

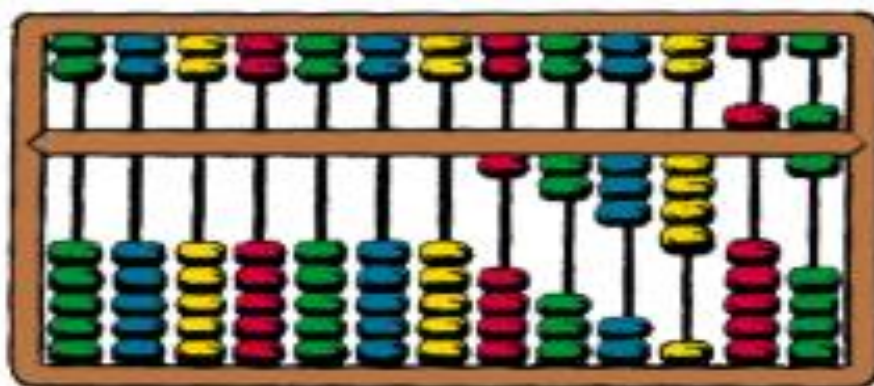
Fundamental of Computer

A computer is an electronic device which consists of hardware and software. Hardware components describe the physical parts of the computer and software controls hardware and run the operating system

Review of brief history of Computer

1. The history of computers starts out about 2000 years ago in Babylonia (Mesopotamia), at the birth of the abacus, a wooden rack holding two horizontal wires with beads strung on them.

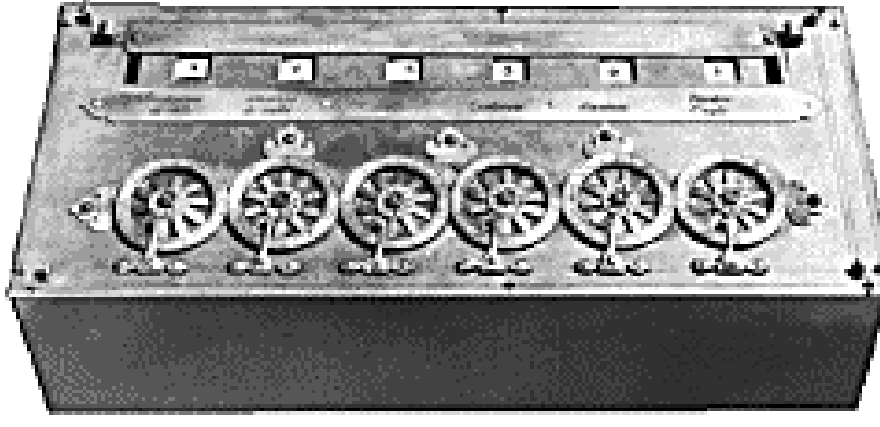
Subject	1st generation	2nd generation	3rd generation	4th generation	5th generation
Period	1940-1956	1956-1963	1964-1971	1971-present	present & beyond
Circuitry	Vacuum tube	Transistor	Integrated chips (IC)	Microprocessor (VLSI)	ULSI (Ultra Large Scale Integration) technology
Memory Capacity	20 KB	128KB	1MB	Magnetic core memory, LSI and VLSI. High Capacity	ULSI
Processing Speed	300 IPS instructions Per sec.	300 IPS	1MIPS (1 million inst. Per sec.)	Faster than 3rd generation	Very fast
Programming Language	Machine, Language	Assembly language & early high-level languages(FORTRAN, COBOL, ALGOL)	C,C++	Higher level languages,C,C++,Java	All the Higher level languages,,Neural networks,
Example of computers	UNIVAC, EDVAC	IBM 1401, IBM 7094, CDC 3600,D UNIVAC 1108	IBM 360 series, 1900 series	Pentium series,Multimedia,	Artificial Intelligence, Robotics



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2. Blaise Pascal has credited the first digital computer in 1642. The basic principle of his calculator is still used today in water meters and modern-day odometers.



3. Punched cards, which were first successfully used with computers in 1890 by Herman Hollerith and James Powers. They developed devices that could read the information that had been



punched into the cards automatically, without human help.

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4. Punch-card using computers created by International Business Machines (IBM), Remington, Burroughs. These computers used electromechanical devices in which electrical power provided mechanical motion -- like turning the wheels of an adding machine. Such

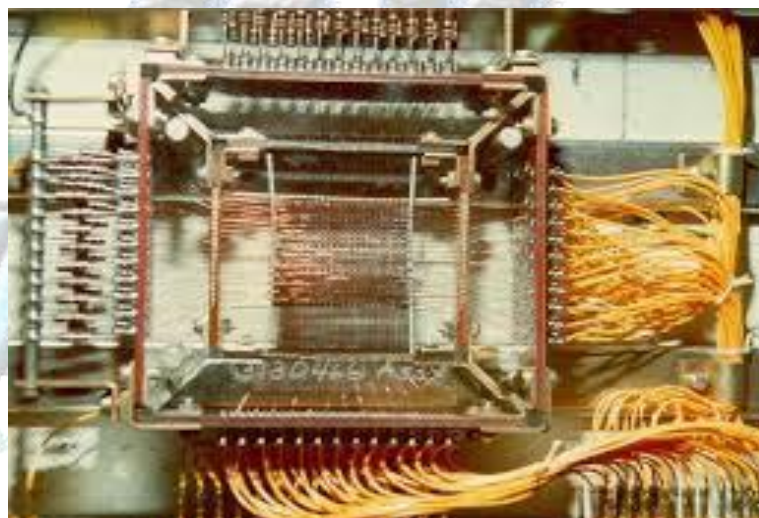
systems included features to: o feed in a specified number of cards automatically o add, multiply, and sort

5. In 1942, John P. Eckert, John W. Mauchly, and their associates at the Moore school of Electrical Engineering of University of Pennsylvania decided to build a high - speed electronic computer to do the job. This machine became known as ENIAC (Electrical Numerical Integrator And Calculator) and it occupied the entire thirty by fifty feet room.

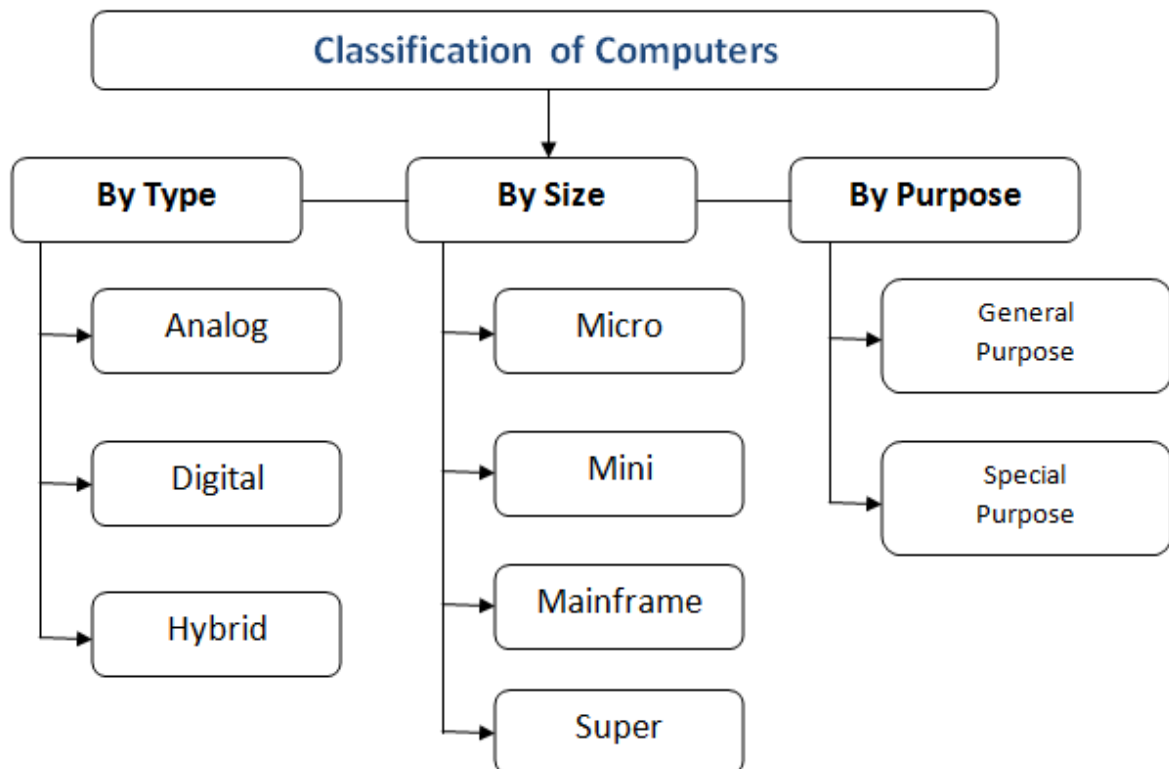


6. ENIAC was therefore about 1,000 times faster than the previous generation of relay computers. ENIAC used 18,000 vacuum tubes about 1,800 square feet of floor space, and consumed about 180,000 watts of electrical power.

7. In 1950 magnetic core memory and the Transistor - Circuit Element of digital computers. RAM capacities increased from 8,000 to 64,000 words in commercially available machines by the 1960s, with access times of 2 to 3 MS (Milliseconds).



8. In the 1980's manufacturing of semiconductor chips was done, The Intel and Motorola Corporations were very competitive into the 1980s, although Japanese firms were making strong economic advances, especially in the area of memory chips. By the late 1980s, some personal computers were run by microprocessors that, handling 32 bits of data at a time



Basic components of Computer



Basic parts of a Computer

Input Unit

The devices which are used to input the data and programs in the computer are known as "Input Devices". Input unit accepts instructions and data from the user and converts these instructions and data in computer acceptable format which are sent to computer system for processing.



Keyboard: Keyboard is most common input device. The data and instructions are input by typing on the keyboard. The message typed on the keyboard reaches the memory unit of a computer. It is connected to a computer via a cable. Apart from alphabet and numeral keys, it has other function keys for performing different functions.

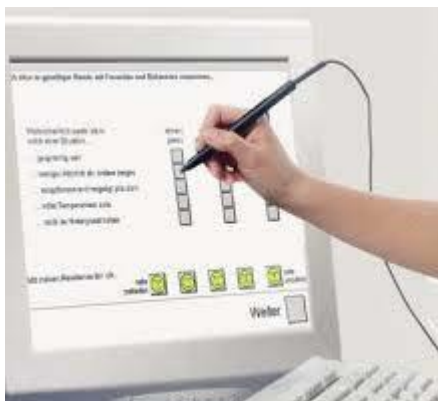
Mouse: It is a pointing device. The mouse is rolled over the mouse pad, which in turn controls the movement of the cursor in the screen. You can click, double click or drag the mouse. Its sensor notifies the speed of its movements to the computer, which in turn moves the cursor/pointer on the screen.



Scanner: Scanners are used to enter information directly in to the computer memory. This device works like a Xerox machine. The scanner converts any type of printed or written information including photographs into digital pulses, which can be manipulated by the computer



Track Ball: Track ball is similar to the upside- down design of the mouse. The user moves the ball directly, while the device itself remains stationary. The user spins the ball in various directions to effect the screen movements.



Light Pen: This is an input device which is used to draw lines or figures on a computer screen. It is touched to the CRT screen where it can detect raster on the screen as it passes.

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Optical Character Reader (OCR): It is a device which detects alpha numeric characters printed or written on a paper. The text which is to be scanned is illuminated by a low frequency light source. The light is absorbed by the dark areas but reflected from the bright areas. The reflected light is received by the photocells



. Bar Code Reader: This device reads bar codes and converts them into electric pulses to be processed by a computer. A bar code is nothing but data coded in form of light and dark bars.

Voice Input Systems: It converts spoken words to machine language form. A microphone is used to convert human speech into electric signals.

The signal pattern is then transmitted to a computer when it is compared to a dictionary of patterns that have been previously placed in a storage unit of computer. When a close match is found, the word is recognized.

Digital Camera: It converts graphics directly into digital form. An electronic chip is used in camera, when light falls, on the chip through the lens, it converts light waves into electrical waves

Output Unit

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Output Device produces the final results of computer into human understandable form. Output unit accepts the results produced by the computer which are in coded form and it converts these coded results to human readable form.

