

Л. В. ДУБОВЦЕВА

**COMPUTER SCIENCE AND
INFORMATION TECHNOLOGY.**

**ИНФОРМАТИКА И
ИНФОРМАЦИОННЫЕ ТЕХНОЛОГИИ
НА АНГЛИЙСКОМ ЯЗЫКЕ**

Учебное пособие

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ
РОССИЙСКОЙ ФЕДЕРАЦИИ

ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ
БЮДЖЕТНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ
ВЫСШЕГО ПРОФЕССИОНАЛЬНОГО ОБРАЗОВАНИЯ

«ВЯТСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ»

Гуманитарный факультет
Кафедра иностранных языков

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В издании содержатся специализированные тексты по
профессиональной тематике. Даются задания различных уровней
сложности на разные виды работы с текстами с целью извлечения
требуемой информации. Пособие предназначено для студентов,
изучающих дисциплину «Иностранный язык».

Тех. редактор А. В. Куликова

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ПРЕДИСЛОВИЕ

Данное пособие предназначено для студентов II курса всех направлений подготовки в сфере информационных технологий. Оно включает такие важные темы, как: структура компьютерной системы, типы периферийных устройств, универсальные вычислительные машины, миникомпьютеры, микрокомпьютеры, программное обеспечение, языки программирования, информационные системы и перспективы развития вычислительной техники в области информационных управленческих систем.

Основная цель данного пособия – познакомить обучающихся с различными областями использования специализированной лексики, научить работать со сложными текстами по специальности, а также сформировать базовые и специальные умения, необходимые для использования английского языка в профессиональных целях. Пособие отвечает принципу самодостаточности, содержит методические рекомендации по выполнению заданий и может стать базой для дальнейшего совершенствования указанных навыков.

Необходимость владения разными видами извлечения информации становится все более актуальной в настоящее время. Знание особенностей употребления специализированной терминологии является одним из основных требований современного этапа профессиональной деятельности будущих специалистов при работе в различных сферах производства и современных технологий. Умение быстро и корректно найти требуемые сведения из различных источников представляется неотъемлемой частью профессиональных навыков тех, кто непосредственно занят или часто сталкивается с поиском, извлечением и формулировкой новой полезной информации из иноязычных источников.

Предложенные в пособии тексты содержательны, насыщены сложными грамматическими конструкциями, незнакомой и нужной для студентов лексикой, достаточного объема, отвечают требованиям к овладению английским языком в профессиональной сфере на продвинутом этапе.

К текстам даются упражнения на выделение главной идеи, на поиск конкретной информации, на понимание, на установление контекстуальных связей, на закрепление новой лексики, на словообразование, на обработку извлеченной из текста информации.

В пособии имеется прилагаемый к каждому разделу словарь активной лексики и глоссарий с толкованиями терминов из профессиональной сферы указанных выше направлений подготовки.

SECTION 1

HARDWARE

UNIT 1

Computer System

[1] A computer can do very little until it is given some information. This is known as the **input** and usually consists of a program and some data. A **program** is a set of instructions, written in a special computer language, telling the computer what operations and processes have to be carried out and in what order they should be done. **Data**, however, is the particular information that has to be processed by the computer, e.g. numbers, names, measurements. Data brought out of the computer is known as the **output**. 5

[2] When a program is run, i.e. put into operation, the computer executes the program step by step to process the data. The same program can be used with different sets of data. Information in the form of programs and data is called **software**. 10

[3] The pieces of equipment making up the computer system are known as **hardware**. The most important item of hardware is the **CPU (Central Processing Unit)**. This is the electronic unit at the centre of the computer system. It contains the **processor** and the **main memory**. The processor is the brain of the computer. It does all the processing and controls all the other devices in the computer system. The main memory is the part of the computer where programs and data being used by the processor can be stored. However, it only stores information while the computer is switched on and it has a limited capacity. 15 20

[4] All the other devices in the computer system which can be connected to the CPU are known as **peripherals**. These include **input**

devices, output devices and storage devices. An input device is a peripheral which enables information to be fed into the computer. The most commonly used input device is a keyboard. An output device is a peripheral which enables information to be brought out of the computer, usually to display the processed data. The most commonly used output device is a specially adapted television known as a monitor or VDU (Visual Display Unit). Another common output device is a printer. This prints the output of the CPU onto paper.

[5] A storage device is a peripheral used for the permanent storage of information. It has a much greater capacity than the main memory and commonly uses discs as the storage medium. These are the main pieces of hardware of any computer system whether a small 'micro' or a large mainframe system.

Exercises

1. Main idea

Which statement best expresses the main idea of the text? Why did you eliminate the other choices?

1. Software is information in the form of programs and data.
2. Hardware is the pieces of equipment making up the computer system.
3. Two main parts of a computer system are hardware and software.
4. There are five parts in any computer system.

2. Contextual reference

Look back at the text and find out what the words in **bold** typeface refer to.

1. until **it** is given (1)
2. **This** is known as (2)
3. **they** should be done(5)

4. **It** does all the processing (17)
5. It has a limited capacity (21)
6. **These** include (23)
7. **This** prints (30)
8. **It** has a much greater capacity (33)

3. Understanding words

Often more than one term is used for the same component. Sometimes we can work out the meaning of these new terms by relating them to terms we already know. Try to link each of the terms in column A with one of the terms in column B. The first one is done for you.

A	B
1. <i>main store</i>	a. CPU
2. central processor	b. <i>main memory</i>
3. backing store	c. VDU
4. primary store	d. storage device
5. secondary store	
6. monitor	
7. internal memory	
8. external memory	
9. screen	

3. Understanding the concept

Try to think of a definition for each of these items before checking them in the Glossary. Then complete the following statements with the appropriate words. Make sure you use the correct form, i.e. singular or plural.

hardware	input	keyboard
software	output	central processor
	storage	

1. ... means the different types of equipment a computer consists of.
2. A computer's hardware comprises a ... which is the heart and brain of the computer.
3. ... and ... devices capable of putting information into a computer and getting it out of it are types of peripheral equipment.
4. The simplest and most common type of input device is a
5. ... means the programs needed to operate computer equipment.
6. Programs are kept on ... devices, which can store a large amount of information.

5. Content review

Match each component in Column A with its function from Column B.

A <i>COMPONENT</i>	B <i>FUNCTION</i>
1. Storage device	a. It displays the processed data.
2. Input device	b. It holds the programs and data being used by the processor.
3. Output device	c. It does all the processing and controls the peripherals.
4. Main memory	d. It allows data to be entered.
5. Processor	e. It provides permanent storage for programs and data.

6. Organizing information

On a separate sheet, organize the information in Unit 1, “Computer Systems”, under *main idea(s)*, *major details* and *minor details*.

UNIT 2

Input Devices

[1] Although the **keyboard** is the most commonly used input device, many other more specialized input devices can be connected to the computer. However, most of them can only be used with programs specially written to suit them. These specialized input devices can be divided into different types. 5

[2] Keypads and touch pads. A **numeric keypad** is a small keyboard with keys arranged like a calculator, allowing a lot of numerical data and calculations to be input easily. On most computers the keypad is part of the main keyboard, to the right of the alphanumeric keys. A **touchpad** has pictures or symbols which only have to be touched to input information. 10
This is particularly useful for people who find the keyboard difficult to use, e.g. young children. It is also useful in situations where only simple input is required.

[3] Cursor control devices. Some input devices are used to move the cursor around the screen. These include mice and joysticks. A **mouse** is a 15
small box with a ball underneath. When it is rolled in any direction across the surface of a desk, the cursor moves across the screen in the same direction. In this way the mouse can be used to point the cursor at special symbols on the screen. These special symbols are known as **icons**. They represent the processes that can be carried out by the program. By pointing 20
the cursor at the required icon and pressing a button on the mouse, the process is put into operation. Mice and icon programs are often used by businessmen, allowing them to control the computer easily while sitting at an office desk. To operate a **joystick**, the user grips and moves a vertical lever. The movement of the lever causes the cursor to move around the 25
screen. Pressing a button on the joystick puts the required process into

operation. Cursor movements can be made very quickly using this device, therefore it is often used for playing fast action games.

[4] Drawing devices. Input devices used for Computer-Aided Design include lightpens and graphics tablets. A **lightpen** is similar in shape to an ordinary pen. It is held against the screen and works by sending signals to the computer when it senses the light given off by the screen. This enables the computer to calculate the lightpen's position. As it is moved, lines are displayed on the screen. The special program used with the lightpen allows the lines to be increased or decreased in size or moved to different positions. In this way, it can be used to 'draw' directly on the screen. A **graphics tablet** has a flat board (or tablet) across which a pen is moved. By using the reflection of light, ultrasound, or other methods, the graphics tablet can measure the distance of the pen from the sides of the tablet and therefore calculate its position. As the pen is moved across the tablet, lines are displayed on the monitor screen. Detailed drawings can be copied by placing them on the tablet and tracing over them with the pen.

[5] Other input devices. A **voice recognition device** allows the user to input data by speaking into a microphone. The computer compares the input with the sound patterns of words stored in the memory. **Measuring devices** connected to a computer allow scientists to monitor processes by making frequent measurements and analyzing the results. The measurements are usually of analogue signals, i.e. signals which vary in continuous manner. Before they are fed into the computer, they must be changed into digital signals, i.e. into pulses of electricity which vary in steps. This is done by a component known as an Analogue to Digital Converter.

Exercises

1. Understanding the structure

Complete these sentences using the information from the text. Follow the model.

Drawings can be copied with a graphics tablet **by placing**
them on the tablet and **tracing** over them with a pen.

1. A mouse is used to select a process by
2. A graphics tablet calculates the position of the pen by
3. You can input information with a touchpad by
4. With a joystick the cursor is moved on the screen by
5. Using a lightpen, lines can be 'drawn' on the screen by

2. Understanding the concept

Solve these problems. What kind of input device would best suit each of these requirements?

- | | |
|--------------------|-----------------------------|
| a. numeric keypad | e. voice recognition device |
| b. graphics tablet | f. mouse |
| c. touchpad | g. lightpen |
| d. joystick | h. measuring device |

1. To input mathematical information.
2. To copy engineering drawings.
3. To guide a rocket in a computer game.
4. To help a busy manager to find a file quickly.
5. To help disabled people who cannot move their arms and legs.
6. To design new components without first making a large number of drawings.
7. To help young children learn to spell.

3. Word forms

We can use this form '*-ing*' to give information on the way things work. Choose the appropriate form of the words to complete the sentences.

1. recognizing, touching, transforming

- 1) Voice recognition devices work by ... human speech signals into electrical signals.
- 2) They are capable of ... simple spoken commands.
- 3) This allows disabled people to use computers without ... the controls.

2. pointing, transforming, pressing, allowing

- 1) A joystick works by ... movements of the stick into movements on the screen.
- 2) They are capable of ... simple spoken commands.
- 3) The stick can be moved in any direction ... the cursor to be moved quickly around the screen.
- 4) ... the cursor at the required icon on the screen and ... the button puts the process into operation.

4. Understanding words

Often more than one term is used for the same component. Sometimes we can work out the meaning of these new terms by relating them to terms we already know. Try to link each of the terms in column A with one of the terms in column B. The first one is done for you.

- | | |
|-------------------|--|
| 1. Numeric keypad | a. It is moved across the monitor screen. The user can 'draw' on the screen. |
| 2. Joystick | b. They recognize simple spoken commands. Disabled people can use computers without touching controls. |
| 3. Lightpen | c. It has keys like a calculator. Numerical data can be input easily. |

4. Voice recognition devices d. The lever can be moved in any direction. The cursor moves quickly about the screen.

5. Solving the problems

These are four types of marks which can be read directly by computer input devices. Match each of these methods to the type of a mark and then to its application.

<i>Mark</i>	<i>Method</i>	<i>Application</i>
1. Optical marks	1. MICR (Magnetic Ink Character Recognition)	1. Identify items of food in a supermarket.
2. Optical characters	2. Bar codes	2. Mark exam papers quickly.
3. Bar code	3. OCR (Optical Character Recognition)	3. Read checks for sorting codes and account numbers.
4. Magnetic ink characters	4. OMR (Optical Mark Recognition)	4. Read bills, passports, etc.

6. Organizing information

On a separate sheet, organize the information in Unit 2, “Input Devices”, under *main idea(s)*, *major details* and *minor details*.

UNIT 3

Output Devices

[1] The most commonly used output device is a **VDU** which has a screen for displaying information. This may be an ordinary television but a specially adapted television, known as a **monitor**, gives a much better quality display. To produce the display, the computer sends signals to separate sections of the screen, causing dots of light to appear in each section. These screen sections are called **pixels** (picture elements). If the computer divides the screen into a large number of small pixels, a very detailed, **high resolution** display is produced. This is suitable for displaying text and high quality graphics but uses up a lot of the computer's memory. The resolution of the display can be changed by changing the **screen mode** of the computer. 5 10

[2] Another common output device is a **printer**. This gives a **hardcopy printout**, i. e. the computer output is printed on paper. There are many different types of printers. To decide which one is most suitable for a particular application, factors such as cost, speed, noise of output and print quality have to be taken into consideration. **Impact printers** print by forcing a print head into contact with an inked ribbon and paper. **Non-impact printers**, on the other hand, give almost silent printing by using methods that do not require mechanical contact between the print head and the paper e.g. heat, electrostatics and lasers. 15 20

[3] A **thermal printer** is an example of an inexpensive non-impact printer. It uses heated wires to print characters on special heat sensitive paper and can have a print rate of about 80 cps. However, having to use special paper adds to the running costs and is often inconvenient. Another type of non-impact printer is an **ink-jet printer**. It operates by firing a fine spray of quick-drying ink at the paper. The ink jet is formed into the 25

required character by electrostatic fields. This type of printer is quite fast and can print at rates of up to about 400 cps.

[4] All the above types of printers are known as **character printers** because they only print one character at a time. They are also considered to be **slow printers** in computer terms. Mainframe computers need printers that are very fast. These **fast printers** include line printers and laser printers. These are only a few of the many types of printers available. The techniques used by these printers are constantly being improved. 30

[5] **Line printers** may be impact or non-impact types. Impact line printers have solid characters on a moving chain or rotating drum but non-impact line printers use electrostatics to form the ink into the shapes of the characters. Line printers print a line of text at a time and can have print rates of about 3,000 lines per minute (3,000 lpm). However, they are very expensive. **Laser printers** are extremely fast, printing a complete page at a time. They are non-impact printers which form an image on a light sensitive drum by scanning it with a laser beam. The image is then transferred to paper using special powdered ink. They can have a print rate of about 20,000 lpm but they are very expensive. 40

Exercises

1. Understanding words

Many terms used in computing consist of two nouns, for example, **lightpen**. The first noun describes the second noun in a number of ways. Study these examples.

- | | |
|--------------------|--|
| 1. lightpen | a pen which is sensitive to light |
| 2. bar code | a code which is made up of printed bars |
| 3. graphics tablet | a tablet which is used for drawing graphics |
| 4. drum plotter | a plotter which has a drum |

Try to define each of these terms in the same way.

1. touchpad
2. storage device
3. flatbed plotter
4. laser printer
5. colour monitor
6. impact printer
7. line printer
8. disc drive
9. voice recognition device
10. ink-jet printer

2. Classifying things

Study these facts about printers.

<i>Impact</i>	<i>Non-impact</i>
mechanical contact between print head and paper	no mechanical contact between print head and paper
noisy	silent
e.g. daisywheel	e.g. thermal

Note complete the blanks in the paragraph.

Printers **can be divided into** (1)... and (2)... printers. (3)... printers print by mechanical contact between print head and paper. **On the other hand**, (4)... printers do not require mechanical contact. (5)... printers are noisy, **whereas** (6)... printers are silent. The daisywheel printer **is an example of** an (7)... printer. **One type of** (8)... printer is a thermal printer.

3. Contrasting things

Another way to classify printers is by speed. Study these facts about fast and slow printers.

<i>Fast</i>	<i>Slow</i>
usually print a line or even a page at a time	print a character at a time
used with mainframe computers	used with microcomputers
very expensive	inexpensive
e.g. laser	e.g. daisywheel

Now complete the blanks in this paragraph:

Printers can also be (1)... into (2)... and slow printers. Fast printers (3)... , whereas (4)... print a character at a time. Fast printers are normally used with mainframes. On the other hand, (5)... with microcomputers. Fast printers are (6)... , whereas (7)... relatively inexpensive. One type of fast printer (8)... . The daisywheel printer (9)...

4. Comparing things

Study these facts about **plotters** which are used for printing high-quality, detailed graphics such as are required in Computer Aided Design.

