FUNDAMENTAL OF COMPUTER

Unit-1

Introduction

The literal meaning of computer is a device that can calculate. However, modern computers can do a lot more than calculate.

Computer is an electronic device that receives input, stores or processes the input as per user instructions and provides output in desired format.

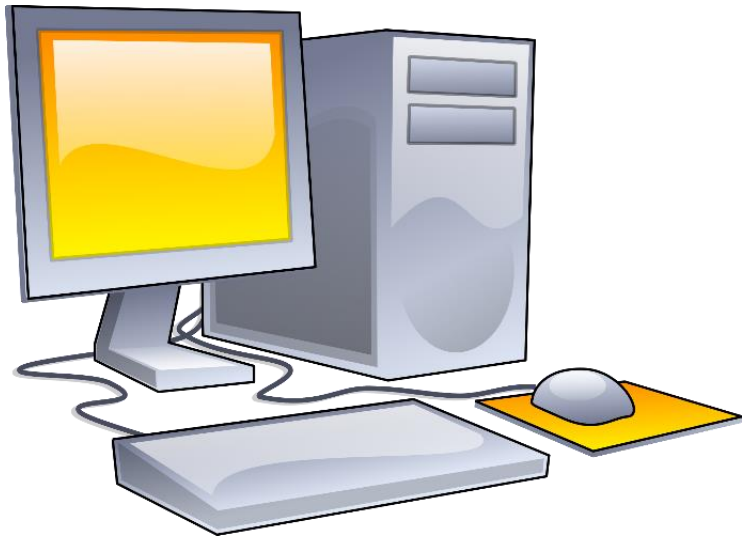
Objectives of Computer

- Computers can do the same task repetitively with same accuracy.
- Computers do not get tired or bored.
- Computers can take up routine tasks while releasing human resource for more intelligent functions.

History of Computers

The word ‘computer’ has a very interesting origin. It was first used in the 16th century for a person who used to compute, i.e. do calculations. The word was used in the same sense as a noun until the 20th century. Women were hired as human computers to carry out all forms of calculations and computations.

By the last part of the 19th century, the word was also used to describe machines that did calculations. The modern-day use of the word is generally to describe programmable digital devices that run on electricity.



History of Computers

Since the evolution of humans, devices have been used for calculations for thousands of years. One of the earliest and most well-known devices was an abacus. Then in 1822, the father of computers, **Charles Babbage** began developing what would be the first mechanical computer. And then in 1833 he actually designed an Analytical Engine which was a general-purpose computer.

Types of Computer

	Analog	Digital	Hybrid
Type of Signal	Continuous(0 to 10V)	Two level 0 or 1 (0V or 5V)	Binary in some parts and continuous in other
Accuracy	1% approximately	Unlimited	In between Analog and Digital
Speed	High speed and parallel operations among components	Low speed sequential as well as parallel processing	In between Analog and Digital
Computational Time	Output is continuous, time wasted in transition time	Finite but results are obtained after complete computation is carried out	Proper programming and optimization decreases the computational time
Precision	Limited	High	Limited

First Generation Computers

Features

- Vacuum tube technology
- Magnetic core memories
- Fastest computing device of their time
- Computation time: milliseconds

Drawbacks

- Bulky in size
- Unreliable and prone to frequent hardware failure
- Consumed too much power
- Non-portable and required air conditioning

Second Generation Computers

• Features

- Transistor based technology
- Smaller in size
- More reliable and less prone to hardware failure
- Wider commercial use

• Drawbacks

- Frequent maintenance needed
- Commercial production was still difficult
- Air conditioning required

Third Generation Computers

• Features

- Integrated circuit based technology
- Smaller in size
- Low power consumption
- More reliable and cheaper
- Portable
- Could be commercially produced at cheaper rates

• Drawbacks

- Complex and sophisticated technology required for the manufacture of CPU and other components

Fourth Generation Computers

• Features

- LSI technology
- Development of microprocessor based technology
- Very small in size
- Very Reliable
- Production cost very less
- Negligible heat generation

• Drawbacks

- Complex and sophisticated technology required for manufacturing the CPU and other components

Fifth Generation Computers

- They are yet to arrive
- They are suppose to have AI
- They will have Knowledge Information Processing Systems
- They use VVLSI (Very Very Large Scale Integration) technology

Parts of Computer

Hardware

- These are the physical components that make up the body of a computer.
- These are the parts that we can see or touch.
- For e.g.- monitor, mouse, keyboard , etc.

Software

- These are the programs that help the user to complete the task.
- These are the parts that we cannot see or touch.
- For e.g.- Operating System, application software, etc.

Desktop

Desktop computers are personal computers (PCs) designed for use by an individual at a fixed location. IBM was the first computer to introduce and popularize use of desktops. A desktop unit typically has a CPU (Central Processing Unit), monitor, keyboard and mouse. Introduction of desktops popularized use of computers among common people as it was compact and affordable.

Laptop

Despite its huge popularity, desktops gave way to a more compact and portable personal computer called laptop in 2000s. Laptops are also called **notebook computers** or simply **notebooks**. Laptops run using batteries and connect to networks using Wi-Fi (Wireless Fidelity) chips. They also have chips for energy efficiency so that they can conserve power whenever possible and have a longer life.

Components of Computer System

A computer has four main components of-

- Input unit
- Memory
- Central Processing Unit
- Output Unit

Input Unit

- The input provides a way of man-to-machine communication.

- The main function of the input device is to enter the data in the computer. The various examples of input data are a mouse, keyboard, light pen, etc.

Memory

- This part of the computer is used as a storage of program as well as data.
- It can be both internal and external.
- Internal memory is directly accessible from CPU
- External memory includes magnetic storage devices such as hard disks, magnetic drums etc.

Central Processing Unit

- This is the place of computer data handling which does all the data manipulation, calculations and formatting data for output.

- Its main components are

❑**Control unit(CU)-** It is responsible for the movement of data and instructions in and out of the memory and CPU

❑**Arithmetic and logic unit(ALU)-**It performs the arithmetic and logical operations on data as a result of the execution of the decoded instructions.

❑**Registers-** It is a set of temporary memory locations in the CPU and each regester has a specific function

Output unit

These devices are required to deliver results to the user of the computer system.

It provides a way of machine-to-man communication

Some of the output devices are:

- Visual Display Unit
- Printer
- Plotter