

2. Which statement is false about a Mainframe computer?

- a) It is larger than desktop PC.
- b) It is used for home entertainment.
- c) It can compute billions of transaction per day.
- d) It is expensive.

### 1.3.2 Analytical Question

1. Describe different types of computers.
2. Prepare a note regarding the power and capacity of a Supercomputer.  
Then compare it with that of your desktop PC. (Need Internet Access)

## Lesson 2: Working Principle of a Computer

### 2.1 Learning Objectives

Upon completion of this lesson of the Unit you will be able to:

- Know how a computer works.

### 2.2 How Computer Works

Most gadgets are rather simple: A toaster heats bread; a microwave oven heats water or the water inside of things; a car provides transportation; a telephone allows you to talk with someone else, from across the globe to sitting across the table. The purpose of any device can be boiled down to the simplest description. But what about a computer? It is very hard to make one single statement on its purposes.

#### 2.2.1 Computers and their Basics

Before we begin to learn the different parts that make up a *computer system* it is important to realize the fact that what a computer really does.

**What Computers really do!** To understand how computers work, it is important first to realize what they do. In fact, the list would be very



Objectives

very long. To mention a few, they are: word processing, video editing, game playing, image processing, web surfing and so on. Although these applications are very diverse in nature there is one thing in common from computer's perspective: *information processing* or simply *processing*.

It has been said that it is hard to describe a computer perfectly. At one time, the computer was considered the ultimate solution for which there was no solution. But that is not quite correct. The computer does basically one thing: *It takes input and then modifies that input to create some form of output (see Figure 1 .6)*. Between the input and output the most important part of the computer system is done and that is *processing*.

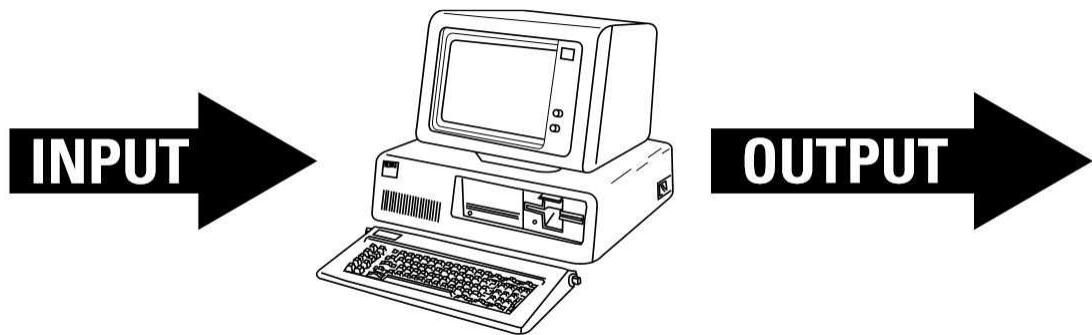


Figure 1 .6: How a Computer Works: Input → Processing → Output

To help you grasp the notion of what a computer does, you should understand *three basic* computer concepts you should remember as shown in the Figure 1 .7. It has three aspects:

- I/O
- Processing
- Storage

**I/O:** Input/output is commonly written as I/O which are the two things a computer does the best. Remember the following points about I/O:

- Any device connected to your computer can be classified either input device or output device.

