UNIT 18 BASIC STRUCTURE OF A COMPUTER

Structure

18.0 OBJECTIVES

In this unit our aim is to give you practice in reading comprehension by (a) setting a passage dealing with the basic structure of a computer, (b)giving a glossary of difficult words and (c)asking different types of questions 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 given words, and (b) match words with their definitions. The section on the grammar and usage first deals with suffixes in English and asks you to identify suffixes and name the parts of speech they belong to. Secondly, it gives practice in the use of conjunctions such as but, however, nevertheless, and although (or though). The last section on writing asks you to write a paragraph based on the information and an outline provided.

18.1 READING COMPREHENSION

18.1.1 Study Guide

The passage begins by stating that the human mind and a computer share a lot because both of them need instructions and data in order to solve a problem. Then it goes on to describe the three units common to all computers, such as memory unit, Arithmetic units and control unit. All these units collectively are known as the Central Processing Unit. In the end the passage describes the role and functioning of the input and output devices.

After you have read the passage once, read it again with the help of the glossary we have given at the end of the passage. Answer all the questions. Check your answers with those given by us at the end o the unit.

18.1.2 Comprehension Passage

Basic Structure of a Computer

One method of introducing the basic structure of a computer is to present it with a problem to solve. In our case this will be a simple problem, one for which we would not normally use a computer. Suppose we want to find the largest number in a given set of numbers.

If we were to engage a human colleague to solve this problem, two elements would be required. First we would have to provide an instruction. This could be a simple statement, e.g. find the largest number in this set. Secondly, we would have to provide the list of numbers.

The computer will also require both these elements in order to solve a problem. The instruction, however, will need to be much more detailed than the one given to a human being. It may involve perhaps as many as separate instructions. You should note that instructing computers to perform various tasks involves a much more comprehensive set of details than we normally require when communicating with each other.

The total set of instructions to perform a given task is called a program. The list of numbers upon which the computer program works is called the data numbers, or data for short. Thus, like the human being a computer requires both instructions and data in order to solve a problem. The difference is that the program instructions are at a much more detailed level.

Memory Unit and Arithmetic Unit

The human colleague requires a memory in order to retain the instruction. So does a computer. Therefore, one component unit of a computer must be a memory unit. However, no computation can take place in this unit. It is just a device for storing or retaining information. The second unit can perform the four basic arithmetical functions of addition, subtraction, multiplication, and division. This unit is called the arithmetic unit, or AU for short. It is in here that any computation is performed. This unit is also capable of comparing two numbers and deciding which is the smaller, the larger or whether they are equal. But how do numbers (data) get into the arithmetic unit from the memory unit?

Control Unit

The purpose of this third and final computer, the control unit (or CU),is to pass numbers of other forms of data into the arithmetic unit and then 'inform' this unit which arithmetic or comparison function to perform.

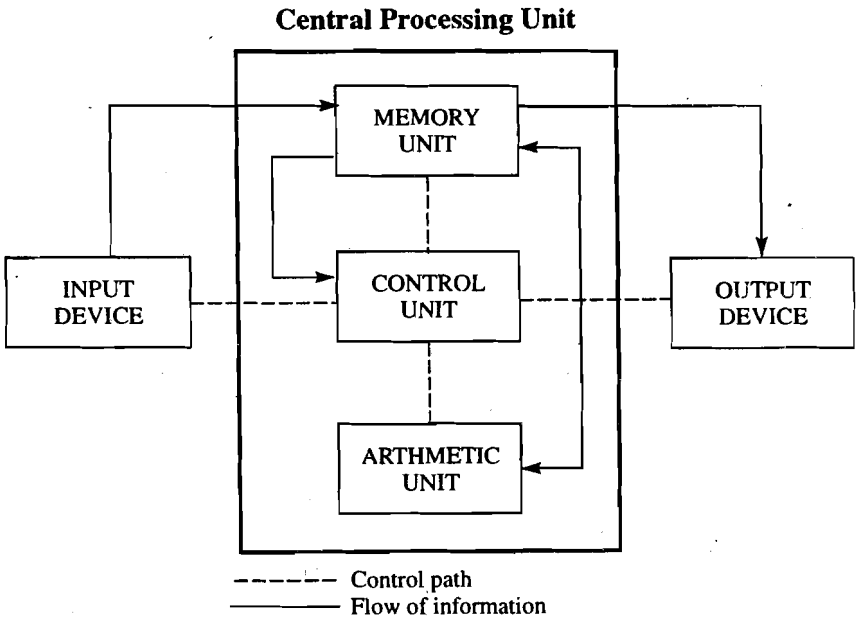

Fig. 18.1

Once the arithmetic unit has computed the result, the control unit passes it into the memory. The control unit, then, is the unit which controls the passage of data to and from the memory and the AU and, also, decides which arithmetic operation the program instruction has asked for.