Monitor: The monitor looks like a television screen. It is also called Visual Display Unit (VDU) and it is used to display information from the computer. There are coloured as well as black and white monitors. The monitor displays text and graphics. Based on the technology used, monitor is classified into two types. They are Cathode Ray Tube (CRT) monitor and Liquid Crystal Display (LCD) monitor.

Printer: A printer is used for transferring data from the computer to the paper. There are colour printers as well as black and white printers. The different types of printers are Dot Matrix Printers, Inkjet Printer and Laser Printers

Types of Printers

Dot Matrix Printer	Inkjet Printer	Laser Printer
Prints characters in the form of dots.	Prints fully formed characters.	Prints fully formed characters.
Speed: 200-540 characters per second.	Speed: 4-8 pages per minute.	Speed: 4-20 pages per minute.
Not very expensive.	Moderately priced.	Expensive.



Dot matrix Printer



Inkjet Printer



Laser Printer

Touch Screen: A touch screen is a display screen that is sensitive to human touch. It allows the user to interact with the computer by touching pictures or words displayed on the screen. Touch screens are used to display the output information on the screen as well as to give input by touching the words or pictures on the screen. Thus it is an input/output device. Touch screens are normally used when information has to be accessed with minimum effort.

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Plotter: Plotter is very large in size and is used to produce graphical output on papers. It uses single or multi color pens to draw pictures as blue print, posters etc.



Storage Unit The data and instructions that are entered into the computer system through input units have to be stored inside the computer before the actual processing starts. Similarly, the results produce by the computer after processing must also be kept somewhere inside the computer system before being passed on to the output units.

The Storage Unit or the primary / main storage of a computer system is designed to do all these things. It provides space for storing data and instructions, intermediate results and for the final results.

Central Processing Unit (CPU)



The main unit inside the computer is the CPU. This unit is responsible for all events inside the computer. It consists of Control Unit and Arithmetic and Logic unit. The CPU is the brain of any computer system. In a human body, all major decisions are taken by the brain and the other parts of the body function as directed by the brain. Similarly, in a computer system, all major calculations and comparisons are made inside the CPU and it activates and controls the operations of other units like Hard disk, Printer etc. of a computer system.



Arithmetic and Logic Unit (ALU): The arithmetic and logic unit (ALU) is the part where actual computations take place. It consists of circuits that perform arithmetic operations (e.g. addition, subtraction, multiplication, division over data received from memory and capable to compare numbers (less than, equal to, or greater than etc).

Control Unit: The control unit acts as a central nervous system for the components of the computer. It manages and coordinates the entire computer system. It obtains instructions from the program stored in main memory, interprets the instructions, and issues signals that cause other units of the system to execute them. the control unit directs and controls the activities of the internal and external devices.

Computer Language

1. Machine Language – (Binary or hexadecimal language)
 - a) A computer programming language consisting of binary or hexadecimal instructions which a computer can respond to directly
2. Assembly Languages – (Low Level Language)
 - a) In the 1950s, to reduce programming complexity and provide some standardization, assembly languages were developed.



b) Assembly languages, also known as symbolic languages use abbreviations or mnemonic code - codes more easily memorized to replace the 0s and 1s of machine languages

ADVANTAGES –

- i. More standardized and easier to use than machine languages
- ii. They operate very efficiently, although not as efficient as the machine languages

3. High Level Language –

High Level Languages helped programmers by reducing further the number of computer operations details they had to specify, so that they could concentrate more on the logic needed to solve the problem

Examples – C, C++, JAVA, COBOL, FORTRAN, SQL etc.

- a) COBOL – For business applications
- b) FORTRAN – In engineering and scientific applications
- c) C, C++, JAVA – For general purposes

A language is defined as the medium of expression of thoughts. All the human beings in this world communicate with each other by a language. Similarly, computer also needs some expression medium to communicate with others.

A computer follows the instructions given by the programmer to perform a specific job. To perform a particular task, programmer prepares a sequence of instructions, known as program. A program written for a computer is known as Software.

1) First Generation Languages - 1GLs (Machine language): When the human being started programming, the computer the instruction were given to it in a language that it could easily understand is called as machine language. The binary language of 1 and 0 is known as

Machine language. Any instruction in this language is given in the form of 1s and 0s.

2) Second Generation Languages- 2GLs (Assembly Language): The first language similar to English was developed in 1950 which was known as Assembly Language or Symbolic Programming Languages. An assembly language is a low-level programming language for microprocessors (CPU) and other programmable devices.

3) Third Generation Languages- (3GLs) (High Level Languages): The languages developed which were nearer to the English language in 1960 were known as High Level languages. The different high level languages are FORTRAN, COBOL, BASIC, PASCAL, PL-1 and many others.

4) Fourth Generation Languages- (4GLs) (Query languages): The 3GLs are procedural in nature means HOW the problem get programmed and the procedures require the knowledge of HOW the problem will be solved. 4GLs are non-procedural that focuses on WHAT of the problem is coded means 'WHAT is required'. The main aim of 4GLs is to be cut down on

developed and maintenance time and making it easier for users. Example of 4GL is SQL (Structured Query Language).

5) Fifth Generation Language-(5GLs): The 5GLs are designed to make the computer “Smarter”. The use of 5GLs language touches on expert systems, computerized collection of the knowledge of many human experts, artificial intelligence and independently smart computer systems. Examples of 5GL are Prolog, OPS5 and Mercury. Graphical User Interface (GUI) based languages: These are the languages which use a Graphical User Interface to write, compile & execute the program with ease. Some of them are-

Visual Basic

Visual C++

C# (Pronounced as C sharp)

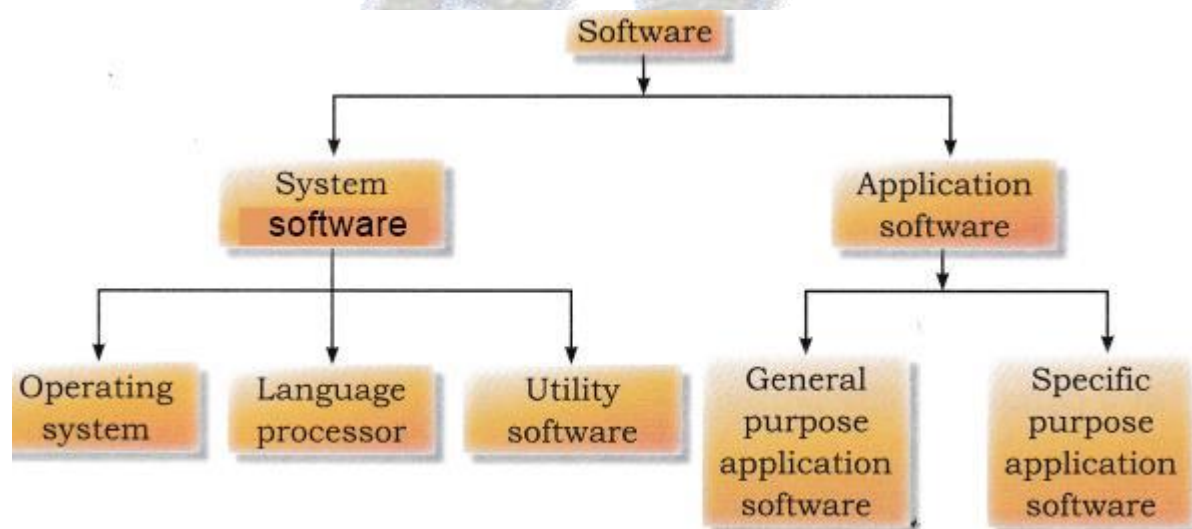
Visual Basic.NET

Visual Basic 2005

Software

Computer software or just software, Is a collection of computer programs and related data that provides the instructions for telling a computer what to do and how to do it.

- It is any set of machine readable instruction that directs a computer to perform specific operation
- Any set of instructions that guides the hardware and tells it how to accomplish each task



System Software

System software is computer software designed to operate the computer hardware to provide basic functionality and to provide a platform for running application software.

Primary Objectives of a system software -

- 1.Enhance the efficiency of hardware utilization
- 2.Make computers simple to use

Examples of system software – Operating System, Language processors, Utility software

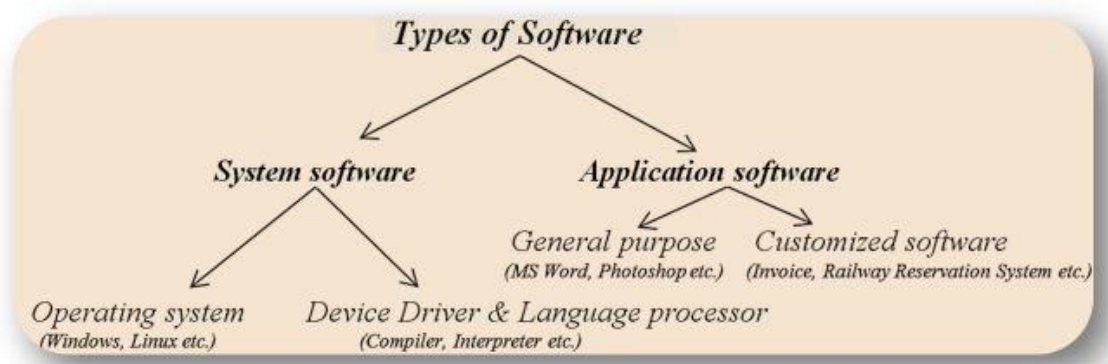
OPERATING SYSTEM

- An operating system is the most important system software and is a must to operate a computer system
- It takes care of scheduling multiple jobs for execution and manages the flow of data and instructions between the input/output units and the main memory

UTILITY SOFTWARE

- Utility software may be considered as a system software which is used quite often in the development of a program
- Major usage is for maintenance work of the computer
- Such programs are normally provided by the manufacturers

Computer software also called program is a set of instructions that directs a computer to perform specific tasks or operations. Computer software consists of computer programs and libraries



System software: Software that directly operates the computer hardware to provide basic functionality needed by users and other software and to provide a platform for running application software. System software includes:



Operating system (OS): Operating system manages resources of computer system like memory, CPU, hard disk, printer etc. also provides an interface between user and computer system & provides various services to other software.

Language Processor & Device drivers: All the devices like mouse, keyboard, modem etc needs at least one corresponding device driver. A device driver is a program that controls a device. A language processor is a hardware device designed or used to perform tasks, such as processing program code to machine code. Language processors are found in languages such as Fortran and COBOL

Application software: Software that performs special functions or provides entertainment functions beyond the basic operation of the computer itself. There are many different types of application software.

General purpose: Microsoft Word, Microsoft Excel, MS PowerPoint, Photoshop etc.

Customized: Invoice Management System, Airline Reservation System etc.

Utilities: Antivirus, Memory tester, Disk partitioning and Disk defragmenter etc.

Computer Memory: A memory is just like a human brain. It is used to store data and instructions. Computer memory is the storage space in computer where data is to be processed and instructions required for processing are stored.

Memory is primarily of three types

Cache Memory Primary Memory or Main Memory Secondary Memory

Cache Memory: Cache memory is a very high speed semiconductor memory which can speed up CPU. It acts as a buffer between the CPU and main memory. It is used to hold those parts of data and program which are most frequently used by CPU. The parts of data and programs are transferred from disk to cache memory by operating system from where CPU can access them.

Advantages

The advantages of cache memory are as follows:

- Cache memory is faster than main memory.
- It consumes less access time as compared to main memory.
- It stores the program that can be executed within a short period of time.
- It stores data for temporary use.

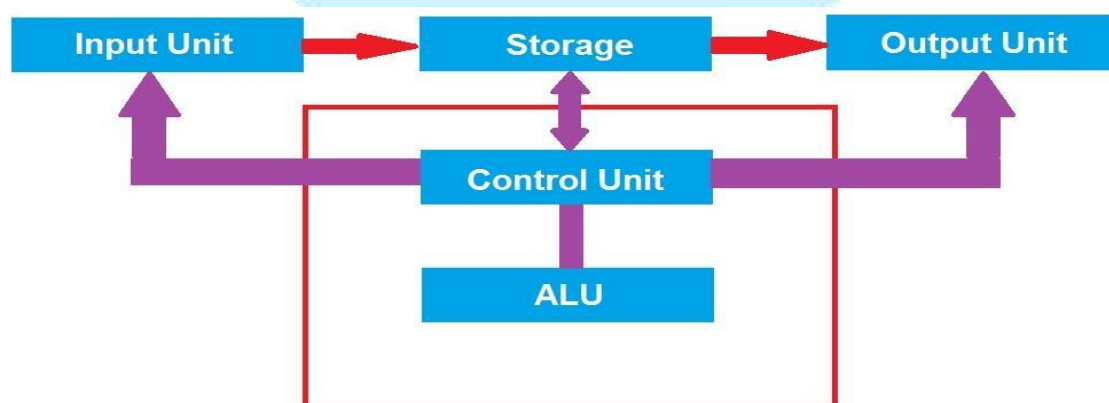
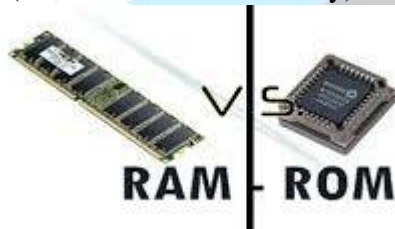
Disadvantages

The disadvantages of cache memory are as follows:

- Cache memory has limited capacity.
- It is very expensive.