<i>Plotters</i>	
drum plotter	flatbed plotters
paper is placed over a drum	paper is placed over a bed
the drum and pen movements are used to produce the drawing	only the pen is moved to produce the drawing
the drawing is produced in a series of small steps	the drawing is produced in a series of small steps
slow	slow

Use these facts to complete the blanks in this paragraph.

- 1) ... can be divided into ... and
- 2) In a ... paper is
- 3) On the other hand, in a ... paper is
- 4) ... in a ... , whereas ... in a
- 5) ... using both types of plotters.
- 6) Both ... and ... are ... plotters.

5. Organizing information

On a separate sheet, organize the information in Unit 3, “Output Devices”, under *main idea(s)*, *major details* and *minor details*.

REVIEW 1: HARDWARE

Type of activity: COMPREHENSION CHECK

The table below lists some of the input and output devices you have studied in this section.

Input device	Application
1. numeric keypad 2. mouse 3. lightpen 4. joystick 5. voice recognition device	
Output device	Application
6. high resolution monitor 7. low resolution monitor 8. ink-jet printer 9. laser printer 10. non-impact printer	

Add to the table the correct application for each device from this list.

- | | |
|----------------------------------|--|
| a. draw on the screen | f. play fast action games |
| b. control computers by speech | g. print text silently |
| c. display high-quality graphics | h. print text very quickly |
| d. input mathematical data | i. select a process easily from a menu |
| e. print text quite fast | j. display text and crude graphics |

TEXT 1

Type of activity: PREDICTING INFORMATION

Strategy:

- Try and check how accurately we can forecast the sentence following the given one. Choose the proceeding sentence from several choices.
- Then compare your passage with the original text (p. 23).

Computers

Many companies have now computerized their accounting procedures because computers can do the work more quickly and more accurately than people. ...

- a) The work the computer does is called data processing.
- b) When computers go wrong, it is usually because there is something wrong with the input.
- c) The mistake made by a person, not by the computer is called GIGO (Garbage In, Garbage Out).

... So the computers store information, find the right information and do calculating. The part of the computer that processes the data (information) is called the CPU (central processing unit). ...

- a) Information put into the computer from the keyboard is called input.
- b) You should attend computer classes if you can't use a computer.
- c) This contains only electronic components, called microchips.

... A computer can only do what it is instructed to do.

- a) The parts of the computer that most people use are called terminals.
- b) The instructions that are stored in a computer are called the computer program.
- c) You do not have to be a computer programmer to use a computer.

TEXT 2

Type of activity: EXTRACTING INFORMATION

Strategy:

- Read through the text quickly. Make sure you understood main ideas and details in each paragraph.
- Then fill each of the numbered blanks in the following passage according to the information given in the text. Use only one word in each space. In some cases more than one answer may be possible.
- When you think you know which word goes in each gap check that there is a relationship in meaning in your passage.

First Office Revolution: Word Processors

- A** Without most people realizing it, there was a revolution in office work a few decades ago. Before that time, it had been only the very large industries that could afford to use new technology. Large computers, or mainframes, were only used by rich companies that could afford the investment. With the advancement of technology, small computers came onto the market which were capable of doing the work which used to be done by much larger and more expensive mainframes, so then most smaller companies could use them.
- B** The main development in small computers was in the field of word processors, or WP's as they were often called. 40 % of British offices were estimated to have a word processor (or some kind of small computer, which was capable of word-processing) and this percentage was growing fast.
- C** A word processor was a small computer linked to a visual display unit, or VDU, a disk drive and a printer. The VDU looked like a television screen. It provided a 'window', or a way of reading the information stored

by the word processor on a floppy disk. This disk was plastic coated and looked rather like a single, or 45 rpm record. It was fed into a disk drive, which transmitted the information from the disk into the word processor as required. The printer provided 'hard copy', that was to say it printed out on paper the information stored. Most printers used daisy wheels. These were little plastic wheels with characters, or letters, on the end of spokes coming out of the central hub. As the daisy-wheel spun round from letter to letter, each word was printed at very high speed. You changed the kind of type simply by substituting a different daisy wheel. Other printers used dot matrix printers. These made up letters from single dots, but the quality of the printing was usually much worse than that produced by daisy wheels.

D Word processors were particularly well suited to the kind of routine work that had to be done in so many offices. For example, they could keep records in their memory. These could be updated by calling them up onto the screen and simply typing in additional information. If copies were needed, they could be printed out on request. As many copies of a standard letter as required could be printed out at any time and without supervision. This could happen outside office hours to free the machine either during the day or even while something else is being typed in. There were many advantages in using a word processor, therefore, for both secretary and manager. The secretary was freed from a lot of routine re-typing and filing. He or she could use this time to do other more interesting work for their boss. From a manager's point of view, secretarial time was being used more productively and doing routine jobs automatically outside office hours could save money. A word processor in full use was highly cost-effective.

E But was it all good? If a lot of routine secretarial work could be done automatically, surely this meant that fewer secretaries were needed. Another worry was the mounting evidence of medical problems related to work with VDU's. The incidence of cataracts among people using word

processor seemed to have risen dramatically. It was also feared that working at a VDU for long hours could cause miscarriages in the early months of pregnancy. Safety screen to put over a VDU had been invented but few companies in England bothered to buy them.

F Whatever the arguments for and against word-processor, they were a key feature of this revolution in office practice.

A few decades (1)... , (2)... many people realizing it, there was a quiet revolution going on in Britain's offices.

According to a survey, about 40% of offices were (3)... to have a word processor or some kind of small computer which was (4)... of word processing and this percentage was (5)... fast.

The WP, as they are often (6)... , freed secretaries from many of the routine (7)... which took up so much of their time.

This meant that the secretary could get on with other more (8)... work, but some bosses just saw it as a way of running their businesses with (9)... secretaries at all!

Trade union health and safety experts were also worried (10)... mounting evidence of medical problems (11)... to work with word processor.

The visual display unit, which looked (12)... a television screen, was blamed for the high incidence (13)... eye problems like cataracts (14)... people using word processors (15)... long hours.

There were also fears about possible miscarriages in the early months of (16)....

Safety screens were available to put (17)... VDU's, but very few companies seemed to (18)... bothered buying them.

Yet (19)... the arguments for and (20)... word processors, they were clearly there to stay.

TEXT 3

Type of activity: ORGANIZING INFORMATION

Strategy:

- Read the text quickly.
- Then find passages containing the main ideas but eliminate any details. Decide which details are more important than the others.
- When you think you know the structure of the text, organize the information in the following table under main ideas, major details and minor details.

Who's Afraid of The VDU?

New technology created problems as well as solved them.

A visual display unit was found in most industrial organizations. This new technology allowed staff to put information into a computer and extract it using a terminal. The information was put into the computer using a keyboard, similar to that of a typewriter, which was part of the terminal. The information or comments that were keyed in often appeared on an accompanying VDU screen where they could be checked before being fed into the computer for storage, requesting information, or transfer to another terminal.

Research into which staff used VDUs showed that manager was reluctant to use computer terminals with or without VDUs. According to Dutch researcher, Dr William Dijkhuis, aspects of the computer terminal might appear threatening to the manager for biological as well as psychological reasons. Managerial jobs rarely involved the use of more than one hand, whereas manual jobs often involved using both hands. Compare the raised hand of a policeman, judge, schoolmaster or chairman – as a symbol of authority – with the two hands needed for digging, sweeping and building. Because using the computer terminal required two hands, bosses apparently saw it as manual work.

On a more primitive level, movement and a bright color often indicated danger. Primitive people watched for movement in their surroundings and certain brightly-colored fruit, fungi and insects often proved dangerous. Of course, these factors would apply to all users of VDUs, which might account for the various complaints that they affected people's health.

Using a different-colored screen, which did not flicker, could eliminate the biological factors. The executive who disliked using both hands could use only one hand. Many did. But the main problem, according to Dr Dijkhuis, appeared to lie in the obvious similarity between computer and typewriter. This, said Dr Dijkhuis, was the most important reason for the boss's reluctance to use a keyboard. They did not feel that someone who had achieved a superior position in an organization should use a machine similar to that used by junior staff. There was an underlying worry amongst some managers that the new technology was simply enabling them to do secretarial work.

The only permanent solution, Dr Dijkhuis said, was to redesign the workstation to make it boss-compatible. That meant pens and not keyboards should operate new computers. Each machine should be programmed to recognize the handwriting and voice of its user. Many of the improvements he suggested were possible at the moment. Some were likely to be possible in the future but, meanwhile, if an executive really wanted to find out what was going on in his organization – it was back to the keyboard.

MAIN IDEAS:	MAJOR DETAILS:	MINOR DETAILS:
1. ...	1. ...	1. ...
2. ...	2. ...	2. ...

Computers

Many companies have now computerized their accounting procedures, because computers can do the work more quickly and more accurately than people. The work the computer does is called data processing. So the computers store information, find the right information and do calculating. The part of the computer that processes the data (information) is called the CPU (central processing unit). This contains only electronic components, called microchips. A computer can only do what it is instructed to do. The instructions that are stored in a computer are called the computer program.

Glossary

A

ADC – Analogue to Digital Converter – component which changes analogue signals into digital signals.

analog signal – signal which changes in a continuous manner.

B

backing store / secondary store / external memory – storage area outside of the CPU, i.e. storage device

bar code – series of black and white lines of varying thickness used to identify items.

bar code reader – input device used to read bar codes.

C

character printer – printer which prints one character at a time.

CPU – Central Processing Unit / central processor – the electronic 'brain' of the computer which mainly consists of the processor and the main memory.

cursor control device – input device used to move cursor around a VDU screen.

D

DAC – Digital to Analogue Converter – component which changes a digital signal into an analogue signal.

daisywheel printer – character impact printer which has solid characters positioned around a wheel.

data – particular information to be processed, e.g. names, numbers etc.

digital signal – signal which changes in steps, i.e. is made up of discrete pulses.

document reader – input device which can transfer information from a document to a computer directly.

dot-matrix printer – character impact printer which prints characters as a pattern of dots.

drum plotter – plotter which has a drum over which the paper is placed.

E

execute – carry out the program instructions step by step

F

fast printer – printer which prints a line or a page at a time.

flatbed plotter – plotter which has a flat board on which the paper is placed.

G

graphics tablet – input device used for copying drawings by tracing over them with a special pen.

H

hardcopy printout – computer output printed on paper.

hardware – pieces of equipment making up a computer system.

high resolution display – VDU screen display made up of small pixels giving very detailed graphics.

I

icon – symbol displayed on VDU screen to represent a process that can be carried out by a program.

impact printer – printer which operates by forcing a print-head into contact with an inked ribbon and paper.

ink-jet printer – printer which operates by spraying quick-drying ink onto paper.

input – information fed into a computer.

input – enter information into the CPU.

input device – piece of equipment which allows information to be fed into a computer in a form that can be understood by the CPU, e.g. keyboard.

J

joystick – cursor control input device with a vertical lever, used to move cursor quickly around screen.

K

keyboard – input device consisting of a large number of keys which emit coded electrical pulses when pressed.

L

laser printer – printer which operates using laser light to photocopy documents.

lightpen – pen-shaped input device which operates by sensing light. Can be used to 'draw' on VDU screen.

line printer – printer which prints a line at a time.

low resolution display – VDU screen display made up of large pixels giving crude graphics.

main memory – storage area in the CPU which holds the programs and data currently being used.

M

main store / primary store / internal memory -storage area inside the CPU, i.e. main memory.

magnetic ink character reader – document reader input device which can read characters printed with magnetic ink.

MICR – Magnetic Ink Character Recognition – reading of characters printed with magnetic ink to provide direct input for a computer.

monitor – specially adapted television which gives a good quality display of computer output.

mouse – small, box-shaped, cursor control input device with a ball underneath allowing it to be rolled across the top of a desk.

N

non-impact printer – printer which prints characters without forcing a printhead into contact with paper.

numeric keypad – small keyboard with keys arranged like a calculator, used to simplify the input of numerical data.

O

OCR – Optical Character Recognition – reading of special characters using the reflection of light to provide direct input for a computer.

OMR – Optical Mark Recognition – reading of special marks using the reflection of light to provide direct input for a computer.

optical character reader – document reader input device which reads characters directly by sensing reflection of light.

optical mark reader – document reader input device which reads marks on documents by sensing reflection of light.

output – bring information out of a computer.

output – information brought out of a computer.

output device – piece of equipment which displays the results of processing in a form which can be understood by humans.

P

peripheral – device connected to and controlled by the CPU, including input devices, output devices and storage devices.

pixel – picture element – the very small section of a VDU screen

plotter – output device used for printing detailed drawings.

printer – output device used for printing text and graphics on paper.

process – manipulate and carry out operations on data.

processor – part of a computer which does all the processing and controls all the other devices in the computer system, sometimes referred to as the CPU.

program – set of instructions telling the computer what to do.

R

run – execute a program line by line.

S

screen – display area of a monitor.

screen mode – computer setting which determines the way in which the computer will display text and graphics on a VDU screen.

software – computer information including programs and data.

slow printer – printer which cannot print any more than one character at a time.

storage device – piece of equipment which allows information to be stored permanently. Usually operates using magnetism, e.g. disc drive.

storage medium – material used for storing information, e.g. magnetic disc.

T

thermal printer – printer which forms characters by heating heat-sensitive paper.

touchpad – input device which only has to be touched to input data.

U

user – person who operates a small computer system or terminal.

V

VDU – Visual Display Unit – output device which displays computer output on a screen.

voice recognition device – input device which accepts input in the form of human speech.

SECTION 2

COMPUTERS

UNIT 4

Mainframes

[1] Large computer systems, or **mainframes**, as they are referred to in the field of computer science, are those computer systems found in **computer installations** processing immense amounts of data. These powerful computers make use of very high-speed main memories into which data and programs to be dealt with are transferred for rapid access. 5
These powerful machines have a larger repertoire of more complex instructions which can be executed more quickly. Whereas smaller computers may take several steps to perform a particular operation, a larger machine may accomplish the same thing with one instruction.

[2] These computers can be of two types: **digital** or **analog**. The 10
digital computer or general-purpose computer, as it is often known, makes up about 90 per cent of the large computers now in use. It gets its name because the data that are presented to it are made up of a code consisting of **digits** – single-character numbers. The digital computer is like a gigantic cash register in that it can do calculations in steps, one after another at 15
tremendous speed and with great accuracy. Digital computer **programming** is by far the most commonly used in **electronic data processing** for business or statistical purposes. The analog computer works something like a car speedometer, in that it continuously works out calculations. It is used essentially for problems involving measurements. It can simulate, or imitate 20
different measurements by electronic means. Both of these computer types – the digital and the analog – are made up of electronic components that may require a large room to accommodate them. At present, the digital

computer is capable of doing anything the analog once did. Moreover, it is easier to program and cheaper to operate. A new type of scientific computer system called the **hybrid computer** has now been produced that combines the two types into one. 25

[3] Really powerful computers continue to be bulky and require special provision for their housing, refrigeration systems, air filtration and power supplies. For a long time this was because much more space was taken up by the input/output devices – the magnetic tape and disk units and other peripheral equipment – than by the electronic components that did not make up the bulk of the machine in a powerful installation. The course of time brought great developments in the mechanical devices associated with computer systems as these had been the weak link, from the point of view of both efficiency and reliability. The power consumption of powerful computers is also quite high, not to mention the price that runs into hundreds of thousands of dollars. 30 35

Exercises

1. Main idea

Which statement best expresses the main idea of the text? Why did you eliminate the other choices?

1. Hybrid computers are a combination of digital and analog computers.
2. Digital computers are used more than any other type of computer.
3. There are three types of mainframes.
4. Analog computers can do more varied work than digital or hybrid computers.

2. Understanding the passage

Decide whether the following sentences are true or false (T/F) by referring to the information in the text. Then make the necessary changes so that the false statements become true.

1. A mainframe is the type of computer that can sit on top of a desk.
2. Mainframes are very powerful and can execute jobs very rapidly and easily.
3. Digital computers are used more than analog computers.
4. The analog computer is far smaller than a digital computer and therefore occupies very little space.
5. The hybrid computer is a combination of both the digital and the analog computer.
6. The analog computer does its calculations one step at a time.
7. The digital computer continuously works out calculations.
8. Mainframes were huge powerful machines whose peripheral equipment took up a lot of space.
9. Mainframes are expensive to buy and to operate.
10. Mainframe technology has reached the end of the road. No further development is needed.

3. Locating information

Find the passages in the text where the following ideas are expressed. Give the line references.

1. Smaller computers may take longer to perform an operation.
2. More technological development was necessary in the mechanical devices associated with computer systems.
3. Mainframes can operate quickly and execute more complex instructions.
4. The hybrid computer is a combination of both digital and analog computers.
5. Digital computers are used more than analog computers.