These three units, the memory, the arithmetic unit and the control unit, are known collectively as the Central Processing Unit, or CPU for short. These are the three units common to all computers, no matter how large or small, how cheap or expensive.

Input and Output

How does a human being put information (data or program instruction) into the memory of the central processing unit ? This is the purpose of a special device called an input device, which is also under the

control of the control unit. An input device will convert the everyday characters which we use, into binary and pass them into the memory unit.

Once the program has processed the data ready to produce results,we would like to see them. We would find it difficult to read long strings of binary noughts and ones and, in consequence, an output device is used to convert binary patterns inside the CPU into our everyday characters. That is, it performs the opposite function to an input device.

There are many different types of input and output devices. Some are more suitable than others in given applications. Here we need mention just two common devices. The keyboard device is used for putting in information. This input device is very similar to an ordinary QWERTY typewriter (the first six letters being q-w-e-r-t-y), except that it has additional keys by which the user can communicate with the computer. Often, the keyboard has a screen attached, which can display any information typed in by the user, or any information sent out by the central processing unit. Together, the keyboard and screen are called a VDU(Visual Display Unit) .If a printed copy is required, so that we can keep a record of computer output, then a hardcopy (i.e. printed) device is required.

The input and output devices, as seen in the figure above are not part of the main CPU. They are on the periphery and are sometimes called peripheral devices.

(From Computer Studies : A first course by John Shelly and Roger Hunt. Second Edition.1987.)

18.1.3 Glossary

structure : organisation or arrangements of the parts of an entity(here the entity is a. computer).

set : any collection of related things.

instruction : a group of characters, bytes, or bits, that defines an operation to be performed by the computer.

perform : to execute instructions in a computer

tasks : elements of work that are part of getting the job done, such as loading of program into computer storage.

program : series of instructions that will cause a computer to process data.

data : raw material of information - individual pieces of quantitative information, such as dollar sales of carpets, number of building permits issued, units of raw material on hand.

Historically, data is a plural noun while datum is singular - a distinction now generally ignored in data processing terminology.

component : basic part; element; part of a computer system.

device : any piece of physical equipment within or attached to a computer.

storing : holding data and delivering it on demand at a later time.

computation : processing of data.

memory : storage facilities of the computer, capable of storing vast amount of data.

binary : pertaining to a pair, in computer terminology it refers to 0 and 1.

processed : manipulating the information which is inputted to the computer by performing arithmetic or logical operation on it.

strings : connected sequence of characters or bits treated as single data item. The word windsurfer is a string of ten characters.

noughts : zeros

characters : any symbol, digit, letter, or punctuation mark stored or processed by computing equipment.

keys : operating parts of a typewriter (row of such keys on the keyboard of a computer)

communicate : transmit information.

screen : surface on which information is displayed, such as video display screen

periphery : edge.

18.1.4 Answer the following questions:

Exercise 1

1. How is a computer different from a human being?
2. How does the Control Unit decide which arithmetic operation has to be performed on the data?
3. In what form is the data stored in the memory unit?
4. How is an input device different from an output device?
5. Why is it necessary to have an output device?
6. How does a user check the computer output before getting its print out?
7. Which components of a computer are required essentially for any sort of computing?
8. How does a control unit proceed?

18.1.5 True and False Statements

Exercise 2

Identify the false statements and then correct them in the light of the facts mentioned in the passage.

1. The memory unit retains only the instructions and not the data.
2. Control processing unit is connected with the input device only through its memory unit.
3. There is no difference between the keyboard device and an ordinary typewriter.
4. The computed results are stored in the memory unit of the C.P.U.
5. The screen can display only that data which has been processed by the C.P.U. unit.