Primary Memory (Main Memory): Primary memory is also known as main memory. It holds only those data and instructions on which computer is currently working. It has limited capacity and data is lost when power is switched off. It is generally made up of semiconductor device. Characteristics of Main Memory

- These are semiconductor memories
- It is known as main memory.
- Usually volatile memory.
- Data is lost in case power is switched off.
- Faster than secondary memories.
- A computer cannot run without primary memory. Primary memory can be divided into RAM (Random Access Memory) and ROM (Read Only Memory)



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RAM & ROM

RAM	ROM
Random Access Memory.	Read Only Memory.
It is Volatile or temporary memory.	It is Non Volatile or permanent memory
Data gets erased when power supply off.	Data stored permanently.
Faster memory.	Slow memory.
It is used in the normal operations of a computer after starting up and loading the operating system.	A ROM chip is used primarily in the start-up process of a computer.

Secondary Memory

It is also known as external memory or non-volatile memory. It is slower than main memory. These are used for storing data or information permanently. For example: hard disk, CD-ROM, DVD etc.

Characteristic of Secondary memory

- These are magnetic and optical memories
- It is non-volatile memory which is used for storage of data in a computer.
- Data is permanently stored even if power is switched off.
- Computer may run without secondary memory.
- Slower than primary memories.



Printers

Printers are output devices which are used to prepare permanent output on paper.

Types of Printers

Printers can be divided into two main categories:

Impact Printers: It uses hammers or pins strike against a ribbon and paper to print the text.

This mechanism is known as electro-mechanical mechanism. They are of two types.

Character Printer **Line Printer**

Character Printer: It prints only one character at a time. It has relatively slower speed. e.g. Dot matrix printers.



Dot Matrix Printer: It prints characters as combination of dots. These have a matrix of pins on the print head of the printer which form the character. There is a carbon between the pins & the paper. The words get printed on the paper when the pin strikes the carbon. There are generally 9 or 24 pins.



Line Printer The line printer is an impact computer printer that prints one entire line of text at a time. It is mostly associated with unit record equipment and the early days of digital computing, but the technology is still in use.

Non-Impact Printers: These printers use non-Impact technology such as ink-jet or laser technology. These printers provide better quality of output at higher speed. These printers are of two types:



Ink-Jet Printer: It prints characters by spraying patterns of ink on the paper from a nozzle or jet. It prints from nozzles having very fine holes, from which ink is pumped out to create various letters and shapes.



Laser Printer: It utilizes a laser beam to produce an image on a drum. The light of the laser alters the electrical charge on the drum wherever it hits. The drum is then rolled through a reservoir of toner, which is picked up by the charged portions of the drum. Finally, the toner is transferred to the paper through a combination of heat and pressure. They are much quieter than dot-matrix. They are also relatively fast. The speed of laser printers ranges from about 4 to 20 pages of text per minute (ppm).

Memory/Storage

SYMBOL	FULL FORM
1 BIT	BINARY DEGIT
4 BITS	NIBBLE
8 BITS	BYTE
1024 BYTE	KILOBYTE
1024 KILOBYTE	MEGABYTE
1024 MEGABYTE	GIGABYTE
1024 GIGABYTE	TERABYTE
1024 TERABYTE	PETABYTE
1024 PETABYTE	HEXABYTE
1024 HEXABYTE	ZEETABYTE

Memory Units

Bit is the smallest memory unit

KB - Kilobyte

MB - Megabyte

GB - Gigabyte

TB - Terabyte

PB - Petabyte

EB - Exabyte

ZB – Zettabyte

YB - Yottabyte

BB - Brontobyte

GB – Geopbyte

Computer Languages

LANGUAGE TRANSLATORS –

- Computers work only on machine language (Binary) – Hence all instructions to be executed by

computers must be in machine language.

- Translators perform the task of translation of high level languages or assemble languages into machine

language

- They also identify errors that may be present in the program

1. ASSEMBLER – Used for translation of assembly language to machine language

2. COMPILER – For translation of high level language to machine language (All at once)

3. INTERPRETER – For translation of high level language to machine language (LINE BY LINE)

Data Communication

Data Communication deals with the transmission of digital data from one device to another.

- It has certain advantages such as

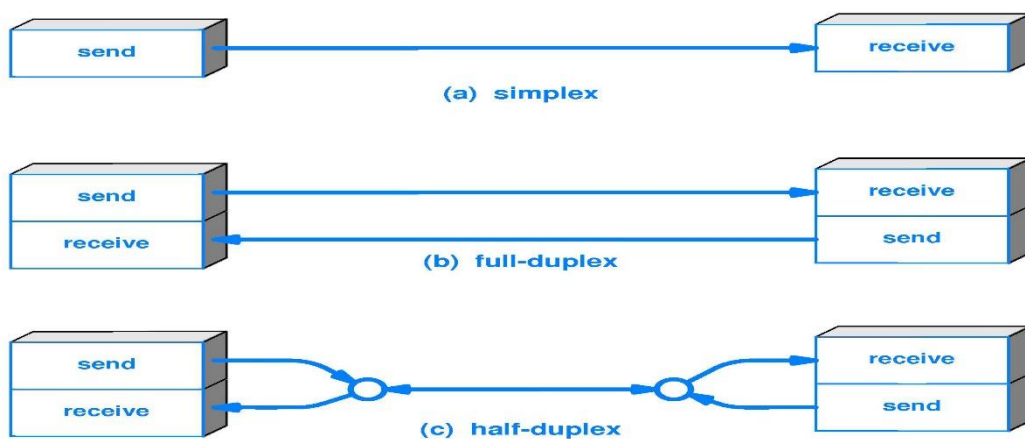
- Saving of time in physical transportation of data
- Quick retrieval of information
- Reduced cost of transmission

Channels of Communication –

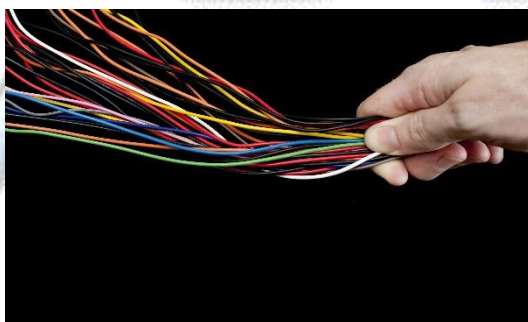
Data is transferred through a pathway called as a communication channel which can be telephone line, satellite communication etc.

Types of Communication Channels –

1. Simplex – Unidirectional – Only one device can transmit
2. Half Duplex – Bi-directional – One device can transmit at a time
3. Full Duplex – Bi-directional – Both can transmit simultaneously



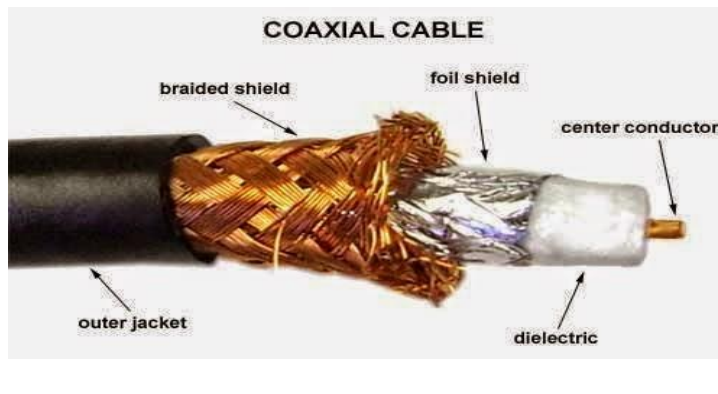
Communication Channels or Communication lines or data links:



1. Standard Telephone line

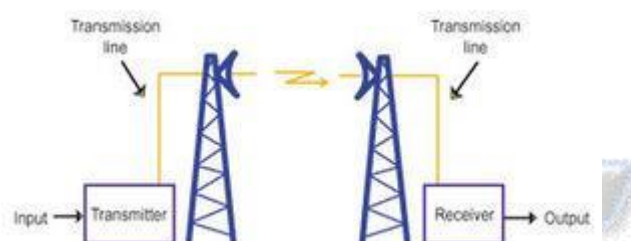
- Consists of two wires of copper covered with insulator

- ☐ Complex network of telephone lines has been already established all over the world
- ☐ Widely used in communication



2.Coaxial Cables

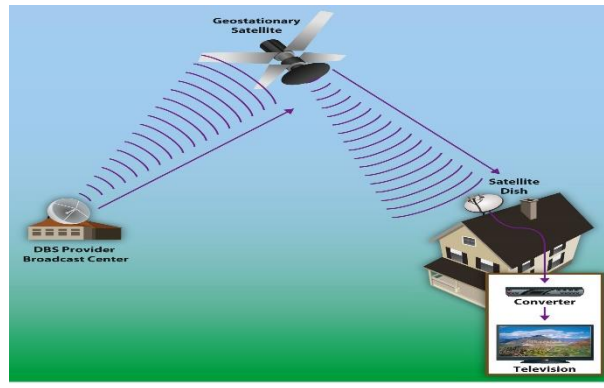
- ☐ Center wire surrounded by insulation
- ☐ High quality communication lines (usually underground)
- ☐ Shield on the outside minimizes electrical and radio frequency interference
- ☐ Reduced distortion and noise



3.Microwave Transmission

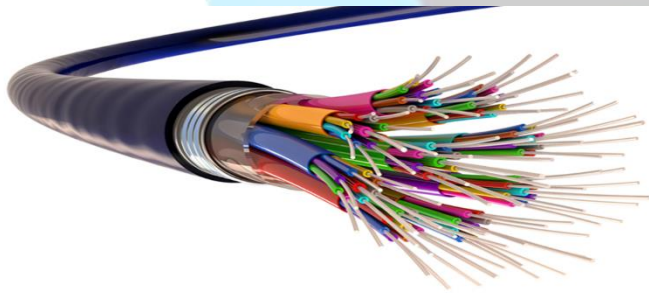
- ☐ Transmits signal through open space (Much faster than telephone line or coaxial cable)
- ☐ Data transmitted in on a line of sight path and needs an antenna to catch it
- ☐ For long distances; signals are first amplified and retransmitted from station to station
- ☐ Gets affected by rain, dust, cloud and bad weather

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4. Satellite Communications

- ☐ Known for fast communication and long distance communication
- ☐ Earth Station sends signal to the satellite; it amplifies it and sends it back to the earth
- ☐ Used for mobile communication such as TV and radio broadcasting



5. Fiber Optics

- ☐ These cables consist of one or more thin filaments of glass fiber wrapped in a layer
- ☐ Glass or plastic fiber that carries light along its length
- ☐ Free from radio frequency interference; hundred times faster than coaxial cables

NETWORK

- A Network is a group of computers that are connected to each other for the purpose of communication.
- A computer network allows computers to communicate with many other computers and to share software resources and information.

IMPORTANT FACT – ARPANET was the first operational computer network in the world

Some Network related terms –

1) Server

- ☐ Main computer that manages resources to other computers connected to a network



- ☐ Most powerful computer on the network
- ☐ Holds the collection of data and program for PCs workstation and other computers
- ☐ Server computer needs to be fast with high RAM and a large storage capacity hard disk

2) Protocol

- ☐ A set of rules and standards which is used by computers to exchange information or data with each other across a network
- ☐ Defined as rules governing the syntax

3) Nodes

- ☐ Node is a connection point where either data transmission ends or redistribution starts

TYPES OF COMPUTER NETWORK

A computer network is a cluster of computers over a shared communication path that works for the purpose of sharing resources from one computer to another, provided by or located on the network nodes.

