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# UNIT 1 INTRODUCTION TO COMPUTERS

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- 1.2 What is a Computer?
- 1.3 Some Important Fundamental Terms
- 1.4 What are the Parts of a Computer?
- 1.5 What Goes on Inside a Computer?
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## 1.1 INTRODUCTION

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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. Fifteen years 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?

### Objectives

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

- list the various parts of a computer,
- describe the various components of a computer,
- explain the term operating system, and
- distinguish between Hardware and Software.

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## 1.2 WHAT IS A COMPUTER?

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Computer derives its name from the word *Compute*, which means calculation. A computer is an electronic device whose basic function is the execution of command(s). A series of commands is normally known as a program.

A computer has two major parts:

1. Hardware – All those parts of a computer, which can be seen and touched, are known as hardware. For example, keyboard, monitor, mouse etc.
2. Software – 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, and
- viewing movies 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!

<b>→ NOTE</b>
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<p><i>Command</i> is an instruction given to the computer to do a specific task. For example pressing the ‘ALT+F4’ key simultaneously tells the computer to quit whatever its doing right now.</p>
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## Understanding Computer Applications



**Speed** A computer can do billions of actions per second.



**Reliability** Failures are usually due to human error, one way or another. (*Blush for us all!*)



**Storage** A computer can keep huge amounts of data.

## WHAT CAN IT DO FOR ME?



### TV Tuner Cards and Video Clips

You can use the educational TV programs as an aid while teaching the children in the classroom.



### Voice Recognition Systems and Dictating a Paper

Tired of typing? Well Voice recognition systems type as you speak! These may be just what you are looking for! You can use these to make question papers and other materials for your students.



### CD-R Drives and Music from the Internet

Did you know that you could use the Internet to locate music, download it to your computer, and create your own compact discs? All it takes is the right software, hardware and a connection to the Internet.



### Instant Messaging

You can use this service to communicate with other teachers. Are you working on a project that needs collaboration with others in your group? You can do all that and more with instant messaging.



### Personal Web Site

Do you have anything that you would like to share with other teachers of the world? You can do it through your own website, possibly even entirely free of cost!

## 1.3 SOME IMPORTANT FUNDAMENTAL TERMS

So what is 'Hardware' anyway? Hardware is all the physical parts of the computer. Hardware is basically any computer part that is tangible in nature i.e. can be seen, touched and felt. For instance, monitor, keyboard, mouse, speakers, joystick, floppy drive are all hardware as illustrated in Figure 1.1. There are other hardware as well as you can see in the Figure 1.1.



Figure 1.1: Hardware

*Software* is a little more complicated than hardware. Software is the programs (instructions) that tell the computer what to do. This is how it goes. By now you know what a ‘Command’ is, so software is nothing but a series of complicated commands



**Figure 1.2: Software**

→ **NOTE**

In the simplest of terms software is what you see on screen.

which are fixed in nature and are run together as one unit for the sole purpose of making the computer do something. For instance, Windows, Notepad, Paintbrush etc. are all software (don’t worry just now even if you haven’t heard of them). In non-technical terms, whatever you can see on the monitor is the software, as can be seen in Figure 1.2.

There are different types of software depending on the requirement of user or computers. Computers need instructions for operation, which are supplied through software. A sequence of instructions perform a specific task is program. A program can be written in different programming languages.

Software falls into two general categories:

1. *System Software* – System software enables other software to interact with the computer hardware. They also control the peripheral devices. Operating systems are the example of system software.
2. *Application Software* – Application software refers to the programs, which allow the computer to carry out specific tasks related to the users such as word processing, payroll processing, inventory control etc.

**Data** are the individual facts like first name, price, quantity ordered.

*Information* is data, which has been processed into a useful form, like a complete mailing address, so that it makes sense to the user and is not simply a sequence of meaningless characters. Data and information are often used interchangeably.

*Default* refers to the original settings i.e. those settings that were there before you changed anything. For e.g. a new automobile comes with the original parts of the company, but later during repairs, other compatible parts may be used. In computer language those original parts are the default parts.