18.1.6 Contextual Reference

Exercise 18

Read the passage again and decide what the underlined words refer to.

1. One method of introducing the basic structure of a computer is to present <u>it</u> (p.1) _____
2. If we were to engage a human colleague to solve <u>this</u> problem (p.2) _____
3. The computer will also require both <u>these</u> elements (p.18) _____
4. Where <u>they</u> are equal (p.6) _____
5. Control unit passes <u>it</u> (p.7)_____
6. <u>This</u> is the purpose of a special device (p.9) _____
7. <u>It</u> performs the opposite function (p.10) _____

18.2 VOCABULARY

18.2.1 Synonyms

Exercise 4

Find synonyms from the passage for the following words:

1. Employ (p.2) _____
2. Need (p.1) _____
3. Different (p.18) _____
4. Exhaustive (p.18) _____
5. Store (p.5) _____
6. Calculation (p.5) _____
7. Apparatus (p.5) _____
8. Change (p.9) _____
9. Zeros (p.10) _____
10. Extra (p.11) _____

18.2.2 Antonyms

Exercise 5

Find antonyms from the passage for the following words:

1. Complicated (p.2) _____
2. Similarity (p.4) _____
3. Individually (p.8) _____
4. Hide (p.11) _____
5. Central (p.12) _____

18.2.3 Matching

Exercise 6

Match words in column 'A' with their definitions in column 'B', by putting the appropriate letters in the brackets provided.

Column 'A'		Column 'B'	
1.	Programme	a.	Part of the computer where data and instructions are held.
2.	Peripheral	b.	That part of computer which accesses instructions in sequence, interprets them and then directs their implementation.
3.	Memory unit	c.	Components of a computer used to get data in and data out.
4.	Data	d.	Unit used for taking out data values from a computer and presenting them in a desired form to the user.
5.	Control unit	e.	A complete set of statements to perform a specified task.
6.	Output devices	f.	Information code in a form acceptable for input to, and processing, by computer system.

18.3 GRAMMAR AND USAGE

18.3.1 Word Formation

Exercise 7

An English word can be divided into three parts: a prefix, a stem and suffix. A prefix comes before the stem and a suffix is what is attached to the end of the stem. For example in the word undependable, un - is a prefix, depend is a stem and -able is a suffix. Prefixes usually change the meaning of the word. For example, un - gives the word dependable a negative meaning. Sufixes, on the other hand, change the word from one part of speech to another. For example, if we add - ly to the adjective neat it gives the adverb neatly. Here are some suffixes and the parts of speech to which they belong.

1. Noun forming suffixes
   - ation, -tion, -ance, -ence, -ist, -ity, -dom, -ship, -ary, -ism

2. Verb forming suffixes
   -ize, -ate, -fy, -en

3. Adjective forming suffixes
   -al, -ar, -ic, -ical, -able,-ible, -ous, -ful, -less, -ish, -ed, -ive, -ing.

4. Adverb forming suffix
   -ly

Read the following sentences and underline the suffixes. Then find out what parts of speech they belong to.

1. Computer manufacturers frequently limit the size of the memory in order to bring the computer within the purchasing power of the market to which they are selling.
2. In the past, computer- designers have built large electronic components, but the resulting computer was expensive and complex.
3. A computer's memory stores all of the data currently being processed as well as the programme that controls the processing.
4. Phased conversion is a method of system implementation in which old information system is gradually replaced by the new one.

18.3.2 Contrasting Conjunctions

Exercise 8

When a writer wants to express that what has been said before is true or correct, but what follows is, in contrast, also true or correct, conjunctions such as the following are commonly used: but, however, nevertheless, although (or though).

Examples

1. Processors used in micro computers are known as micro processors, but there is no conceptual difference between micro processors and processors found in larger computer systems.
2. Computers in commercial and industrial settings have been around for several decades. There is nothing new about that. What is new, however, is the availability of computing power to managers and workers throughout the organisation at modest cost.
3. Hard disks are usually about fourteen inches in diameter, although smaller disks are common place in micro computer systems.
4. Considerable ingenuity has been exercised into packing powerful instructions into 10 available bits. Nevertheless some mini computers with the common 10 bit word use two words for some instructions.

Choose the most appropriate conjunctions from the following list to fill in the blanks.

but, however, although, nevertheless.