Some of the uses of computer networks are the following:

- Communicating using email, video, instant messaging, etc.
- Sharing devices such as printers, scanners, etc.
- Sharing files
- Sharing software and operating programs on remote systems
- Allowing network users to easily access and maintain information

Types of Computer Networks

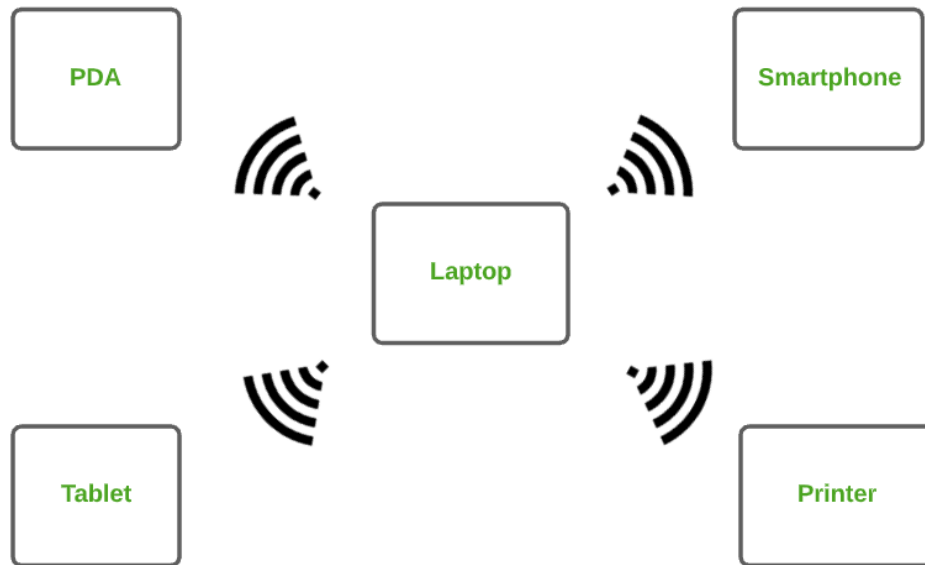
1. Personal Area Network (PAN)
2. Local Area Network (LAN)
3. Wide Area Network (WAN)
4. Wireless Local Area Network (WLAN)
5. Campus Area Network (CAN)
6. Metropolitan Area Network (MAN)
7. Storage Area Network (SAN)
8. System-Area Network (SAN)
9. Passive Optical Local Area Network (POLAN)
10. Enterprise Private Network (EPN)
11. Virtual Private Network (VPN)
12. Home Area Network (HAN)

These are explained as following below.

1. Personal Area Network (PAN) :


PAN is the most basic type of computer network. This network is restrained to a single person, that is, communication between the computer devices is centred only to an individual's work space. PAN offers a network range of 10 meters from a person to the device providing communication.


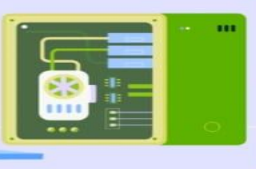
Examples of PAN are USB, computer, phone, tablet, printer, PDA, etc.



2. Local Area Network (LAN) :


LAN is the most frequently used network. A LAN is a computer network that connects computers together through a common communication path, contained within a limited area, that is, locally. A LAN encompasses two or more computers connected over a server. The two important technologies involved in this network are Ethernet and Wi-fi. Examples of LAN are networking in a home, school, library, laboratory, college, office, etc.


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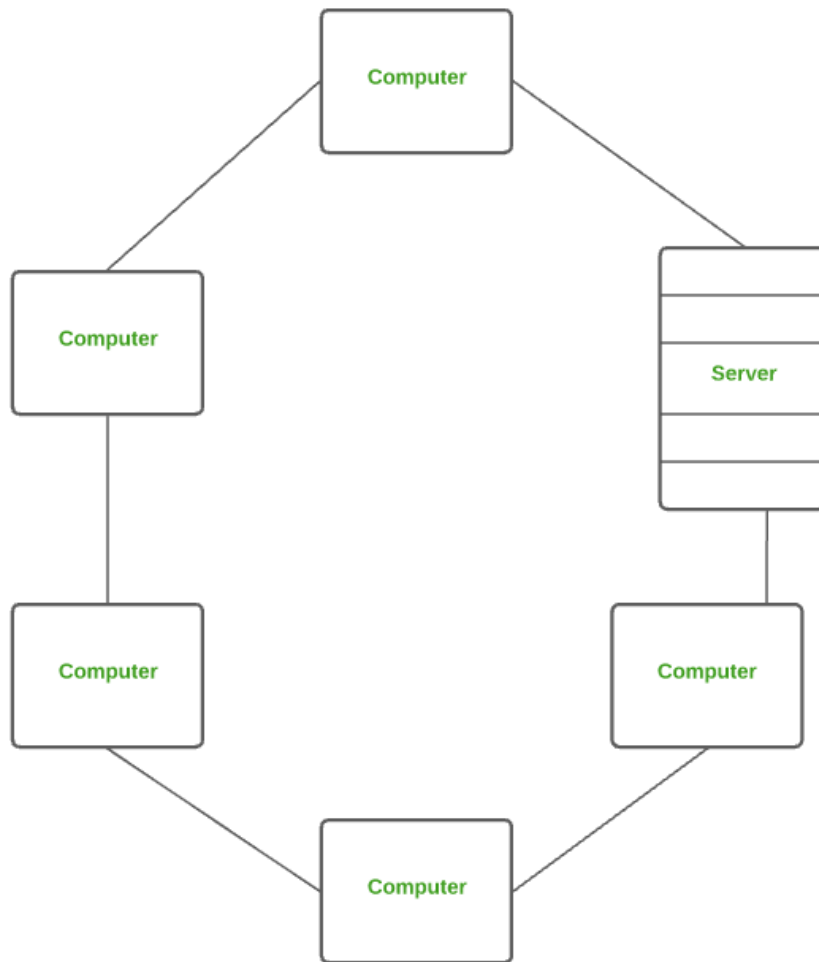
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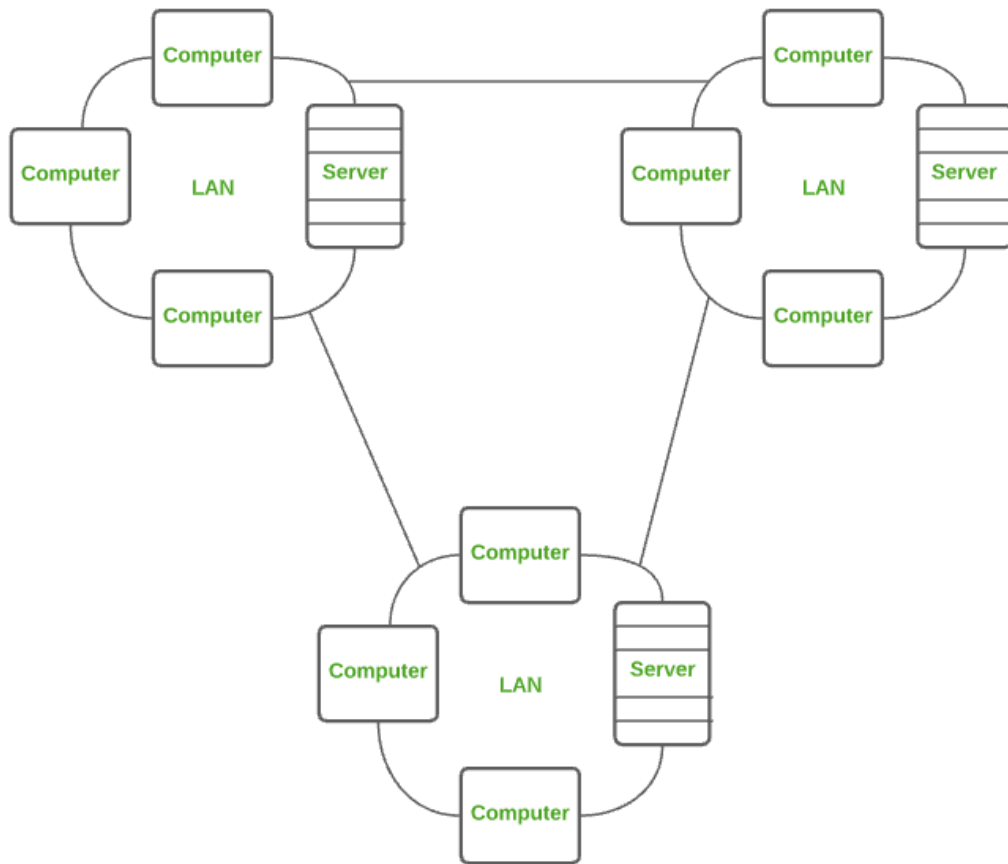


3. Wide Area Network (WAN) :

WAN is a type of computer network that connects computers over a large geographical distance through a shared communication path. It is not restrained to a single location but extends over many locations. WAN can also be defined as a group of local area networks that communicate with each other.

The most common example of WAN is the Internet.





4. Wireless Local Area Network (WLAN) :

WLAN is a type of computer network that acts as a local area network but makes use of wireless network technology like Wi-Fi. This network doesn't allow devices to communicate over physical cables like in LAN but allows devices to communicate wirelessly.

The most common example of WLAN is Wi-Fi.

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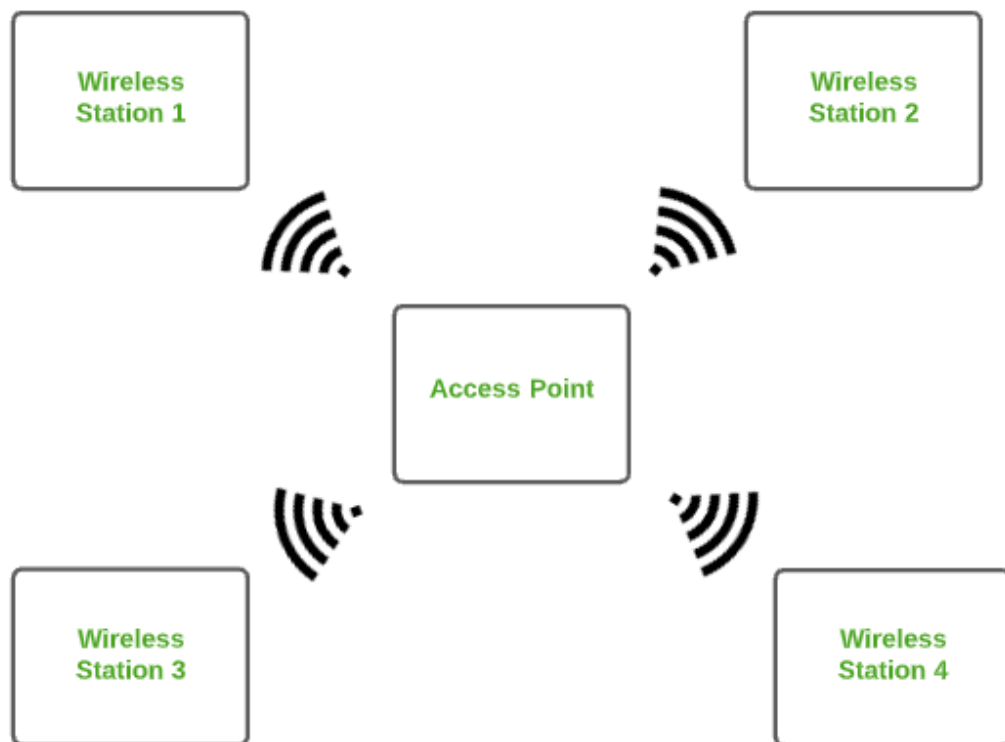
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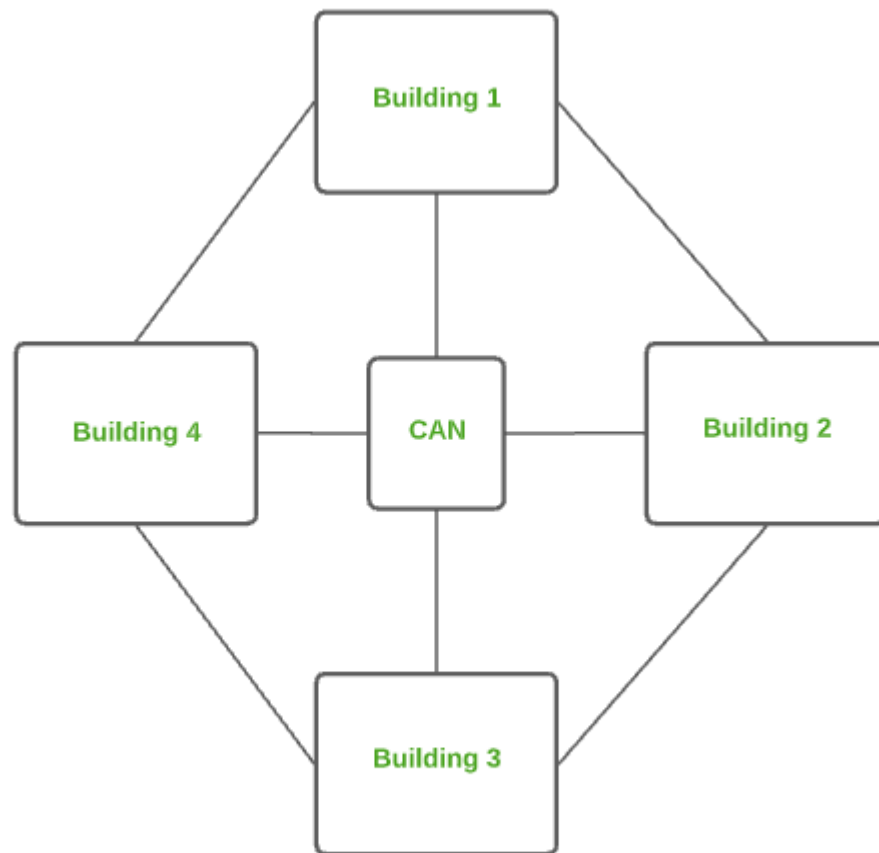


