

Unit-1

What is Computer?

A computer is a device that accepts information (in the form of digitalized data) and manipulates it for some result based on a program, software, or sequence of instructions on how the data is to be processed.

Complex computers include the means for storing data for some necessary duration. A program may be invariable and built into the computer hardware, different programs may be provided to the computer.

Major types of computers

Analog computer - represents data by measurable quantities.

Desktop computer - a personal computer that fits on a desk and is often used for business or gaming.

Digital computer - operates with numbers expressed as digits.

Hybrid computer - combines features of both analog and digital computers.

Laptop (notebook) - an easily transported computer that is smaller than a briefcase.

Mainframe (big iron) computer - a centralized computer used for large scale computing.

Microcomputer - generally referred to as a PC (personal computer). Uses a single integrated semiconductor chip microprocessor.

Minicomputer - an antiquated term for a computer that is smaller than a mainframe and larger than a microcomputer.

Netbook - a smaller and less powerful version of a laptop.

Personal computer (PC) - a digital computer designed to be used by one person at a time.

Smartphone - a cellular telephone designed with an integrated computer.

Supercomputer - a high performing computer that operates at extremely high speeds.

Tablet computer (tablet PC) - a wireless personal computer with a touch screen.

Workstation - equipment designed for a single user to complete a specialized technical/scientific task.

Characteristics of Computer:

- **SPEED** : In general, no human being can compete to solving the complex computation, faster than computer.
- **ACCURACY** : Since Computer is programmed, so what ever input we give it gives result with accurately.
- **STORAGE** : Computer can store mass storage of data with appropriate format.
- **DILIGENCE** : Computer can work for hours without any break and creating error.
- **VERSATILITY** : We can use computer to perform completely different type of work at the same time.

- **POWER OF REMEMBERING** : It can remember data for us.
- **NO IQ** : Computer does not work without instruction.
- **NO FEELING** : Computer does not have emotions, knowledge, experience, feeling.

Computer and its components.

Limitations of Computer Systems:

Limitations are the drawbacks of the computer system in which humans outperform them.

Lack of common-sense

This is one of the major limitations of computer systems. No matter how efficient, fast and reliable computer systems might be but yet do not have any common sense because no full-proof algorithm has been designed to programme logic into them. As computers function based on the stored programme(s), they simply lack common sense.

Zero IQ

Another of the limitations of computer systems is that they have zero Intelligence Quotient (IQ). They are unable to see and think the actions to perform in a particular situation unless that situation is already programmed into them. Computers are programmable to complete each and every task, however small it may be.

Lack of Decision-making

Decision-making is a complicated process involving information, knowledge, intelligence, wisdom, and ability to judge. The computer system does not have the ability to make decisions on their own because they do not possess all the essentials of decision-making.

They can be programmed to take such decisions, which are purely procedure-oriented. If a computer has not been programmed for a particular decision situation, it will not take a decision due to lack of wisdom and evaluation faculties. Human beings, on the other hand, possess this great power of decision-making.

Hardware: Computer hardware can be categorized as having either internal or external components. Internal components include items such as the motherboard, central processing unit ([CPU](#)), random access memory ([RAM](#)), hard drive, optical drive, heat sink, power supply, transistors, chips, graphics processing unit ([GPU](#)), and network interface card ([NIC](#)).

Examples of Hardware are the following –

- **Input devices** – keyboard, mouse, etc.
- **Output devices** – printer, monitor, etc.
- **Secondary storage devices** – Hard disk, CD, DVD, etc.
- **Internal components** – CPU, motherboard, RAM, etc.

CPU:

CPU is the abbreviation for *central processing unit*. Sometimes referred to simply as the *central processor*, but more commonly called a *processor*, the CPU is the brains of the [computer](#) where most calculations take place. In terms of computing power, the CPU is the most important element of a [computer system](#).

