
UNIT 17 COMPUTER TYPES

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17.0 OBJECTIVES

In this unit our aim is to give you practice in reading comprehension by (a) setting a passage on types of computers, (b) giving a glossary of difficult words, and (c) asking question relating to comprehension of the passage. In the vocabulary section, we have set exercises asking you to (a) find synonyms and antonyms from the passage for the words listed and (b) fill in the blanks with technical words from the passage. The section on grammar and usage deals with connectives such as because, since etc. In the section on writing we give practice in writing definition of terms used in computer science.

17.1 READING COMPREHENSION

17.1.1 Study Guide

The passage first distinguishes between analog and digital computers and then describes salient characteristics of major types of computers available today. The passage also mentions some of the applications of these computer types.

After you have read the passage once, read it again with the help of the glossary we have provided at the end of the passage. Answer all the questions and check your answers with the answers given at the end of the unit.

17.1.2 Comprehension Passage

COMPUTER TYPES

Computers can be broadly categorised by the way they process data and by their size.

ANALOG VERSUS DIGITAL COMPUTERS

An analog computer processes data that vary continuously, such as variations in temperature, speed, the chemical composition of petroleum products, or the amount of current flowing through an electrical conductor. Analog computers are used for a wide variety of industrial and scientific applications that require the processing of data that are measured continuously.

Analog computers measure things. Digital computers, in contrast, count things. By far the majority of computers in use today are digital. There are more counting applications than there are applications that

require continuous measurement. Because of their pervasiveness in business settings, we will limit our attention here to digital computers.

Monsters, Mainframes, Minis and Micros

Categorizing computers by size is not very easy. That's because the computing power of a large computer that filled a room in 1970 can be carried about in a briefcase today. Nevertheless, those in the industry find it convenient to refer to computer systems as mainframe computers, minicomputers, and microcomputers. The term monster computer is reserved for computer systems of enormous power and size which are typically employed for scientific research and military applications.

Monster Computers

Monster computers are also known as maxi computers and supercomputers. The Cray and the CYBER computers are the best known examples of monster computers today. The Cray, for instance, sells for up to \$20 million, depending on its configuration. Its installation requires specially prepared subflooring to carry its weight and special plumbing to carry the fluorocarbon fluid needed to cool it. The purchase price includes the services of two full-time engineers to maintain it forever.

Fewer than 150 monster computers have been installed, although in the next few years that number is expected to triple. Monster computers are used in such applications as nuclear physics, meteorology and petroleum engineering as well as military applications. Today, weather forecasts for the entire globe can be predicted by one monster computer.

Mainframe Computers

Mainframes make up the bulk of computer installations in large organisations, at least in the sense that they do more data processing work than any other types of computers. Typical mainframe computers cost over \$400,000 and can exceed \$1 million. Because they have special power and environmental control requirements, mainframes are housed in special rooms. This feature has added greatly to the computing.

Mainframe computers often serve more than one user at a time because they are able to support large networks of individual terminals and remote job-entry locations. Banks, large commercial and industrial companies and government agencies all use mainframe computers, though they often use other types as well. Most professional programmers work in a mainframe environment, preparing new programs and maintaining existing ones.

Minicomputers

Minicomputers more properly called medium-sized computers, are smaller, slower, and less expensive than mainframes. They have no special power or environmental control requirements, so they can be located conveniently throughout an organisation's facilities. They cost between \$170,000 and \$40,000 millions can perform many of the tasks that a mainframe can, but on a reduced scale. They can support a network of user terminals, but not as many as mainframes can. They can store and retrieve data from same types of input and output devices as mainframes, but they have a smaller storage capacity.

Microcomputers

The microcomputer gets its name from the fact that its main computing component, the microprocessor, is located on one integrated circuit or chip. Larger computers use more than one chip for the various processing components. Of the four sizes of computers, micros are the slowest, but they more than offset that relative disadvantage with their ease of use and low cost. Microcomputers fit nicely on desktops; for that reason they are sometimes known as desktop computers. Many individuals purchase microcomputers for personal use, either for their jobs or for other purposes. Micros, then, are also known as personal computers.

(From 'Using microcomputers' by Richard W. Brightman and Jeffrey M. Dimsdale, 1987).