5. Campus Area Network (CAN) :

CAN is bigger than a LAN but smaller than a MAN. This is a type of computer network which is usually used in places like a school or college. This network covers a limited geographical area that is, it spreads across several buildings within the campus. Examples of CAN are networks that cover schools, colleges, buildings, etc.

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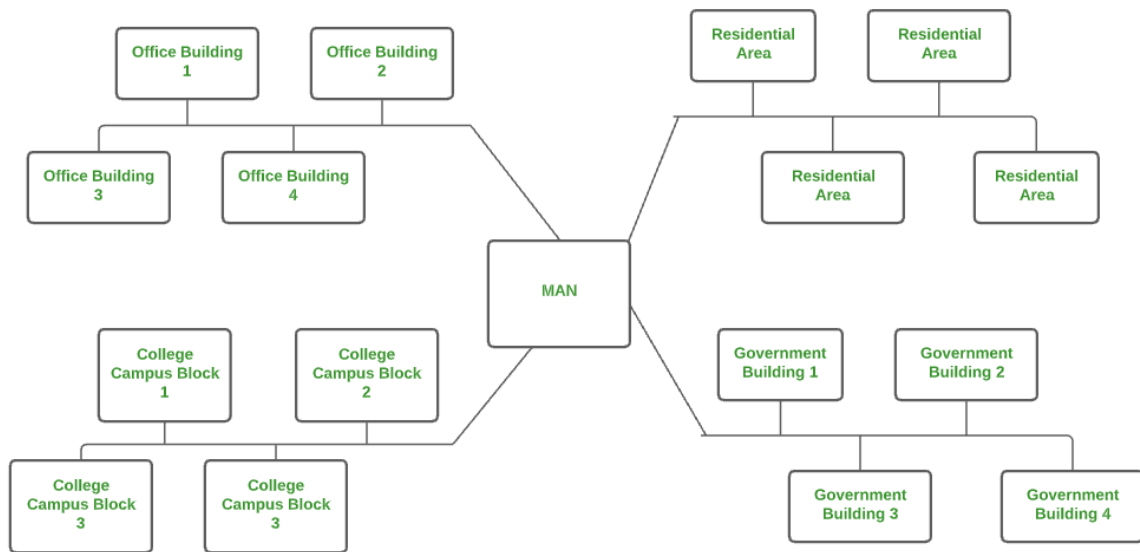


6. Metropolitan Area Network (MAN) :

A MAN is larger than a LAN but smaller than a WAN. This is the type of computer network that connects computers over a geographical distance through a shared communication path over a city, town or metropolitan area.

Examples of MAN are networking in towns, cities, a single large city, large area within multiple buildings, etc.

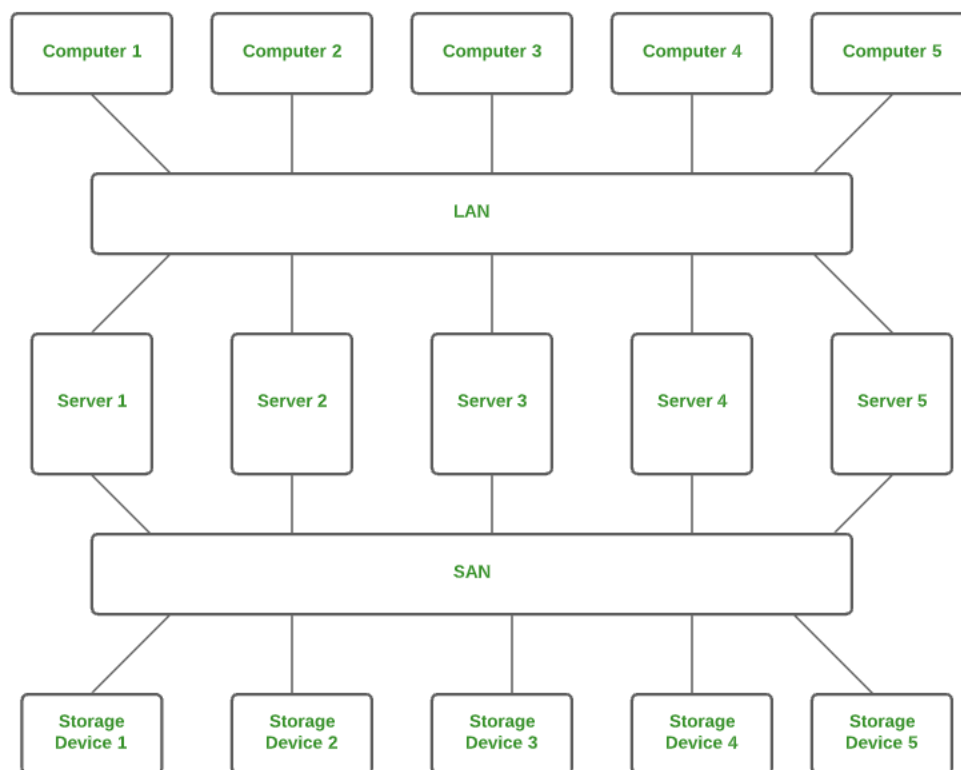
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7. Storage Area Network (SAN) :

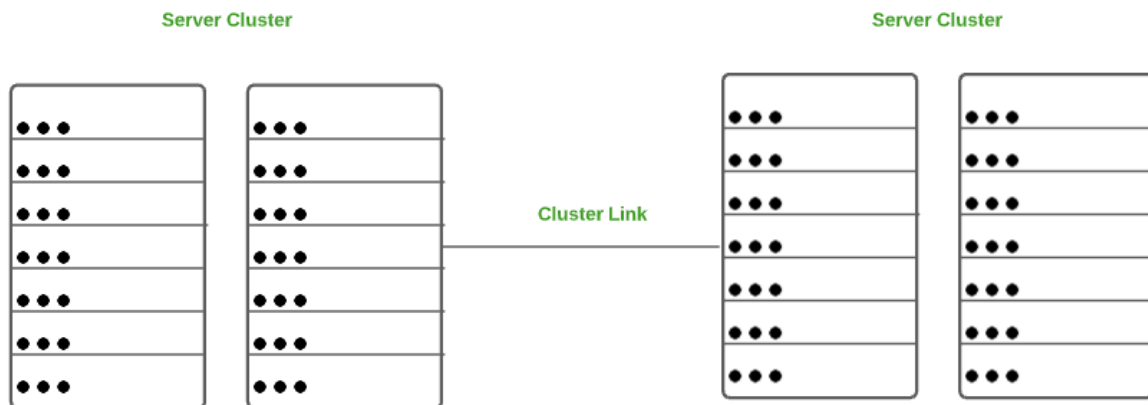
SAN is a type of computer network that is high speed and connects groups of storage devices to several servers. This network does not depend on LAN or WAN.. Instead, a SAN moves the storage resources from the network to its own high-powered network. A SAN provides access to block-level data storage.

Examples of SAN are a network of disks accessed by a network of servers.



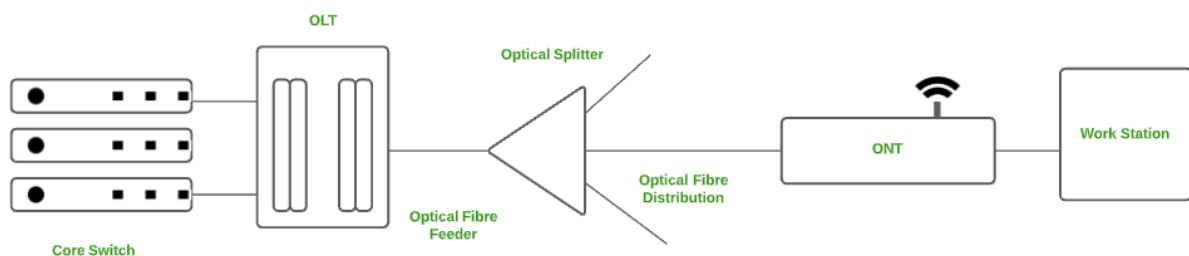
8. System Area Network (SAN) :

A SAN is a type of computer network that connects a cluster of high-performance computers. It is a connection-oriented and high bandwidth network. A SAN is a type of LAN that handles high amounts of information in large requests. This network is useful for processing applications that require high network performance. Microsoft SQL Server 2005 uses SAN through virtual interface adapter.



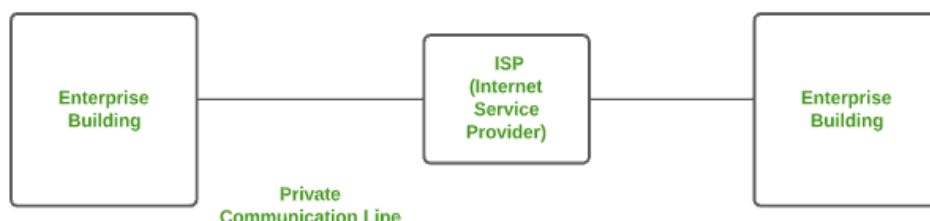
9. Passive Optical Local Area Network (POLAN) :

A POLAN is a type of computer network which is an alternative to a LAN. POLAN uses optical splitters to split an optical signal from a single strand of single mode optical fibre to multiple signals to distribute users and devices. In short, POLAN is a point to multipoint LAN architecture.



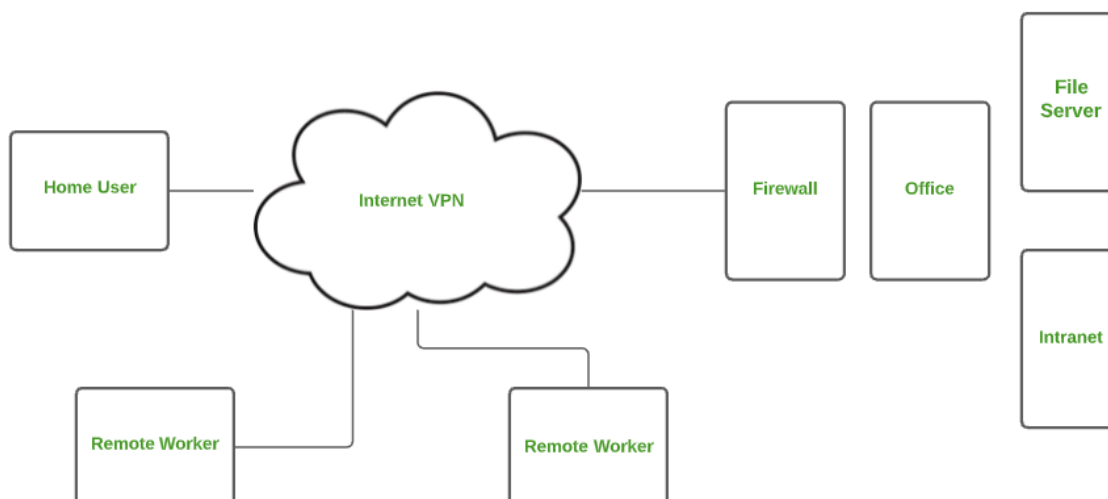
10. Enterprise Private Network (EPN) :

EPN is a type of computer network mostly used by businesses that want a secure connection over various locations to share computer resources.