*Computers for personal use* come in different shapes and sizes, as illustrated in Figure 1.3, depending upon how and for what purpose are they used. Some commonly used personal computers and their brief descriptions are given below:



Palmtop



PDA/ Personal  
Digital Assistant



Tablet Personal



Laptop



Desktop

Figure 1.3: Different types of Personal Computers

These terms should be understood very carefully, as they are the fundamental concepts in any discussion on computers.

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## 1.4 WHAT ARE THE PARTS OF A COMPUTER?

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A computer is designed to perform four basic functions and thus has four main parts, which are discussed below:

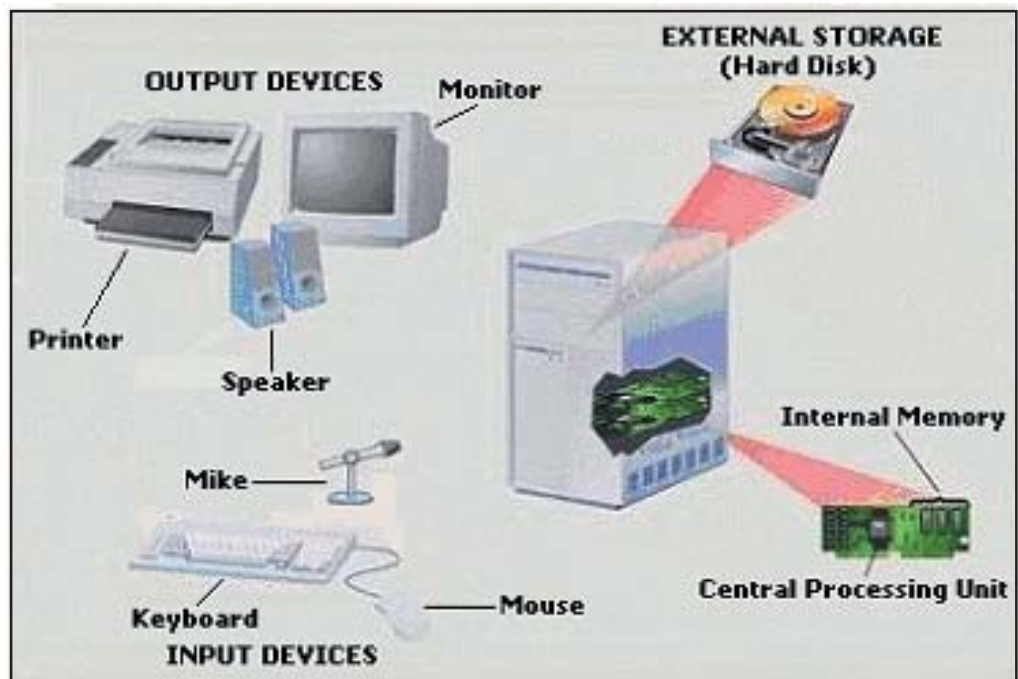


Figure 1.4: Parts of a Computer

- *Inputting* - To perform computation, computer requires input of data from users. The data is entered using an input device, such as a keyboard or mouse as shown in Figure 1.4.

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* - 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*. A typical processor is shown in the Figure 1.5.



**Figure 1.5: Processor**

The processor along with a lot of other things is housed in the central processing unit (CPU), where the actual processing takes place. The CPU, as can be seen in the Figure 1.4, comprises of Control Unit and Arithmetic Logic Unit. The central processor is controlled by the instructions it gets from the memory. The CPU retrieves and executes these instructions one by one until it completes a given task. Each instruction tells the CPU what to do (add, divide, move and compare) and also tells it where in the memory to find the data to be processed. The central processor is very fast; it can execute a billion or more instructions every second. Present day popular CPU is Pentium 4, which operate at 1.5 GHz. It indicates that this processor can execute a simple addition in  $1/1.5 \times 10^9$  seconds.

- *Outputting* - 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.
  - *Storing* - 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.
1. *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.

#### → NOTE

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

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

2. *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*. Floppy disks, Hard disks, as illustrated in Figure 1.6, are the common examples.