Components of a CPU

The two typical components of a CPU include the following:

- The *arithmetic logic unit (ALU)*, which performs arithmetic and logical operations.
- The *control unit (CU)*, which extracts [instructions](#) from [memory](#) and decodes and [executes](#) them, calling on the ALU when necessary.

Memory



Computer **memory** is any physical device capable of storing information temporarily like [RAM](#) (random access memory), or permanently, like [ROM](#) (read-only memory). Memory devices utilize [integrated circuits](#) and are used by [operating systems](#), [software](#), and [hardware](#).

Volatile vs. non-volatile memory

Memory can be either [volatile](#) and [non-volatile](#) memory. **Volatile memory** is a memory that loses its contents when the computer or hardware device loses power. Computer RAM is an example of a volatile memory and is why if your computer freezes or reboots when working on a program, you lose anything that hasn't been saved. **Non-volatile memory**, sometimes abbreviated as NVRAM, is a memory that keeps its contents even if the power is lost. [EPROM](#) is an example of a non-volatile memory.

Primary Memory:

Primary Memory also called as volatile memory because the memory can't store the data permanently. Primary memory select any part of memory when user want to save the data in memory but that may not be store permanently on that location. It also has another name i.e. RAM.

Random Access Memory (RAM):

The primary storage is referred to as random access memory (RAM) due to the random selection

It performs both read and write operations on memory. If power failures happened in systems during memory access then you will lose your data permanently. So, RAM is volatile memory. RAM categorized into following types.

- DRAM
- SRAM
- DRDRAM

Secondary Memory / Non Volatile Memory:

Secondary memory is external and permanent memory that is useful to store the external storage media such as floppy disk, magnetic disks, magnetic tapes and etc cache devices. Secondary memory deals with following types of components.

Read Only Memory (ROM) :

ROM is permanent memory location that offer huge types of standards to save data. But it work with read only operation. No data lose happen whenever power failure occur during the ROM memory work in computers.

ROM memory has several models such names are following.

- 1. PROM:** Programmable Read Only Memory (PROM) maintains large storage media but can't offer the erase features in ROM. This type of RO maintains PROM chips to write data once and read many. The programs or instructions designed in PROM can't be erased by other programs.
- 2. EPROM :** Erasable Programmable Read Only Memory designed for recover the problems of PROM and ROM. Users can delete the data of EPROM thorough pass on ultraviolet light and it erases chip is reprogrammed.
- 3. EEPROM:** Electrically Erasable Programmable Read Only Memory similar to the EPROM but it uses electrical beam for erase the data of ROM.

Modern Communication

Fax:

Fax, in full **facsimile**, also called **telefax**, in [telecommunications](#), the transmission and reproduction of documents by wire or [radio wave](#). Common [fax machines](#) are designed to scan printed textual and graphic material and then transmit the information through the [telephone](#) network to similar machines, where facsimiles are reproduced close to the form of the original documents. Fax machines, because of their low cost and their reliability, speed, and simplicity of operation, revolutionized business and personal correspondence. They virtually replaced [telegraphic](#) services, and they also present an [alternative](#) to government-run postal services and private couriers.

Voice Mail:

Voice mail is a voice message that a caller leaves when the person called is absent or is busy with another conversation. The voicemail feature acts in a way similar to the old answering machine, but with the main difference that instead of the voice message being stored on your answering machine, it is stored on the service provider's [server](#), in a space reserved for the user called a mailbox. It is

not very different from email, save that the messages are voices instead of text.

Email: E-mail (electronic mail) is the exchange of computer-stored messages by telecommunication. E-mail messages are usually encoded in [ASCII](#) text. However, you can also send non-text files, such as graphic images and sound files, as attachments sent in [binary](#) streams. E-mail was one of the first uses of the Internet and is still the most popular use. A large percentage of the total traffic over the Internet is e-mail. E-mail can also be exchanged between [online service provider](#) users and in networks other than the Internet, both public and private.