6. Mainframes are large powerful computers.
7. An analog computer is comparable to a car speedometer in the way it operates.
8. Digital computers do calculations, one after another, quickly and exactly.

4. Contextual reference

Look back at the text and find out what the words in **bold** typeface refer to.

1. **which** can be executed (7)
2. as **it** is often known (11)
3. **that** are presented to it (13)
4. in that **it** can do calculations (15)
5. in that **it** continuously works out (19)
6. **Both** of these computer types (21)
7. **that** may require a large room (23)
8. **that** combines the two types (26)
9. require special provision for **their** housing (29)
10. **that** runs into thousands of dollars (37)

5. Understanding words

Refer back to the text and find synonyms for the following words.

1. area (2)
2. acted on (7)
3. do (9)
4. composed of (13)
5. principally (20)

Now refer back to the text and find antonyms for the following words.

6. ignored (5)
7. seldom (11)

8. little (14)
9. small (28)
10. weak (35)

6. Word forms

First choose the appropriate form of the words to complete the sentences. Then check the differences of meaning in your dictionary.

1. permission, permit, permissible, permitted

1. It is usually not ... to smoke in a computer installation.
2. Computers ... people to use their time more effectively.
3. Building ... is usually required before starting any renovations to a building for a computer department.

2. continuation, continue, continuing, continuously

1. If microcomputer sales ... to increase, it won't be long before every household has one.
2. Computers can do repetitive operations ... without getting bored.
3. There is a ... interest in discovering new areas where computers can be used.

3. measurement, measure, measured, measurable

1. The analog computer is essentially used for problems involving
2. Because computer equipment is often bulky, the area used for a computer installation must be ... out carefully.
3. The number of employees a computer company has can be seen as a ... of its success in the business world.

4. association, associate, associated

1. Computers are ... with speed and accuracy.
2. There are many computer ... around the world to which computer professionals belong.

3. Business ... in different cities often communicate with each other via their computers.

5. efficiency, efficient, efficiently

1. Using a hand calculator to do simple mathematics is an ... way of working.
2. Computers can solve problems faster and more ... than humans.
3. ... is important in any service industry.

7. Content review

Try to think of a definition for each of these items before checking them in the Glossary. Then complete the following statements with the appropriate words. (Some can be used more than once.) Make sure you use the correct form, i.e. singular or plural.

mainframe	computer installation	digit
hybrid computer	code	programming
digital	analog	C++

1. The system is a computer which has combined the features of both the ... and ... computer. It is used mainly in scientific research.
2. ... computers get their name from the word These are single character numbers that make up the ... in which the data are presented to the computer for processing.
3. ... are usually found in large
4. The most commonly used language of ... in the business community is

8. Organizing information

On a separate sheet, organize the information in Unit 4, “Mainframes”, under *main idea(s)*, *major details* and *minor details*.

UNIT 5

Minicomputers

[1] Until the mid-1960s, digital computers were powerful, physically large and expensive. What was really needed though, were computers of less power, a smaller memory capacity and without such a large array of peripheral equipment. This need was partially satisfied by the rapid improvement in performance of the semi-conductor devices (transistors), and their incredible reduction in size, cost and power; all of which led to the development of the **minicomputer** or **mini** for short. Although there was no exact definition of a minicomputer, it was generally understood to refer to a computer whose mainframe was physically small, had a fixed word length between 8 and 32 **bits** and cost less than U.S. \$100,000 for the central processor. In the early days the amount of **primary storage** available optionally in minicomputer systems ranged from 32 to 512 Kb; however, some systems allowed this memory to be expanded even further. 5 10

[2] A large number of peripherals were developed especially for use in systems built around minicomputers; they were sometimes referred to as mini-peripherals. These included magnetic tape cartridges and cassettes, small disk units and a large variety of printers and consoles. 15

[3] Many minicomputers are used merely for a fixed application and run only a single program. This is changed only when necessary either to correct errors or when a change in the design of the system is introduced. Since the operating environment for most minis is far less varied and complex than large mainframes, it goes without saying that the software and peripheral requirements differ greatly from those of a computer which runs several hundred ever-changing jobs a day. The operating systems of minis also usually provide system access to either a single user or to a limited number of users at a time. 20 25

[4] Since many minis are employed in **real-time processing**, they are usually provided with operating systems that are specialized for this purpose. For example, most minis have an **interrupt feature** which allows a program to be interrupted when they receive a special signal indicating 30 that any one of a number of external events, to which they are preprogrammed to respond, has occurred. When the interrupt occurs, the computer stores enough information about the job in process to resume operation after it has responded to the interruption. Because minicomputer systems have been used so often in **real-time applications**, other aspects of 35 their design have changed; that is, they usually possess the hardware capability to be connected directly to a large variety of measurement instruments, to analog and digital converters, to **microprocessors**, and ultimately, to an even larger mainframe in order to analyze the collected data. 40

Exercises

1. Main idea

Which statement best expresses the main idea of the text? Why did you eliminate the other choices?

1. Minicomputers are not as effective as mainframes.
2. Minicomputers are as useful as mainframes.
3. Minicomputers are not as big and expensive as mainframes.
4. Minicomputers will not be of any use in the future.

2. Understanding the passage

Indicate whether the following ideas are stated or not stated (S/NS) in the text.

1. The rapid development of transistors led to the development of minicomputers.

2. A minicomputer is said to be very much the same as a mainframe.
3. Special peripheral devices were developed to go with minicomputers.
4. Minicomputers can understand more than one computer language.
5. Mainframe operating systems usually provide access to a number of users at the same time.
6. Minicomputers have specialized features because of the operations they execute.
7. Minicomputers can be connected directly to various types of devices.
8. Microcomputers were developed after mainframes.
9. Minicomputers will be more popular in the future than mainframes.
10. Operating minicomputers cost less than operating mainframes.

3. Locating information

Find the passages in the text where the following ideas are expressed. Give the line references.

1. Various peripherals were developed to go with minicomputers.
2. Minicomputers were developed after the mid-1960s.
3. Minicomputers have special built-in features that enable them to store information while responding to another operation.
4. The improved performance of transistors led to the development of minicomputers.
5. Minicomputers can be hooked up to larger mainframes if need be.
6. Minicomputers are usually used for single-purpose jobs.
7. Minicomputers are similar to mainframes except that they are smaller.
8. Fewer people can use minicomputers at one time than mainframes.

4. Contextual reference

Look back at the text and find out what the words in **bold** typeface refer to.

1. **This** need was partially satisfied (4)

2. **their** incredible reduction in size (6)
3. **they** were sometimes referred to (15)
4. **This** is changed only when necessary (19)
5. differ greatly from **those** of a computer (23)
6. **they** are usually provided with (27)
7. when **they** receive a special signal (30)
8. to **which** they are preprogrammed (31)
9. other aspects of **their** design (36)
10. **they** usually possess the hardware (36)

5. Understanding words

Refer back to the text and find synonyms for the following words.

1. range (3)
2. unbelievable (6)
3. purpose (18)
4. continue (33)
5. forms (35)

Now refer back to the text and find antonyms for the following words.

6. reduced (13)
7. non-specific (18)
8. unalterable (24)
9. not used (27)
10. not happened (32)

6. Word forms

First choose the appropriate form of the words to complete the sentences. Then check the differences of meaning in your dictionary.

1. power, powerful, powerfully, powerless, powered

1. There are many ways of producing
2. Battery ... calculators occupy less space than their predecessors.
3. A computer is a very ... machine.
4. Computers are rendered ... if there isn't an emergency supply system in case of power failure.

2. partiality, partial, partially, part

1. Some people show ... to certain computer companies because of the success rate.
2. Sometimes only a ... of the data is necessary to solve a problem.
3. The need for smaller memory capacity was ... satisfied by the improved performance of transistors.

3. generality, generalize, general, generally

1. ... purpose computers are larger than minicomputers.
2. It is the ... consensus of opinion that computers have improved the quality of life.
3. Minicomputers are ... cheaper than mainframes.
4. It is often easier to ... than to talk about specifics.

4. specialize, special, specially, specialist, specialization, specialized

1. Computer ... is a must for most large-scale companies today.
2. Magnetic tape cartridges were ... peripheral devices used with minicomputers.
3. A computer processes ... prepared items of information.

5. change, changeable, changeably, changing

1. Computer personnel often have to take refresher courses in the ... field of computer science.
2. Many ... have taken place in the computer industry in the last decade.
3. Memory and primary storage can be used inter-...

7. Content review

Match the words in column A with the words or statements in column B.

A	B
1. minicomputer	a. processing unit of microcomputer
2. primary memory	b. specialized secondary memory devices
3. mini-peripherals	c. where operator can manually operate the computer
4. cartridges	d. internal storage
5. console	e. fixed word length of 8-32 bit
6. microprocessors	f. attached to minicomputers

8. Organizing information

On a separate sheet, organize the information in Unit 2, “Minicomputers”, under *main idea(s)*, *major details* and *minor details*.

UNIT 6

Microcomputers

[1] The early 1970s saw the birth of the **microcomputer**, or **micro** for short. The central processor of the micro, called the **microprocessor**, is built as a single **semiconductor device**; that is, the thousands of individual circuit elements necessary to perform all the logical and arithmetic functions of a computer are manufactured as a single **chip**. A complete 5 microcomputer system is composed of a microprocessor, a memory and peripheral equipment. The processor, memory and electronic controls for the peripheral equipment are usually put together on a single or on a few printed **circuit boards**. Systems using microprocessors can be hooked up together to do the work that formerly only minicomputer systems were 10 capable of doing. Micros generally have somewhat simpler and less flexible instruction sets than minis, and are typically much slower. In the early days different micros were available with 4-, 8-, 12-, 16-bit word lengths, and some new ones use 32 and 64-bit chips. Similarly, minis were available with word lengths up to 32 bits. Although minis can be equipped with much 15 larger **primary memory** sizes, micros are becoming more powerful and converging with minicomputer technology.

[2] The extremely low price of micros has opened up entirely new areas of application for computers. Only a few decades ago, a central processing unit of medium capability sold for a few hundred thousand 20 dollars (U.S.), and now some microprocessors sell for as cheaply as \$10. Of course, now when we have a usable microcomputer system, the price is somewhere between \$200 and \$5000 depending on the display unit, secondary storage, and whatever other peripherals are needed.

[3] The available range of microcomputer systems is evolving more 25 rapidly than minicomputers. Because of their incredibly low price, it is now

possible to use only a small fraction of the computer's capability in a particular system application and still be far ahead financially of any other way of getting the job done. For example, thousands of industrial robots are in use today, and the number is growing very rapidly as this relatively new industry improves the price and performance of its products by using the latest microcomputers. 30

[4] Microcomputer software is developing rapidly and it now covers a tremendous range of applications. As well as data processing, software can also be written for specialized tasks even as complex as navigating rockets. 35 Some modern micros are even capable of **multi-tasking**. In addition to their extensive use in control systems of all types, they are destined for many new uses from more complex calculators to automobile engine operation and medical diagnostics. They are already used in automobile emission control systems and not long ago were the basis of many TV game 40 attachments. There is also a rapidly growing market for personal computers whose application potential in education is only just beginning to be exploited.

[5] It seems that the limits for microcomputer applications have by no means been reached. There were those who predicted that the home and 45 hobby computer markets, and the education market, would grow into multi-billion dollar enterprises, and they prove right. It also appears that performance of microprocessors could well increase ten-fold in the future while prices for micros could decrease by as much.

Exercises

1. Main idea

Which statement best expresses the main idea of the text? Why did you eliminate the other choices?

1. Microcomputers will be everywhere in the future.
2. There is no limit to what microcomputers can do.
3. Microcomputers are cheap, reliable and efficient.
4. Microcomputers are far superior to minicomputers.

2. Understanding the passage

Indicate whether the following ideas are stated or not stated (S/NS) in the text.

1. Microcomputers were developed after minicomputers.
2. The processor of a microcomputer is printed on a chip.
3. A mainframe uses more power than a microcomputer.
4. Microcomputers can do the work done by minicomputers.
5. Microcomputers have the same memory capacity as minicomputers and can be hooked up to the same variety of peripherals.
6. Microcomputers are cheaper than minicomputers.
7. Many different types of industries are using microcomputers to do their work.
8. Microcomputers are now used in sophisticated toys and games.
9. Because of microminiaturization, mainframes now occupy less space.
10. In the future microcomputers will be cheaper, better and probably used in every aspect of life.

3. Locating information

Find the passages in the text where the following ideas are expressed. Give the line references.

1. Microcomputers can do work that formerly was done by minicomputers.
2. Microcomputers are mainly used for single-purpose jobs.
3. The integrated circuitry of a microcomputer has been reduced to a chip.
4. Microcomputer technology will continue to improve.
5. Microcomputers are smaller, simpler and less flexible than minicomputers.

6. Microcomputers are a recent development in computer technology.
7. Microcomputer systems are increasing faster than minicomputers.
8. In the future, microprocessors will be cheaper, and their capacity and performance will be greater.

4. Contextual reference

Look back at the text and find out what the words in bold typeface refer to.

1. **that** formerly (10)
2. Because of **their** incredibly low price (26)
3. **this** relatively new industry (30)
4. performance of **its** products (31)
5. **it** now covers (33)
6. In addition to **their** extensive use (36)
7. **they** are destined for many new uses (37)
8. **They** are already used (39)
9. **whose** application potential (42)
10. **who** predicted that (45)

5. Understanding words

Refer back to the text and find synonyms for the following words.

1. individual (3)
2. connected (9)
3. moderate (18)
4. scope (25)
5. intended (37)

Now refer back to the text and find antonyms for the following words.

6. death (1)
7. in part (18)

8. worsens (31)
9. earliest (32)
10. increase (49)

6. Word forms

First choose the appropriate form of the words to complete the sentences. Then check the differences of meaning in your dictionary.

1. completion, complete, completely, completed

1. When you've ... this book, you should have a basic knowledge of computers and how they operate.
2. There are car manufacturing plants that are ... operated by robots.
3. A ... microcomputer system has a microprocessor, a memory and peripheral equipment.

2. simple, simplify, simply, simplest, simpler

1. Microcomputers are usually ... to operate.
2. A microcomputer may be ... to operate than a minicomputer.
3. Using a computer to control the payroll will ... matters for many companies.

3. flexibility, flexible, flexibly, flex

1. Because of their ... microcomputers are becoming more popular than minicomputers.
2. Minicomputers have a more ... set of instructions than microcomputers.

4. finance, financial, financially

1. The ... implications of leasing a computer may be less than owning one.
2. Companies often borrow huge sums of money to ... large-scale projects to computerize their business.
3. ... speaking, a microcomputer is more affordable than a minicomputer.

5. education, educational, educationally, educated

1. There are many ... institutes that teach computer programming.
2. Nowadays a well-... person should have a good knowledge of computers.
3. There are many fields of ... today that use computers as teaching tools.

7. Content review

Try to think of a definition for each of these items before checking them in the Glossary. Then complete the following statements with the appropriate words. (Some can be used more than once.) Make sure you use the correct form, i.e. singular or plural.

microcomputer	semiconductor	chip
microprocessor	circuit board	primary memory
minicomputer	micro	memory

- 1.... are often referred to as ... for short.
2. A ... system is composed of a ..., ... and peripheral equipment.
3. The ... of a microcomputer is usually built as a single ... device known as a
4. Microcomputers have small and cannot be hooked up to as many peripherals as
5. A few are normally used for the processor, memory and electronic controls of peripherals for microcomputers.

8. Organizing information

On a separate sheet, organize the information in Unit 6, “Microcomputers”, under *main idea(s)*, *major details* and *minor details*.

REVIEW 2: COMPUTERS

Type of activity: COMPREHENSION CHECK

Summarize the texts on “Mainframes”, “Minicomputers” and “Microcomputers” (Units 4, 5, 6) by completing the following table.

Types of computers			
	MAINFRAMES	MINI-COMPUTERS	MICRO-COMPUTERS
When developed			developed in the 70s
Usage			used in fixed applications
Memory speed and capacity		most primary memory ranges from 32 to 512 Kbytes	
Electrical power method			consumes little electrical power
Price	extremely high prices		
Size			small portable size
Complexity of instructions	very complex instructions which can be executed quickly		

Number of users			single user- personal computer
Type of processing	allows batch as well as real-time processing		

TEXT 1

Type of activity: GAPPED TEXT

Strategy:

- Read the paragraphs that have been removed (A, B).
- Then read the text.
- When you think you know which paragraph goes in each gap check that there is a relationship in meaning between this paragraph and the paragraph that goes before and after it.

