UNIT 1   INTRODUCTION TO COMPUTERS

Structure

1.1   INTRODUCTION

In this Unit, we try to make you conversant with what a computer is and how it can be useful to you in your workplace and your home. Two-Three decade ago, most people had little to do with computers at least directly. Then slowly, as computers evolved, it changed everything. These days nearly everybody is using computers in all areas of life so, why should you be left behind?

1.2   OBJECTIVE

After going through this unit, you should be able to:

● define the term Computer;

● list the various parts of a computer;

● describe the various components of a computer;

● explain the term Software; and

● distinguish between Hardware and Software.

1.3   WHAT IS A COMPUTER?

Computer is an electronic device for storing and processing data, in binary form, according to the instructions given by a computer program. The basic function of Computer is the execution of command(s). A series of commands is normally known as a program. Command is an instruction given to the computer to do a specific task.

A computer has two major parts: Hardware and Software. All those parts of a computer, which can be seen and touched, are known as hardware. For example, keyboard, monitor, mouse etc. Software is another name for programs.

Hardware and software are discussed at length later in this Unit. These days, a computer is not limited only to computation, but it can also be used for writing letters, maintaining database, listening to songs, viewing movies and shopping online etc.

A computer is a very powerful machine. It can compute several billions of instructions per second. In fact it will not be an overstatement to say that a computer is, generally speaking, computationally the most powerful machine ever developed by humans!

1.4 SOME IMPORTANT FUNDAMENTAL TERMS

Fig. 1.1: Hardware

As stated in the previous section, computers are made up of hardware and software. **Hardware** is any computer part that is tangible in nature i.e. can be seen, touched and felt. For instance, monitor, keyboard, mouse, speakers, joystick, hard drive are all hardware.

Computer hardware is useless unless it is provided with the necessary software. **Software** is a term which is used to describe the instructions that are given to computer. Software is a set of programs, which are designed to perform a well-defined function. A program is a sequence of instructions written to solve a particular problem. Software is capable of performing many tasks using the hardware.

Software is classified into specific categories in the computer world i.e. System Software and Application Software.

● **System Software** – System Software controls the working of the computer system and manages effective execution of a user's applications. It enables other software to interact with the computer hardware. They also control the peripheral devices. System software includes operating

systems, device drivers, and more. System software is almost always pre-installed on your computer.

- **Application Software** – Application software are developed in order to execute some specific function such as word processing, payroll processing, inventory control etc.

Data is raw, unorganised facts that need to be processed. Data can be something simple and seemingly random and useless until it is organised.

Information is data, when data is processed, organised, structured or presented in a given context so as to make it useful, it is called information.

Default refers to pre-selected settings which are used in case a uses does not specify specific choice, i.e. a default drive on a computer is hard disk drive. In computer language those original parts are the default parts.

BIOS - BIOS refers to basic input/output system (BIOS). BIOS software is built into the PC, and is the first code run by a PC when powered on, and that is why it is called boot firmware. In computing, firmware is software that is embedded in a hardware device. Thus, primary function of the BIOS is to test and set up the hardware and load and start an operating system.

Uniform resource locator (URL) the address of a site on the World Wide Web (a major application of Internet discussed in Unit 3); a standard way of locating objects on the Internet.

File - Nameable unit of data storage; an element of data storage; a single sequence of bytes.

Folder - A graphical representation used to organise a collection of computer files; as in the concept of a filing cabinet (computer's hard drive) with files (folders)

Freeware - Software provided at no cost to the user.

Volatile - The word Volatile refers to the fact that the contents of the memory are lost if the power is switched off.

Non-Volatile - Non-Volatile on the other hand means that the contents are preserved even after the power is switched off and could be read again when its switched on.

1.5   WHAT ARE THE PARTS OF A COMPUTER?

The basic part of computer is processor (CPU), memory, and input/output devices. Each computer receives input from a variety of devices, processes that data with the CPU and memory, and sends results to some form of output.

The main Parts of a Personnel Computer are as follows:

Computer case

The computer case contains the main components of the computer, including the motherboard, central processing unit (CPU), and power supply.

The front of the case usually has an On/Off button and one or more optical drives.

Fig. 1.2: Computer Case

Computer cases come in different shapes and sizes. A desktop case lies flat on a desk and the monitor usually sits on top of it. A tower case is tall and sits next to the monitor or on the floor.

Motherboard

Fig. 1.3: Motherboard

A motherboard is one of the most essential parts of a computer system. Each component of computer is attached to the motherboard. It holds together many of the components of a computer, including the central processing unit (CPU), memory and connectors for input and output devices.

