# CSE-1101

## Introduction to Computer System

**Definition:** A Computer is a machine or device that performs process, calculation, and operations based on instruction provide by a software or handwear program. It has the ability to accept data (input), process it and then produce outputs.

Computer can also store data for letter uses in appropriate store devices and retrieve whenever it necessary.

Modern Computer are electronic devices use for a variety of purpose ranging from browsing the web, writing documents, editing videos, creating applications, playing games etc.

They are designed to execute applications and provide variety of solutions by combining integrated handwear and software components.

**Functions of Computer:** The functions of Computer are numerous as modern computers are capable of completing simple to complex tasks, with case.

Computer technology and related devices or components are becoming more advanced over time. In these ways it is very difficult to classify the functions of a computer. However, some basic functions are performed by every computer system irrespective its size, power or modernity.

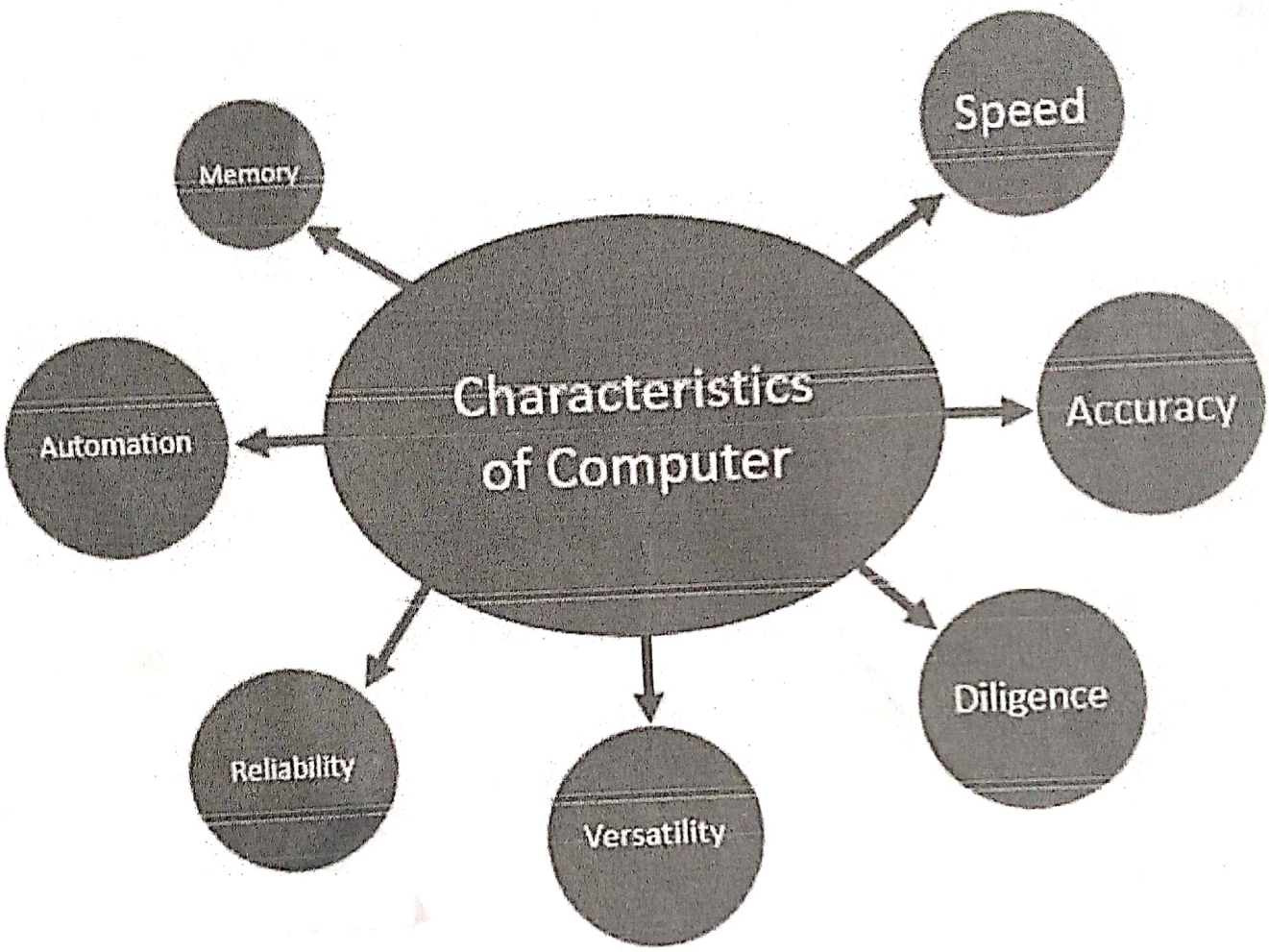
Based on the fundamental working of a computer system, a computer mainly has four basic functions, namely:

1. Data input,
2. Data processing,
3. Information output,
4. Data and information storage.

The above function of the computer is also known as an input function, process function, output function, and storage function respectively.

# Characteristics of Computer

The Characteristics of the computer system are as follows:




**Speed:** A computer works with much higher speed and accuracy compared to humans, while performing mathematical calculations. Computer can process millions of instructions per second. The time taken by computers for their operations is microseconds and nanoseconds.

**Accuracy:** Computer performs calculation with 100% accuracy. Error may occur due to data inconsisting or inaccuracy.

**Diligence:** A computer can perform millions of tasks or calculations with the same consistency and accuracy. If doesn't feel tired and lack of concentration.

**Versatility:** Versatility refers to the capability of a computer to perform different kinds of works with same accuracy and efficiency.

**Reliability:**

A computer is reliable as it gives consistent result for similar set of data that is, if we give same set of input any number of times, we will get the same result.

**Automation:** Computer performs all the tasks automatically. That is, it performs tasks without manual intervention.

**Memory:** A computer has built in memory called primary memory where it stores data. Secondary storage are removable devices such as CDs, Pen drive, etc. Which are also used to stores data.

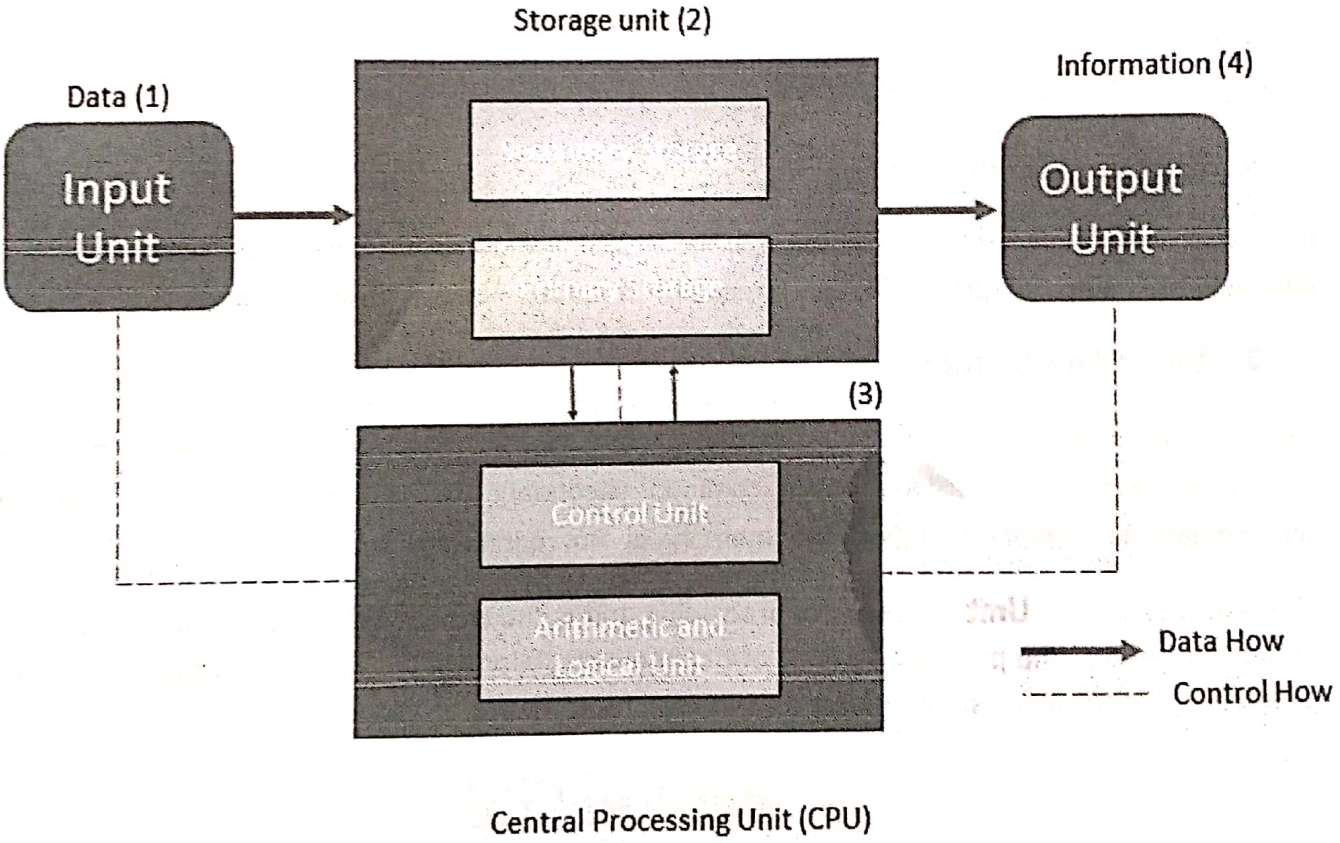



**Fig: Block Diagram of the computer system**

# Block Diagram of a Computer system

**Input unit:**

- It accepts the data from the outside world.
- It converts these data in computer acceptable form (Binary- 0 and 1).
- It supplies the converted data to the computer system for durther processing.