A New-Age Typewriter

1. The display screen shows the type exactly as it will appear on a finished page, including boldface, pitch changes, centering and margins. An «undo» key erases the previous command and allows a user to experiment

A. The Display Typewriter falls somewhere between an IBM Selectric and a video-display word processor. It consists of a printer, a moveable keyboard and a display screen that can be tilted and swiveled to adjust to the operator's position. For simple clerical tasks, such as typing envelopes or labels,

without worrying about ruining a complex block of text. A document isn't printed until the user has composed every letter on the screen, so it can be proofread and revised before it is transferred to paper.

2. The Display Typewriter's greatest advantage may be its ease of operation. Printing and typing instructions appear on the screen, and there are no hidden commands that have to be memorized. In additions, all special function keys are clearly labeled and color-identified.

items can be slipped in one piece at a time and the operator can type directly from the keyboard onto the papers. For more complex chores, such as producing form letters contracts and statistical tables, the machine has a «display mode» that allows the user to compose, edit and store a document and print it once it is letter-perfect. The standard memory holds the equivalent of 15 typed pages of material and can be expanded to 105 pages.

B. Most modern offices were filled with a host of devices designed to translate words into type – from the latest word processor to the outmoded but still indispensable typewriter. Clerical workers could waste a lot of time running from their desks to printers and back to their keyboards. With an eye toward streamlining the clutter, Prototype Corp. of Sun Valley, Calif., has developed an office-machine hybrid that combines the electronic capabilities of a word processor with the simplicity of a typewriter.

TEXT 2

Type of activity: SUPPLYING INFORMATION

Strategy:

- Supply the omitted words in each gap in paragraph A.
- Work at paragraph B putting the sentences in the correct order; then check that there is a relationship in meaning between each sentence and the sentence that goes before and after it.
- Supply in the omitted words in each gap in paragraphs C, D. Then check that there is a relationship in meaning among paragraphs.

Talking Typewriter

A.

Blind people can learn to (1)... by feeling the (2)... on a (3)... but they can't spot a mistake. In order to help blind people produce (4)...-free typing and use a computer, Dr Tom Vincent from Britain's Open University has designed a (5)... that reads aloud what has been typed.

1. error
2. keys
3. keyboard
4. system
5. type

B.

1. It is programmed to pronounce English words, or pronounce phonetically words not in its memory. 1. ...
2. He added a voice – a cheap commercial speech synthesizer – to a relatively cheap microcomputer. 2. ...
3. Once the text is complete, a printed copy can be made in the usual way. 3. ...
4. Any mistakes can easily be corrected. 4. ...
5. The computer is programmed to repeat each character as it is typed and to read back what is displayed on the 5. ...

computer screen – either a letter or word at a time, or whole sentences.

6. ...

6. The voice helps by speaking the word or character that has been deleted and the correct version replacing it.

C.

But many blind people read and write in braille – the (6)... of raised dots that can be read by touch. So Dr Vincent decided to try and teach the computer to understand braille. This was difficult because braille isn't simply a (7)... for letter translation of written English. Whole phrases can be written in just a few braille (8)... . Dr Vincent had to stretch the microcomputer's (9)... its maximum to translate braille into everyday English. Braille is written with a special machine Dr Vincent adapted by putting (10)... under the keys. The switches (11)... electronically with the computer.

- 6. characters
- 7. communicate
- 8. letter
- 9. memory
- 10. switches
- 11. system

D.

This prizewinning (12)... is already in use, enabling blind students at a college in Wales to use computers. The computer output can be (13)... or printed text. Dr Vincent is now developing an (14)... sensor that can recognize printed words and read them aloud.

- 12. invention
- 13. optical
- 14. speech

Glossary

A

analog computer – a computer that can simulate different measurements by electronic means. It continuously works and calculates.

B

bit – binary digit which is either 0 or 1. Eight bits equal to 1 byte.

C

cartridge – a circular disk called a platter which is about the same size as a long-playing phonograph record, which can be magnetized on both sides.

central processing unit (CPU) – the brain of the computer which consists of three components: the memory, the arithmetic-logical unit and the control unit. It controls and carries out instructions given to the computer.

chip – a square or rectangular piece of semiconductor upon which several layers of an integrated circuit are etched. It is used in microcomputers.

circuit board – a board containing integrated circuits which make up the processor, memory and electronic controls for the peripheral equipment of microcomputers.

computer installation – a data processing center including the hardware, software, and the buildings and offices necessary for building input/output media.

computer system – the central processing unit with storage and associated peripherals working together as a useful whole.

console – a typewriter like a machine with a screen which allows the operator to communicate with the computer and get an up-to-date view of the jobs being processed.

D

data – the information that is input with the program, and on which mathematical and logical operations are to be performed.

database – a file of data which is structured in such a way as to satisfy the needs of various users and not only one specific application.

data base management – to structure and organize data so that the requirements of various users are met without the need to duplicate the data.

data processing – handling or manipulating information called data which is specially prepared to be understood by the computer. This involves clerical functions as well as arithmetic and logical operations performed by the computer.

digit – a number which has only one character: 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9.

digital computer – a computer in which information is represented by one or two electronic states: on or off. These are represented by the two digits 1 and 0 respectively.

F

fixed application – a program written to solve one specific problem.

H

hybrid computer – a scientific computer system which incorporates characteristics of the digital and analog computers.

I

interactive – also conversational: to be able to communicate with the computer on a question and answer basis.

interrupt feature – when a program is interrupted upon receiving a signal indicating that any one of a number of external events has occurred.

K

Kbyte – $2^{10} = 1024$; e.g. $32K = 32 * 2^{10} = 2^5 * 2^{10} = 2^{15} = 32,768$.

M

mainframe – a large computer system which is found in large installations processing immense amounts of data.

memory board – same as circuit board.

memory unit – refers to the backing store media such as magnetic tape or magnetic disk.

microcomputer – a microcomputer which is based upon an integrated circuit microprocessor; also called computer-on-a-chip.

microprocessor – the central processing unit of a microcomputer. It is built as a single semiconductor device.

minicomputer – a computer whose mainframe is physically small, has a fixed word length between 8 and 32 bits and costs less than \$100,000 for the central processor.

miniperipheral – peripherals specially developed for minicomputers, e.g. magnetic tape cartridges and cassettes.

N

network – several computers each working independently, but connected together in order to share resources such as disks and printers.

O

operator – the person who is responsible for the manual control operations of the computer. He is mainly concerned with hardware.

output – the results of performing arithmetic and logical operations on data. It is transmitted by the computer to a physical medium such as cards, tapes or disks.

P

primary memory – the internal storage locations of a computer; also referred to as main memory or real storage.

programming – writing programs for the computer.

R

real time application – applications which require real time processing.

real time processing – processing of data as soon as they are generated and using these data to update the relevant files. The opposite is *batch processing*. Process control systems nearly always operate as real-time systems, because they must process the data arriving from the devices they are controlling quickly enough to feed back information affecting their operation.

S

semiconductor – a material which is neither a good nor a bad conductor of electricity. Its conductivity increases at high temperatures. Transistors are made of semiconductor materials.

READING COMPETENCE 1

TEXT 1

Type of activity: MULTIPLE MATCHING

Strategy:

- Learn to recognize the structure (like a plan) of the text. This will help you decide on the paragraph headings.
- Read the following article about computer errors and decide which of these two plans the writer followed.

Describe the situation.

Describe a problem.

Describe unsatisfactory solutions.

State the problem again.

Ask a question.

Answer the question.

Give specific examples.

Ask another question.

- Then read the article again and choose a heading for each paragraph from the list below. There is one extra heading, which you do not need to use. The first one has been done for you.

A. An old problem with serious consequences.

B. Two new approaches, but can they solve the problem?

C. A potentially tragic error.

D. But are they here to stay?

E. Experts say 'Bring back maths!'

F. Old methods are no longer satisfactory.

G. We couldn't live without them.

When a Computer Error Is a Fatal Mistake

Our lives depend on computers. They control our money, transport, and our exam results. Yet their programs are now so complex that no one can get rid of all the mistakes.

(0_G)

Life without computers has become unimaginable. They are designed to look after so many boring but essential tasks – from microwave cooking to flying across the Atlantic – that we have become dependent on them.

(1___)

But as the demands placed on computers grow, so have the number of incidents involving computer errors. Now computer experts are warning that the traditional ways of building computer systems are just not good enough to deal with complex tasks like flying planes or maintaining nuclear power stations. It is only a matter of time before a computer-made catastrophe occurs.

(2___)

As early as 1889, a word entered the language that was to become all too familiar to computer scientists: a 'bug', meaning a mistake. For decades bugs and 'de-bugging' were taken to be part of every computer engineer's job. Everyone accepted that there would always be some mistakes in any new system. But 'safety critical' systems that fly planes, drive trains or control nuclear power stations can have bugs that could kill. This is obviously unacceptable.

(3___)

One way to stop bugs in computer systems is to get different teams of programmers to work in isolation from each other. That way, runs the theory, they won't all make the same type of mistake when designing and writing computer codes. In fact research shows that programmers think alike, have the same type of training – and make similar mistakes. So even if they work separately, mistakes can still occur. Another technique is to produce backup

systems that start to operate when the first system fails. This has been used on everything from the space shuttle to the A320 airbus, but unfortunately problems that cause one computer to fail can make all the others fail, too.

(4___)

A growing number of computer safety experts believe the time has come to stop trying to 'patch up' computer systems. They say programmers have to learn to think clearly and to be able to demonstrate through mathematical symbols that the program cannot go seriously wrong. Until programmers learn to do this, we will probably just have to live with the results of computer bugs.

(5___)

Of course, more often than not the errors are just annoying, but sometimes they can come close to causing tragedies. On the Piccadilly line in London's Underground a driver who was going south along a track got confused while moving his empty train through a cross-over point. He started to head north, straight at a southbound train full of people. The computerized signaling system failed to warn him of impending disaster and it was only his quick human reactions that prevented a crash.

Now find words or phrases in the text with the following meanings.

1. impossible to imagine (0)
2. needing support from (0)
3. long-established, conventional (1)
4. sudden great disaster (1)
5. often seen or heard (2)
6. not good enough (2)
7. separately (3)
8. support (3)
9. terrible events that cause great sadness (5)
10. about to happen (5)

TEXT 2

Type of activity: GAPPED TEXT

Strategy:

- Three paragraphs have been removed from this newspaper article.
- Read each paragraph. Then choose from the paragraphs A-D the one which fits each gap (2-4). There is one extra paragraph which you do not need to use.

Scanning fingers

(1)

One of the top concerns of business executives today is data security – the protection of company records stored on computers from tampering and theft. The most common method of computer security is a password. But passwords can be stolen or guessed. So-called biometric security devices – which verify identity by means of unique human physical characteristics – are considered by many a safer alternative. One such device is the finger scanner, which checks fingerprints to authenticate a person's identity. Finger

A The display screen shows the type exactly as it will appear on a finished page, including boldface, pitch changes, centering and margins. An «undo» key erases the previous command and allows a user to experiment without worrying about ruining a complex block of text. A document isn't printed until the user has composed every letter on the screen, so it can be proofread and revised before it is transferred to paper.

B Now at least three U.S. companies produce desktop finger scanners that are smaller, faster and less expensive than their predecessors. All three systems will work with PC's, local-area networks, minicomputers and mainframes. All can alert company officials if authorized users attempt to gain access to a computer and

scanners (and other biometric devices) have been used for years to restrict physical access to certain rooms or buildings, but until recently were too large and expensive for use with computers.

(2 ____)

(3 ____)

(4 ____)

(5)

Finger scanners represent two thirds of the biometric security market, which also includes voice recognition and hand geometry devices. Fowler and others believe that because companies spend millions of dollars to build data bases only to worry about their susceptibility to hackers and software "viruses", the commercial and governmental market for biological security units will grow.

all can control access to both hardware and disk components.

C Randy Fowler, founder and president of Indentix, calls his TouchSafe scanner a "foolproof" security system. TouchSafe features a sensor module that is about the size of a computer mouse. The sensor "enrolls" a user by scanning one of his fingerprints (any one will do), digitizing up to a quarter-million pieces of information and converting them into a (proprietary) mathematical formula, called a template, which is stored – in the system. Any time the user wants to use the PC, he presses the same finger on the sensor and, in two seconds, the product compares the new file fingerprint to the stored template. If the two match, TouchSafe grants access to the terminal; if they don't, entry refused.

D Bob Glowienke of ThumbScan say finger scanners can eliminate the corporate need for an expensive "callback" security system – a piece of external hardware that calls back an employee on the telephone, after he has dialed up the company mainframe and given his password, to verify his identity and grant access to the system.

TEXT 3

Type of activity: JUMBLED TEXT

Strategy:

- Here are two newspaper articles, but they have been mixed up.
- Look at the headlines, and read the paragraphs quickly to decide which paragraph goes with which story.
- Then read the paragraphs again and put them in the right order.

Your Computers & Your Health:

Real and Imagined Problems

A On the other hand intensive periods of work on the computer can lead to eye fatigue, stress and muscular-skeletal pains. Nonetheless these symptoms appear mostly when the user ignores a few elementary ergonomical rules, for instance if they subject themselves to unsatisfactory working conditions or use inadequate equipment. Further-more, certain individuals with particular medical problems will be at greater risk. The possible ill-effects of working on the computer are therefore inseparable from very wide ergonomical, medical and social

Can Computers Cause Stress?

D In addition, computer technology can be used to check the performance of employees, hence the feeling of being watched over could exacerbate psychological tension. All these problems are aggravated by time pressure.

E According to studies, the use of computer at work could be a specific cause of psychological tension. Computer users, for example, may become frustrated or vexed if the computer has a slow response time when processing data. As the user does not know how long the computer

factors. This is because the root of the problems associated with computing and their solution are more likely to be found through investigating work conditions and customs, general health of the user and even his life-style, than in the technical make up of the computer itself.

B In the case of data input the poor and repetitive nature of the work can make the user feel unqualified. It also encourages a feeling of weariness, tediousness, or saturation.

C Of course it would not be fair, or true, to blame the computer itself as the only cause of stress: it all depends on how computer technology is used. Several other factors of psychological tension can be found in today's work environment, such as the organization of work, social relationships and work atmosphere.

will take to process the job, he remains very alert and attentive as he waits.

F The computer and its effects on health often evokes baseless fears on the part of the user, a sign no doubt that many people have not completely mastered work with computers. The computer has been accused of causing cataracts and myopia; of emitting harmful rays to the skin and the eyes. Some have even suspected the computer of increasing the risk of a miscarriage for women. The majority of these fears are unjustified. None of the many studies effectuated on the subject have established a causal link between visual deterioration and working on the computer. As for ionizing rays and electromagnetic fields, they are always below permitted levels.

SECTION 3

SOFTWARE

UNIT 7

Software Characteristics

[1] **Software** plays an important role in system development. It is the “driver” of the **hardware**. Without software, obviously, there can be no computer processing. Software is the significant component of an information system for two reasons: First, hardware won't run without software. Software gives the computer the “intelligence” it needs to do the job. This means that **accessing, storing, retrieving, and modifying** information are all determined by the programs in computer memory. Second, software controls virtually every activity affecting the database: 5

An effective program has four characteristics: 1) accuracy; 2) good documentation; 3) flexibility; 4) performance. 10

[2] **Accuracy** means that the software must be free of syntax and logic errors. A **syntax error** results from using an improper form of a command or misusing symbols. For example, misspelling the command PRINT would signal a syntax error. Syntax errors are identified by the software. Thus, they are easy to find and relatively easy to correct. 15

[3] A **logic error** results from improper use of syntactically correct statements. For example, a payroll program that withholds 80 percent rather than 20 percent of gross earnings for federal income tax contains a logic error. A program with logic errors will usually produce some output, but the output will not be correct in all cases. Logic errors can be very difficult to find. In some cases, programs run for years before all the logic errors are detected and corrected. 20

[4] Software requires **documentation**, which provides directions for using software. Good documentation describes procedures for operating the software in a clear and concise manner. This includes flowcharts, troubleshooting guidelines, and an index with cross references. More and more software packages include a condensed version of the manual built into the software. “Help” screens, menus, and the like allow the user to operate the software virtually without reference to manuals. These aids describe the major commands and function keys or specify solutions to common problems faced in using the software. In addition, templates that lie over function keys on the keyboards remove any need for having to memorize codes or procedures.

[5] **Flexibility** in a software system means that the software is capable of handling a large variety of transactions and responds to different situations. For example, the user may wish to display results on a screen, print the results only, or perhaps do both. In the case of display, the user may want to have a summary report on the screen or a detailed report displayed one screen at a time. These options also characterize the software as user friendly, stemming from its flexibility to adapt to various types of inquiries.

[6] The fourth characteristic of software is **performance**, or the efficiency with which the program responds to inquiries from the user. Much of the software's performance level is constrained by the nature of the inquiry and the way the files are organized as well as by the software itself. That is why an organization or business must test the software for performance before committing it to regular use.

