# BASICS OF COMPUTER AND ITS OPERATIONS

A computer is an electronic device that can receive, store, process, and output data. It is a machine that can perform a variety of tasks and operations, ranging from simple calculations to complex simulations and artificial intelligence.

Computers consist of hardware components such as the central processing unit (CPU), memory, storage devices, input/output devices, and peripherals, as well as software components such as the operating system and applications.

The history of computers can be traced back to the 19th century when mechanical devices such as the Analytical Engine and tabulating machines were developed. However, modern computers as we know them today were developed in the mid-20th century with the invention of the transistor and the development of integrated circuits.

Today, computers are widely used in various industries such as education, finance, healthcare, and entertainment, and they have revolutionized the way we live, work, and communicate. They have also given rise to a new era of technology such as the internet, cloud computing, and mobile devices, which have further transformed our daily lives.

Computer is a device that transforms data into meaningful information. It processes the input according to the set of instructions provided to it by the user and gives the desired output quickly. A Computer can perform the following set of functions:

- Accept data
- Store data
- Process data as desired
- Retrieve the stored data as and when required
- Print the result in desired format.

**Data and Information:** Data: It is the term used for raw facts and figures fed into the computer and along with the set of instructions which enables the computer to convert this raw data into the refined and useful information. Information: Data represented in useful and meaningful form is information.
Data and information are related concepts, but they have different meanings. Data refers to raw facts and figures that are unorganized and have no meaning on their own. Information, on the other hand, is data that has been processed, organized, and given context to make it meaningful and useful.

Data can take many forms, such as numbers, words, images, or sounds. For example, a list of sales figures for a company is data. However, this data by itself does not provide any useful information. It needs to be processed and analyzed to be turned into information that can be used for decision-making.

Information is data that has been processed and organized in a meaningful way to convey a message or answer a question. For example, using the sales figures from the earlier example, an analyst could create a graph or chart that shows the sales trends over time, providing meaningful information about the company's performance.

In summary, data is the raw, unorganized facts and figures, while information is data that has been processed and given context to be meaningful and useful for decision-making.

**Classification of Computers:** Computers can be classified based on the technology being used and the way they are designed to perform the various tasks. Computers can be categorized into Digital, Analog and Hybrid based on their design and working:

1. **Digital Computers:** These are the modern computers which are capable of processing information in discrete form. In digital technology data which can be in the form of letters, symbols or numbers is represented in binary form i.e. 0s and 1s. The digital computers are used in industrial, business and scientific applications. They are quite suitable for large volume data processing.
2. **Analog Computers:** These computers are used to process data generated by ongoing physical processes. A thermometer is an example of an analog computer since it measures the change in mercury level continuously. Analog computers are well suited to simulating systems. A simulator helps to conduct experiments repeatedly in real time environment. Some of the common examples are simulations in aircrafts, nuclear power plants, hydraulic and electronic networks.
3. **Hybrid Computers:** These use both analog and digital technology. It has the speed of analog computer and the accuracy of a digital computer. It may accept digital or analog signals but an extensive conversion of data from digital to analog and analog to digital has to be done. Hybrid Computers are used as a cost-effective means for complex simulations.
4. **Supercomputers:** These are the most powerful and expensive computers that are used for complex scientific calculations, simulations, and research. They are used in fields such as weather forecasting, cryptography, and nuclear research.
5. **Mainframe Computers:** These are large and powerful computers that are used by large organizations such as banks, airlines, and government agencies to process massive amounts of data and handle multiple users simultaneously.
6. **Mini Computers:** These are smaller and less powerful than mainframe computers, but they are still capable of handling multiple users and processing large amounts of data. They are commonly used by small to medium-sized businesses for accounting, inventory management, and other data-intensive tasks.
7. **Personal Computers:** These are small and affordable computers that are designed for individual users. They are commonly used for personal productivity, entertainment, and communication.
8. **Workstations:** These are high-performance computers that are used by professionals such as architects, engineers, and designers to run complex software applications for tasks such as 3D modeling, animation, and scientific visualization.
9. **Embedded Systems:** These are specialized computers that are built into other devices such as cars, appliances, and medical equipment to control their operations and perform specific functions.
10. **Mobile Devices:** These are small and portable computers that are designed for on-the-go use, such as smartphones, tablets, and laptops

## Classification of Digital Computers
1. **Micro Computers:** These are also known as Personal Computers. These type of digital computer uses a microprocessor (a CPU on a single chip) and include both

desktops and laptops. These computers can work on small volume of data, are very versatile and can handle variety of applications. These computers are being used as work stations, CAD, multimedia and advertising applications. Example: portable computers such as PDAs (Personal Digital Assistants) and tablets

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2. **Mini Computers:** These computers can support multiple users working simultaneously on the same machine. These are mainly used in an organization where computers installed in various departments are interconnected. These computers are useful for small business organizations.

3. **Main Frames:** These computers are large and very powerful computers with very high memory capacity. These can process huge databases such as census at extremely fast rate. They are suitable for big organizations, banks, industries etc. and can support hundreds of users simultaneously on the network.

4. **Super Computers:** These are fastest and very expensive computers. They can execute billions of instructions per second. These are multiprocessor, parallel systems suitable for specialized complex scientific applications involving huge amounts of mathematical applications such as weather forecasting.

