MODULE 1 UNDERSTANDING THE COMPUTER

UNIT 1 BASIC CONCEPTS

CONTENTS

1.0 INTRODUCTION

The computer is fast becoming the universal machine of the 21st century. Early computers were large in size and too expensive to be owned by individuals. Thus they were confined to the laboratories and few research institutes. They could only be programmed by computer engineers. The basic applications were confined to undertaking complex calculations in science and engineering. Today, the computer is no longer confined to the laboratory. Computers and, indeed, computing have become embedded in almost every item we use. Computing is fast becoming ubiquitous. Its application transcends science, engineering, communication, space science, aviation, financial institutions, social sciences, humanities, the military, transportation, manufacturing, and extractive industries to mention but a few. This unit presents the background information about computers.

2.0 OBJECTIVES

At the end of this unit you should be able to:

- define the computer
- explain data processing
- explain data and information identify methods of data processing mention the characteristics of a computer.

3.0 MAIN CONTENT

3.1 Definitions

Computer: A computer is basically defined as a tool or machine used for processing data to give required information. It is capable of:

- taking input data through the keyboard (input unit),
- storing the input data in a diskette, hard disk or other medium,
- processing it in the central processing unit (CPU) and
- giving out the result (output) on the screen or the Visual Display Unit (VDU).

(DATA)
(INFORMATION)

INPUT

PROCESSING

OUTPUT

Fig. 1: A schematic diagram to define a computer

Data: The term data refers to facts about a person, object or place, e.g. name, age, complexion, school, class, height etc.

Information: This is referred to as processed data or a meaningful statement, e.g. net pay of workers, examination results of students, list of successful candidates in an examination or interview etc.

3.2 Methods of Data Processing

The following are the three major methods that have been widely used for data processing over the years:

- The Manual method,
- The Mechanical method and
- The Computer method.

The Manual Method

The manual method of data processing involves the use of chalk, wall, pen, pencil and the like. These devices, machines or tools facilitate human efforts in recording, classifying, manipulating, sorting and presenting data or information. The manual data processing operations entail considerable manual efforts. Thus, the manual method is cumbersome, tiresome, boring, frustrating and time consuming. Furthermore, the processing of data by the manual method is likely to be affected by human errors. When there are errors, then the reliability, accuracy, neatness, tidiness, and validity of the data would be in doubt. The manual method does not allow for the processing of large volumes of data on a regular and timely basis.

The Mechanical Method

The mechanical method of data processing involves the use of machines such as the typewriter, roneo machines, adding machines and the like. These machines facilitate human efforts in recording, classifying, manipulating, sorting and presenting data or information. The mechanical operations are basically routine in nature. There is virtually no creative thinking. Mechanical operations are noisy, hazardous, error prone and untidy. The mechanical method does not allow for the processing of large volumes of data continuously and timely.

The Computer Method

The computer method of carrying out data processing has the following major features:

- Data can be steadily and continuously processed
- The operations are practically not noisy
- There is a store where data and instructions can be stored temporarily and permanent.

- Errors can be easily and neatly corrected.
- Output reports are usually very neat, decent and can be produced in various forms such as adding graphs, diagrams and pictures etc.
- Accuracy and reliability are highly enhanced
- Below are further attributes of a computer which make an indispensable tool for humans.

3.3 Characteristics of a Computer

- **Speed:** The computer can manipulate large data at incredible speed and response time can be very fast.
- **Accuracy:** Its accuracy is very high and its consistency can be relied upon. Errors committed in computing are mostly due to human rather than technological weakness. There are in-built error detecting schemes in the computer.
- **Storage:** It has both internal and external storage facilities for holding data and instructions. This capacity varies from one machine to the other. Memories are built up in K (Kilo) modules where K=1024 memory locations.
- **Automatic:** Once a program is in the computer's memory, it can run automatically each time it is opened. The individual has little or no instruction to give again.
- **Reliability:** Being a machine, a computer does not suffer human traits of tiredness and lack of concentration. It will perform the last job with the same speed and accuracy as the first job every time even if ten million jobs are involved.
- **Flexibility:** It can perform any type of task once it can be reduced to logical steps. Modern computers can be used to perform a variety of functions like on-line processing, multiprogramming, real time processing etc.

3.4 The Computing System

The computing system is made up of the computer system, the user and the environment in which the computer is operated.

The Computer System
The computer system is made up of the hardware and the software.

The Hardware
The computer hardware comprises the input unit, the processing unit and the output unit.

The input unit comprises those media through which data is fed into the computer. Examples include the keyboard, mouse, joystick, trackball and scanner.

The processing unit is made up of the Arithmetic and Logic Unit (ALU), the control unit and the main memory. The main memory also known as the primary memory is made up of the Read Only Memory (ROM) and the Random Access Memory (RAM).

The output unit is made up of those media through which data, instructions for processing the data (program), and the result of the processing operation are displayed for the user to see. Examples of the output unit are the monitor (Visual Display Unit) and the printer.

Software

Computer software is the series of instructions that enable the computer to perform a task or group of tasks. A program is made up of a group of instructions to perform a task. Series of programs linked together make up software. Computer programs could be categorised into system software, utility software, and application programs.

Computer Users

Computer users are the different categories of personnel that operate the computer. We have expert users and casual users. The expert users could be further categorised into computer engineers, computer programmers and computer operators.

The Computing Environment

The computing environment includes the building housing the other elements of the computing system namely the computer and the users, the furniture, auxiliary devices such as the voltage stabiliser, the Uninterruptible Power Supply System (UPS), the fans, the air conditioners etc. The schematic diagram of the computing system is presented in Fig. 2a. to Fig. 2d.

Fig. 2c: Computer users

Computer users

Casual users

End users

Expert users

System engineers

Programmers

Computer operators

Data entry clerks

Fig. 2d: Computing environment

Computing environment

Building

Furniture
and fittings

Auxiliary devices

Air
conditioner

Voltage
stabilizer

UPS

4.0 CONCLUSION

The computer is a machine used for a variety of purposes. Its use transcends all areas of human endeavours owing to the advantages of the computer method of data processing over the manual and mechanical methods of data processing.

5.0 SUMMARY

This unit has taught the following:

- The computer is any electronic device that can accept data, process it and produce an output
- The computer method of data processing is superior to the manual and mechanical methods of data processing
- The computing system is made up of the computer system, the users and the computing environment.

6.0 TUTOR-MARKED ASSIGNMENT

1 a. What is a computer?
b. What are the advantages of the computer method of data processing over the manual and mechanical methods of data processing.

2. Draw a schematic diagram of a computing system and describe each of the components.

7.0 REFERENCES/FURTHER READING

Akinyokun, O.C. (1999). *Principles and Practice of Computing Technology*. Ibadan: International Publishers Limited.

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