Exercises

1. Main idea

Which statement best expresses the main idea of the text? Why did you eliminate the other choices?

1. Flexibility is one of the main characteristics of an effective program.
2. Good documentation is necessary for using software.
3. An effective program has four characteristics.
4. Testing the software for performance must be done first.

2. Understanding the passage

Decide whether the following sentences are true or false (T/F) by referring to the information in the text. Then make the necessary changes so that the false statements become true.

1. Organizations are becoming increasingly dependent on hardware rather than software to solve day-to-day problems.
2. Software is responsible for the computer operation.
3. Effective software has four characteristics.
4. Syntax errors can be very difficult to find.
5. Logic errors are identified by the software.
6. Documentation provides directions for using the software.
7. Thanks to flexibility the software is capable of handling a large variety of transactions and responds to different situations.
8. Performance is the rate at which the program responds to inquiries from the user.

3. Locating information

Find the passages in the text where the following ideas are expressed. Give the line references.

1. The driver of the hardware is the computer's operating system and application programs produce the information for the end user.
2. Effective software has four characteristics.
3. Software must be free of syntax and logical errors.
4. Programs can run for years before all the logical errors are detected and corrected.
5. Software needs good documentation.
6. Flexibility characterizes the software.

4. Contextual reference

Look back at the text and find out what the words in **bold** typeface refer to.

1. **It** is the "driver" ... (1)
2. ... **it** needs to do the job. (5)
3. ... **they** are easy to find ... (15)
4. **This** includes ... (25)
5. ... or ... do **both** (37)
6. ... before committing **it**. (47)

5. Understanding words

Refer back to the text and find synonyms for the following words.

1. mistake (12)
2. is produced by (16)
3. discover (21)
4. customer (28)

Refer back to the text and find the terms for the following definitions:

5. The collection of programs and routines associated with a computer (1)
6. Physical equipment (2)
7. Giving much information in few words (23)
8. A distinguishing feature (42)

6. Word forms

First choose the appropriate form of the words to complete the sentences. Then check the differences of meaning in your dictionary.

1. use, using, user, used

1. A syntax error results from ... an improper form of a command.
2. The ... may wish to display results on a screen.
3. An organization must test the software for performance before committing it to a regular

2. results, results in, results from

1. He may wish to display ... on a screen.
2. A logic error ... improper use of syntactically correct statements.
3. An improper form of a command or missing symbols ... a syntax error.

7. Content review

Try to think of a definition for each of these items. Then complete the following statements with the appropriate words. (Some can be used more than once.)

Make sure you use the correct form.

access	modify	software	performance
store	accuracy	respond	documentation
retrieve	flexibility	handling	efficiency
			processing

1. ... plays an important role in system development.
2. ... , ... , ... , and ... information are determined by the programs in computer memory.
3. Without ... there can be no computer
4. ... means that the ... must be free of errors.
5. ... requires ..., which provides directions for using the

6. ... in a ... system means that the ... is capable of ... a large variety of transactions and responds to different situations.
7. The fourth characteristic of ... is ..., or the ... with which the program ... to inquiries from the user.

8. Organizing information

On a separate sheet, organize the information in Unit 7, “Software Characteristics”, under *main idea(s)*, *major details* and *minor details*.

UNIT 8

Programming Languages

[1] A program is coded in a specific language. A programming language is a means by which a programmer communicates the design to the computer. There are four levels of programming languages: machine, assembly, high-level, and fourth-generation languages.

[2] **Assembly Languages.** The programming task of machine language was significantly simplified by the creation of assembler or translating programs in the early 1950s. Programs were written in easier-to-remember symbolic codes instead of numerical codes. Memory addresses were also referenced by symbols rather than addresses in machine language. An **assembler** translated assembly language programs into machine code for the computer.

[3] The program development cycle using assembly language consists of the following steps:

1. The program is written in symbolic language. This is called the **source program**.
2. The vendor-provided assembler reads the source program and converts it into machine language, or the object program.
3. Any syntax errors detected during assembly are printed for correction.
4. The object program is loaded into computer memory for processing.

[4] **High-Level or Procedural Languages.** Assembly and machine languages were machine dependent. A program worked on only one type of machine. The instructions had to be rewritten in a different assembly language to work on another type of computer. In addition, assembly and machine languages are difficult to learn, code, update, or maintain. As a result, a variety of machine-independent languages appeared in the 1960s. Known as high-level or procedural languages, these languages allow the

programmer to specify at a higher level of abstraction than assembly languages how the computer is to perform tasks. Procedural languages must of course, like assembly languages, be translated into machine language for computer processing. 30

[5] High-level languages introduced several new language features that were standard in their instructions. That is, the instructions were essentially the same for every computer. A special program for each computer, called a **compiler**, translated the standard instructions into the special machine language for a specific model computer. This meant the same instructions 35 could be translated by different compilers (on different machines) without having to rewrite the original program.

[6] Another development was that the languages were designed for specific classes of applications. Fortran Algol and Pascal were designed for coding scientific problems, while Cobol was designed for business data 40 transaction processing. General languages included Basic. In addition, these high-level languages were more like human languages. They were easier for people to use than assembly language. Many computer applications are written in a variety of high-level languages, although newer fourth-generation languages are also used for developing today's applications. 45

[7] Compared to assembly languages, high-level languages have two distinct advantages:

1. The programming commands are problem oriented rather than machine oriented. This means that the programmer can focus on the problem solving. 50
2. A programming command is generally translated into a number of machine instructions rather than only one translation in assembly language. This obviously makes developing an application in a procedural language much faster.

Exercises

1. Main idea

Which statement best expresses the main idea of the text? Why did you eliminate the other choices?

1. Assembly and machine languages were machine dependent.
2. There are four levels of programming languages.
3. Most computer applications are written in high-level languages.
4. High-level languages have some advantages.

2. Understanding the passage

Decide whether the following sentences are true or false (T/F) by referring to the information in the text. Then make the necessary changes so that the false statements become true.

1. There are three levels of programming languages.
2. Programs using assembly languages were written in easier-to-remember symbolic codes instead of numerical codes.
3. Assembly and machine languages were machine independent.
4. Machine-independent languages were Fortran and Cobol.
5. High-level languages were more like human languages.
6. Cobol and Fortran are business languages while Algol and Pascal are known to be scientific ones.

3. Locating information

Find the passages in the text where the following ideas are expressed. Give the line references.

1. A program goes through coding before it is ready to use.
2. Machine languages write programs in codes tied directly to the computer.

3. An assembler translates the symbolic codes into machine codes for processing.
4. High-level languages perform tasks at a much higher level than assembly languages.
5. High-level languages are compiled into special machine language for processing.
6. A compiler is a special program for each computer.
7. A lot of computer applications are written in high-level languages.

4. Contextual reference

Look back at the text and find out what the words in bold typeface refer to.

1. **This** is called ... (14)
2. ... converts **it** ... (16)
3. ... **these** languages allow ... (26)
4. **They** were easier ... (42)

5. Understanding words

Refer back to the text and find terms for the following definitions.

1. A means by which a programmer communicates the design to the computer-(1)
2. A means to translate the symbolic codes into machine codes for processing-(6)
3. The program written in symbolic language (14)
4. The procedural languages (26)
5. A special program for each computer (34)
6. More like human languages (42)
7. Business and scientific languages (39-40)

6. Word forms

Choose the appropriate form of the words to complete the sentences.

1. design, designer, designed, designing

1. Cobol was ... for business data translation processing.
2. A programming language is a means by which a programmer communicates the ... to the computer.
3. The ... is developing new program.

2. Have, having, has

1. The same instructions could be translated by different compilers without ... to rewrite the original program.
2. High-level languages ... two distinct advantages.
3. The instruction ... to be rewritten.

3. using, use, used, to use

1. The program development cycle ... assembly language consists of four steps.
2. They were easier for people ... than assembly language.
3. There has been a variety of high-level languages in ... until recently.

4. program, programmer, programming, programmed

1. A ... communicates the design to the computer.
2. A ... is coded in a specific language.
3. There are four levels of ... languages.
4. This is called the source

7. Content review

Try to think of a definition for each of these items. Then complete the following statements with the appropriate words. (Some can be used more than once.)

program	programming languages	machine language
assembler	high-level language	assembly language
computer		

1. There are four levels of
2. Coding is the actual writing of ... instructions.
3. is used for writing a ... in codes tied directly to the ...
4. is used for writing programs in symbolic codes.
5. An ... translates the symbolic codes into machine codes for processing.
6. are translated into special for processing.
7. have two distinct advantages.

8. Organizing information

On a separate sheet, organize the information in Unit 8, “Programming Languages”, under *main idea(s)*, *major details* and *minor details*.

UNIT 9

Fourth-Generation Languages

[1] A move away from the emphasis on programming languages by professional programmers and toward user-oriented, easy-to-learn languages is what we call **fourth-generation languages (4GL)**. They include a broad range of languages that have common features. These very high-level or **nonprocedural languages** differ from procedural languages 5 in four ways:

1. They are easier to use and learn.
2. The translation software performs the processing logic. Thus the programmer specifies the task(s) to be performed, not how they are to be performed. 10
3. Screen design features make it easy to show what you want written on a monitor and include easy-to-choose features like highlighting, blinking, reverse video, and other accents. Changes are easy to make and the results are seen instantly.
4. Fourth-generation languages can do **report writing**. The report is 15 described by the user and the processor figures out how to produce it. For communications and networks, other features allow the user to specify who can access what information. Perhaps most important, fourth-generation language integrates all these features into one program.

[2] Although fourth-generation languages have features that make it possible to solve problems on computers much more quickly than with the 20 traditional software and its standard high-level languages, some of the disadvantages of previous languages may reappear. For example, often the language is designed to run on software that must be run on one particular type of machine.

[3] As you can see, the aim of fourth-generation languages is to allow 25 people to program easily, naturally, and more quickly. This is accomplished

by having people specify what they want and letting the computer create the instructions it will use in the program. In the same way that changes to high-level languages influenced program design through the introduction of flowcharting and pseudo-code, fourth-generation languages have influenced design techniques. The new technique, called **prototyping**, is quickly becoming a part of the programming cycle. It allows the user to see exactly what will be available in the final program and to refine the specifications at an early stage of the program development. This, in turn, can save a lot of time later on.

[4] Prototyping uses a fourth-generation language with its speed to create the first version of a program. Sometimes this version is used without further enhancement. Sometimes a faster production version is developed from the prototype using a traditional high-level language. The finished version may have additional parts not included in the prototype. Alternatively, the high-level language may prove faster in the finished version than the fourth-generation language would have been. Or the program may need a traditional language to fit together with previously developed programs.

45

Exercises

1. Main idea

Which statement best expresses the main idea of the text? Why did you eliminate the other choices?

1. Fourth-generation languages can do report writing.
2. The translation software performs the processing logic.
3. Prototyping is becoming a part of the programming cycle.
4. Fourth-generation languages are nonprocedural languages.

2. Understanding the passage

Decide whether the following sentences are true or false (T/F) by referring to the information in the text. Then make the necessary changes so that the false statements become true.

1. Fourth-generation languages are nonprocedural languages.
2. 4GLs are not easy to use and learn.
3. Using 4GLs, the programmer specifies how the task(s) are to be performed.
4. Fourth-generation languages can do report writing.
5. Fourth-generation languages have some of the disadvantages of procedural languages.
6. Fourth-generation languages do not allow people to program easily, naturally and more quickly.
7. Prototyping can save a lot of time.

3. Locating information

Find the passages in the text where the following ideas are expressed. Give the line references.

1. Fourth-generation languages allow to program easily, naturally and more quickly.
2. Fourth-generation languages include a large range of languages.
3. Fourth-generation languages solve problems on computers much more quickly than high-level languages.
4. The high-level languages may prove faster in the finished version than the fourth-generation languages.
5. Prototyping allows the user to refine the specifications at an early stage of the program development.
6. Fourth-generation languages are easy-to-learn languages.

4. Contextual reference

Look back at the text and find out what the words in bold typeface refer to.

1. **They** include ... (3)
2. **These** very high-level ... languages ... (4)
3. **They** are to be ... (9)
4. ... **its** standard high-level languages (22)
5. ... what **they** want ... (28)
6. ... the instructions **it** will use... (29)
7. **It** allows the use... (33)

5. Understanding words

Refer back to the text and find synonyms for the following words.

1. term (3)
2. drawback (23)
3. purpose (26)
4. apply (29)
5. step (35)
6. rate (37)

Fill in the blanks with the correct prefix. Look the words back in the text.

- | | |
|------------|-------------------|
| 1. pseudo- | 1. ... procedural |
| 2. re- | 2. ... advantage |
| 3. non- | 3. ... appear |
| 4. dis- | 4. ... code |
| 5. re- | 5. ... written |

6. Word forms

First choose the appropriate form of the words to complete the sentences. Then check the differences of meaning in your dictionary.

1. program, programming, (to) program, programmer

1. The aim of fourth-generation languages is to allow people to ... easily.
2. There is a move away from the emphasis on ... languages by professional ... and toward user-oriented, easy-to-learn languages.
3. They use this language to create the first version of a
4. It was at an early stage of the ... development.
5. Prototyping is quickly becoming a part of the ... cycle.
6. The ... specifies the task(s).

2. processing, processor, processed, process

1. The translation software performs the ... logic.
2. The ... figures out how to produce the report.
3. This ... is called coding.

7. Content review

Try to think of a definition for each of these items. Then complete the following statements with the appropriate words. (Some can be used more than once.)

fourth generation languages	programming	flowcharting
procedural languages	processing	pseudo-code
high-level languages	prototyping	program
nonprocedural languages	report writing	

1. ... uses ... to create the first version of a ...
2. ... differ from ... in four ways.
3. ... can do
4. The new technique called ... is becoming a part of the ... cycle.
5. ... influence ... design through the introduction of ... and
6. ... are known to be the types of ... languages.

8. Organizing information

On a separate sheet, organize the information in Unit 9, “Fourth-Generation Languages”, under *main idea(s)*, *major details* and *minor details*.

REVIEW 3: SOFTWARE

Type of activity: COMPREHENSION CHECK

Describe programming languages using information from the text below. Then summarize information on the third-generation and fourth-generation languages using the table below. Classify, contrast and compare them.

There are four levels of programming languages:

1. **Machine language:** writing programs in codes tied directly to the computer.
2. **Assembly language:** writing programs in English-like (symbolic) codes rather than machine codes. An assembler, then, translates the symbolic codes into machine codes for processing.
3. **High-level language:** a procedural or problem-oriented language that performs tasks at a much higher level than assembly language. High-level languages such as Cobol and Fortran are compiled (translated) into special machine language for processing.
4. **Fourth-generation language:** a nonprocedural language that requires fewer lines of code than a high-level language. The programmer needs only to specify the task, not how it is performed. The translation software does the rest that has to do with processing.

Third-Generation Language	Fourth-Generation Language
1. Geared for experienced programmers	1. Users as well as programmers may use it
2. Originally developed for a batch environment	2. Ideal for on-line environment
3. Deals with a file-related environment	3. Deals with a database-related environment
4. Must specify how to perform a task	4. Must specify what results are desired; the information system decides on
5. Generally requires many procedural instructions	

6. Program code is not easy to learn or maintain	the "how" end of the process 5. Far fewer instructions are needed 6. Commands make the language easy to learn and maintain
--	--

TEXT 1

Type of activity: UNENTITLED TEXT

Strategy:

- Read newspaper articles, choose the most suitable heading from the list A-E for each passage.

The headlines:

- A. Cheap Robot**
- B. A Deadly Game?**
- C. Copycats Halted**
- D. Crime Watchers**
- E. Once Bitten**

(1 ____)

COMPUTER games may be distracting children from exercise which could prevent their death from heart disease in later life.

Dr. Neil Armstrong, the director of the Coronary Prevention in Children project at Exeter University, says spending hours playing computer games and watching television are keeping children from healthy pastimes.

A survey of 700 children aged 11 to 16 in Devon showed that 20 per cent had cholesterol levels above the recommended World Health Organisation adult figure.

(2 ____)

CONSTABLE David Casey of Cambridgeshire police has connected his office computer to the Campus 2000 electronic mail network which will enable local pupils to contact police headquarters via their own computer systems. "Altogether there are about 60 schools online, representing about a quarter of the total in the county," he says.

Using the service, which is operated by BT and The Times Network Systems, pupils can access a special database with a range of information on police matters.

(3 ____)

THE LATEST thing in inexpensive robots has six spindly legs, a thin metal body and gets its energy from a battery. Indiana University sells the Stiquito for just \$10 (about £6.90).