The motherboard receives power from the computer's power supply. The motherboard allows all the components to communicate, including the CPU.

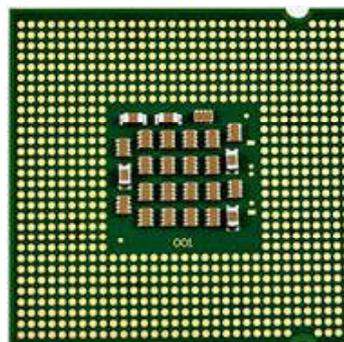**Central Processing Unit (CPU)**

Fig. 1.4: Central Processing Unit

It is referred to as a processor, central processor, or microprocessor, the CPU is the central processing unit of the computer. A central processing unit is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logic, controlling, and input/output operations specified by the instructions. The CPU is the brains of the computer where most calculations take place.

Random Access Memory (RAM)

RAM is alternatively referred to as main memory, primary memory. Random Access Memory is a hardware device that allows information to be stored and retrieved on a computer. RAM is found in servers, PCs, tablets, smart phones and other devices, such as printers.

Fig. 1.5: Random Access Memory

Random Access Memory is volatile. That means data is retained in RAM as long as the computer is on, but it is lost when the computer is turned off. When the computer is rebooted (re-started), your data can be reloaded into RAM, usually from a Hard Drive provided you have saved your work.

Monitor

The monitor works with a video card which is located inside the computer case, to display images and text on the screen. Most monitors have control buttons that allow you to change your monitor's display settings, and some monitors also have built-in speakers.

Newer monitors usually have **LCD** (liquid crystal display) or **LED** (light-emitting diode) displays. These can be made very thin, and they are often called **flat-panel displays**. Older monitors were using **CRT** (cathode ray tube) displays. CRT monitors are much larger and heavier, and they take up more desk space.

Fig. 1.6: Monitor

Keyboard

A computer keyboard is one of the primary **input devices** used with a computer. Similar to an electric typewriter, a keyboard is composed of

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buttons that create letters, numbers, and symbols, as well as perform other functions.

Fig. 1.7: Keyboard

Mouse

A computer mouse is a handheld hardware input device that controls a cursor in a GUI (graphical user interface) and can move and select text, icons, files, and folders on your computer. The mouse is another important tool for communicating with computers. It is also known as a pointing device. There are two main mouse types: optical and wireless mouse.

Fig. 1.8: Mouse

Basic functions of Computer

A computer is designed to perform four basic functions such as input, processing, storage and output which are discussed below:

Input: To perform computation, computer requires input of data from users. The data is entered using an input device, such as a keyboard, mouse etc. Input devices translate the data into electronic signals the computer can process.

The keyboard is an example of an input device that accepts data and translates it into electronic signals. For example, when you press the Alphabet A on the keyboard, it is translated into its electronic code, which is sent to the computer. So keyboard is one way to get data into the computer. Mouse, Scanner are other examples of Input Devices.

Processing: the retrieval or manipulation of information into a new form (e.g., results from a search engine). Processing refers to the calculations and other functions that a computer performs on the data. The Computer processes the data according to a set of instructions called a program. Processing is performed by a very important part of a computer known as the processor.

Output: Computer prints the processed information in a form that can be used by the user. The information is printed, displayed, or reported using some type of output device like a printer or monitor. Output devices convert information from the electronic form used by the computer into a form that people can easily work with.

Storage: It is helpful in storing or preservation of information for later use (e.g., files stored on a hard drive).

Computer saves the data or instructions for future use and retrieval, on various storage devices. The storage areas are also frequently referred to as the memory. The memory of a computer is a place where data and programs are stored. The memory is of two types. One meant for permanent storage i.e. auxiliary memory, and the one meant for temporary storage i.e. main memory. Both are discussed below.

- **Main memory** - Main memory serves as a temporary storage area for data and instructions. This memory is generally not separated from the computer and therefore it is also called as Internal Memory. Data and instructions are required to be stored in main memory from where it can be retrieved by central processing unit for processing results. This memory is also called RAM or Random Access Memory. The main memory is designed to be very fast. A very important aspect is that it is volatile in nature.

- **Auxiliary memory** - The programs and data, which are required to be used again and again, are kept in auxiliary or secondary memory. This memory is more frequently separated from the computer and therefore it is also called as External Memory. USB drives, Hard disks, CDs, DVDs are the common examples of Auxiliary memory.