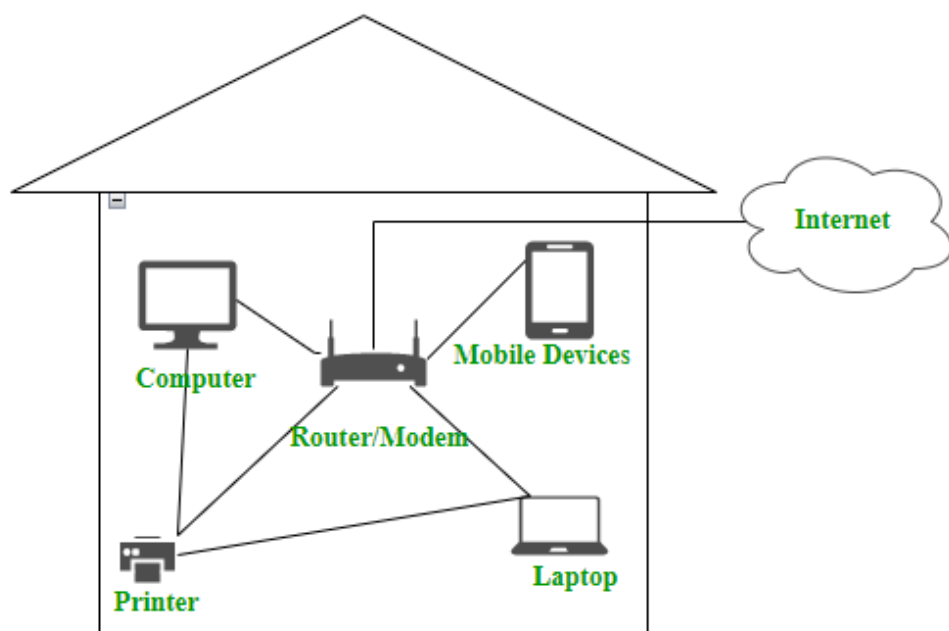
11. Virtual Private Network (VPN) :

A VPN is a type of computer network that extends a private network across the internet and lets the user send and receive data as if they were connected to a private network even though they are not. Through a virtual point-to-point connection users can access a private network remotely. VPN protects you from malicious sources by operating as a medium that gives you a protected network connection.



12. Home Area Network (HAN) :

Many of the houses might have more than a computer. To interconnect those computers and with other peripheral devices, a network should be established similar to the local area network (LAN) within that home. Such a type of network that allows a user to interconnect multiple computers and other digital devices within the home is referred to as Home Area Network (HAN). HAN encourages sharing of resources, files, and programs within the network. It supports both wired and wireless communication.



Home Area Network

LAN	MAN	WAN
Short for local area network.	Short for metropolitan area network.	Short for wide area network.
Connects a group of computers within a limited geographic area.	Confined to a city or town. Distance coverage is larger than LAN and smaller than WAN.	Covers a large geographical area such as a state, country or a continent.
High bandwidth for data transfer.	Bandwidth is moderate for data transfer.	Low bandwidth for data transfer.
Owned by private companies or individuals.	Ownership can be private or public.	Established under distributed ownership.
Limited to 100 to 1000 meters.	Distance coverage is up to 100 kilometers.	Spans a huge area of 100,000 kilometers.
Lower setup cost due to inexpensive devices.	Moderate installation costs.	Higher setup cost than LAN and MAN.
Higher data transfer speeds with 10, 100, and 1000 Mbps high-speed Ethernet.	Speed can go up to 100 Mbps.	Low data transfer rates between 10 to 20 Mbps.

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NETWORK TOPOLOGIES

What is a TOPOLOGY?

• TOPOLOGY of a network refers to the physical configuration of cables, computers and other peripherals

The arrangement of a network that comprises nodes and connecting lines via sender and receiver is referred to as network topology. The various network topologies are:

Mesh Topology:

In a mesh topology, every device is connected to another device via a particular channel. In Mesh Topology, the protocols used are AHCP (Ad Hoc Configuration Protocols), DHCP (Dynamic Host Configuration Protocol), etc.

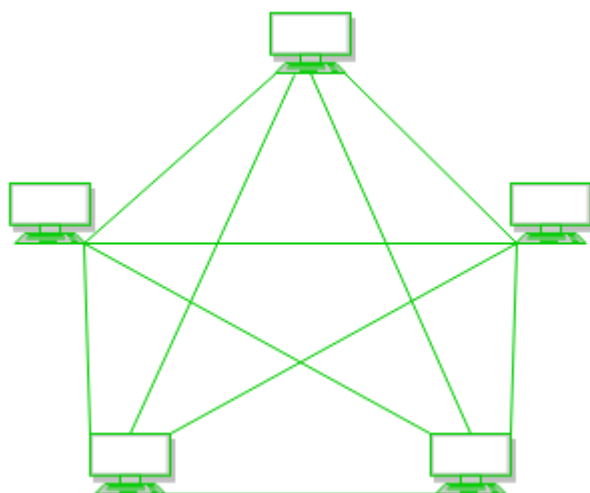


Figure 1: Every device is connected to another via dedicated channels. These channels are known as links.

- Suppose, the N number of devices are connected with each other in a mesh topology, the total number of ports that are required by each device is N-1. In Figure 1, there are 5 devices connected to each other, hence the total number of ports required by each device is 4. The total number of ports required = $N \times (N-1)$.
- Suppose, N number of devices are connected with each other in a mesh topology, then the total number of dedicated links required to connect them is ${}^N C_2$ i.e. $N(N-1)/2$. In Figure 1, there are 5 devices connected to each other, hence the total number of links required is $5 \times 4 / 2 = 10$.

Advantages of this topology:

- Communication is very fast between the nodes.
- It is robust.
- The fault is diagnosed easily. Data is reliable because data is transferred among the devices through dedicated channels or links.
- Provides security and privacy.

Problems with this topology:

- Installation and configuration are difficult.
- The cost of cables is high as bulk wiring is required, hence suitable for less number of devices.
- The cost of maintenance is high.

Star Topology:

In star topology, all the devices are connected to a single hub through a cable. This hub is the central node and all other nodes are connected to the central node. The hub can be passive in nature i.e., not an intelligent hub such as broadcasting devices, at the same time the hub can be intelligent known as an active hub. Active hubs have repeaters in them. Coaxial cables or RJ-45 cables are used to connect the computers. In Star Topology, many popular Ethernet LAN protocols are used as CD(Collision Detection), CSMA (Carrier Sense Multiple Access), etc.

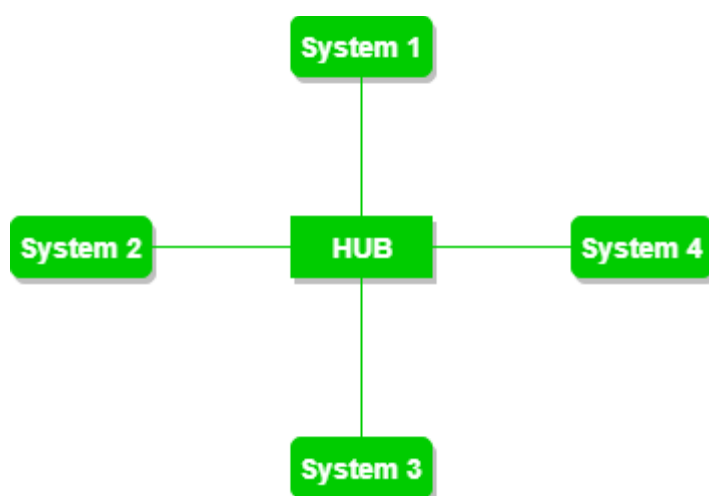


Figure 2: A star topology having four systems connected to a single point of connection i.e. hub.

Advantages of this topology:

- If N devices are connected to each other in a star topology, then the number of cables required to connect them is N. So, it is easy to set up.
- Each device requires only 1 port i.e. to connect to the hub, therefore the total number of ports required is N.
- It is Robust. If one link fails only that link will affect and not other than that.
- Easy to fault identification and fault isolation.
- Star topology is cost-effective as it uses inexpensive coaxial cable.

Problems with this topology:



- If the concentrator (hub) on which the whole topology relies fails, the whole system will crash down.
- The cost of installation is high.
- Performance is based on the single concentrator i.e. hub.

Bus Topology:

Bus topology is a network type in which every computer and network device is connected to a single cable. It is bi-directional. It is a multi-point connection and a non-robust topology because if the backbone fails the topology crashes. In Bus Topology, various MAC (Media Access Control) protocols are followed by LAN ethernet connections like TDMA, Pure Aloha, CDMA, Slotted Aloha, etc.

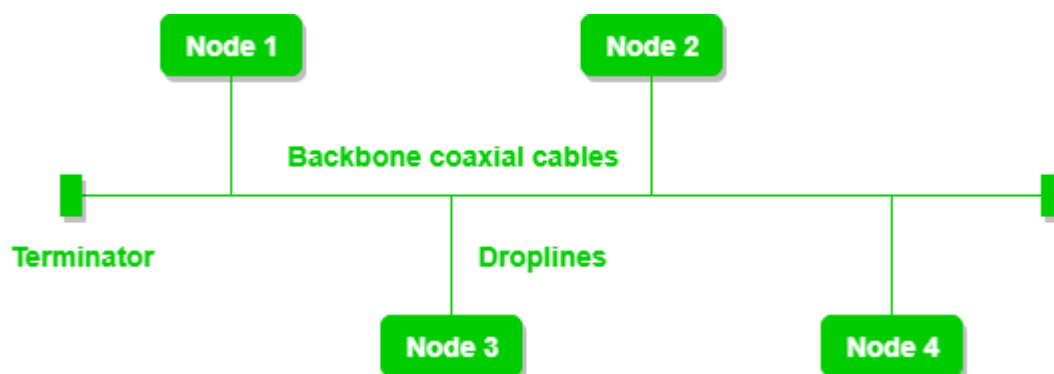


Figure 3: A bus topology with shared backbone cable. The nodes are connected to the channel via drop lines.

Advantages of this topology:

- If N devices are connected to each other in a bus topology, then the number of cables required to connect them is 1, known as backbone cable, and N drop lines are required.
- Coaxial or twisted pair cables are mainly used in bus-based networks that support up to 10 Mbps.
- The cost of the cable is less compared to other topologies, but it is used to build small networks.
- Bus topology is familiar technology as installation and troubleshooting techniques are well known.

Problems with this topology:

- A bus topology is quite simpler, but still, it requires a lot of cabling.
- If the common cable fails, then the whole system will crash down.
- If the network traffic is heavy, it increases collisions in the network. To avoid this, various protocols are used in the MAC layer known as Pure Aloha, Slotted Aloha, CSMA/CD, etc.
- Adding new devices to the network would slow down networks.
- Security is very low.

Ring Topology:

In this topology, it forms a ring connecting devices with exactly two neighboring devices.

A number of repeaters are used for Ring topology with a 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.

The data flows in one direction, i.e., it is unidirectional, but it can be made bidirectional by having 2 connections between each Network Node, it is called Dual Ring Topology. In-Ring Topology, the Token Ring Passing protocol is used by the workstations to transmit the data.