E-mail can be distributed to lists of people as well as to individuals. A shared distribution list can be managed by using an [e-mail reflector](#). Some mailing lists allow you to subscribe by sending a request to the mailing list administrator. A mailing list that is administered automatically is called a [list server](#).

Steps of creating email id:

- (a) **Visit a website that offers an email service.** Go to mail.yahoo.com
- (b) **Find where to sign in.** Usually, there is a small link image or text that says "register" or "create email account".
- (c) To create your Yahoo! mail account. **Follow all the instructions on the page, filling out all the needed details.** Enter your name, gender, birth date, country and zip code. Enter in your own personal Yahoo! ID that will be used as your email address. You can also select the "Check" button to make sure that name is still available. If not available, choose another name or pick from the suggestions Yahoo! provides. Enter the password. In some cases, you may feel uncomfortable letting out certain information. Don't worry, most of the time email accounts do not need information such as telephone and street address, and you can skip these completely. Click to "Create My Account" button.
- (d) Click in "**Get started**" button and your new Yahoo! email is now available for use.
- (e) Go to **mail.yahoo.com** and **sign in**.
- (f) Enter your correct email ID and password and then Click to "**SIGN IN**" button.
- (g) Click "**MAIL**" to check and to create the mail.
- (h) Click to "**compose**" button to create new message.
- (i) When you click on "**compose**" button you get new window where you can send a mail.
- (j) To read the message.
- (k) On Right top of the screen click to "**sign out**" to go to Yahoo! Home page.

Group Communication:

Group communication is a mode of communication in an organization, between employers and employees, and employees in teams/groups. Group communication can further be looked from an

marketing perspective as communicating to a group of people or target customers in order to market a product.

Small group communications can be looked at as groups of size 3 to 20. And larger groups looked can be of sizes 100 to 200 in size. Group communication can be effective, when there is a specific purpose to the communication, a proper means of communication, and content of the communication suitable to the target audience, and a proper communicator who can drive the initiative and process.

Group communication can be of various means, like social media, digital media, print media, speeches and focus group communication etc. The choice of the means of communication depends on factors like the target audience, the means and availability of the communication mode, cost implication for the communication initiative.

Group communication can have effective results in case of marketing, where the communication is vital for selling and marketing products and product launches etc.

Teleconferencing:

Teleconferencing means meeting through a telecommunications medium. It is a generic term for linking people between two or more locations by electronics. There are at least six types of teleconferencing: audio, audiographic, computer, video, business television (BTV), and distance education. The methods used differ in the technology, but common factors contribute to the shared definition of teleconferencing:

- Use a telecommunications channel
- Link people at multiple locations
- Interactive to provide two-way communications
- Dynamic to require users' active participation

Video conferencing:

A video conference is a live, visual connection between two or more people residing in separate locations for the purpose of communication. At its simplest, video conferencing provides transmission of static images and text between two locations. At its most sophisticated, it provides transmission of full-motion video images and high-quality audio between multiple locations.

Bandwidth: Bandwidth is the capacity of a wired or wireless network communications link to transmit the maximum amount of data from one point to another over a computer network or internet connection in a given amount of time -- usually one second. Synonymous with capacity, bandwidth describes the [data transfer rate](#). Bandwidth is not a measure of network speed -- a common misconception.

While bandwidth is traditionally expressed in [bits](#) per second ([bps](#)), modern network links have greater capacity, which is typically measured in millions of bits per second ([megabits per second](#), or Mbps) or billions of bits per second ([gigabits per second](#), or Gbps).