17.1.3 Glossary

process : manipulate information which is inputted to the computer by performing arithmetic or logical operations on it.

vary continuously	: change every moment.
chemical composition	: how substances are made up (their elements), how they combine, how they act under different conditions.
conductor	: substance that conducts electric current.
applications	: uses
digital	: pertaining to representation of information by encoding as bits of 1s or 0s that indicate on or off states.
pervasiveness	: to be present everywhere.
computing power	: power of the computer to do what the user wants.
brief case	: a case for carrying summary of instructions for the customer or user.
refer to	: speak of
reserved	: kept for the special use.
enormous	: huge
typically	: normally
employed	: used
maxi computers or super computer	: largest, faster and most expensive main frame computers available. Used by business organisations that need extraordinary amount of computing power.
The Cray	: Line of super-computers manufactured by Cray Research, Inc., including The Cray I - which can process 80 million instructions per second and has main storage for over one million characters - and The Cray 17, which can process a billion operations a second.
monster	: a thing of an extraordinary size or shape.
The Cyber	: line of super-computers and main frames manufactured by control Data Corporation.
configuration	: assembly of machines that are programmed to operate as a system. Lay-out or design of elements in a hardware or information processing system.
installation	: fixing an apparatus in position for use; a computing system.
subflooring	: flooring at a lower level.
plumbing	: pipes etc. in building.
fluoro carbon fluid	: any of a series of compounds of fluorine and carbon(corresponding to hydrocarbons) highly resistant to heat and chemical action.
maintain	: to eliminate faults or to keep hardware or programmes in a satisfactory, working condition.
triple	: become three times.
Nuclear physics	: the science of forces and transformations within the nucleus of the atom.
meteorology	: study of weather and climate.
weather forecasts	: predicting the weather.
globe	: the world

predicted	:	told in advance.
make up	:	form; constitute.
bulk	:	majority; most.
computer installations	:	computer systems.
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.
exceed	:	be greater than
power	:	energy (electric)
housed	:	placed
networks	:	several computers each working independently, but connected together in order to share resources such as disks and printers.
terminals	:	devices at which data is inputted to the computer or results outputted on to a screen or paper.
agencies	:	offices
professional	:	doing or practising something as a fulltime occupation or for payment or to make a living.
programmer	:	person whose job is to design, write, and test programmes and the instructions that cause a computer to do a specific job.
programme	:	a list of instructions which are used by the computer to solve a problem.
located	:	situated.
tasks	:	element of work that is part of getting the job done, such as loading of programme into computer storage.
reduced	:	smaller
scale	:	relative size.
store	:	hold and deliver it on demand at a later time.
retrieve	:	extracting data from a database or files.
input device	:	unit used to get data from the human user into the central processing unit, such as a card reader, cassette recorder, disk drive, keyboard terminal, magnetic tape unit, MICR reader, and an acoustic character recognition (voice input) unit.
output device	:	unit used for taking out data values from a computer and presenting them in the desired form to the user, such as a computer output, microfilm recorder, digital plotter, printer, and video display terminal.
storage capacity	:	number of items of data that a storage device is capable of containing. It is frequently defined in terms of computer bytes (k bytes or M bytes) or words (K words).
microprocessor	:	the central processing unit of a micro computer. Arithmetic, logic and control elements required for processing, generally contained on one integrated circuit chip.

offset : compensate for; balance.

relative : comparative.

nicely : very well.

17.1.4 Answer the following Questions :

Exercise 1

1. For what sort of data are analog computers used?
2. How is an analog computer different from a digital computer?
3. Why are digital computers popular in the business world?
4. Why are the Cray and the Cyber computers known as monster computers?
5. List the reasons which make the monster computer so expensive.
6. Why is the demand for monster computers increasing?
7. What special arrangements are required for the installation of main frame computers?
8. What are the special features of main frame computers?
9. In what ways do the mini computers differ from the main frame computers?
10. From where does the mini computer get its name?
11. What are the other names used for micro computers?
12. What has led people to purchase micro computers for their personal use?

17.1.5 Complete the table

Exercise 2

Complete the following table based on the information contained in the passage you have read. Wherever you find a dash it means that the information for that block is not given in the passage.

Types of Computers

Characteristics	Monster computer	Main frame Computer	Mini Computer	Micro computer
Size				
Storage capacity				
Speed				
Cost				
No. of users served at a time Installation Requirements Fields of use				

17.1.6 True or False statements

Exercise 3

Say whether the following statements are true or false (T/F) by referring to the passage you have read. If a statement is false, make necessary changes to make it correct.

1. Analog computers are used in the fields of industry and science because they are more accurate than the digital computers.
2. The computing power of a computer does not depend on its size alone.
3. The Cray and the Cyber are the only monster computers available today.
4. In big organisations no other computer type processes as much data as the main frame computer
5. Mini computers can do none of the jobs which main frame computers do.

