 1,024 megabytes of memory, and the memory type is SDRAM, this is written as 1,024 MB SDRAM, and is pronounced ‘a thousand and twenty-four megabytes ess-dee-dram’.

The processor and memory modules are located on the [7]_____. Changing a computer’s processor is not generally practical, but the memory can usually be [8]_____.

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