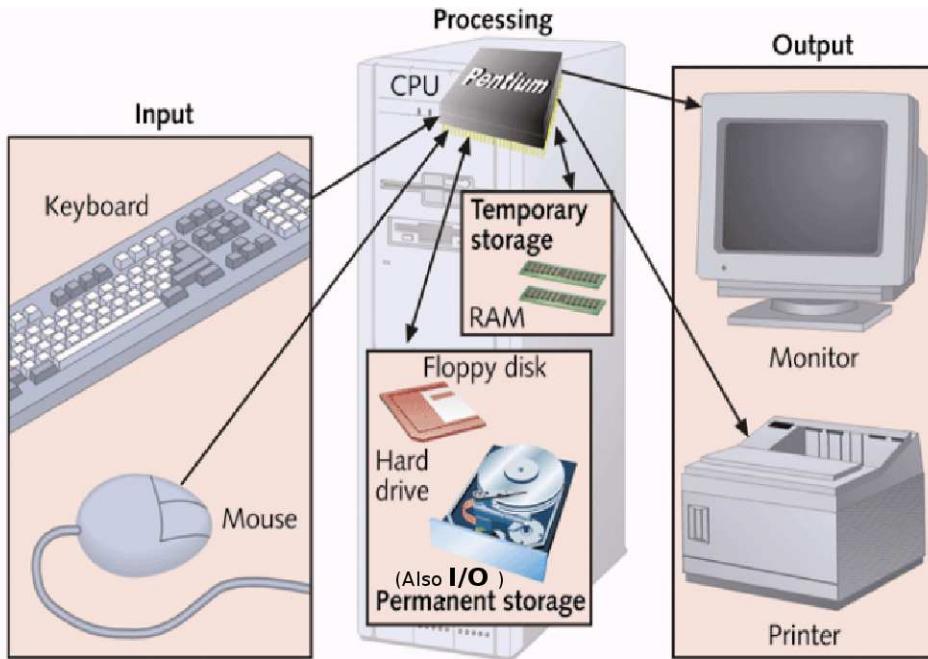


Figure 1 .7: How a Computer Works: A General Diagram

- Input devices are used to send information to the computer. The keyboard, mouse, scanner and digital camera are some examples of input devices.
- Output devices are those the computer uses to show its output, such as the screen and printer.
- Some devices can do both input and output, such as a hard drive, floppy disk and a modem. The computer can use those devices to supply input as well as send output to those devices.

**Processing:** Processing is the stage where the input data is manipulated to generate meaningful information called output.

- Processing is handled by a *processor* which is called the *brain of the computer*.
- The processor does not have any processing capacity unless you instruct it. Telling the computer what to do is the instruction set. By using a lot of instructions a software is developed.

**Storage:** The final part of the computer equation is storage, which in a computer is referred to as memory. The storage is necessary on the most basic level because the processor needs a place to perform its operations.

On a modern computer, storage comes in two forms: temporary and permanent.

RAM is the temporary storage, where the processor does its work, where programs run, and where information is stored while it is being used. You can imagine that RAM is the microprocessors' playground.

Disk drives provide long-term storage also called secondary storage. The disks also allow information to be saved and recalled for later use like a closet or storage unit. Disk storage is the place where things go when the microprocessor is not directly working on them but from where stuff can be retrieved later, if needed.

A good analogy of temporary and permanent storage is shown in Figure 1 .8.

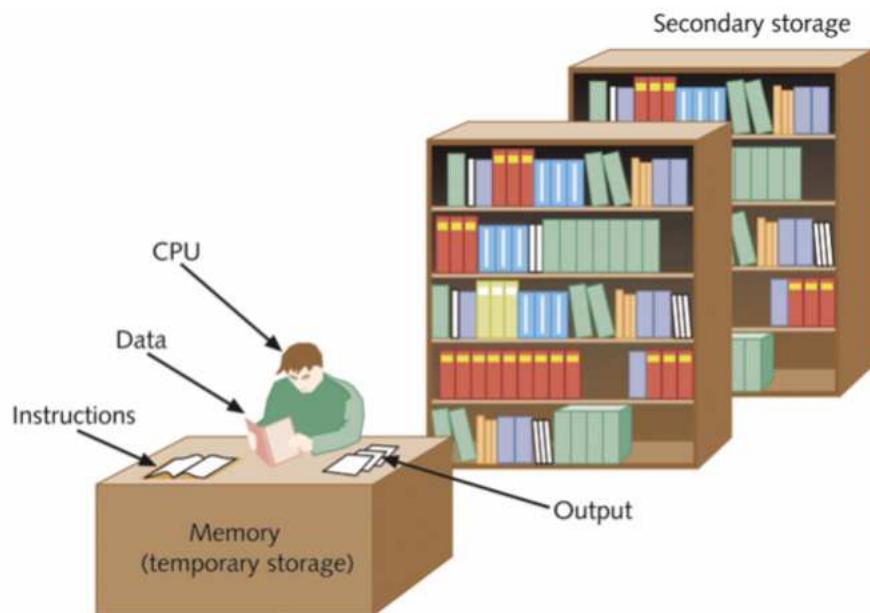


Figure 1 .8: Storage of Computer: A General Comparison

### 2.2.2 Hardware and Software

A computer system is a blend of two different things: hardware and software. Hardware and software must go well together to create the full computer system.