17.1.7 Contextual reference

Exercise 4

Look at the passage and find out what the underlined words refer to

1. that vary continuously (line 3) _____
2. that require the processing of data (line 7) _____
3. Because of their pervasiveness in business settings,..... (line 11) _____
4. depends on its configuration (line 173) _____
5. Its installation requires (line 173) _____
6. includes the services of two full-time engineers to maintain it (line 176) _____
7. This feature has added greatly to the mystique of computing. (line 37) _____
8. Though they often use other types as well (Line 417) _____
9. and maintaining existing ones (line 44) _____
10. with their ease of use and low cost (line 53) _____

17.2 VOCABULARY

17.2.1 Synonyms

Exercise 5

Find synonyms from the passage for the following words:

- | | | |
|-------------------|-----------|-------|
| 1. Change | (para 1) | _____ |
| 2. Restrict | (para 17) | _____ |
| 3. Example | (para 4) | _____ |
| 4. set up | (para 5) | _____ |
| 5. Forecast | (para 5) | _____ |
| 6. Placed | (para 6) | _____ |
| 7. Characteristic | (para 6) | _____ |
| 8. Preserving | (para 7) | _____ |
| 9. Recall | (para 8) | _____ |
| 10. Balance | (para 9) | _____ |

17.2.2 Antonyms

Exercise 5

Find antonyms from the passage for the following words.

1. Narrow (para 1) _____
2. Interrupted (para 17) _____
3. Small (para 3) _____
4. Excludes (para 4) _____
5. Near (para 7) _____
6. Increased (para 8) _____

Fill in the blanks

Exercise 7

Fill the blanks in the following sentences by using the appropriate words from the list given below:

Monster computer	Micro computer
Analog computer	Main frame computer
Digital computer	Mini computer

1. A computer that measures continuously changing data such as speed and chemical composition is called an _____.
2. The largest, fastest and most expensive class of computers is known as _____.
3. A _____ is distinguished from a main frame computer by small size, lower cost and less data handling capacity.
4. A _____ manipulates discontinuous data and performs arithmetic and logic operations on such data.
5. _____ is a large, expensive computer generally used for information processing in large business organisation.
6. A small computing machine based upon an integrated circuit microprocessor is generally known as _____.

17.3 GRAMMAR AND USAGE

Exercise 8

Cause - effect relationships are very commonly used in scientific texts. They are expressed in many ways. For example, connectives such as because, since, due to, in response to, as are used in specifying a cause.

Examples

1. Because they have special power and environmental control requirements, the main frames are housed in special rooms.
2. Since computers have to handle both characters and numbers, the common approach is to have word lengths greater than eight bits but to allow each word to store more than one character.

Similarly, the connectives used to introduce a result are the following :

therefore, hence, for this reason, thus, so that, with the result that

Examples

1. Many hard disk systems attach several disks to one spindle, so that they all rotate together.

2. The efficiency of programming is a major cost of computer usage and is a major factor in assessing the feasibility of potential applications for the mini computer. Therefore, the manager of a mini computer stallation should make every effort to ensure that programmes are produced expeditiously.

Sometimes casual relationship is suggested by using 'if'

Example

If the original number is already in a normalised form, 0.1173 is represented as : 0.1173×10 .

Sometimes the use of verbs such as the following conveys a cause-effect relationship :

result in, result, cause, allow, prevent, enable, bring about, be caused by

Example

Certain advances in mass storage devices allow twice the amount of information to be stored on a disc by packing the information closer together.

Read the following sentences and underline the connectives and those parts of the sentences which express cause/effect/result.

1. Any record stored on disk may be retrieved without having to process through all of the preceding record in the file. For this reason, device, or DASD.
2. Input/output devices are often called peripherals because they relate peripherally to the central processing unit.
3. Printers and data entry devices such as keyboards are the slowest. As a result, the processor spends most of its time waiting for the peripherals to do their work.
4. The relations are not treated as files from which records must be read, but rather as tables of relationships, hence the name data base management system.
5. If the central memory component loses its information when the power supply is switched off, it is said to be a volatile memory.
6. Since the CM locations are expensive, there is a limit to the number that any computer will have.
7. Because the data are stored on tape sequentially, they must be processed sequentially.

17.4 WRITING

Defining

Exercise 9

It is a very common practice in scientific writing to define the new terms or ideas being discussed in order that they become clear to the reader. One very common method is to give the term being defined and say what it is.

Examples

1. Keyboard is an input device.
2. Microchip is a tiny silicon chip.
3. Cobol is an acronym for common business oriented language.
4. Arithmetic-Logical unit is a component of the CPU.
5. A card reader is an input device.

Very often the definitions given above proved to be inadequate in definitions and so are expanded by providing more information as in the following examples:

6. Talking computer is a computer system that uses a speech synthesis to produce speech.
7. Drum is an impact printer which has a spinning cylinder for each character position in a line.
8. Flow chart is a diagram which represents a solution of a problem.

