The Concept of Computer

# What is a Computer?

A computer is a programmable machine designed to perform arithmetic and logical operations automatically and sequentially on the input given by the user and gives the desired output after processing. Computer components are divided into two major categories namely hardware and software.. Software is the set of programs that make use of hardware for performing various functions.

# Characteristics of Computers

The characteristics of computers that have made them so powerful and universally useful are;

1. **Speed**

Computers work at an incredible speed. A powerful computer is capable of performing about 3-4 million simple instructions per second.

1. **Accuracy**

In addition to being fast, computers are also accurate. Errors that may occur can almost always be attributed to human error (inaccurate data, poorly designed system or faulty instructions/programs written by the programmer).

1. **Diligence**

Unlike human beings, computers are highly consistent. They do not suffer from human traits of boredom and tiredness resulting in lack of concentration. Computers, therefore, are better than human beings in performing voluminous and repetitive jobs.

1. **Versatility**

Computers are versatile machines and are capable of performing any task as long as it can be broken down into a series of logical steps. The presence of computers can be seen in almost every sphere – Railway/Air reservation, Banks, Hotels, Weather forecasting and many more.

1. **Storage**

Capacity Today’s computers can store large volumes of data. The piece of information once recorded (or stored) in the computer, can never be forgotten and can be retrieved almost instantaneously.

# Computer components

1. **Hardware**

Hardware is the machine itself and its connected devices such as monitor, keyboard, mouse etc

1. **Input Devices:**

* The Keyboard: The keyboard is one of two ways to interact with your computer. The keys should mostly mimic a traditional typewriter.
* The Mouse

This is the other way to interact with your computer. Most mice have two buttons—a right and a left button—and a scrolling wheel. Mice are used as pointer devices to navigate through a computer. Think of this as your hand inside the computer.

* Touch Pads

A device that lays on the desktop and responds to pressure

* Light Pens

Used to allow users to point to areas on a screen

* Scanners

A scanner allows you to scan printed material and convert it into a file format that may be used within the PC

1. **Output Devices:**

* Printers ;there are many different types of printers.
* In large organizations laser printers are most commonly used due to the fact that they can print very fast and give a very high quality output.
* Speakers; Enhances the value of educational and presentation products.
* The Monitor The monitor looks like a television screen and is where you see what is happening on your computer. Think of this as the “face” of the computer.

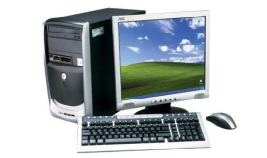
1. Storage Devices

* Hard Disks
* Speed: Very fast! The speed of a hard disk is often quoted as "average access time" speed, measured in milliseconds. The smaller this number the faster the disk.
* Capacity: Enormous! Often 40/80 Gigabytes. A Gigabyte is equivalent to 1024 Megabytes.
* Cost: Hard disks costs are falling rapidly and normally represent the cheapest way of storing data.CD-ROM Disks
* DVD Drives
* Speed: Much faster than CD-ROM drives but not as fast as hard disks.
* Capacity: Up to 17 Gbytes.
* Cost: Slightly higher than CD-ROM drives.
* Memory

1. ROM – Read Only Memory Read Only Memory (ROM) as the name suggests is a special type of memory chip that holds software that can be read but not written to.
2. RAM - Random Access Memory The main 'working' memory used by the computer. When the operating system loads from disk when you first switch on the computer, it is copied into RAM.

# Computer Organization

A computer is system as show in (figure 1) consists of mainly four basic units; namely input unit, storage unit, central processing unit and output unit.

Fig. 1: Computer System 

Central Processing unit further includes Arithmetic logic unit and control unit, as shown in Figure 2.

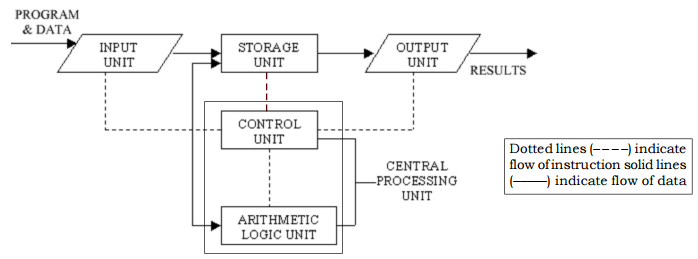


Fig.2: Basic computer Organization

A computer performs five major operations or functions irrespective of its size and make. These are

• It accepts data or instructions as input,

• It stores data and instruction

• It processes data as per the instructions,

• It controls all operations inside a computer, and

• It gives results in the form of output.

1. **Functional Units:**
2. **Input Unit**: This unit is used for entering data and programs into the computer system by the user for processing.
3. **Output Unit**: The output unit is used for storing the result as output produced by the computer after processing.
4. **Processing:** The task of performing operations like arithmetic and logical operations is called processing. The Central Processing Unit (CPU) takes data and instructions from the storage unit and makes all sorts of calculations based on the instructions given and the type of data provided. It is then sent back to the storage unit. CPU includes Arithmetic logic unit (ALU) and control unit (CU)
5. **Arithmetic Logic Unit**: All calculations and comparisons, based on the instructions provided, are carried out within the ALU. It performs arithmetic functions like addition, subtraction, multiplication, division and also logical operations like greater than, less than and equal to etc.
6. **Control Unit:** Controlling of all operations like input, processing and output are performed by control unit. It takes care of step by step processing of all operations inside the computer.

# Computer Software

Computer software is the set of programs that makes the hardware perform a set of tasks in particular order. Hardware and software are complimentary to each other. Both have to work together to produce meaningful results. Computer software is classified into two broad categories; system software and application software.

1. **System Software**: System software consists of a group of programs that control the operations of a computer equipment including functions like managing memory, managing peripherals, loading, storing, and is an interface between the application programs and the computer. MS DOS (Microsoft’s Disk Operating System), UNIX are examples of system software.
2. **Application software:** Software that can perform a specific task for the user, such as word processing, accounting, budgeting or payroll, fall under the category of application software. Word processors, spreadsheets, database management systems are all examples of general purpose application software.

# Types of application software are:

* **Word processing software:**

The main purpose of this software is to produce documents. MS-Word, Word Pad, Notepad and some other text editors are some of the examples of word processing software.

• **Database software:**

Database is a collection of related data. The purpose of this software is to organize and manage data. The advantage of this software is that you can change the way data is stored and displayed. MS access, dBase, FoxPro, Paradox, and Oracle are some of the examples of database software.

• **Spread sheet software**:

The spread sheet software is used to maintain budget, financial statements, grade sheets, and sales records. The purpose of this software is organizing numbers. It also allows the users to performsimple or complex calculations on the numbers entered in rows and columns. MS-Excel is one of the example of spreadsheet software.

* **Presentation software:** This software is used to display the information in the form of slide show. The three main functions of presentation software is editing that allows insertion and formatting of text, including graphics in the text and executing the slide shows. The best example for this type of application software is Microsoft PowerPoint.

• **Multimedia software:** Media players and real players are the examples of multimedia software. This software will allow the user to create audio and videos. The different forms of multimedia software are audio converters, players, burners, video encoders and decoders.

# Computer Language

Computer language or programming language is a coded syntax used by computer programmers to communicate with a computer. Computer language establishes a flow of communication between software programs. The language enables a computer user to dictate what commands the computer must perform to process data. These languages can be classified into following categories;

1. Machine language

2. Assembly language

3. High level language