The piano-wire legs and thin metal body give Stiquito a spidery look. Each leg joint has a hair-thin strand of a nickel-titanium alloy that – unlike most metals – contracts when heated and expands when cooled. When an electric charge is applied to a strand of the alloy it expands. Switching off the charge causes it to contract. Applying the charges in sequence makes it "walk."

(4 ____)

CUT-PRICE computer technology may not win long-term customers. The cost of hardware is the primary cause of customers switching brands only 14 per cent of the time, according to a US survey by research firm Prognostics.

More than four out five change suppliers, it says, because of dissatisfaction with products and service.

"This is a danger to vendors caught in a price war," says James Wood, a vice president of Prognostics. "Too many are responding to lower profit margins

by cutting costs in critical loyalty areas like customer service. Price may win customers but does not keep them."

(5 __)

THE FIRST British case over copying the "look" of a software program has resulted in a decision by the High Court that copyright can protect the way a program looks and feels even where the program code has not been copied.

TEXT 2

Type of activity: GAPPED TEXT

Strategy:

- Read the text and the sentences/paragraphs that have been removed once quickly. Find the main idea in each paragraph of the text. In the sentences or paragraphs that have been removed:
 - work out what pronouns, demonstratives and possessive adjectives refer to;
 - look for a meaning/relationship between the sentences or paragraphs and the text;
 - pay attention to linking words like **however**, **furthermore**, **therefore**, **but**, **etc.**
- Then read the newspaper articles. **Seven** paragraphs have been removed from the article. Choose from the paragraphs A-H the one which fits each gap (1-6). There is one extra paragraph which you do not need to use. There is an example at the beginning (0).

Computer Systems to Suit Any Taste

(0 D)

Most users have already discovered the world of telecommunications. This is proved by the number of subscribers to Relcom, the leading telecommunication network in Russia – about 150,000.

(1)

Nevertheless, such an approach to practical life proved unexpected and new for many managers, entrepreneurs, organizers of

Naturally, of great importance for a user is the opportunity of getting a connection to various information resources.

What the global computer systems are like

production, who have got used to sending letters in envelopes in the old manner; to choose business and juridical information from heaps of publications; to keep a bulky teletype operating staff for sending telex messages and faxes with the help of a secretary.

(2 ____)

It depends on your information requirements and financial possibilities. If you are ready to spend thousands of dollars, the problem of a reliable and fast communication will be solved for you, with branches and partners at home and abroad, and an access to the remote data banks. The allotted lines will provide an opportunity for a permanent round-the-clock exchange of information in the on-line regime (that is, in the regime of an "instant" reply). You'll be supplied with a complete communication system, the local (office) networks in various cities will be linked and a private sub-network will be arranged for your firm, agreements will be concluded with firms — owners of data bases.

(3 ____)

Spending money only on the analog and having paid a few dozen dollars for connection, one may become a subscriber to the electronic mail and commercial conferences in off-line regime (there is no permanent connection, and

and what useful operations can be done with their help?

C The most popular in our country is the Relcom electronic mail, which uses a single address space with Internet mail widespread in the world. But most of Russian as well as international networks are in-tegrated in one way or another, that is one can be a subscriber of SITEC network and have communication with all the users of Relcom and Internet.

D The information and telecommunications market in Russia developed impetuously and gave rise to a sharp competition among domestic and foreign firms which offered a great number of services in

the data are transmitted less promptly than in on-line regime). Having obtained the address in the electronic mail, you get an opportunity to enter from your computer into correspondence with other users of this electronic mail throughout the world. It will take a few hours for your electronic mail to be delivered to you in off-line regime. The cost of transmitting data depends on the distance and constitutes a few cents for a kilobyte (a page of a text occupies approximately 2 kilobytes).

(4 ____)

Many networks offer to become a subscriber to electronic mail and on-line conferences. Among the most popular in Russia are SPRINT, SOVAM, Teleport, IASNET, Infotel, Geonet, Glasnet, Rosnet, Interlink and others. The rates for services may range from several dozen to several hundred dollars lumpsome.

Also useful for businessmen can be electronic notice boards on which each user of the network may put his advertising or commercial notices or to read those of others. Also rather popular are the systems of electronic auctions and electronic exchanges in on-line regime. Among the best known systems are Remart, EXnet, MEB, the Russian company of stock-brokers.

computer communications and the transmission of information.

E Firms and individuals for whom a computer has long become a part of their life make the bulk of the "army" of users. Now they have been joined by many banks, exchanges, commercial organizations, news agencies.

F But if you are short of major financial resources or for the time being cannot make up your mind on investing them in such global projects, for you, too, there are possibilities (certainly, more modest) to get linked with the outside world of computers.

G The "mice" are designed to as enable one to depress their keys as seldom as possible. The

(5 __)

The best known among data base producers abroad are Reuters and Telerate agencies (exchange and financial information), Dow Jones News (commercial information). In Russia these data bases are accessible through the networks SOVAM Teleport, SPRINT, Interlink, MARK III (GEIS).

Popular among Russian producers are the Economic News Agency, Cominfo agency, Russica information firm, the information-commercial center Monolit, MP RIKO. Their data bases are accessible through many networks in Russia.

(6 __)

Not yet being a subscriber one can contact several networks by using an analog, the number of the so-called guest input, and work in the demonstration regime. To choose the network for connection, it is necessary to compare their services, rates, technical data, accessible information resources, reliability and the reputation of network (who are its users, founders and owners), the friendliness of interface (how convenient it will be for an untrained user to work in the network), the entry in Russian and foreign networks and other factors.

keyboards of the Microsoft company have very "light" keys, whereas the software considerably simplifies work on the computer. As reported by Newsweek magazine, towards the end of the year the Compaq Corp. will paste on all of its keyboards a warning for users about the need to familiarize themselves with a special manual on how to relax their hands while typing.

H Worth mentioning among the networks orientated to granting information services are MIR and Remart. Meant for the manager of a major enterprise, in need of partners, suppliers and consumers of goods is the SLDAB system of the German Octopus Warolein firm.

Glossary

A

access – being allowed to use a computer and read or alter files stored in it.

accuracy – means that the software must be free of syntax and logic errors.
(‘Accurate’ means correct, without any errors.)

address – 1) number allowing a central processing unit to reference a physical location in a storage medium in a computer system; 2) unique number that identifies a device on a network.

C

compile – to convert a high level language program into a machine code program that can be executed by itself.

compiler – computer program (piece of software) that converts an encoded program into a machine code program.

D

documentation – information, notes and diagrams that describe the function, use and operation of a piece of hardware and software.

E

error – mistake due to an operator; mistake caused by a hardware or software fault; mistake in a program that prevents a program or system running correctly.
Logical error – fault in a program design causing incorrect branching or operation. *Syntax error* – error resulting from incorrect use of programming language syntax.

F

flexibility – ability of hardware or software to adapt to various conditions or tasks.

flowchart – a diagram representing a sequence of events or operations. The most commonly used flowcharting symbols are rectangles containing descriptive texts, used for processing operations, and diamonds, used to represent decisions or alternative courses of action.

function key – key or switch that has been assigned a particular task or sequence of instructions.

G

generation – 1) producing data or software or programs using a computer; 2) state or age of the technology used in the design of a system. *First generation computers* – original computers made with valve-based electronic technology, started around 1951. *Second generation computers* – computers which used transistors instead of valves. *Third generation computers* – computers which used integrated circuits instead of transistors. *Fourth generation computers* – computer technology using LSI circuits, developed around 1970 and still in current use. *Fourth generation languages* – languages that are user-friendly and have been designed with the non-expert in mind. *Fifth generation computers* – next stage of computer system design using fast VLSI circuits and powerful programming languages to allow human interaction.

H

hardware – physical units, components, integrated circuits , disks and mechanisms that make up a computer or its peripherals.

K

keyboard – number of keys fixed together in some order, used to enter information into a computer or to produce characters on a typewriter.

L

language – system of words or symbols which allows communication with computers (such as one that allows computer instructions to be entered as words which are easy to understand, and then translates them into machine code).

M

manual – document containing instructions about the operation of a system or piece of software.

P

performance – way in which someone or something works. Thus the phrase ‘high performance equipment’ means high quality equipment

procedure – 1) small section of computer instruction code that provides a frequently used function and can be called upon from a main program; 2) method or route used when solving a problem.

procedural language – high-level programming language in which the programmer enters the actions required to achieve the result wanted. *Non-procedural language* – programming language which does not execute statements one after another, nor calls subroutines; instead it defines a set of facts that can be queried.

prototype – first working model of a device or program, which is then tested and adapted to improve it.

prototyping – making a prototype.

R

report generator – software that allows data from database files to be merged with a document (in the form of graphs and tables) to provide a complete report.

retrieve – to extract information from a file or storage device.

S

software – any program or groups of programs which instructs the hardware on how it should perform, including operating systems, word processors and applications programs.

store – to save data, which can then be used again as necessary.

SECTION 4

INFORMATION SYSTEMS

UNIT 10

Computers Nowadays

[1] In today's knowledge society information is a critical resource. The computer's vast popularity in recent years results from the fact that usable information is the backbone of industry and commerce. Information is a resource that must be managed and controlled. Two-thirds of the average executive's time is spent processing or communicating information, and well over half of the U.S. workforce is directly engaged in some form of information handling – reports, ad hoc inquiries, spreadsheet analysis, and other functions. 5

[2] Computers have become an integral part of a company's everyday activities because of the kind of information they generate and their speed of delivery. The use of computers in business dates back to the mid-1950s, when batch-processing applications such as payroll were once the mainstay of computer centers. The role of computers in such activities is now so routine that they are taken virtually for granted. 10

[3] Today's information resource is used not only for cost reduction but in pursuing business strategies. For example, consider Mobil Oil's strategy to market gasoline in California by installing point-of-sale terminals at gasoline stations for customers to use with the automated teller machines of two major banks. And what about airlines, car rental firms, and hotels working together to offer bonus programs for frequent flyers through computers that track bonus miles and issue awards? 15 20

[4] These examples illustrate today's emphasis on information and the value of information. The challenge of the 1980s is using information

technology to gain competitive advantage and extending the limits of the computer to incorporate artificial intelligence as a revolutionary step for decision support. The wide range of computer and communication technologies that provides quality information for decision making makes up today's management information systems, or MIS. 25

[5] MIS is an integrated, computer-based, interactive system that supports operations and decision-making functions at all levels. It serves the organization's functional areas through decision models. Models draw most of their inputs from the database and place the output into it. MIS, relatively unknown in the 1960s, had its foundations in the early 1970s. It has gone through several stages of technological change – from "isolated" computing to today's user-machine interface. 30 35

[6] MIS is a practical approach to developing information systems in support of decision making. MIS is a broad category of systems. Some activities are highly integrated and “prespecified” for repetitive transaction processing, other activities are customized for specific decision making tasks. Office automation and the communication network that facilitates clerical support are the significant applications of MIS. 40

[7] Related to MIS are decision support systems (DSS) – the managerial use of computers. DSS represents a step away from the traditional terminal toward the personal computer linked to the mainframe. DSS incorporates expert systems that use rules of logic and a knowledge base to simulate the human expert's thought processes. 45

Exercises

1. Main idea

Arrange the following statements as they are used in the text.

1. The role of computers in business has increased since 1950s.

2. Decision support systems are used in management.
3. Information technology extends the limits of computers incorporating artificial intelligence and providing decision support.
4. Computers are used to pursue business strategies realized in various programs for airlines, car rental firms, hotels.
5. Great attention is paid in the text to the management information system
6. Information is the main resource in our today's society.
7. MIS is a new branch which serves organization's functional areas.

2. Understanding the passage

Decide whether the following sentences are true or false (T/F) by referring to the information in the text. Then make the necessary changes so that the false statements become true.

1. Information is a critical resource in today's knowledge society.
2. Computers are widely used nowadays because of the speed and cost savings of information processing.
3. A smaller part of companies' personnel is engaged in some form of information handling.
4. The use of computers is as long as 40-50 years.
5. Today's information resource is used primarily for cost reduction.
6. Computers and communication resources are joined into a management information system to provide information for decision making.
7. MIS is an individual system with highly specific tasks.
8. Office automation and communication networks facilitate clerical support.
9. The basis for the wide range of computer and communication technologies is the management information system (MIS).
10. MIS is an integrated, computer-based system used for decision-making functions and all kinds of operations.

11. The functioning of MIS is based on decision models contained in the database.
12. MIS was widely used in 1960s and 1970s.
13. DSS is an independent decision-making system.
14. DSS contains the traditional terminal.

3. Locating information

Find in the text those passages where the following ideas are expressed. Give the passage references.

1. The examples illustrating the use of information in pursuing business strategies.
2. The definition of MIS.
3. The role of computers in business nowadays.
4. Time spent on processing and communicating information.
5. The logical structure of DSS.
6. The challenge of the 1980s in using information technology.
7. The description of decision models.
8. The development of MIS.

4. Contextual reference

Look back at the text and find out what the words in bold type refer to.

1. ... **that** supports ... (30)
2. **It** serves ... (30)
3. ... into **it**. (32)
4. ... **it** has gone ... (33)
5. ... **that** use ... (45)

5. Word forms

Choose the appropriate form of the words to complete the sentences.

1. to manage, manager, management, managerial

1. Quality information is necessary for ... and decision making.
2. ... of all levels use decision models drawn from the database.
3. DSS is the ... use of computers.
4. ... information system had its foundations in the early 1970s.
5. MIS helps to ... a business.

6. Understanding word forms

Fill in the missing words. Refer back to the text if necessary.

<i>adjective</i>	<i>verb</i>	<i>noun</i>
popular	-	+
+	use	+
+	execute	+
-	deliver	+
-	apply	+
-	reduce	+
-	emphasize	+
+	compete	-
intelligent	-	+
+	manage	+
+	repeat	-

7. Content review

Summarize the text by completing the table:

	<i>MIS</i>	<i>DSS</i>
Definition	+	+
Development	+	–
Application	+	+
Structure	+	+

8. Organizing information

Summarize the contents of the text “Computers Nowadays” by completing the following table.

Computers in business

When introduced	+
Application	+
Advantages	+
Points to be discussed	+

UNIT 11

Management Information Systems (1)

1. MIS Definition

Just what is MIS? What does it do? There is no agreement on a common definition. Terms such as information systems, information services, or information processing systems, often used as synonyms for MIS, refer to an information system that supports transaction processing and management decision-making functions.

MIS, a field of over a quarter century's standing in practice and a subject of research since the late 1960s, is *an integrated, computer-based, user-machine system that provides information for supporting operations and decision-making functions*. Its key elements are:

1. *Integrated system* to serve many users.
2. *Computer-based* system that integrates a number of applications through a database.
3. *User-machine interface* that gives instant response to ad hoc inquiries.
4. *Providing information* to all managerial levels.
5. *Support of operations* and decision-making functions.

These elements tell us that MIS can be an important organizing medium. Developing a MIS means creating a new environment in which to manage a business. To clarify this point, we will elaborate on each element and discuss the activities that led to the development trends in MIS.

2. Integrated System

If MIS is to provide a new environment for decision making, the applications must be integrated to serve all authorized users. Integration means centralizing files for shared access to information across applications. It also means eliminating redundancies and inconsistencies that are common in

traditional files. Individual applications designed with one user in mind are often incompatible with other applications that use the same data. In contrast, a single application integrating common data across users becomes the preferred approach in application design.

Integration in computer-based applications is usually based on a master plan that commits management to MIS development. The plan specifies actions to be taken, standards, and guidelines for installing an information system. Although users may develop their own applications on freestanding microcomputers, a master plan can require that such applications be compatible with the organization's mainframe. Providing diverse applications within integration standards is a trend that promotes user-machine interface and compatibility of files for use by multiple users.

3. Computer-Based System

A MIS depends heavily on the capabilities and power of the computer used for it. A computer system has four major components: input, processing, output, and secondary storage. Data are entered into the central processing unit (CPU) through an input device such as a keyboard. The CPU acts on the data based on an application program stored in the computer's main memory. The resulting information is produced through a printer in the form of a report.

Today's computer power makes MIS a reality. The question facing MIS designers, however, is not how much computer power is required, but what applications should be run on the computer. Choice of applications depends on how ready the user is to interface with the computer, cost/benefit aspects, and management support for change.

Because management information systems are computer-based, developing a MIS depends on the right choice of hardware, software, database, procedures for computer operation, and MIS personnel – analysts, database designers, programmers, computer operators, and support staff.

Exercises

1. Main idea

Arrange the following points in accordance with the logic of the text.

1. Purpose of MIS.
2. Definition of MIS.
3. Sort of integration in MIS.
4. Development of MIS.
5. Reliance on computers.

2. Understanding the passage

Decide whether the following sentences are true or false (T/F) by referring to the information in the text (then make the necessary changes so that the false statements become true).