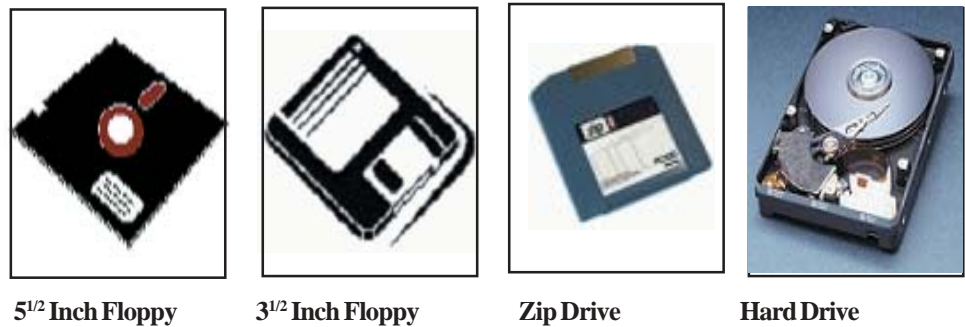


Figure 1.6: Auxiliary Memory

Because of its relatively slow speed, auxiliary storage is used for storing programs and data not immediately needed by the computer. The programs and data are then copied into faster main memory when needed. This memory is non-volatile in nature.

## 1.5 WHAT GOES ON INSIDE A COMPUTER?

What actually happens when you input the data for processing? Inside the computer, as highlighted in the Figure 1.7 (a), the following events take place when a user inputs the data.

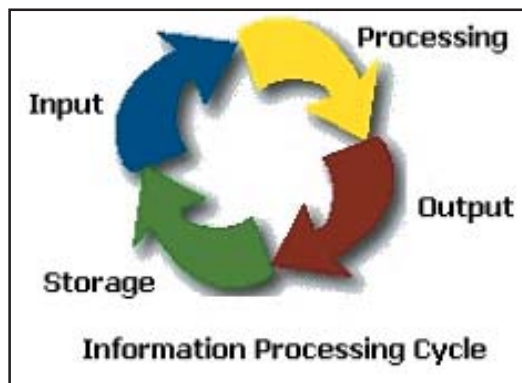


Figure 1.7 (a): Data Processing Cycle

Each of the processes mentioned above, are performed by the respective computer parts mentioned in the previous section. The interaction among the parts during the information/data processing cycle is depicted in the Figure 1.7(b):

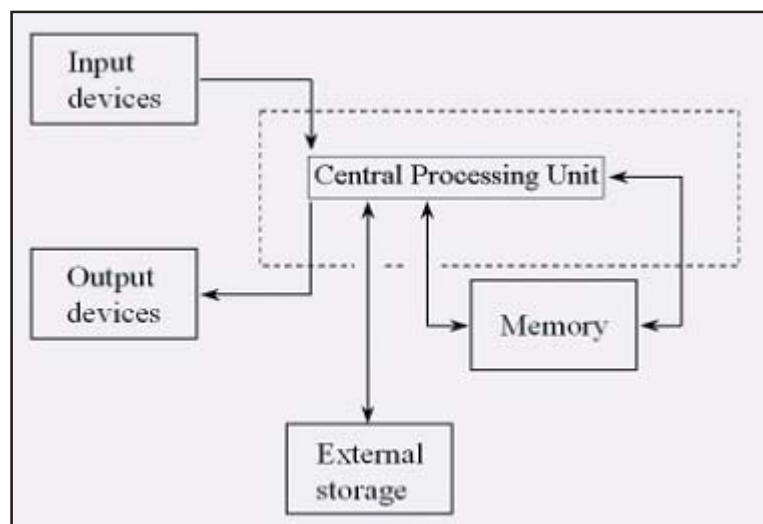


Figure 1.7 (b): Data Processing Cycle

1. The program and the necessary data are entered into the computer system from an input device, as indicated in Figure 1.7(b), and are stored in main memory where they can be accessed as needed.
2. Now, the CPU retrieves the instructions from the main memory, one by one, and decodes each instruction to determine what operation to be performed.
3. When required by instruction, the CPU also retrieves the necessary data from main memory.
4. 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 are sent to an output device such as a printer.

The Figure 1.7(c) depicts the above concept with actual computer parts.