- The keyboard and mouse are common examples of input devices.

**~~Storage~~ unit:**
output

- It holds the data and instructions requerd for processing (recived from input devices).
- Intermidiate results of processing before these results are realsed to an output device.
- The common output devices are printer, and monitor.

## Types of Storage unit:

1. **Primary Storage:**

It is also known as memory, is used to hold pices of program instructions and data, intermidiate results of processing and recently produced results of processing.

2. **Secondary Storage:**

We can store the data and programs on a long term basis in the secondary memory. The hard disks and optical disks are the common secondary devices. It is slow and chep memory as compare to primary memory. the memory is not connected to the processor directly.

**Control processing Unit:** The control processing unit is the central processor or main processor of the computer system. The processor armies out of the instructions of the computer program with the help of basic arithmetic logic, input/output operations.

## Parts of CPU

**Arithmetic Logical Unit:** The arithmetic and logical unit is the combinational digital electronic circuit that can perform arithmetic operations on integer binary number. It presents the arithmetic and logical operations.

**Control Unit:** The control unit controls all the activities or operations which are performed inside the computer system. It receives instructions or information directly from the main memory of the computer.

**Output Unit:**

i. The devices receive or accept the data in binary form.

ii. The output devices convert the code into the human readable form.
iii. This device produces the converted result and show to users.
iv. The monitor or printer are common example of output device.