1. Such terms as information systems, information services, information processing system are synonymous to MIS.
2. MIS was put into service some 50 years ago.
3. MIS includes more than five key elements.
4. Integration in MIS differs from traditional approaches in several aspects, such as file organization, multiple access to databases.
5. A trend is to provide diverse applications within integration standards.
6. A computer system has three major components: input, processing and output.
7. Developing a MIS depends on the choice of hardware, software, database, procedures for computer operations, and a MIS personnel.

3. Locating information

Find those passages in which the following ideas are expressed. Give the passage references.

1. The essential properties of MIS.
2. Problems of system designs.
3. Problems of information access.
4. Planning of installation and maintenance of MIS.

4. Understanding the concept

Match the term and its definition.

1. user/machine interface
 2. response
 3. user
 4. information system
 5. information
-
1. By ... is here meant a subsystem of a communication network for interaction between the computer terminal (or a command center of a network) and a human operator.
 2. ... is a person utilizing a terminal or a PC to provide inputs or obtain outputs from a database.
 3. ... is an information provided from databases on a visual display terminal.
 4. Any signal transmitted or stored in a network is qualified as
 5. Any system designed to perform operations upon data by some form of automatic processing and control is termed

5. Organizing information

Summarize the contents of the text “Management Information Systems” part 1 on the following topics:

1. Key elements of MIS.
2. MIS is an integrated system.
3. MIS is a computer-based system.

UNIT 12

Management Information Systems (2)

4. Using a database

A major component of MIS is the database. Before it became available, users operated in a conventional file environment. Programs handled data with no data sharing across applications. In a database environment, common data are available to multiple users. Instead of restricting each user or program to managing separate data, users share data across applications. The software, called the database management system (DBMS) manages the data as an entity and coordinates data sharing.

A database is critical for MIS operation. It stores information as an integrated entity. The goal is to make information access easy, quick, inexpensive, and flexible for the user. This is accomplished by controlling redundancy, making the system user friendly (easy to learn and use), and ensuring data independence (changing hardware or adding new data without having to rewrite existing programs), and data accuracy and integrity.

Managing databases requires a database administrator (DBA) to coordinate data activities and the database. Besides a background in management, the DBA is expected to have the technical knowledge to deal with database designers. For the success of this key role, MIS staff and senior management support is critical.

5. Using Models

MIS applies decision models for problem solving. A model is a near representation of reality. Decision models are oriented to a number of decision-making areas:

1. Evaluation of investment alternatives (e.g. net present value analysis).
2. Data analysis (e.g., sales analysis).
3. Scheduling (e.g., production scheduling).

4. Simulation (e.g., plant expansion planning).

Today's modern manager uses models for studying decision situations. A database provides an interface with the models on a real-time basis that is processing inquiries or data as they actually occur.

Despite a surge in popularity during the past decade, decision models have not been as effective as they should be. In many cases, they are used on an ad hoc basis. Model outputs stand alone rather than as inputs to other models. Most decision models are also not easily updated and lose their usefulness in a changing decision-making environment. One alternative is to have an integrated database that is compatible with the model.

6. User-Machine Interface

A critical element in MIS design is the user-machine **interface**, an environment that allows the user to enter a command into the computer and the computer displays the results on the screen. This face-to-face dialog improves the user's decision-making potential. Today's computers provide online interface between the user and the machine by means of screen, keyboard or "mouse", menu-driven software, and the physical design of the system to match human comfort. The last factor falls under the category of ergonomics because it is concerned with comfort, fatigue, ease of use, and issues that affect the welfare, satisfaction, and performance of people working with user-machine systems. For example, a built-in swivel under a monitor allows a user wearing bifocals to tilt the screen for easy reading angle. Similar features apply to the design of desks, chairs, lighting, etc.

The concept of user-machine interface is a major step away from the days when an end user got reports only through the computer center. The end user is anyone authorized to enter, access, or retrieve data from a computer facility. In an interface environment, the end user interfaces with the computer on a real-time basis. Instructions are entered through a keyboard. The computer may be a

freestanding microcomputer or a mainframe serving multiple users through remote terminals. Response to inquiries is either displayed on a monitor or printed out in a matter of seconds.

The user-machine interface has several implications:

1. The user is likely to support a computer if the language or procedure is easy to learn and use.
2. The hardware and software must produce results in time to be used for making decisions.
3. MIS designers must have knowledge of computer technology and the user's business requirements to ensure a successful user-machine interface.

Today's trend in MIS development suggests that the user need not be a computer "hacker" or an expert in information technology. The goal is to design a system that accepts user inquiries in English-like words, processes commands through a menu-driven format, and produces results accurately, quickly, and completely.

Exercises

1. Main idea

Arrange the following points in accordance with the logic of the text.

1. Trends in MIS development.
2. Model approach to decision making.
3. Aspect of human factor in the whole system.
4. Implications of user-machine interface.
5. Description of software.

2. Understanding the passage

Decide whether the following sentences are true or false (T/F) by referring to the information in the text (then make the necessary changes so that the false statements become true).

1. The database is a major component of MIS.
2. The role of database administrator in MIS is negligible.
3. There are three areas of models applications.
4. Models are used in the same way as during the past decade.
5. User-machine interface is an important element of the system.
6. Computers provide on-line interface between the user and the machine by means of hardware facilities, special software products and physical design of the terminals.
7. The concept of user-machine interface differs from the early days of computers.
8. Today's user of MIS is not supposed to be an expert in information technology.

3. Locating information

Find those passages in which the following ideas are expressed. Give the passage references.

1. Comfort of an operator in the system design.
2. The category of ergonomics.
3. Real-time basis of operation.
4. Implications of user-machine interface.

4. Understanding the concept

Define the following terms. Refer back to the texts and use glossary.

1. hardware
2. software
3. database

4. procedure
5. personnel
6. redundancy
7. user-friendly system
8. model
9. end user

5. Organizing information

Summarize the contents of the text “Management Information Systems”, part 2 on the following topics:

1. MIS is a critical resource in information handling.
2. MIS is an important medium in decision making.
3. MIS is based on user-machine interface.

REVIEW 4: INFORMATION SYSTEMS

Type of activity: COMPREHENSION CHECK

Strategy:

- Read and translate the text without a dictionary.
- Then answer the review questions.

MIS Review

[1] MIS is an integrated, computer-based, user-machine system that provides information for supporting operations and management decision-making functions. Integration means centralization of files across applications and elimination of redundancies.

[2] MIS depends heavily on the computer's processing power. A computer consists of input, processing, output, and secondary storage components for supporting MIS activities. The operating elements are the hardware, software, database, procedures, and MIS personnel.

[3] A major computer-based aspect of MIS is the database with common data shared by multiple users according to need and prior arrangements. The software that manages the database is the database management system or DBMS. The overall objective is to make access to information easy, quick, inexpensive, and flexible for the user.

[4] MIS applies various decision models oriented to a number of decision-making areas such as evaluation of investment alternatives, data analysis, scheduling, and simulation. Database provides a constant interface with the models for analysis and solutions.

[5] The user-machine interface represents the screen, the keyboard, user-friendly software, menus, and ergonomic features for human comfort. Through the keyboard, the user enters instructions for information access or retrieval. The implication of this interface is that the user can "live" with a user-friendly environment and a system that can produce results for decision-making.

[6] The personal computer has introduced a new way of doing business. It started as a stand-alone for specific application processing; today it is being linked to the mainframe, allowing the user to interface with corporate databases for decision making.

[7] DSS is a computational aid to help managers integrate judgment, experience, and insight with focus on management performance. It is used in planning and examines alternatives in relatively unstructured decision making situations.

[8] The expert system, an extension of artificial intelligence, is one aspect of DSS with a knowledge base and decision rules for representing the "expert's" thought processes.

[9] The trend in MIS is to get closer to the user and expand the information system network to allow transactions to be collected closer to their source. This goal is achieved by the availability of intelligent terminals and the personal computer.

Review Questions

1. What is MIS? Do you agree with the text's definition?
2. Describe briefly the operating elements of MIS. Which elements do you consider most critical?
3. "In a database environment, common data are available and used by several users." Do you agree? Explain.

4. Distinguish between:

- isolated and consolidated computing;
- structured and unstructured decision making;
- embedded and distributed computing.

5. What is DSS? Carefully discuss the relationship between MIS and DSS.

6. In what way is MIS changing business organizations? Explain in detail.

TEXT 1

Type of activity: UNENTITLED TEXT

Strategy:

- Read newspaper articles, choose the most suitable heading from the list A-G for each passage.

The headlines:

- A. Smaller Digit**
- B. Car Check**
- C. Clever Copier**
- D. Chinese Cracker**
- E. CD-TV**
- F. Pirates Lose**
- G. Ring In the New?**

(1 ____)

MERCURY is hoping that the national code change due to take place next April will result in hordes of new customers. Companies have sometimes been deterred from switching from BT to Mercury because the move involved having to change telephone numbers, inform customers and change the numbers on stationery and vehicles.

Mercury claims that almost a third of British businesses will now consider switching since phone numbers will be changing next year anyway.

(2 ____)

SINGAPORE is launching the world's first electronic road-pricing system to reduce traffic congestion. Under the system now being tested, selected entry points send a signal to an electronic card fixed to a vehicle when it passes a marker to enter a restricted area.

It the stored-value card is absent or does not contain enough money, the system will riggers cameras to photograph the rear licence plate of the vehicle as it passes.

(3 ____)

SONY has shown off a new CD-ROM game machine in Tokyo that it will start selling to the end of this year.

The "play station" will come equipped with a detachable card, plug into conventional television sets and give buyers high-resolution computer graphics of about the same quality as that of workstations, the company says.

The machine, likely to cost about £300, will compete with a similar 32-bit machine that went on sale in March from Matsushita, Sony's arch-rival.

(4 ____)

DIGITAL Equipment nay shed another 20,000 jobs over the next two years and sell some businesses in an attempt to become more competitive.

Digital employs about 92,000 workers, including temporary employees, and has previously said it intends to cut 7,000 jobs this quarter Robert Palmer. Digital's chief executive says the company should have a workforce of only 65.000.

(5 ____)

CHINA is to launch 30 foreign satellites over the next seven years. The launches will be made on by the new Long March. A rocket, the most ambitious development yet, is created in an industry employing 100.000 peoples with an annual budget exceeding £30 million.

China is in competition with the European Union, Japan, Russia and the United States for a share of the lucrative market for launching satellite.

(6 ____)

A PHOTOCOPIER has been developed by Ricoh with an automatic page-turning system for copying books and other bound documents without damaging them.

The machine consists of a scanner and a page-turning belt. The document to be copied is placed on its spine on a special tray inserted into the copier. The belt is charged electro-statically to attract each page.

(7 __)

WARSAW police have confiscated about 3.300 discs and detained six dealers of illegally copied computer software in their firm significant action against computer pirates.

In Poland, an estimated 94 per cent of all computer software is illegally copied. Under Poland's new copyright law, convicted software "pirates" face up to three years jail.

TEXT 2

Type of activity: JUMBLED TEXT

Strategy:

- Read the paragraphs quickly, and then put them in the right order.

A PC that can read

(1 ____)

Textpert can read at a rate of 1,500 characters per minute. A full-page typewritten document can be scanned in one or two minutes. Textpert can handle hyphens and other punctuation, read graphics and spread-sheets (meaning numbers) and recognize different type fonts on the same page. And, it can be trained to read unusual type styles. Once trained, it will read different sizes of that style automatically. The program's error rate – when used with original, uncreased documents in good condition – is said to be less than .05 percent.

(2 ____)

OCR software for PC's has been around for a few years. But earlier programs could read only a few typefaces and a very limited range of type sizes. They were also error-prone and somewhat difficult to operate. Textpert can read all nonstylized typefaces – in any Indo-European language – between six and 46 points in size. It also recognizes precise hand-lettered manuscripts, though not ordinary handwriting. The program, which requires one megabyte of computer memory, was designed for use with a Macintosh and a standard digital image scanner (a device that looks like a portable copier and scans pages that have been placed face down on it). But now it is also compatible with any PC.

(3 ____)

You've finally decided to pull your Great Unpublished Novel out from under the bed, where it's been yellowing in a carton, and send it to a publisher. But first you've got to clean up the dirty, error-filled manuscript. Until recently, you would have had two alternatives: type it into a PC yourself – a laborious task – or pay someone else to do it for you – an expensive proposition for an unpublished writer. Now there's a better way. Let your PC "read" and store the book quickly, using an optical character recognition (OCR) software system.

(4 ____)

Boon to libraries: There are many potential applications. In desktop publishing, OCR systems can be used to enter original documents and graphics into a computer for editing and reprinting. It might also become a boon to legal and financial companies, libraries and archives, which instead of employing armies of key punchers to enter and manage large volumes of data, could scan pages of information rapidly for storage on optical disks. Some years ago a team from the Oxford University Press began the Herculean task of transferring the six-volume second edition of the Oxford English Dictionary into computerized files. It was not feasible to use OCR for the task because, at that time, the systems could not pick up the multitude of fonts in the dictionary. As a result, it took 150 clerks 18 months to key punch all the information into computers. Today, with improved OCR, the task would take half as long. It is estimated that the worldwide market for OCR software will certainly grow further.

(5 ____)

Some years ago Spanish company, Ciencia i Tecnologia Aplicada (CTA) of Barcelona, released the second generation of its Textpert OCR system. According to officials at CTA, the new Textpert is one of the first affordable,

high quality OCR systems for PC's. It's the first program to bring sophisticated text character recognition to the PC.

Glossary

A

application – a particular problem to which information technology is applied.

artificial intelligence (AI) – The goal of artificial intelligence work in information technology field is to develop computer systems that exhibit some of the intelligence characteristics of human beings. It is an intellectual hybrid built on the disciplines of philosophy, linguistics, mathematics, electrical engineering and computer science. There are several sub-areas within AI, of which the most important are expert systems, natural language understanding, computer vision, knowledge representation and learning systems.

automatic teller machine (ATM) – a device used to dispense cash and for other banking functions, popularly known as ‘hole-in-the-wall’ banking machine. Most ATM read plastic cards which identify the customer and perhaps carry details of credit limits. They are connected by data communication links to the computer system of banks and other financial service companies.

authorization – giving a user permission to access a system.

B

batch processing – computer processing of information that has been assembled into batches of transactions prior to input. Batch processing was the main method used in the early days of data processing.

C

compatibility – the ability of one component of a computer-based system to work with another. This can apply at a number of different levels:

Program compatibility means that a program that runs on one type of machine will also run on another.

Language compatibility means that a program written in that language can be compiled and run.

Plug compatibility means that a hardware component can replace another and plug into the same interface socket.

computer-based system – a computer system, plus the people and procedures within an organization that make use of it, interacting to meet some defined goal. In the field of information technology, the computer will be a digital computer and the goal will be to generate and/or handle information.

D

data administration – a role associated with data management and the concept of ‘data as a resource’, arising from database management. Data administration deals with the business and political issues arising from the sharing of data across organizational units.

data independence – the concept that data should be independent from the programs that use it and from how it is stored, so that either can be changed without affecting the other, and so that people (programmers, end-users) using the data do not need to know things that are irrelevant to their particular tasks. Data independence can be divided into two broad categories: physical data independence and logical data independence.

data management – the formal collection, storage and preparation of data, to ensure that it is available and appropriate for the uses to which it may be applied within an organization. Data management uses techniques such as data analysis, and software tools such as data dictionaries and database management systems.

data terminal – 1) used within telecommunications to mean any device capable of sending or receiving digital information over a communications network; 2) used within computing to mean a device that operates under the control of a computer system and to which it is connected by means of a communications link.

database management system (DBMS) – a set of interrelated software tools designed to construct and provide access to a database held on a computer system, and to control the privacy, security and integrity of the data. The tools usually embody special programming languages for describing and manipulating the data, known as data description and data manipulation languages respectively. They may also include a data dictionary system – a means of recording the contents of a database and how it is used.

decision support system (DSS) – a computer system designed to help people to make decisions. It will normally provide some means of capturing and storing the data on which decisions depend, plus various tools that can be used to manipulate the data, in order to model alternatives and explore the consequences of different courses of action.

distributed data processing – data processing where a number of independent computer systems are installed at different locations to process and store data that originates locally.

E

embedded – integrated into another device or routine in such a way that the user of the latter is not aware of its presence.

end user – the ultimate user of a computer system, rather than the people that purchase it or develop applications programs for others to use.

H

hack – originally meant to program software or alter programming code, usually operating outside the formal business structure of the software industry, but is now associated with attempting unauthorized access to a computer than with programming. This breed of hackers has gained a bad name because of their much-publicized successes in breaking through the security procedures surrounding Government computers, but hackers have also been the source of a

great deal of valuable public domain software for home and personal computers, distributed via bulletin boards and from user to user.

