

**COMP101TH**  
**Problem Solving Using Computer**  
**Unit: 1 (Computer Fundamentals)**  
**Lecture: 2**

**“Everything comes to us that belong to us if we create the capacity to receive it.”**

**...Rabindranath Tagore**

- **Nadir:** the lowest or most unsuccessful point in a situation, the bottom  
E.g. asking that question was nadir of my career.
- **PODCAST:** A podcast is a type of digital media, usually audio, that is available in a series of episodes or parts and is streamed or downloaded by the end user over the Internet. Podcasts can be made available via a release schedule or uploaded to the Web randomly.

- **Advantages of Computers**

- **High Speed**

- It is capable of performing calculation of very large amount of data.
- The computer has units of speed in microsecond, nanosecond, and even the picosecond.
- It can perform millions of calculations in a few seconds as compared to man who will spend many months to perform the same task.

- **Accuracy**

- In addition to being very fast, computers are very accurate.
- Computers perform all jobs with 100% accuracy provided that the input is correct.

- **Storage Capability**

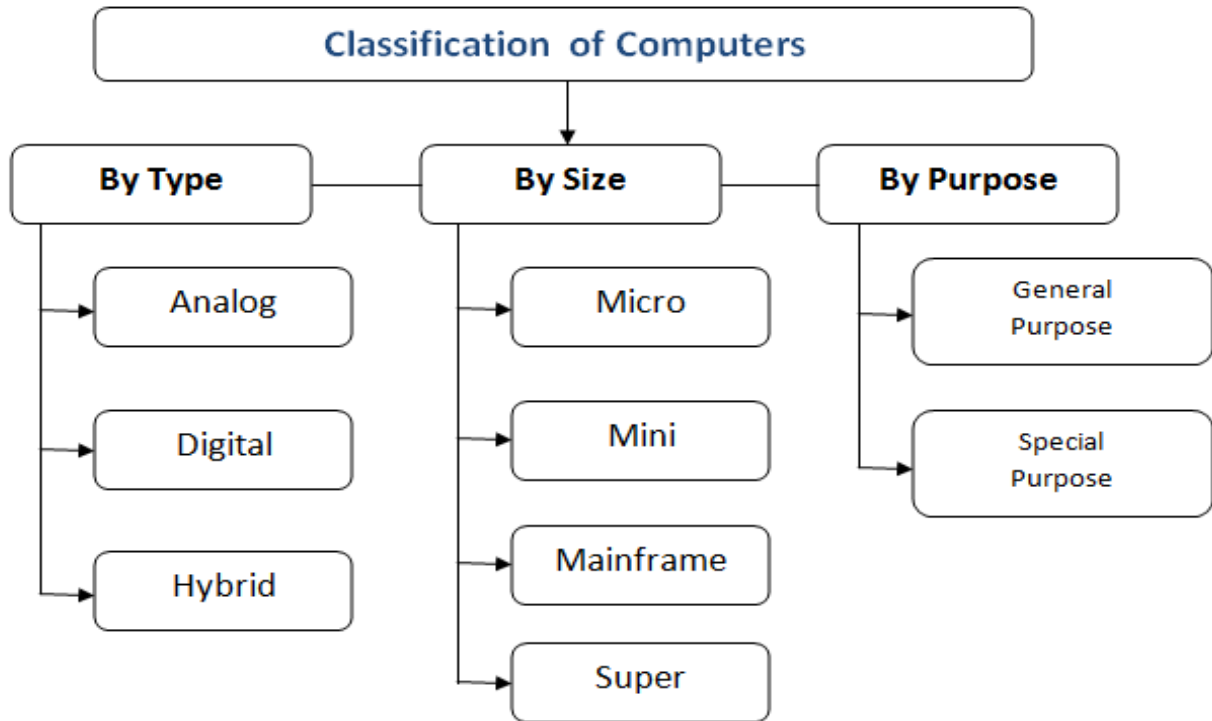
- Memory is a very important characteristic of computers.
- A computer has much more storage capacity than human beings.
- It can store large amount of data.
- It can store any type of data such as images, videos, text, audio, etc.

- **Diligence**

- Unlike human beings, a computer is free from monotony, tiredness, and lack of concentration.
- It can work continuously without any error and boredom.

- It can perform repeated tasks with the same speed and accuracy.
- **Versatility**
  - A computer is very flexible in performing the jobs to be done.
  - This machine can be used to solve the problems related to various fields.
  - At one instance, it may be solving a complex scientific problem and the very next moment it may be playing a card game.
- **Reliability**
  - A computer is a reliable machine.
  - Modern electronic components have long lives.
  - Computers are designed to make maintenance easy
- **Automation**
  - Automation is the ability to perform a given task automatically. Once the computer receives a program i.e., the program is stored in the computer memory, then the program and instruction can control the program execution without human interaction.
- **Reduction in Paper Work and Cost**
  - The use of computers for data processing in an organization leads to reduction in paper work and results in speeding up the process.
  - As data in electronic files can be retrieved as and when required, the problem of maintenance of large number of paper files gets reduced.
- **Disadvantages of Computers:**
  - **No IQ**
    - A computer is a machine that has no intelligence to perform any task.
    - Each instruction has to be given to the computer.
    - A computer cannot take any decision on its own.
  - **Dependency**
    - It functions as per the user's instruction, thus it is fully dependent on humans.
  - **Environment**
    - The operating environment of the computer should be dust free and suitable.
  - **No Feeling**
    - Computers have no feelings or emotions.