Modem:

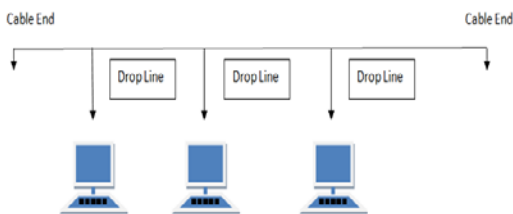
Modem is short for "Modulator-Demodulator." It is a [hardware](#) component that allows a [computer](#) or another device, such as a [router](#) or [switch](#), to connect to the Internet. It converts or "modulates" an [analog](#) signal from a telephone or cable wire to [digital](#) data (1s and 0s) that a computer can recognize. Similarly, it converts digital data from a computer or other device into an analog signal that can be sent over standard telephone lines.

Types of Network Topology

Network Topology is the schematic description of a network arrangement, connecting various nodes(sender and receiver) through lines of connection.

BUS Topology

Bus topology is a network type in which every computer and network device is connected to single cable. When it has exactly two endpoints, then it is called **Linear Bus topology**.

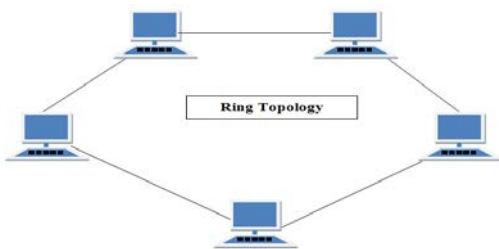


Features of Bus Topology

1. It transmits data only in one direction.
2. Every device is connected to a single cable

RING Topology

It is called ring topology because it forms a ring as each computer is connected to another computer, with the last one connected to the first. Exactly two neighbours for each device.



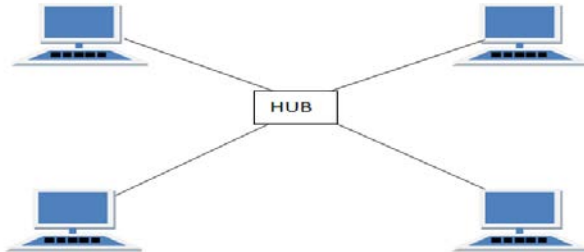
Features of Ring Topology

1. A number of repeaters are used for Ring topology with large number of nodes, because if someone wants to send some data to the last node in the ring topology with 100 nodes, then the data will have to pass through 99 nodes to reach the 100th node. Hence to prevent data loss repeaters are used in the network.
2. The transmission is unidirectional, but it can be made bidirectional by having 2 connections between each Network Node, it is called **Dual Ring Topology**.
3. In Dual Ring Topology, two ring networks are formed, and data flow is in opposite direction

- in them. Also, if one ring fails, the second ring can act as a backup, to keep the network up.
4. Data is transferred in a sequential manner that is bit by bit. Data transmitted, has to pass through each node of the network, till the destination node.

STAR Topology

In this type of topology all the computers are connected to a single hub through a cable. This hub is the central node and all others nodes are connected to the central node.

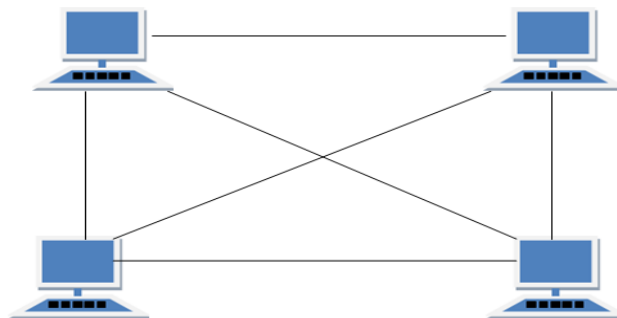


Features of Star Topology

1. Every node has its own dedicated connection to the hub.
2. Hub acts as a repeater for data flow.
3. Can be used with twisted pair, Optical Fibre or coaxial cable.

MESH Topology

It is a point-to-point connection to other nodes or devices. All the network nodes are connected to each other. Mesh has $n(n-1)/2$ physical channels to link n devices.



Features of Mesh Topology

1. Fully connected.
2. Robust.
3. Not flexible.