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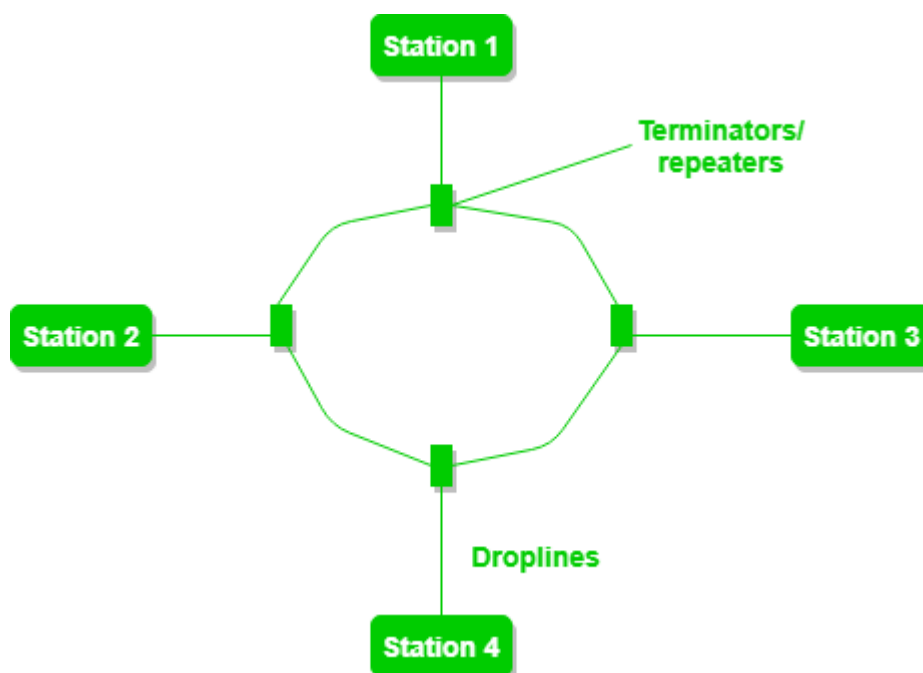


Figure 4: A ring topology comprises 4 stations connected with each forming a ring. The most common access method of ring topology is token passing.

- **Token passing:** It is a network access method in which a token is passed from one node to another node.
- **Token:** It is a frame that circulates around the network.

The following operations take place in ring topology are :

1. One station is known as a **monitor** station which takes all the responsibility for performing the operations.
2. To transmit the data, the station has to hold the token. After the transmission is done, the token is to be released for other stations to use.
3. When no station is transmitting the data, then the token will circulate in the ring.
4. There are two types of token release techniques: **Early token release** releases the token just after transmitting the data and **Delayed token release** releases the token after the acknowledgment is received from the receiver.

Advantages of this topology:

- The data transmission is high-speed.
- The possibility of collision is minimum in this type of topology.
- Cheap to install and expand.
- It is less costly than a star topology.

Problems with this topology:

- The failure of a single node in the network can cause the entire network to fail.
- Troubleshooting is difficult in this topology.
- The addition of stations in between or the removal of stations can disturb the whole topology.
- Less secure.

Tree Topology :

This topology is the variation of the Star topology. This topology has a hierarchical flow of data. In Tree Topology, protocols like DHCP and SAC (Standard Automatic Configuration) are used.

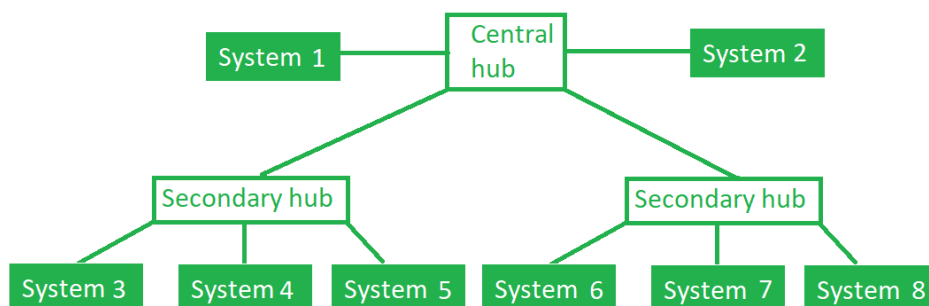


Figure 5: In this, the various secondary hubs are connected to the central hub which contains the repeater. This data flow from top to bottom i.e. from the central hub to the secondary and then to the devices or from bottom to top i.e. devices to the secondary hub and then to the central hub. It is a multi-point connection and a non-robust topology because if the backbone fails the topology crashes.

Advantages of this topology :

- It allows more devices to be attached to a single central hub thus it decreases the distance that is traveled by the signal to come to the devices.
- It allows the network to get isolated and also prioritize from different computers.
- We can add **new devices to the existing network**.
- **Error detection** and **error correction** are very easy in a tree topology.

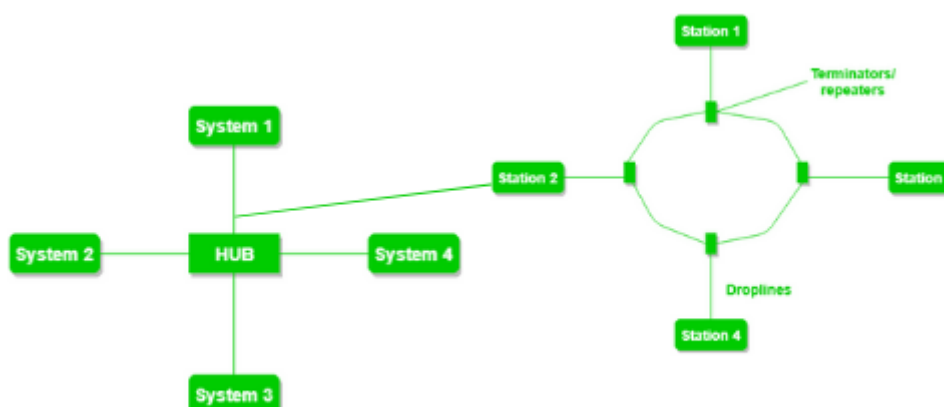
Problems with this topology :

- If the central hub gets fails the entire system fails.
- The cost is high because of the cabling.
- If new devices are added, it becomes difficult to reconfigure.

Hybrid Topology :

This topological technology is the combination of all the various types of topologies we have studied above. It is used when the nodes are free to take any form. It means these can be individuals such as Ring or Star topology or can be a combination of various types of topologies seen above. Each individual topology uses the protocol that has been discussed earlier.





Hybrid Topology

Figure 6: The above figure shows the structure of the Hybrid topology. As seen it contains a combination of all different types of networks.

Advantages of this topology :

- This topology is **very flexible**.
- The size of the network can be easily expanded by **adding new devices**.

Problems with this topology :

- It is challenging to **design the architecture** of the Hybrid Network.
- **Hubs** used in this topology are **very expensive**.
- The infrastructure cost is very high as a hybrid network **requires a lot of cabling and network devices**

What is INTERNET?

□ INTERNET is a global system of interconnected computer networks that use the standard Internet Protocol suite (TCP/IP) to serve millions of users worldwide. It is probably the largest LAN in the world

□ The Department of Defence of USA created ARPANET in response to SOVIET UNIONs launching Sputnik in 1957

TCP/IP – Transmission Control Protocol & Internet Protocol

What is the role of TCP/IP?

- TCP divides the data into data packets for the purpose of sending and receiving data. The rules for reassembling data and damage-free delivery are also specified.
- IP's role is to put destination on such packet.
- IP Address – XXX.XXX.XXX.XXX – 8 Bits of information in each OCTET

- Total 32 bits of information in an IP Address



Who GOVERNS the Internet?

Internet has NO Chief Operating Officer & it is governed by a number of authorities

VOLUNTARY AUTHORITIES

- ☐ ISOC (Internet Society) – Objective to promote global exchange of information
- ☐ IAB (Internet Architecture Board) – Sets standard and provides internet addresses
- ☐ IETF (Internet Engineering Task Force) – Discusses the technical and operational problems
- ☐ ICANN (Internet Corporation for Assigned Names and Numbers)

HARDWARE for INTERNET

1. MODEM – To convert analog to digital and digital to analog.
2. HUB – Place of convergence where data arrives & is forwarded
3. BRIDGE – It is a network that connects two or more networks
4. ROUTER – Router determines the next network point to which data packet should be forwarded. Available at low prices these days and enable connection to more devices
5. GATEWAY – Entrance to another network

SOFTWARE for INTERNET

1. HTTP – Hypertext Transfer Protocol
 - ☐ Defines the format for communication between web browsers and web servers
2. IMAP – Internet Message Access Protocol
 - ☐ Defines format for communication between E-mail servers and clients
3. SSL – Secure Sockets Layer
 - ☐ Developed by NETSCAPE for transmitting private documents

4.TCP/IP – Transfer Control Protocol / Internet Protocol

□ Main protocol used in the INTERNET – It manages all the information that moves across the internet

5.FTP – File Transfer Protocol

□ Standards that establish the format in which files can be transmitted from one computer to another.

6.TFTP – Trivial File Transfer Protocol

7.SMTP – Simple Mail Transfer Protocol

8.HTML – Hypertext Markup Language

9.SGML – Standard General Markup Language

10. URL – Uniform Resource Locator

Network Models – OSI & TCP/IP

The concept of network layers is a framework that helps to understand complex network interactions.

There are two models that are widely referenced today:

1. OSI - Open Systems Interconnection

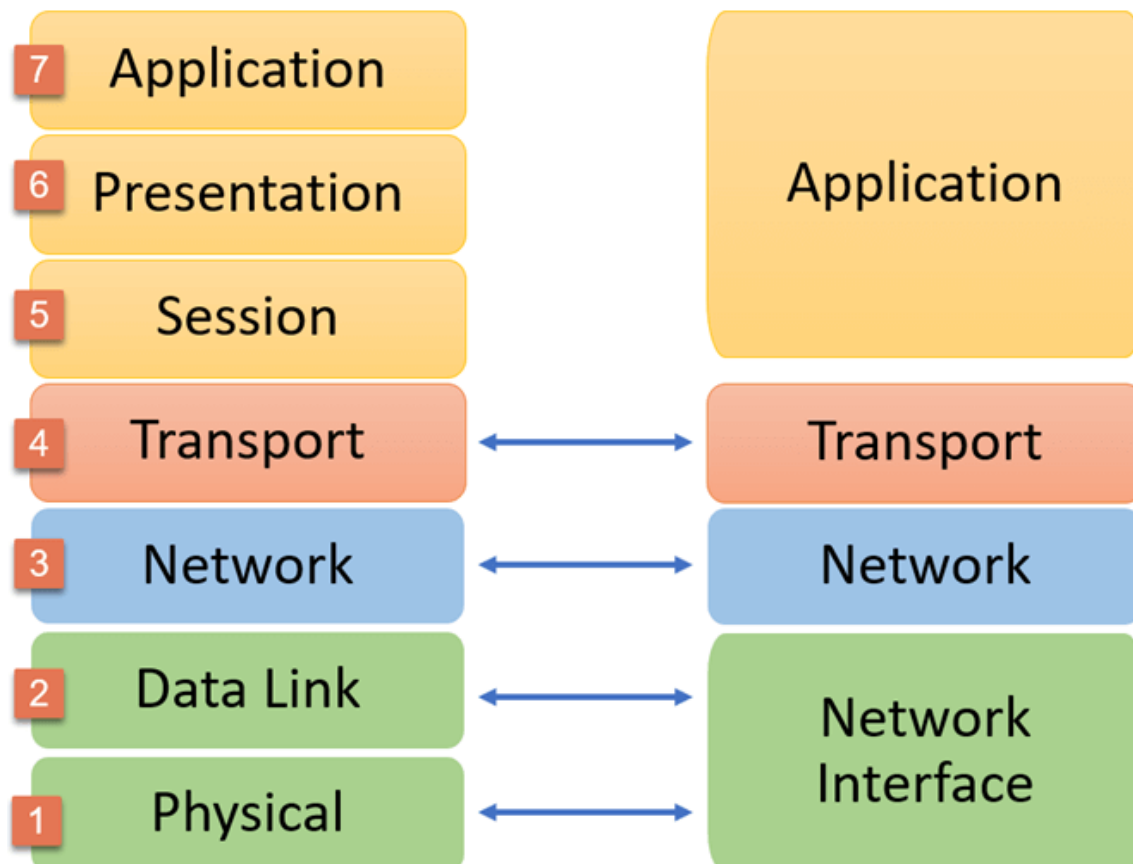
2. TCP/IP

The concepts are similar, but the layers themselves differ between the two models.

OSI Reference Model



TCP/IP Conceptual Layers



WEBSITE

- A website is a collection of web pages and related content that is identified by a common domain name
- Websites are the most important element of the internet.
- The central page of a website is called a home page.
- Home Page - is usually the first page you see when you call a website up and can also be called a 'start page' or 'index page'. From here onwards, the user delves into the site's subpages.

Types of Website:

1.

Static – Having fixed and display the same content for every user, usually written exclusively in HTML.

2.

Dynamic – They can display different content and provide user interaction, by making use of advanced programming and databases in addition to HTML.

DOMAIN NAME

- ☐ A domain name is your website name.
- ☐ A domain name is the address where Internet users can access your website.
- ☐ A domain name is used for finding and identifying computers on the Internet.