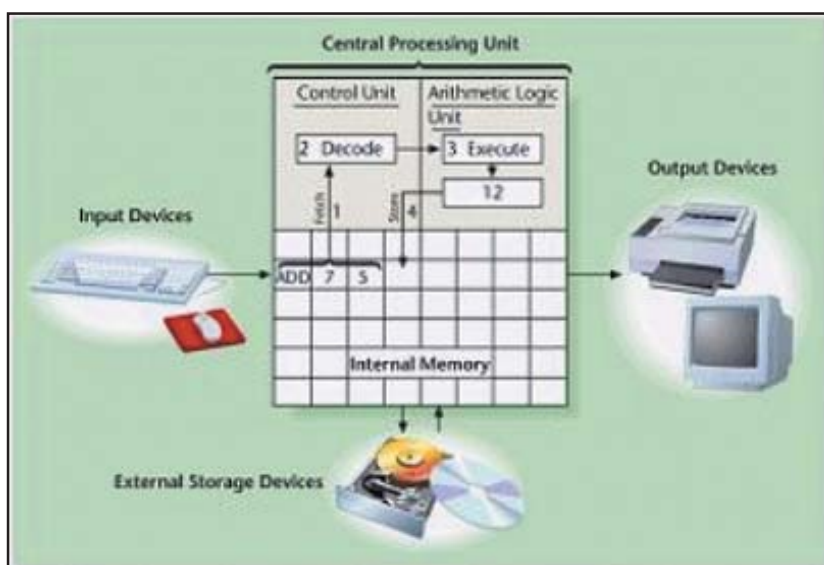


Figure 1.7 (c): Data Processing Cycle

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## 1.6 LET US SUM UP

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

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## 1.7 CHECK YOUR PROGRESS EXERCISE

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1. Write atleast five popular applications of computers.  
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2. Give atleast give 2-3 differences between hardware and software.  
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3. What is Application Software?

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4. Enumerate the four main functions of a computer.

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5. Through a neat and well labelled diagram, explain the data processing cycle.

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## 1.8 ANSWERS TO CHECK YOUR PROGRESS EXERCISE

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1. The five popular applications of computers include:

- writing letters,
- using educational TV programmes as an teaching aid,
- instant messaging,
- personal website, and
- listing songs, viewing movies

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

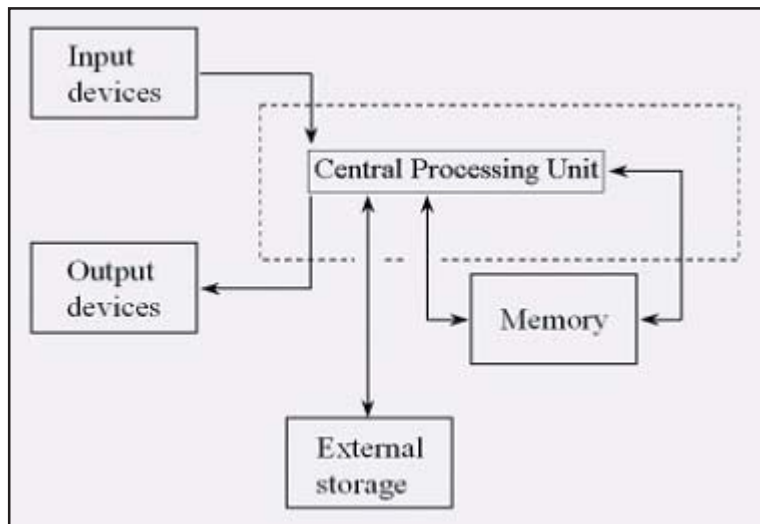
- a) Hardware is all the physical parts of the computer, while software is the programmes that tell the computer what to do.
- b) Hardware is any computer part that is tangible in nature e.g. Monitor, Keyboard, Mouse, Speakers. While software is a series of complicated commands which are fixed in nature and are run together as one unit for the sole purpose of making the computer do something for e.g. Windows, Notepad, Paintbrush.
- c) 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.

3. Application software refers to the programs, which allow the computer to carry out specific tasks related to the users such as word processing, payroll processing etc.

4. 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.

5. The data processing cycle can be explained as follows:



- the program and the necessary data are entered into the computer system and the input device and are stored in main memory.
- the CPU retrieves the information from the main memory and decodes each instruction to determine what operation to be performed.
- the CPU also retrieves the necessary data from main memory.
- the CPU performs the operation required by the instruction. As each instruction is performed, the results are either temporarily saved by the CPU or are stored in the main memory.