## Classification of Computer

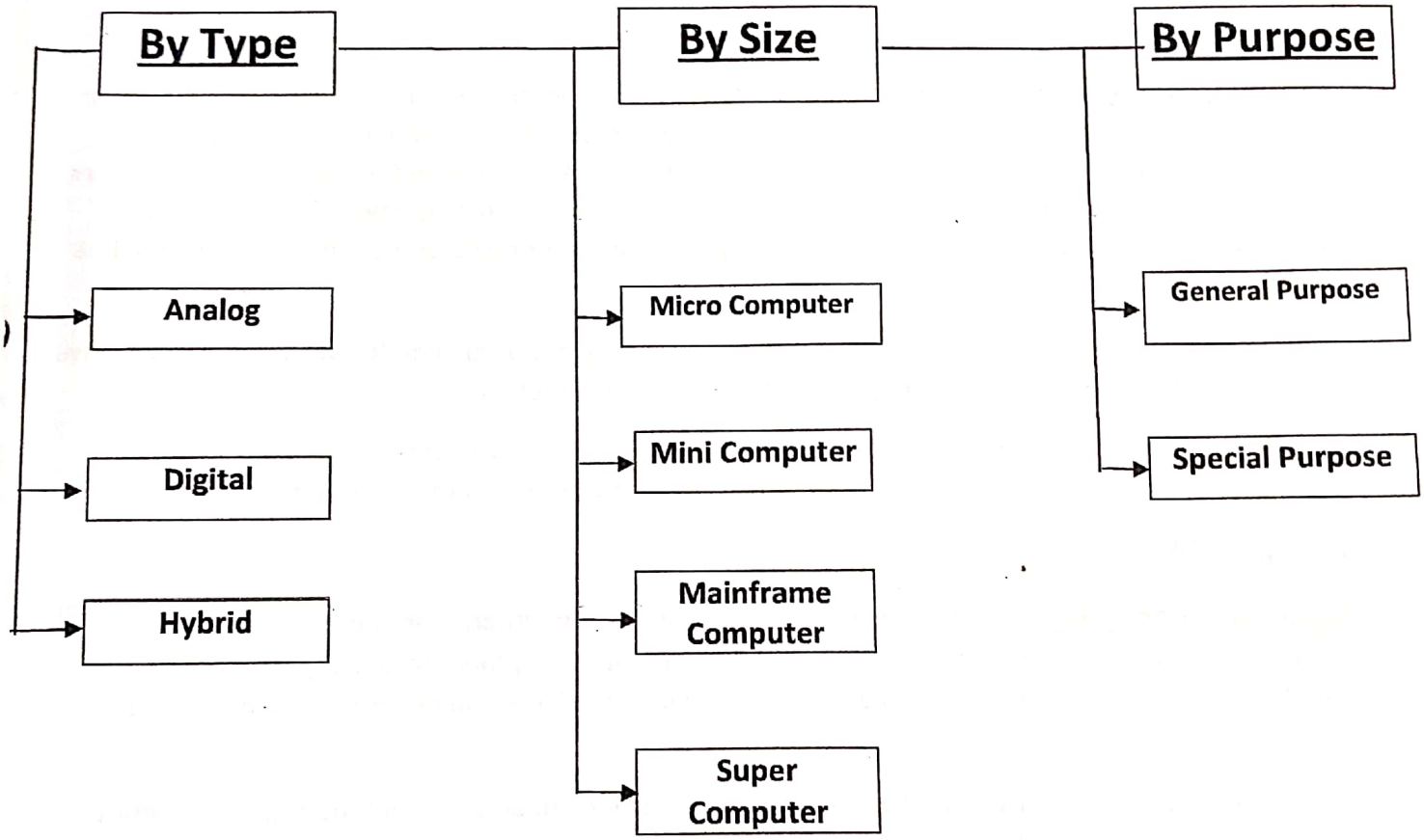



**Fig: Classification of Computer**

### Analog Computer:

An analog computer is a computer which is used for process analog data. Analog computer store data in contentious form of physical quantities and perform calculations with the help of measures. It is quite different from digital computer which makes the symbolic number to represent results.

**Example:** Temperature, Air pressure, ECG, Frequency of Signal, etc.

**Digital Computer:** The definition of a digital computer is the most commonly used type of computer and is used to process information with quantities using the binary number system that is using only the two digits 0 and 1.

**Example:** Smartphones, tablets, calculators, and digital clock etc.

**Hybrid Computer:** Hybrid computers are computer that exhibit features of analog computer and digital computer.

**Example:** Gasoline Machine (Oil Pump).

**Micro Computer:** A micro computer is a small, relatively inexpensive computer with a microprocessor as its control processing unit (CPU). It includes a microprocessor, memory and minimal input/output (I/O) circuitry mounted or a single printed circuit board (PCB). A microcomputer is a complete computer on a small scale, designed use by one person at a time. A micro computer is now primarily called a personal computer (PC) or a device based on a single cheap microprocessor. Common micro computers are laptop and desktops.

**Mini Computer:** Mini computers are digital computers, generally used in multi user systems. They have high processing speed and high storage capacity then microcomputers.

Micro computers can support 4-200 users simultaneously. The users can access the micro computer through their PCs terminal. They one used for real-time applications in industries research center etc.

**Example:** PDP 11 and IBM (8000 series).

**Mainframe Computer:** Mainframe computer are multi-user, multi-programming and high-performance computers. They operate a very high speed, have very long storage capacity and can handle the workload of many users. Mainframe computers are large and powerful systems generally used in centralize database.