5. **Mainframe Computers:** These are large and powerful computers that are used by large organizations such as banks, airlines, and government agencies to process massive amounts of data and handle multiple users simultaneously.

6. **Minicomputers:** These are smaller and less powerful than mainframe computers, but they are still capable of handling multiple users and processing large amounts of data. They are commonly used by small to medium-sized

businesses for accounting, inventory management, and other data-intensive tasks.

7. **Microcomputers:** These are the most common type of digital computers, also known as personal computers or PCs. They are designed for individual users and are used for personal productivity, entertainment, and communication.

8. **Workstations:** These are high-performance computers that are used by professionals such as architects, engineers, and designers to run complex software applications for tasks such as 3D modeling, animation, and scientific visualization.

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## Peripheral Devices

These devices are used for performing the specific functions and are connected to the computer externally. These peripheral devices enable the computer to operate according to the user requirements by feeding data in and out of the computer. Peripheral devices are as follows:

- Keyboard
- Mouse
- Light Pen
- Optical/magnetic Scanner
- Touch Screen
- Microphone for voice as input
- Track Ball
- Monitor (Visual Display Unit)
- Printers
- Plotter
- Speaker

## Types of Software

1. **System Software:** These are those software, without which our PC, laptop won't run, i.e. it is must for a device to be operating. For Example: Linux, Unix, Windows etc.

2. **Application Software:** These are those software, without which our PC, laptop can run, i.e. these software are not necessary for a device to be operating. For Example: Facebook, WhatsApp, Games.

## Difference between Hacker and Cracker

1. **Hacker:** They will just warn you something about malicious activity going around in your computer. It will not steal your information.
2. **Cracker:** They will try to steal your Information without informing you.

## Basic computer operation:

1. **Booting up:** This is the process of starting up the computer by loading the operating system (OS) into memory. The computer runs a series of checks to ensure all hardware is working correctly before loading the OS.
2. **Logging in:** After booting up, you will need to log in to access your user account. This requires entering your username and password.
3. **Running programs:** Once you have logged in, you can run programs on your computer. Programs can include web browsers, office applications, media players, and more.
4. **Accessing data:** You can access data stored on your computer or other connected devices, such as external hard drives or cloud storage services. This can include files, documents, photos, and other media.
5. **Connecting to the internet:** You can connect to the internet to access websites, download files, and communicate with others online. This typically involves using a web browser to access websites and other online services.
6. **Communicating with other devices:** You can communicate with other devices connected to your computer, such as printers, scanners, or other peripherals. This allows you to print documents, scan images, and perform other tasks.
7. **Saving and backing up data:** It's important to save and back up your data regularly to avoid data loss. You can save data to your local hard drive, external hard drives, or cloud storage services.
8. **Shutting down:** When you're finished using your computer, you should shut it down properly. This involves closing all programs and files, saving any changes, and shutting down the OS.
9. **Troubleshooting:** If you experience issues with your computer, you may need to troubleshoot the problem. This can involve diagnosing hardware or software issues, performing updates, or reinstalling drivers.
10. **Security:** It's important to keep your computer secure by using antivirus software, firewalls, and other security measures. This helps protect your data and prevent unauthorized access to your system.

## Issues of basic computers and computer operations:

some common issues that can arise with basic computers and computer operations:

1. Slow performance: Computers can become slow and unresponsive due to a variety of factors, such as lack of storage space, outdated hardware, or malware.
2. Malware and viruses: Malware and viruses can infect computers and cause a range of problems, including data loss, system crashes, and identity theft.
3. Hardware failures: Computer hardware components can fail over time, leading to issues like system crashes, data loss, and display problems.

4. Software glitches: Software applications can sometimes malfunction or crash, leading to issues like data loss or unresponsive programs.
5. Driver problems: Drivers are software components that enable hardware devices to communicate with the operating system. If drivers become outdated or corrupted, it can lead to issues like hardware failures or system crashes.
6. Compatibility issues: Sometimes software applications or hardware components may not be compatible with each other, leading to issues like system crashes or display problems.
7. Internet connectivity issues: Problems with internet connectivity can lead to issues like slow loading web pages, interrupted downloads, and difficulty accessing online services.
8. User error: Users can sometimes make mistakes or accidentally delete files or programs, leading to issues like data loss or unresponsive programs.

CPU process the data, and to process that data we need fast speed memory which is known as RAM.

| RAM | Hard Disk |
|---|---|
| RAM is an electronic device | Hard-disk is an electromechanical device |
| Electronic device are faster in speed | Electro-mechanical device has speed slower than Electronic device. |
| CPU is an electronic device, so it's speed can match with RAM. Therefore, CPU and RAM have connections and that connections is known as buses | Hard disk is an electro-mechanical device. Therefore, it's speed cannot be match by CPU and hence there is no connection between hard-disk and CPU. |
| RAM is much faster than a hard-disk. RAM is a type of volatile memory that can be accessed quickly by the CPU. This allows for fast data processing and multitasking. | Hard-disk is a type of non-volatile storage that is much slower than RAM. It is used for long-term storage of data that needs to be preserved even when the computer is turned off. |
| RAM is volatile, meaning that its contents are lost when the computer is turned off. | Hard-disk is non-volatile, meaning that its contents are preserved even when the computer is turned off. This makes hard-disk an ideal choice for long-term storage of data. |