I

information management – a general term used to characterize any form of business or office management that considers information (data, text, images, etc.) and information resources (including personnel and information systems) as primary assets.

information processing – a term that superseded data processing when the application of computers widened beyond the basic operational systems of organizations that were the initial targets. Thus it includes the application of computers to tasks in the office, the warehouse, the sales outlet, the factory; and the processing of documents, images, etc. As well as structured data.

information technology (IT) – electronic technologies for collecting, storing, processing and communicating information. They may be separated into two main categories: 1) those which process information, such as computer systems, and 2) those which disseminate information, such as telecommunication systems. Increasingly, the term is used to describe systems that combine both.

integrated program support environment (IPSE) – a set of computer-based tools for specifying, designing, programming and testing computer applications. IPSEs are intended to provide a complete method for developing systems that is independent of the programming language used.

integrity – used of a set of data, such as one or more data files, to mean that it is internally consistent and represents what it is supposed to represent.

interface – the meeting of two components of a computer system or an information system that have differing characteristics. Thus they must be matched in order for the system as a whole to operate. The term is used both for the manner in which the matching takes place and for the device that executes it.

M

management information system (MIS) – This term was first coined when early data processing systems outgrew their original role of controlling basic business processes, and began to be adapted to meet managers' information needs. It is also used in a narrower sense to mean an application specifically designed to supply managers with information.

multi-user – of computer systems, able to be used by more than one person at the same time. This is achieved mainly via the operating system, which shares out the system resources, such as processor and memory, among the programs being run by different users.

O

on-line processing – processing carried out under the control of the main computer within a computer-based system.

R

redundancy – 1) the inclusion within a computer system or within its components, of additional capacity not required to meet normal demands. This additional capacity is brought into use when failures occur, thus achieving higher reliability.; 2) the attachment of extra information to a data field, so that accuracy can be checked, for example after transmission or after being entered at a keyboard.

resource – 1) any part of a computer system that a program can request the use of, such as an area of memory, a printer or a data file. Normally the program must reserve the resource first, either implicitly when it is loaded or explicitly by issuing a request to the operating system. 2) On some computer systems, the term is used in a special sense to describe anything used by a program that is likely to change depending on the use made of the program. This is defined as a

resource external to the program, rather than being included within it, so that it can easily be changed when needed.

resource-sharing network – a communication network used by computer systems at different geographical locations (commonly universities and other research institutions) to share one another's resources.

S

simulate – operate in the same manner as, in terms of the activities undertaken. This is normally achieved via software programmed to behave as nearly as possible like the device being simulated.

spreadsheet – an application program (usually a package) that helps users to build up two-dimensional tables of numeric and text information.

system analysis – the process of analysis used to decide how best to put a computer-based system to work in a particular area of an organization's operations. In the normal development life cycle of a computer-based system, the systems analysis stage follows the feasibility study, which decides whether a development is desirable and what its objectives should be, and precedes the system and program design stages, which are concerned with how the system should be constructed.

system implementation – the process of delivering to its intended users the programs that constitute a new computer-based system, and bringing into operation the new procedures required to use them.

system specification – a document that defines how a computer-based system will be expressed in hardware and software terms. It may also explain in detail how the system will operate, in terms of the clerical or other procedures that it affects. The system specification is the main product of the systems design stage of systems development, and it forms the basis on which equipment will be procured and programs will be designed.

T

transaction – all the processing activities – updating of files, returning an acknowledgement, etc. – that must be completed within a computer system to record an external transaction, such as the placing of an order by a customer or a purchase in a shop. Where the data for a transaction is entered via terminals (commonly called teleprocessing), a transaction might consist of a number of exchanges of messages between the terminal and the computer system containing the applications program. Also used to mean the message or messages that are generated and sent to the computer system to record the transaction.

U

update – change the contents of a data file, a program or a variable to reflect the latest required values.

user-friendly – describes computer systems and applications that non-specialist users find easy to use.

READING COMPETENCE 2

TEXT 1

Type of activity: JUMBLED TEXT

Strategy:

- The article consists of 5 paragraphs that have been mixed up. Read the paragraphs quickly, and then put them in the right order.

Motorola Shows High-Speed Modems

(1 ____)

V.32 modems, series 3265/66 and 3265/66 FAST, are among the world's quickest and most reliable. The 3265/66 series modem provides information exchange. It also has full-duplex reading and runs synchronically as well as asynchronously with all the important applications for personal computers.

(2 ____)

With the help of Motorola modems and any personal computer you like you can join the global information exchange through the telephone net. It will save you a good deal of time and money.

(3 ____)

The Motorola Information system Group, which originated from the merger of the Motorola Codex and Motorola UDS – offers its new models for Russian companies: V.32 and V.34 modems. Motorola's modem series provides access to economic and financial information and e-mail communication. It facilitates modern stock operations and offers even more services.

(4 ____)

Self-control, distant reconfiguration, high data compression, and error correction make V.32 series 3265/66 and 3265/66 FAST modems compete successfully with other companies' products. V.34R modem is one of the company's new prospective models. It provides a great transfer rate, which means a considerable advance in V-Fast technology.

(5 ____)

Creation of modern facilities for information exchange is a very important issue for banks and private companies in Russia and the CIS. Joining the Society for Worldwide Interbank Financial Telecommunications (SWIFT), information exchange between banks, creation of private networks and involvement in global telecommunications requires new modern equipment for the customers.

TEXT 2

Type of activity: JUMBLED TEXT

Strategy:

- Here are three newspaper articles, but they have been mixed up.
- Look at the headlines, and read the paragraphs quickly to decide which paragraphs go with which story. Then put them in the right order.

Computerized Maps For Space-Age Cars	Safer Car Telephones	Car Talk
---	-----------------------------	-----------------

(A ____)

For now, the major stumbling block to full-scaled production of satellite-guided cars is the price, which is prohibitive. Ground-based receivers can cost as much as \$100,000, though that figure should drop quickly once they go into mass production. In addition, an inexpensive screen suitable for cars still needs to be developed. Despite those obstacles, however, most firms seem confident that the bugs will be ironed out and that a \$500 car-navigation system could be available soon. By then, it is possible that no motorist will ever have to ask directions – or tackle a clumsy paper road map – again.

(B ____)

Clear Voice is designed to replace existing cellular mikes. The product is said to be compatible with almost any cellular car phone with hand-free circuitry. Shure also has a right-hand drive version of the system for the United Kingdom and Australia. Price: \$199.

(C ____)

The navigation systems consist of a receiver for satellite radio transmissions, a display screen and a computer that acts as an interface between the two. Road maps are stored on a laser videodisc, and the driver can call up the appropriate map on the display screen by touching a button. The receiver pulls in radio signals from three satellites, which the computer then uses to calculate the vehicle's location on the map.

(D ____)

Now comes a new cellular microphone and amplifier, whose manufacturer, Shure Brothers Inc. of Evanston, IL, claims eliminates most background noise and provides practically the same high audio quality as car handsets. The system is called Clear Voice. According to officials at Shure, it has two advantages over

ordinary hand-free mikes; its technical design and its position in relation to the driver. The microphone attaches directly to the shoulder strap of the user's seat belt, bringing the driver's voice closer to the point of transmission. And the mike employs a high-directional pickup pattern that is said to discriminate against sounds coming from behind or to the side of the microphone.

(E ____)

Even a limousine would be cluttered if it had to cart around more than 10,000 maps, and the most diligent driver-navigator would be hard put to pinpoint a car's location down to 300 yards. But soon those capabilities may be available to any automobile buyer as a result of a space age navigation system that uses computerized maps and radio transmissions from satellites to pinpoint the exact location of a vehicle. Already, most major car manufactures are considering satellite based navigation. The three principal American automobile manufactures – General Motors, Ford and Chrysler, as well as Japan's Mazda and Nissan have developed prototypes.

(F ____)

Automobile drivers and passengers now face a new, unseen hazard on the road: the users of cellular mobile telephones. Looking at the phone while dialing or speaking can prevent drivers from keeping their hands on the wheel and their eyes on the road: industry experts agree that drivers are more likely to have an accident while using their phones. That fact has stirred concern among highway safety organizations and legislators in the United States, and some want to ban cellular phones altogether. While manufacturers have not yet come up with a cellular mobile phone that is completely "hands free", several companies have recently developed components that could make mobile phones less distracting – and their users less accident prone.

(G ____)

The most obvious advantage of the futuristic navigation system is that they make it nearly impossible for driver to get lost. The systems also give the driver instant access to a computerized equivalent of a massive road atlas. Depending on how the systems are programmed they can deliver the sort of guidebook information that a vacationer would find help. In addition, the computers can help drivers plan trips by showing the best route to a particular destination.

(H ____)

Cellular car phones are a popular but problematic innovation. All come with so-called hand-free microphones, many of which are mounted on the visor and allow the driver to talk while keeping both hands on the wheel. The problem is that the mikes pick up back-ground noise (from the engine, air conditioner, radio or traffic) which sometimes makes it difficult for the person at the receiving end to understand what the driver is saying. To avoid the problem some drivers revert to the handset, but that invites danger because one hand must be taken off the steering wheel.

(I ____)

Voice Control Systems, Inc., based in Dallas, Tex., has developed a microprocessor unit that allows standard cellular telephones to "dial" numbers at the sound of a human voice. The Voice Dialer unit is attached to the phone's transmitter and receiver in the car's trunk. Programmed with a limited vocabulary, it can respond only to digits and specific control commands spoken by the user, who must pause a quarter of a second between each digit or command. (Frequently dialed numbers can be preprogrammed into simple, single command codes.) The driver picks up the handset, and initiates calls by saying "Dial," followed by the number or command code; a synthesized voice

will repeat the number sequence and place the call when told to "Send." A unique aspect of the Voice Dialer is that it is speaker independent; the unit will respond to any voice regardless of gender, accent or tone. Voice Control hopes to have the units on the market by the end of the year. Price: \$500.

(J ____)

Cellular Research Associates, inc., of Ft. Worth, Texas, has introduced a cellular microphone that – with the exception of dialing – makes automobile telephone use totally hands free. Measuring only four square inches, the AutoMic unit can be clipped to the car's visor, steering column or anywhere near the phone user. The microphone's cable is plugged directly into the base of the phone. Equipped with a microchip amplifier similar to those in some high-quality stereo systems, the AutoMic is particularly sensitive in picking up voices as well as reducing distortion caused by the rumbling of the engine and road noise. Taking advantage of the existing speaker in the phone base, AutoMic enables the user to talk and listen to the other party at the same time. Unlike similar hands-free units being developed by some car manufactures for their top-line automobiles, the AutoMic can be attached to almost any cellular mobile phone.

TEXT 3

Type of activity: JUMBLED TEXT

Strategy:

- Here are two newspaper articles headlined “Putting the finger on security” and “Scanning fingers”, but they have been mixed up.
- Look at the headlines and read the paragraph quickly to decide which paragraphs belong to which articles.

Putting the Finger on Security: Biometrics Could Make Any Combination Locks Obsolete	Writing to Your Computer
---	---------------------------------

(1 ____)

Think this is only the stuff of fictional covert operatives! Think again, and welcome to the new world of biometric security. It is a world in which traditional keys and combination locks could eventually become obsolete. Increasingly, access to buildings, rooms and vaults will be controlled by computerized machines that can recognize characteristics of people seeking entrance: fingerprints, blood-vessel arrangements in the eye's retina, voice patterns, even typing rhythms. These biometric machines have special sensors that pick up the characteristics, convert them into digital code and compare them with data stored in the computer's memory bank. Unless the information matches up with the characteristics of authorized persons, entrance is denied.

(2 ____)

Penmanship traits: Designed to work with a personal computer, Personal Writer consists of an electronic writing slate to activate the program. If the writer is using the system for the first time, he must "train" it by hand copying two pages of text from manual. The Personal Writer program analyzes the

individual's penmanship traits and records them in a file. Personal Writer is available in two versions: one reads hand printing (writing with unconnected letters); the second, more sophisticated version reads script or cursive writing.

(3 ____)

Another biometric technique, voice verification, works by creating a digital picture of an individual's vocal tract. Bad colds or even Rich Little cannot trip up the device, since it recognizes the physiological characteristics that produce speech, not sound or pronunciation. Using this device is as easy as saying "Open sesame." Such major corporations as Hertz and Martin Marietta rely on the technology to protect their computer systems, and these user-friendly voice analyzers could be especially attractive to homeowners and small businesses.

(4 ____)

The main attraction of such a system is that it is virtually foolproof. Keys can be copied, combination locks cracked, and the computerized cards used to open doors in fancy hotels can be stolen. But no one can steal or copy a fingerprint. Another advantage: people who use biometric locks no longer have to worry about forgetting their keys.

(5 ____)

Anatex has begun marketing Personal Writer in France. For marketing purposes, the hand-printing program was made available first. They want people to get accustomed to the product. The script-reading version has been released soon after. Anatex markets Personal Writer in the United States. Anatex officials predict there will be strong demand for Personal Writer, even if rival software firms begin selling their own handwriting programs. After all, there's a potential worldwide market of 200 million bad typists.

(6 ____)

In an unusual application, Orion Re-Entry, California's largest privately owned halfway house for prisoners trying to move back into society, uses a finfingerprint scanner to monitor the comings and goings of its residents. Before

heading off for weekend furloughs or checking in from work, residents press their right forefingers against the machine. "It's much more expedient than the body checks we had in prison," says a resident. For the facility's manager, Bari Caine, the system is an excellent way to keep track of 84 residents and a high-turnover staff. "We can't always expect every staff member to know every resident's face," she says.

(7 ____)

The benefit of the computer revolution was elusive for one group of people: who can't – or won't – type. Lacking keyboard proficiency, they couldn't use computers to process data, write letters or access programs. Now the things are different. Anatex, a software firm based in Paris, has begun marketing Personal Writer, a program that reads handwriting and turns it into printed text on the computer screen. Its market is anyone who is more comfortable with a pen than a keyboard.

(8 ____)

A built-in 200,000-word dictionary, available in both English and French, helps interpret the handwriting. For example, if "seasons" is written with an "s" that looks more like "z", the program will check the listings for "seasonz", and, failing to find it, automatically insert the proper spelling.

(9 ____)

One limit on the spread of biometrics has been the high price – typically \$3,000 or more for a security-access system. But as with many other electronic gadgets, the cost could come down rapidly Ecco Industries of Danvers, Mass., hopes to market a \$300 voice recognition security device for consumers next year. Within a few years, biometric security systems may be incorporated into automated-teller machines and employed at checkout counters to verify that a person is not using a stolen credit card. "In time," predicts Joseph Freeman, head of a security market-research and consulting firm in Newtown, Conn., "you'll be able to touch a spot on your steering wheel and start your car."

(10 ____)

The most common biometric security system so far is the finfingerprint scanner. In Japan a developer is installing the devices in 360 luxury homes as a security selling point. A health spa in Denver employs a print scanner to keep track of how often its members use the facilities. MAPCO Inc. of Tulsa relies on a system from Identix, based in Sunnyvale, Calif., to ensure that only authorized truck drivers are allowed to transport loads of dangerous gases.

(11 ____)

In the new, updated version of the TV show "Mission: Impossible" special agent Jim Phelps no longer gets his top-secret instructions by merely opening an envelope and listening to a tape recorder. These days Phelps puts his right thumb on the special pad of a black box that, after reading his thumbprint, promptly pops open and gives a laserdisc video presentation of his next assignment. No one but Phelps can open the box because no one else has his thumbprint.

(12 ____)

Personal Writer can even recognize changeable handwriting: if the computer gets stumped by a strange "m" scrawled in a rush, it will ask for clarification and store the letter for future reference. In effect, the Personal Writer program can recognize nearly endless variations of any letter. Once the writing is transmitted into the computer, it can be displayed on the screen or printed out as a manuscript.

(13 ____)

Biometric eye scanners are in use in many high-security settings. One model, manufactured by EyeDentify of Beaverton, Ore., works by directing a low-intensity infrared light through the pupil to the back of the eye. Within two seconds the retinal pattern, viewed by a camera, is compared with data in stored records. At American Airlines' underground computer center in Tulsa, a dozen eye scanners screen the retinal patterns of 500 employees. "People were afraid

of it at first," says Hani Rabi, an engineering manager for the airline. "But now they feel very comfortable with the security it affords."

(14 ____)

About 20 U. S. companies, mostly young and small, are manufacturing biometric systems. Major customers include such security-conscious institutions as the military, nuclear plants, research labs and banks. The ultimate success of biometrics, however, will depend on broad business and consumer acceptance. Proponents hope the technology will someday be standard in companies, stores, homes.

БИБЛИОГРАФИЯ

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НА АНГЛИЙСКОМ ЯЗЫКЕ**

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