

## Unit-I-A

**Computer Fundamentals:** Introduction to Computers: Characteristics of Computers, Uses of Computers, Types and generations of Computers.

### Definition of Computer / What is Computer ?

*The term computer is derived from the Latin term 'computare', this means to calculate. "Computer" word was used firstly in the 1640s; it was used to represent "the person who calculates". The use of the term to mean "calculating machine" is from 1897. The "modern use" of the term, to mean "programmable digital electronic computer" started from 1945; (Source : Wikipedia)*

#### Definition of Computer :

A computer is a device that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming. Modern computers have the ability to follow generalized sets of operations, called *programs*. These programs enable computers to perform an extremely wide range of tasks.

Or

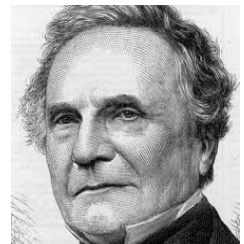
A Computer is an electronic device or machine that can perform arithmetic operations like addition, subtraction, multiplication, division etc. as well as logical operations like comparisons at very high speed. A computer is also called a data processor because it can store, process and retrieve data whenever desired.

Or

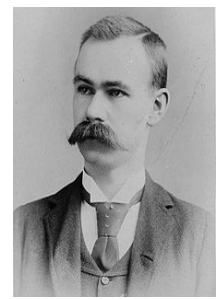
Computer is an electronic device that can receive data through the input unit, store the data in memory unit, processes the data in Arithmetic and Logic Unit (ALU) with the help of computer software and finally give the results through output unit.

#### Some interesting facts :

**Charles Babbage** 1791 – 1871 from England was a mathematician, philosopher, inventor who originated the concept of a digital programmable computer. He is considered as a "father of the computer" for his essential ideas of modern computers and invention of analytical engine in 1837.



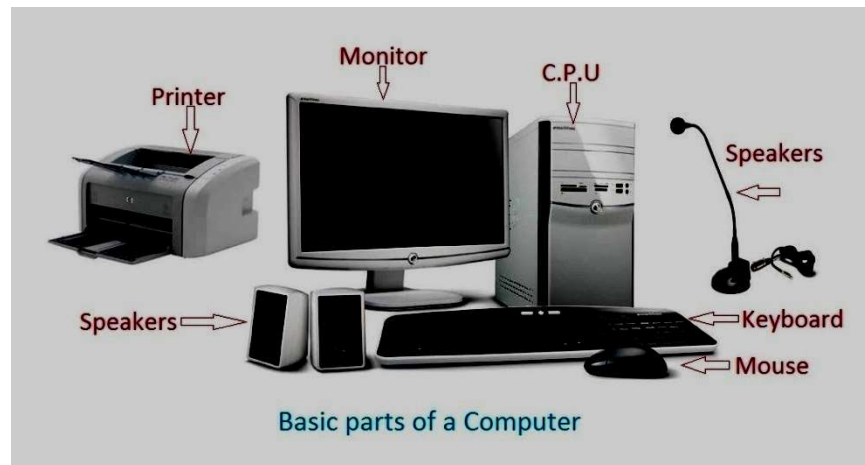
**Herman Hollerith** 1860-1929 from America was a Statistician and Inventor. He started the Tabulating Machine Company in 1896, where he used punched card based input technique in the tabulation machines. The company later becomes the well-known computer Company IBM ( International Business Machines).



**John von Neumann** gave the design of digital computer architecture in 1945. This architecture is comprised of an ALU (arithmetic logic unit), memory, input/output, and a control unit. This design is still used, in one form or another, in all computers and many electronic devices produced today. (Source : <https://www.computerhope.com/jargon/v/vonneuma.htm>)



## Basic Parts of a Computer



These parts of the Computer and some other devices are connected together with the help of wires and cables.

### The basic parts of a computer system are:

1. Monitor
2. CPU (Central Processing Unit)
3. Keyboard
4. Mouse
5. Speakers
6. Printer

### Brief information about various parts of computer

**Compact disc:** It stores information many times more than a floppy disk.

**CPU:** The processing device in a computer.

**Data:** It is the information given to the computer.

**Electronic machine:** It is the machine that runs with the help of electricity.

**Floppy disk:** It stores a small amount of information.

**Hard disk:** It stores a large amount of information.

**Headphones:** The device for listening to the recorded sounds without disturbing others.

**Input devices:** These help us put data into the computer.

**Joystick:** It is used for playing computer games.

**Keyboard:** This is used to enter data into the computer system.

**Microphone:** It is used for recording sound.

**Monitor:** It shows whatever you type on the keyboard or draw with the mouse.

**Mouse:** It is pointing device.

**Output devices:** These help us to show the results of processing.

**Processing device:** Helps to store, sort, arrange and change the inputs on a computer.

**Scanner:** It copies pictures and pages and turns into images that can be saved on a computer.

**Speakers:** These are used for listening to recorded sound.

**Storage devices:** These are form the memory of the computer.

**Web camera:** It is used for taking live photos and videos.

## Comparison of Human and Computer : Discussion in the class only

### Characteristics of Computer

The characteristics of the computer are as follow:

- 1. Automatic :** Computers are automatic, once started they carry out their jobs automatically without human intervention.
- 2. Speed :** Computers processing speed is very fast. Most of the modern computers (Ghz or 10<sup>9</sup> instructions per second processing speed) can process billions of instruction in one second. Multi core processor architecture has further enhanced the processing speed of the computers.
- 3. Accuracy :** Computer performs every calculation with the same accuracy. Computer can give wrong outputs only when the inputs supplied to it are wrong.
- 4. Diligence :** Computer is free from monotony, tiredness and lack of concentration. It can keep continuously working for years.
- 5. Versatility:** Computer can perform variety of tasks such as word processing, web browsing, gaming, database management etc.
- 6. Memory :** Computer can store huge amount of data in its memory and can recall any piece of information whenever required.
- 7. No I.Q. :** Computer do not have any intelligence. We have to give it instructions what to do and how to do. Moreover, it can respond to only those instructions which are already fed into it.
- 8. No Feeling :** Computers do not have any feeling, they do not have any sense of joy, love, success, failure etc.

### Uses of Computer

We can divide the uses of Computer in 4 categories.

#### 1. Standalone Applications.

A stand alone application is one, through which a computer can perform all its tasks on its own without the need of communication with other computer systems.

Applications Examples

Applications	Nature of use	Name of Application
Office	Writing documents, doing calculations, preparing presentation	MS Office, Open Office
Multimedia	Drawing and Painting, Watching videos , Composing / Listening Music , Photograph editing	MS Paint, Windows media Player, VLC, Photoshop

Programming	Write Computer Programs using computer software's	Turbo C, Visual Studio, Python
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## 2. Internet applications.

The applications which are accessible from any computer by using the network/ Internet are known as Internet applications. These devices work upon client-server model and use browser or application specific software's for accessing Internet applications.

Applications	Nature of use	Name of Application
Web Searching/ browsing	To search desired information on Internet.	Google, Bing, Baidu etc.
Communication	Sending Emails, messages, photos, videos, meme etc	Gmail, Yahooemail, Facebook, Twitter etc.
Transaction	Booking Tickets, ATM, Net Banking, Online shopping etc.	Websites/ Mobile Apps of Railways, Banks, Amazon, Flipkart etc.
Education	Online courses, Online books, video lectures etc.	NPTEL, MOOC, SWYAM, ShoduSindhu etc.
Entertainment	Online TV & Radio, Watching movies, videos, listen to music, Online video games etc.	Youtube, tiktok, Amazon prime, NetFlix etc.

## 3. Special purpose applications.

The applications which are developed for some specific purpose comes under this category e.g.

Applications	Nature of use
Climate Forecasting	The applications which are used by weather analysts to predict daily weather and rain, earthquakes, cyclones.
Defence	Applications used by defence personnel for missile targeting, unmanned aircrafts.

Cellular Communication	Applications used by mobile service providers for mobile communication.
Space	Applications used by space agencies like ISRO, NASA for monitoring satellite data and space mission
Medicine	Medical equipments such as CT SCAN, ECG, echo cardiography, ultrasound etc used to diagnose patient conditions.

#### 4. Embedded applications

Embedded applications are those which are used to control a device and provide a user interface.

Applications	Nature of use
Appliances	Mobile phones, GPS, Microwave ovens, washing machines , video gaming consoles etc. are controlled by specific embedded applications.
Smartcards	These cards contains a chip that store users data. The examples of such cards are Dabit/Credit Card, SIM Card, Entry Card etc.
Self Diagnostic devices	The devices which are used to test Blood Sugar, Blood Pressure etc.
Robots	The machine that is controlled by complex computer programs and can be used in the field of manufacturing, surgery, defence etc.

#### Types of Computer

We can divide computers into 4 catagories

- **Super Computer**
- **Mainframe Computer**
- **Mini Computer**
- **Micro Computer**

**Super computers** are the fastest and the most expensive computers. These huge computers are used to solve very complex science and engineering problems. Supercomputers get their processing power by taking advantage of *parallel processing*; they use lots of CPUs at

the same time on one problem. A typical supercomputer can do up to ten trillion individual calculations every second. Example Supercomputers:



K Computer



Columbia

**Mainframe computers** are similar to supercomputers in many aspects, the main difference between them is the fact that a supercomputer use all its raw power to focus on very few tasks, while a mainframe purpose is to perform thousands or millions of operations concurrently. Due to its nature, mainframes are often employed by large organizations for bulk data processing, such as census, industry and consumer statistics, enterprise resource planning and transaction processing.



**Minicomputers/ Workstations** are used by small businesses & firms. Minicomputers are also called as “Midrange Computers”. These are small machines and can be accommodated on a disk with not as processing and data storage capabilities as super-computers & Mainframes. These computers are not designed for a single user. Individual departments of a large company or organizations use Mini-computers for specific purposes. For example, a production department can use Mini-computers for monitoring certain production process.