1.6 WHAT GOES ON INSIDE A COMPUTER?

What actually happens when you input the data for processing? Inside the computer, the following events take place when a user inputs the data:
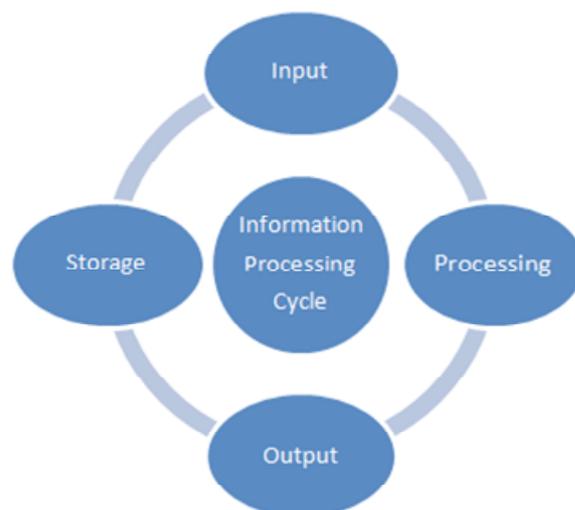

Fig. 1.9: Information Processing Cycle

- The program and the necessary data are entered into the computer system from an input device and are stored in main memory where they can be accessed as needed.

- Now, the CPU retrieves the instructions from the main memory, one by one, and decodes each instruction to determine what operation to be performed.

- When required by instruction, the CPU also retrieves the necessary data from main memory.

- The CPU then performs the operation required by the instruction, which might be arithmetic or logical operation. As each instruction is performed, the results are either temporarily saved by the CPU or are stored in main memory.

The data processing cycle data (retrieve instruction, decode and execute instruction, save results) is repeated until all the program instructions have been carried out by the CPU. The final results are then either stored in main memory, or is sent to an output device such as a printer.

1.7 LET US SUM UP

In this unit you learnt the basic concepts of the computer, this unit is critical in your understanding of the subsequent units. Do not worry if you are still not well versed with the concepts, you can come back to the unit and brush up the basics whenever the need be.

1.8 CHECK YOUR PROGRESS EXERCISE

1. Define the term Computer.

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2. What is the difference between Volatile and Non-Volatile?

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3. Differentiate between hardware and software.

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4. What is System Software?

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5. Enumerate the four main functions of a computer.

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6. What is main memory in a computer?

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1.8 ANSWERS TO CHECK YOUR PROGRESS EXERCISE

1. Computer is an electronic device that is designed to work with Information. The term computer is derived from the word 'compute', which means calculation. Computer can not do anything without a Program.

   Computer is an advanced electronic device that takes raw data as input from the user and processes these data under the control of set of instructions called program and gives the result/output and saves output for the future use. It can process both numerical as well as non-numerical (arithmetic and logical) calculations.

2. Volatile Memory is a type of memory in which data contained in the memory is lost whenever the power is turned off. RAM or Random Access Memory is an example of a volatile memory. It is temporary memory which is not capable of storing content permanently. Non-Volatile Memory is a type of memory in which data is not lost in case of power failure or turned off system. It is permanent type of memory in which content is stored in permanently. ROM or Read Only Memory is an example of the Non-volatile memory.

3. The differences between hardware and software are as follows:

   ● Hardware is all the physical parts of the computer, while software is the programmes that till the computer what to do.

   ● Hardware is any computer part that is tangible in nature e.g. Monitor, Keyboard, Mouse, Speakers while software is a series of commands which are fixed in nature and are run together as one unit for the sole purpose of making the computer do something for e.g. Windows, Notepad, Paintbrush.

   ● The different types of hardware include system case, DVD-ROM drive etc. while there are 2 types of software which include system software and application software.

4. System software is a type of computer program that is designed to run a computer's hardware and application programs. The operating system (OS) is the best-known example of system software. The operating system manages all the other programs in a computer. The

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well known names of Operating system software are like Microsoft Windows, macOS, Ubuntu (a Linux distribution).

5. The four main functions of a computer are:

    ● execution of command(s),

    ● processing of the data according to a set of instructions,

    ● printing the processed information that can be used, and

    ● Saves the data or instructions for future use and retrieval.

6. The main memory is defined as the central storage in a computer. Main memory is where programs and data are kept when the processor is actively using them. When programs and data become active, they are copied from secondary memory into main memory where the processor can interact with them. A copy of data remains in secondary memory. RAM is an example of Main memory.