- **Classification/ Types of Computers:**



- Classification by Technology Used:

- According to the technology used, computers are of following three types:

- Digital computers
- Analog computers
- Hybrid computers

- **Digital Computers:**

- **Digital computers** are mainly general purpose computers that **represent and store data in discrete quantities or numbers.**
- In these computers, all processing is done in terms of numeric representation (**binary digits**) of data and information.
- Although the user enters the data in decimal or character form, it is converted into binary digits (0s and 1s).
- **For example:** PC, Laptop etc.

- **Analog Computers:**

- Analog computers are special purpose computers that represent and store **data in continuously varying physical quantities** such as current, voltage or frequency.

- These computers are programmed for measuring physical quantities like pressure, temperature, speed, etc., and to perform computations on these measurements.
- Analog computers are mainly used for scientific and engineering applications.
- **Some of the examples of Analog computers are:**
  - **Thermometer:** It is a simple analog computer used to measure temperature.
  - **Speedometer:** Car's speedometer is another example of analog computer where the position of the needle on dial represents the speed of the car.
- **Limitations of the Analog computer:**
  - These do not have logical facilities afforded by programming.
  - They do not have the ability to store data in large quantities.
  - Cost of implementation of computation is very high
- **Hybrid computers:**
  - Hybrid computers incorporate the technology of **both analog and digital computers.**
  - These computers store and process analog signals which have been converted into discrete numbers using analog to digital converters.
  - They can also convert the digital numbers into analog signals or physical properties using digital to analog converters.
  - Hybrid computers are mainly **used in artificial intelligence (robotics) and computer aided manufacturing** (e.g., process control).
  - **For example:** Automated Teller Machine (ATM).
- **Classification by Size and Capacity**
  - **Microcomputers:**
    - Microcomputers are also **called personal computers (PCs) and use microprocessor as its CPU**, a memory unit, and input device and an output device.
    - They are small in size. Also, they do not have large storage capacities.

- They are more commonly called **personal computers** because they are designed to **be used by one person at a time**.
- Popular uses for microcomputers include word processing, surfing the Web, sending and receiving e-mail, spreadsheet calculations, database management, editing photographs, creating graphics, and playing music or games.
- Few examples are **IBM PC, PS/2, Apple II and Macintosh**.
- **Minicomputers:**
  - A **minicomputer** is a **multi-user computer**.
  - They have high processing speed and high storage capacity than the microcomputers.
  - Minicomputers **can support 4-200 users simultaneously**.
  - They are used for real-time applications in industries, research centers etc.
  - E.g. PDP-11, IBM (8000 series)
- **Mainframe Computers:**
  - Mainframe Computers are **multi-user, multi-programming and high performance** computers.
  - They operate at a very high speed, have very large storage capacity and can handle the workload of many users.
  - These are generally **used in centralized databases**.
  - Mainframe computers are used in organizations like banks or companies, where many people require frequent access to the same data.
  - E.g. CDC 6600 and IBM ES000 series.
- **Supercomputers:**
  - These are the **largest and fastest computers**.
  - A super computer has a number of CPUs which operate in parallel to make it faster.
  - They are used for **massive data processing and solving very sophisticated problems** i.e., in the fields of science and defense, designing and launching missiles, weather forecasting, biomedical research, aircraft design and automobile design.

- E.g. **CRAY 3**.
- India has a series of super computers called **PARAM** developed by C-DAC and ANURAG.
- **Classification by Purpose:**
  - **General Purpose Computer:**
    - General-purpose computer is the one that **can work on different types of programs** input to it and thus be used in countless applications.
    - The programs are **not permanently stored but are input at the time of execution**.
    - These computers are **very versatile**.
    - Simply by using a general purpose computer and different software, various tasks can be accomplished, including writing and editing (word processing), manipulating facts in a data base, tracking manufacturing inventory, making scientific calculations etc.
  - **Special Purpose Computer:**
    - Special-purpose computer is the one that is designed to **perform a specific task**.
    - The instructions (programs) to carry out the task are **permanently stored in the machine**.
    - For the specific tasks, this type of computer works efficiently but such computers **are not versatile**.
    - Such a computer system would be useful in playing graphic intensive Video Games, traffic lights control system, navigational system in an aircraft, weather forecasting, satellite launch / tracking etc.