1. _____ electronic means of transmitting and displaying information are growing in popularity, printed paper remains an essential communication medium.
2. To be sure, one cannot carry on a fluent conversation with a computer, _____ one can communicate the essentials.
3. Data may be entered into a computer system by many means; _____ the keyboard remains the predominant input device for micro computers.
4. _____ easier to use, menu-driven programme tend to be less powerful than their command driven brethren.
5. Cards of varying capacities have been used to record data,_____ the tendency has been to standardise on an 80 -column card.
6. Many of the applications employ specialised computer programmes to do much of the work: payroll programmes, inventory management programmes, asset management programms, and the like. _____ managers often find that the information they need must be organised and reported differently than specialised programmes can accommodate.
7. The earlier use of micro film involved a two-stage process, first producing a hard copy of the output and then photographing it. _____ techniques have been developed for transference direct from magnetic tape to micro-film, an extremely fast method of producing a permanent copy.

18.4 WRITING

Exercise 9

Use the information given in the following table to write a paragraph on functions of the basic components of the computer. You may use the outline given after the table.

	Components	**Functions**
1.	Central Processing unit (C.P.U) a) control unit b) Arithmetic Unit c) Memory Unit	 Controls (i) the arithmetic operations (ii) passage of data to and from memory and Arithmetic units. Computers Stores information
2.	Input device	Converts every day characters into binary and passes them into the memory unit.
3.	Output device	Converts binary patterns inside the C.P.U into everyday. characters.

A computer consists of three basic components:

_____ _____ _____ Central Processing Unit is subdivided into three different parts _____ _____ _____. The Control Unit _____. The memory unit_____ The Arithmetic Unit is used _____. Input device _____ _ Output device _____

18.5 LET US SUM UP

In this unit we have given you practice in

a) Understanding a passage dealing with the basic structure of a computer.

b) Identifying false statements and correcting them.

c) Finding out objects or persons who have been referred to by certain pronouns and demonstratives used in the passage.

d) Finding out synonyms and antonyms from the passage.

e) Matching technical words with their definitions.

f) Suffixes.

g) Contrasting conjunctions.

h) Writing a paragraph using the information and the outline given.

ANSWERS TO THE EXERCISES

Exercise 1

1. A computer requires a much more detailed set of instructions.
2. It learns from the programme instructions in the memory unit.
3. It is stored in the form of binary noughts and ones.
4. An input device converts every data character into binary noughts and ones, whereas the output device changes the binary noughts and ones back into everyday characters.
5. It is necessary to have an output device because without this device it would be difficult to read the output of the computer.
6. A user can look at it on the screen before getting a print out.
7. Input device, C.P.U. unit, and output device.
8. It first finds out from the memory unit which arithmetic operation the programme instruction has asked for. Then it passes the required data into the arithmetic unit and informs this unit which arithmetic functions to perform.

Exercise 2

1. False. The memory unit retains both the instructions and the data.
2. True.
3. False. The keyboard device is similar to an ordinary typewriter except that it has additional keys by which the user can communicate with the computer.
4. True.
5. False. The screen can display any data typed in by the user or any information sent out by the C.P.U.

Exercise 3

1. Computer, 2. Finding the largest number in a given set of number,
3. instruction and list of numbers, 4. the numbers, 5. the result,
6. how a human being puts information into the memory of the C.P.U., 7. output device.

Exercise 4

1. Engage,	2. require,	3. separate,	4. comprehensive,
5. retain,	6. computation,	7. device,	
8. convert,	9. noughts,	10. additional.	

Exercise 5

1. simple, 2. difference, 3. collectively,
4. display, 5. peripheral.

Exercise 6

1. e, 2. c, 3. a, 4. f, 5. b, 6. d.

Exercise 7

1. computer (noun), manufacturers (noun), frequently (adverb), Computer (noun),purchasing (adjective).
2. Computer (noun), electronic (adjective), resulting (adjective), Computer (noun),expensive (adjective)
3. Computer (noun), currently (adverb), processing adjective),
4. Phased (adjective), conversion (noun), implementation (noun), information (noun), gradually (adverb).

Exercise 8

1. although, 2. but, 3. however, 4. although,
5. but, 6. nevertheless, 7. however.