The definitions 5 - 8 include the terms to be defined, the group they belong to and the characteristics which distinguish them from other members of the group.

Now write definitions for the following terms using the information given below:

S. No.	Terms	Group	Characteristics
1.	A computer	electronic device	processes information
2.	A programmer	a person	prepares programmes to solve problems.
3.	Artificial intelligence	a machine	emulates human processes
4.	A disk drive	a device	capable of transmitting magnetic impulses from the disk to the computer memory and vice-versa.
5.	Fortran	a high level programming	used for mathematical and scientific problems.
6.	A printer	an output device	changes the output data into printed form.
7.	A transistor	a small semiconductor	operates as an amplifier.
8.	A memory chip	a semiconductor device	stores information in the form of electrical charges.

17.5 LET US SUM UP

In this unit we have given practice in

- a) Understanding a passage dealing with different types of computers and their individual applications
- b) Identifying false statements and correcting them.
- c) Filling in a table dealing with some of the characteristics of the computers discussed in the passage.
- d) Filling in blanks with words from the passage .
- e) Finding out objects or persons who have been referred to by certain pronouns and demonstratives used in the passage.
- f) Finding out synonyms and antonyms.
- g) Causal connectives
- h) Writing definitions of terms used in computer science.

Answers to Exercise

Exercise 1

1. It is used for the data which varies continuously.
2. Analog computers measure things, whereas digital computers count things.

3. Digital computers are popular in the business world because there are more counting tasks in the business world and digital computers are good at counting things.
4. They are known as monster computers because of their power and size.
5. 1) lay-out, 17) installation requires specially prepared subflooring, and special plumbing, 3) services of two full-time engineers required forever for its maintenance.
6. They are found useful in the fields of nuclear physics, meteorology, petroleum engineering and military applications.
7. They require special rooms and special power and environmental controls.
8. They can support a large network of individual terminals, serve remote job-entry locations, and have a large memory capacity.
9. They support a smaller network of user terminals, have smaller storage capacity and can perform tasks on a reduced scale.
10. They get their name from the fact that they are mediumsized computers.
11. The other names are - desktop computers, personal computer.
12. Its cost is low and is very easy to use.

Exercise 2

Characteristics	Monster computer	Main frame computer	Mini computer	Micro computer
Size	Enormous	Big	Smaller than the main frame	Smallest
Storage Capacity	Bit	Big	Smaller than the main frame	Smallest
Speed Cost	Fast upto \$20 million	fast over \$400,000 and can exceed \$1 Million	Slower Between \$20,000-40,000	Slowest
No. of users-Served at a time	—	a large number	Not as large as main frame	One
Installation requirements	Specially prepared subflooring, plumbing, services of two engineers.	A special room, special power & environmental controls.	No special power & environmental controls	Can be used anywhere
Fields of use	Military scientific research, nuclear physics, petroleum engineering, meteorology.	Banks, large commercial, and industrial companies, Govt. agencies	In an organisation	Personal one

Exercise 3

1. False. Analog computers are used in the field of industry and science because they are good at processing data that vary continuously.
2. True.
3. False. The Cray and The Cyber are the two examples of monster computers used today.

4. True.
5. False. Mini computers can do many of the jobs which main frame computers do.

Exercise 4

1. data,
2. industrial and scientific applications,
3. digital computers,
4. The Cray's,
5. The Cray's
6. The Cray,
7. The main frames are housed in special rooms,
8. Banks, large commercial and industrial companies, and government agencies,
9. Programmes
10. Micro computers.

Exercise 5

1. variation,
2. limit,
3. instance,
4. installed.
5. predicted,
6. housed,
7. feature,
8. maintaining,
9. retrieve,
10. offset.

Exercise 6

1. Wide,
2. continuous,
3. enormous,
4. includes,
5. remote and
6. reduced.

Exercise 7

1. analog computer,
2. monster computer,
3. mini computer,
4. digital computer,
5. main frame computer,
6. micro computer.

Exercise 8

1. For this reason : a disk _____ DASD.
2. because: because they _____ unit.
3. As a result : as a result
4. hence; hence the namesystem.
5. If; If the control off.
6. Since; Since the CM..... expensive.
7. Because; Because the data tape sequentially.

Exercise 9

1. A computer is an electronic device which/that processes information.
2. A programmer is a person who prepares programmes to solve problems.
3. Artificial intelligence is a machine that/which emulates human process.
4. A disk device is a device which /that is capable of vice-versa.
5. Fortran is a high level programming language that/which is used for mathematical and scientific problems.
6. A printer is an output device which/that changes the output data into printed form.
7. A transistor is small semiconductor that/which operates as a amplifier.
8. A memory chip is a semiconductor that/which stores information in the forms of electrical charges.