**Hardware:** The physical parts of a computer and related devices are collectively called computer hardware. The internal hardware parts of a computer are often referred to as *components*, while external hardware devices are usually termed as *peripheral devices* or simply *peripherals*. But in general, they all fall under the category of computer hardware. Computer case and power supply are the typical examples of computer hardware. We will explore this idea in more detail very soon.

**Software:** Software refers to the set of instructions or programs that make the computer perform specific tasks. Some programs are designed to ensure that the computer works. They are termed as *system programs*, while other programs do very specific tasks called *application programs*. When you turn on your computer a *system program* called *Operating System* (i.e. Windows 7, Linux) is automatically loaded to ensure that you can do other tasks efficiently. If you start writing a document using a word-processing program (i.e. Microsoft Word in Windows or LibreOffice in Linux) you are actually using one *application program*.

*A musical orchestra is a good analogy to think of hardware and software in a computer. For hardware, you have the musicians and their instruments. The software is the music. As with a computer, the music (software) tells the musicians and their instruments (hardware) what to do.*

**Hardware Explored:** Since the course objective is confined in the area of computer hardware troubleshooting it is essential to further explain computer hardware.

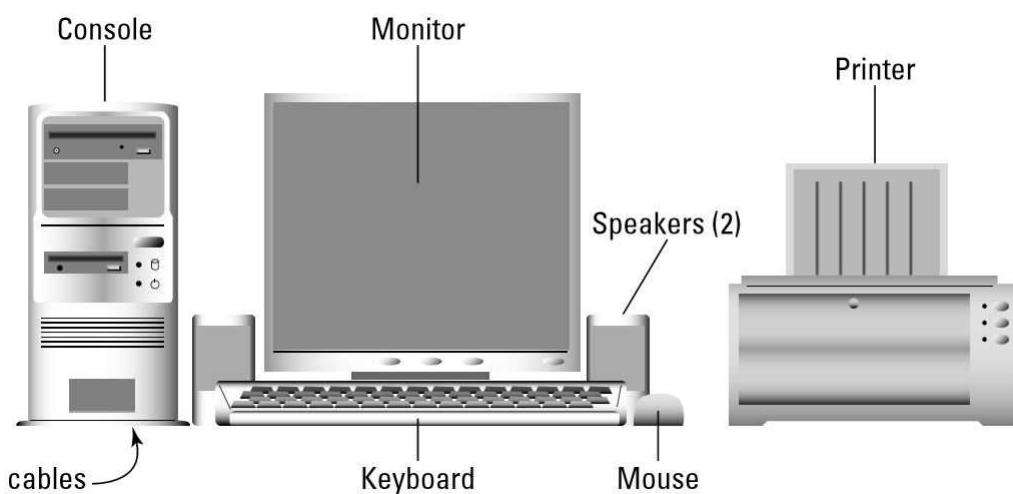


Figure 1 .9: Basic Hardware of a Computer

Figure 1.9 shows a typical computer system. The big, important pieces have been labeled for your enjoyment. It is important that you know which piece does which task and its proper terminology.

- **Computer Case:** It is the large box that contains most of the essential components of a computer. In more formal language it is also called *Computer Console*. Although in general the term console is used to indicate the basic terminal where you can issue commands directly.
- **Monitor:** The monitor is the device where the computer displays information, its output.
- **Keyboard:** It is the device by which you can type something. It is the most primitive way to communicate with the computer, hence keyboard is often referred to as an input device.
- **Mouse:** The computer mouse is a helpful device that lets you work with graphical objects that the computer displays on the monitor.
- **Speakers:** For audio output we need speakers, either external or built-in (mostly for Laptops).
- **Printer:** It prints and produces *hard copy*.

## 2.3 Exercise

### 2.3.1 Multiple Choice Question

1. What is the general task that all computers do?
  - a) Gaming
  - b) Information Processing
  - c) Video Editing
  - d) Word Processing
2. Which of the following is an example of an application program?
  - a) Windows 95
  - b) Windows 7
  - c) Microsoft Office
  - d) Linux
3. Which is an example of a software?

- a) Mouse
  - b) Hard disk
  - c) Linux
  - d) Keyboard
4. Which of the following can be used both as storage and I/O?
- a) Mouse
  - b) Hard disk
  - c) Monitor
  - d) Keyboard

### 2.3.2 Analytical Question

1. Briefly explain how hardware and software work together in a computer.
2. What do you understand by system program and application program?  
Explain with suitable examples.