Mainframe computer are used in organizations like banks or companies, where many people require frequent access the same data.

**Example:** CDC 6600 and IBMES 00.

**Super computer:** Super computers are the latest and the most expensive machine. They have high processing speed compared to other computers. Some of the super computers can perform trillions of calculations per second. Super computers are built by inter connecting thousands of processors that can work parallel. Super computers are used for highly calculations intensive tasks such as weather for casting, climate research etc.

**General Purpose Computer:** A general computer is one of that given the appropriate application and required time, should be able to perform most common computing tasks.

**Example:** Desktop, Smartphone, and tablets are general purpose computer.

**Special Purpose Computer:** As the main states a special purpose computer are designed to be task specific and most of time their job is to solve one particular problems. They are also known as dedicated computer, because they are dedicated to perform a single task over and over again.

**Example:** Automatic - teller Machine (ATM) or, Washing Machine.

# Branching:

Branching is so called because the program chooses to follow one branch or another.

## if statement

This is the most simple form of the branching statements.

if the expression is true then the statement or block of statements gets executed otherwise these statements are skipped.

**if** statements take the following form:

Show Example

```
if (expression)
  statement;

or

if (expression)
  {
    Block of statements;
  }

or
if.....else

if (expression)
  {
    Block of statements;
  }
else
  {
    Block of statements;
  }

or
```

# Hardware, Software, and Firmware

**Hardware:** Hardware is the computer's part that is seen and touched by us. These are physical parts of the computer, which make up the body of our computer like, keyboard, mouse, monitor, printer, hard disk, motherboard, etc.

**Software:** Software is a set of instructions, data or programs used to operate computer and execute specific tasks.

**Example:** Google chrome; M.S. Office, etc.

The main categories of software are **application software** and **system software.**

**Application software:** An application software is that software which fulfills a specific need or perform tasks.

**Example:** Calculator, Facebook, Google Chrome, etc.

**System software:** System software is designed to run a computer's hardware and provides a platform for applications to run on top.

**Example:** Windows, Linux (Operating Systems).

**Firmware:** Firmware is a type of software that is associated with hardware.

Firmware is a software installer at the time of manufacturing any hardware, including hardware, such as keyboards, hard drive, BIOS and printers. The firmware contains instructions programs to perform the basic functions of any hardware.

■ **Comparison between software and firmware:**

| | Software | | Firmware |
|---|---|---|---|
| i. | Set of instructions | i. | Type of software to control the hardware. |
| ii. | It includes categories such as application, computer programming tools. | ii. | It includes no such categories. |
| iii. | Its size massive. | iii. | Its size is very small. |
| iv. | Both low-level and high-level language is used in the developing process. | iv. | Usually, low-level language is used the developing process. |

# Impact of computer

## Positive impact:

i. It helps us to automate various tasks that we can not do manually.
ii. It helps us to organize our data and information in a better way.
iii. It has much more computing and calculation power than an ordinary human.
iv. It may be the storge of our important files.
v. It may help us solve problems faster than a ordinary human being can do.

## Negative impact:

i. It can potentially destroy our social life and interactions with humans it we do not maintain the balance.
ii. It may affect to destruction of our eye sight due to radiation.
iii. It may damage our studies and life.
iv. Too much time in front of monitor may adverse effect our eye sight and can also make you fat.

# Number system

A number system is a way to represent arithmetic value count or measure of a particular quantity.

A number system can be considered as a mathematical notation of numbers using a set of digits or symbols. Every number system is identified with the help of its base or radix.

■ What is Base or Radix of a number system?

→ The Base or Radix of a number system can be referred as the total number of different symbols which can be used in a particular number system. Radix means 'Root' in Latin.

Radix/Base:

1. Decimal (10). → 0 1 2 3 4 5 6 7 8 9
2. Binary (2). → 0 1
3. Octal (8). → 0 1 2 3 4 5 6 7
4. Hexadecimal (16). → 0 1 2 3 4 5 6 7 8 9 A B C D E F

Class Test: 01

CSE 1101 Time: 50 Minutes Full Marks: 10

What is the definition of Computer? (1)

How many basic functions does a computer have?? (1)

Draw the diagram of characteristics of computer & describe any two characteristics. (2+2)

Draw the Block Diagram of a Computer System. ( 4)