3 -WHAT IS A COMPUTER?

Computer is an electronic device. As mentioned in the introduction it can do arithmetic calculations faster. But as you will see later it does much more than that. It can be compared to a magic box, which serves different purpose to different people. For a common man computer is simply a calculator, which works automatic and quite fast. For a person who knows much about it, computer is a machine capable of solving problems and manipulating data. It accepts data, processes the data by doing some mathematical and logical operations and gives us the desired output.

Therefore, we may define *computer as a device that transforms data*. Data can be anything like marks obtained by you in various subjects. It can also be name, age, sex, weight, height, etc. of all the students in your class or income, savings, investments, etc., of a country. Computer can be defined in terms of its functions. It can i) accept data ii) store data, iii) process data as desired, and iv) retrieve the stored data as and when required and v) print the result in desired format. You will know more about these functions as you go through the later lessons.

4- CHARACTERISTICS OF COMPUTER

Let us identify the major characteristics of computer. These can be discussed under the headings of speed, accuracy, diligence, versatility and memory.

4.1 Speed

As you know computer can work very fast. It takes only few seconds for calculations that we take hours to complete. Suppose you are asked to calculate the average monthly income of one thousand persons in your neighborhood. For this you have to add income from all sources for all persons on a day to day basis and find out the average for each one of them. How long will it take for you to do this? One day, two days or one week? Do you know your small computer can finish this work in few seconds? The weather forecasting that you see every day on TV is the results of compilation and analysis of huge amount of data on temperature, humidity, pressure, etc. of various places on computers. It takes few minutes for the computer to process this huge amount of data and give the result.

You will be surprised to know that computer can perform millions (1,000,000) of instructions and even more per second. Therefore, we determine the speed of computer in terms of microsecond (10-6 part of a second) or nano-second (10-9 part of a second). From this you can imagine how fast your computer performs work.

4.2 Accuracy

Suppose some one calculates faster but commits a lot of errors in computing. Such result is useless. There is another aspect. Suppose you want to divide 15 by 7. You may work out up to 2 decimal places and

say the dividend is 2.14. I may calculate up to 4 decimal places and say that the result is 2.1428. Some one else may go up to 9 decimal places and say the result is 2.142857143. Hence, in addition to speed, the computer should have accuracy or correctness in computing.

The degree of accuracy of computer is very high and every calculation is performed with the same accuracy. The accuracy level is determined on the basis of design of computer. The errors in computer are due to human and inaccurate data.

4.3 Diligence

A computer is free from tiredness, lack of concentration, fatigue, etc. It can work for hours without creating any error. If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy. Due to this capability it overpowers human being in routine type of work.

4.4 Versatility

It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electric bills.

4.5 Power of Remembering

Computer has the power of storing any amount of information or data. Any information can be stored and recalled as long as you require it, for any numbers of years. It depends entirely upon you how much data you want to store in a computer and when to lose or retrieve these data.

4.6 No IQ

Computer is a dumb machine and it cannot do any work without instruction from the user. It performs the instructions at tremendous speed and with accuracy. It is you to decide what you want to do and in what sequence. So a computer cannot take its own decision as you can.

4.7 No Feeling

It does not have feelings or emotion, taste, knowledge and experience. Thus it does not get tired even after long hours of work. It does not distinguish between users.

4.8 Storage

The Computer has an in-built memory where it can store a large amount of data. You can also store data in secondary storage devices such as floppies, which can be kept outside your computer and can be carried to other computers.

5- Computer Categories.

Computers are categorized into four general types based mainly on their processing speeds and their capacity to store data.

1- Supercomputers:

Supercomputers are high-capacity computers that cost millions of dollars. Occupy special air-conditioned rooms, and are often used for research, weather forecasting, and mathematical research.

2- Mainframe Computers:

Less powerful than supercomputers. Mainframe computers are fast, large-capacity computers also occupying specially wired, air-conditioned rooms. Mainframes are used by large organizations, banks, airlines, universities.

3- Minicomputers:

Because of their lesser processing speeds and data-storing capacities, they have been typically used by medium-sized companies for specific purposes, such as accounting.

4- Microcomputers:

Microcomputers are small computers that can fit on a desktop. Microcomputers are of two types: ***personal computers*** and ***workstations***.

FUNCTIONAL UNITS

In order to carry out the operations mentioned in the previous section the computer allocates the task between its various functional units. The computer system is divided into three separate units for its operation. They are 1) arithmetic logical unit, 2) control unit, and 3) central processing unit.

Arithmetic Logical Unit (ALU)

After you enter data through the input device it is stored in the primary storage unit. The actual processing of the data and instruction are performed by Arithmetic Logical Unit. The major operations performed by the ALU are addition, subtraction, multiplication, division, logic and comparison. Data is transferred to ALU from storage unit when required. After processing the output is returned back to storage unit for further processing or getting stored.

Control Unit (CU)

The next component of computer is the Control Unit, which acts like the supervisor seeing that things are done in proper fashion. The control unit determines the sequence in which computer programs and instructions are executed. Things like processing of programs stored in the main memory, interpretation of the instructions and issuing of signals for other units of the computer to execute them. It also acts as a switch board operator when several users access the computer simultaneously. Thereby it coordinates the activities of computer's peripheral equipment as they perform the input and output. Therefore it is the manager of all operations mentioned in the previous section.

Central Processing Unit (CPU)

The ALU and the CU of a computer system are jointly known as the central processing unit. You may call CPU as the brain of any computer system. It is just like brain that takes all major decisions, makes all sorts of calculations and directs different parts of the computer functions by activating and controlling the operations.