Categories :

- 1..com – Commercial Institutions or organization
- 2..edu – Educational Institutions
- 3..gov – Government sites
- 4..mil – Military Sites
- 5..net – Gateways and administrative hosts
- 6..org – Private Organization

E-MAIL

An email address is a unique address, which identifies a location to send and receive email. It contains username, followed by an “@” symbol and then domain name

EMAIL ID - gv@example.com

Structure of EMAIL :-

- 1)From – Contains Email ID and name of the sender optionally
- 2)To – To another email ID and optionally name of the receiver
- 3)Subject – Brief summary of the contents of the message
- 4)Date – Local time when the message was sent
- 5)CC – Carbon Copy
- 6)BCC – Blind Carbon Copy

COMPUTER HACKING / VIRUS

HACKING – Is an attempt to exploit a computer system or a private network inside a computer. It is the unauthorized access to control over computer network security systems for some illicit purposes.



Viruses, Trojan Horse, Password Cracking are all types of Computer Hacking!

VIRUS - A virus is a parasitic program that infects another legitimate program, which is sometimes called the host. To infect the host program, the virus modifies the host so that it contains a copy of the virus.

- Managed to wreck PCs all across the world.
- Infecting almost 10% of the world's PCs connected to the Internet, the virus caused a total damage of around \$10 billion

Types of virus –

- 1.Malware - is short for malicious software. Malware is designed to cause damage to a stand alone computer or a networked pc. So wherever a malware term is used it means a program which is designed to damage your computer.
- 2.Adware - Generically adware is a software application in which advertising banners are displayed while any program is running. Adware can automatically get downloaded to your system while browsing any website and can be viewed through pop-up windows or through a bar that appears on a computer screen automatically. Adware's are used by companies for marketing purpose.
- 3.Spyware - Spyware is a type of program that is installed with or without your permission on your personal computers to collect information about users, their computer or browsing habitstracks each and everything that you do without your knowledge and send it to remote user. It also can download other malicious programs from internet and install it on the computer.
- 4.Cluster Virus - If any program is run from the infected disk, the program causes the virus also to run . This technique creates the illusion that the virus has infected every program on the disk.
- 5.Worms - A worm is a program whose purpose is to duplicate itself.
- 6.Trojan Horses - A Trojan horse, or Trojan, is a type of malicious code or software that looks legitimate but can take control of your computer. A Trojan is designed to damage, disrupt, steal, or in general inflict some other harmful action on your data or network

Microsoft Office is a suite of desktop productivity applications that is designed specifically to be used for office or business use. It is a proprietary product of Microsoft Corporation and was first released in 1990. Microsoft Office is available in 35 different languages and is supported by Windows, Mac and most Linux variants. It mainly consists of Word, Excel, PowerPoint, Access, OneNote, Outlook and Publisher applications

You can start any software of MS-Office by using the Start button. There are five packages of MS-Office 1. MS-Word (Word Processing Software) 2. MS-Excel (Spreadsheet Software)



3. MS-PowerPoint (Presentation Software)
4. MS-Access (Database Management Software)
5. MS-Outlook (E-mail Client)

Microsoft Word MS-Word is a Word processing application which is one of the most important and widely used applications found on computer. It provides tools for editing, formatting and printing of documents smaller than 45 Kb. The document can be a poster, report, letter, brochure, Web page, newsletter, etc. e.g. WordStar, Notepad for Windows.

Start MS-Word There are two methods of starting MS-Word which are as follows (i) Click on Start button and then click on Run option. Run dialog box will be appear on screen. Now, type winword on text box and press Enter key. (ii) Click Start button All Programs Microsoft Office Microsoft Office Word 2007. It opens MS-Word with a blank document.

By default, the name of the blank document is Document1.docx, where.docx are the extensions of a MS-Word file.

Components of Microsoft Word The components of MS-Word are as follows (i) Title Bar It shows the name of the application and name of the file.

It consists of three control buttons, i.e. (a) Minimize (reduces the window but Word still active) (b) Restore (brings Word window to the maximum original size) (c) Close (Close the word window) (ii) Standard Tool Bar It displays the symbol for the common operation like Open, Print, Save, etc.

(iii) Ribbon It is a set of tools and commands across the top of the screen. It consists of a panel of

commands which are organised into a set of tabs.

(iv) Tab On the ribbon, it contains the buttons needed to edit characters, text and layout.

(a) Home tab Consists of Clipboard (Cut, Copy, Paste), Font (Size, Color, Bold, Italic, Underline),

Paragraph (Bullets/ Numbering, Indent), Styles, Editing (Find and Replace).

(b) Insert tab Consists of Pages (Cover Page, Blank Page, Page Break), Tables (Table), Illustrations

(Picture, ClipArt, Shapes, SmartArt, Chart), Links (Hyperlink, Book mark, cross-referenc), Header & Footer, Text (TextBox, Date & Time, Object), Symbols (Equation, Symbol).

(c) Page Layout tab Consists of Themes, Page Setup, Page Background, Paragraph, Arrange.

(d) References tab Consists of Table of Contents, Footnotes, Citations & Bibliography, Captions,

Index, Table of Authorities.

(e) Mailings tab Consists of Create, Start Mail Mrge, Write and Insert Fields, Preview Results

and Finish.

(f) Review tab Consists of Proofing (Spelling & Grammar, Thesaurus, Translate), Comments, Tracking, Changes, Compare, Protect.

(g) View tab Consists of Document Views (Print Layout, Full Screen Reading), Show/Hide, Zoom, Window, Macros, etc.

(v) Ruler It appears on the top of the document window. It allows to format the horizontal or vertical

alignment of text in a document.

There are two types of rulers

(a) Horizontal ruler It indicates the width of the document and is used to set left and right margins.

(b) Vertical ruler It indicates the height of the document and is used to set top and bottom margins.

(vi) Status Bar It displays the information such as page number, current page, current template, column number and line number, etc.

(vii) Work Area It is the rectangular area of the document window that can be use to type the text. It is also called as workplace.

(viii) Cursor It is also called insertion pointer. It denotes the place where text, graphics or any other item would be placed when you type, overwrite or insert them.

Features of Microsoft Word The features of MS-Word are described below (i) Text Editing It provides editing, adding and deleting text, modification of text content i.e. cut, copy and paste. When, we cut any text in our document, it will save in hard drive temporarily, till we paste it on any other place.

(ii) Format Text It offers to modify the text in any of the available hundreds of text designs. It formats text in various styles such as bold, italic, underline, etc.

(iii) Indentation It denotes the distance text boundaries and page margins. It offers three types of indentation— positive, hanging and negative indent.

(iv) Page Orientation It facilitates selection of typed text printed or visible in horizontal view or vertical view on a specified size of the page. Word offers Portrait—vertically oriented and Landscape—horizontally oriented.



(v) Find and Replace This feature allows flexibility and comfort to the user to replace a text with a substituted text at all places.

(vi) Spell Check This facilitates automatic and manual checking of spelling mistakes and also suggests a few possible alternate options for incorrect spelt words.

(vii) Thesaurus It contains a comprehensive dictionary and thesaurus feature offers synonym options for a word.

(viii) Bullets and Numbering A list of bullets and numbering features used for tables, lists, pages and tables of content. Bullets are arranged in unordered lists and numbering are arranged in ordered lists.

(ix) Graphics It provides the facility of incorporating drawings in the documents which enhances their usefulness.

(x) Object Linking and Embedding (OLE) It is a program integration technology that is used to share information between programs through objects. Objects save entities like charts, equations, video clips, audio clips, pictures, etc.

(xi) Horizontal and Vertical Scroll Bars They enable one to move up and down or left and right across the window. The horizontal scroll bar is located above the status bar. The vertical scroll bar is located along the right side of the screen to move up and down the document.

(xii) Save a Document When we create a new document, it will be saved into the hard drive. To save a document, user has three common ways (i) To click on Save option from File menu. (ii) Select Save button from Standard toolbar. (iii) Pressing Ctrl + S key..

Introduction to Ms-Power Point A PowerPoint presentation is a presentation created using Microsoft PowerPoint software.

The presentation is a collection of individual slides that contain information on a topic. PowerPoint presentations are commonly used in business meetings and for training and educational purposes.

Microsoft PowerPoint is a software product used to perform computerbased presentations. There are various circumstances in which a presentation is made: teaching a class, introducing a product to sell, explaining an organizational structure, etc. The preparation and the actual delivery of each are quite different. PowerPoint typically comes with a set of preloaded themes for you to choose from.

These can range from simple color changes to complete format layouts with accompanying font text. Themes can be applied through the whole presentation or a single slide. Using the page setup allows you to optimize the presentation for the display size; for instance, you should use a larger screen ratio when displaying on a projector compared to a computer screen.

Features PowerPoint software features and formatting options include a wizard that walks you through the presentation creation process. Design templates---prepackaged background designs and font styles that will be applied to all slides in a presentation. When viewing a



presentation, slide progression can be manual, using the computer mouse or keyboard to progress to the next slide, or slides can be set up to progress after a specified length of time. Slide introductions and transitions can be added to the slides.

Introduction to Ms-Excel Microsoft Excel is a general-purpose electronic spreadsheet used to organize, calculate, and analyze data. The task you can complete with Excel ranges from preparing a simple family budget, preparing a purchase order, or managing a complex accounting ledger for a medium size business.

Excel Features There are a number of features that are available in Excel to make your task easier. Some of the main features are: AutoFormat - lets you to choose many preset table formatting options.

1. AutoSum - helps you to add the contents of a cluster of adjacent cells.
2. List AutoFill - automatically extends cell formatting when a new item is added to the end of a list.
3. AutoShapes toolbar- will allow you to draw a number of geometrical shapes, arrows, flowchart elements, stars and more. With these shapes you can draw your own graphs.
4. Drag and Drop - feature will help you to reposition the data and text by simply dragging the data with the help of mouse.
5. Charts - features will help you in presenting a graphical representation of your data in the form of Pie, Bar, Line charts and more.
6. PivotTable - flips and sums data in seconds and allows you to perform data analysis and generating reports like periodic financial statements, statistical reports, etc. You can also analyse complex data relationships graphically.
7. Shortcut Menus - commands that are appropriate to the task that you are doing appear by clicking the right mouse button.

IMPORTANT COMPUTER ABBREVIATIONS

1. COMPUTER - Commonly Operated Machine Particularly Used for Trade/Technology, Education and Research
2. AAC - Advanced Audio Coding
3. AI - Artificial Intelligence
4. ARPANET - Advanced Research Projects Agency Network
5. ALGOL - Algorithmic Language

6. ALU - Arithmetic Logic Unit
7. AOL - America Online
8. API - Application Program Interface
9. APT - Automatically Programmed Tooling
10. ARP - Address Resolution Protocol
11. ASP - Active Server Pages
12. ATM - Asynchronous Transfer Mode
13. AVI - Audio Video Interleave
14. ASCII - American Standard Code for Information Interchange
15. AT - Advanced Technology
16. AUI - Attachment Unit Interface
17. BASIC - Beginner's All-purpose Symbolic Instruction Code
18. BCD - Binary Coded Decimal
19. BHTML - Broadcast Hyper Text Markup Language
20. BMP - Bitmap
21. BIOS - Basic Input Output System
22. BIU - Bus Interface Unit
23. BPS - Bytes Per Second
24. BCC - Blind Carbon Copy
25. CC - Carbon Copy
26. CAI - Computer Aided Instruction
27. CDMA - Code Division Multiple Access
28. CRT - Cathode Ray Tube
29. CAD - Computer Aided Design
30. CADD - Computer Aided Design and Drafting
31. CD - Compact Disk

32. CDRW - Compact Disk Rewritable
33. CAM - Computer Aided Manufacturing
34. CROM - Computerized Range of Motion
35. CDROM - Compact Disk Read Only Memory
36. CMD – Command
37. CISC - Complex Instructions Set Computers
38. COBOL - Common Business Oriented Language
39. CPI - Clock / Cycle Per Instruction
40. CPU - Central Processing Unit
41. CSS - Cascading Style Sheets
42. CUI - Character User Interface
43. DAT - Digital Audio Tape
44. DDR - Double Data Rate
45. DOS - Disk Operating System
46. DOC - Data Optimizing Computer
47. Doc – Document
48. DVD - Digital Versatile Disk
49. DVI - Digital Visual Interface
50. DVDR - Digital Versatile Disk Recordable
51. DVDRW - Digital Versatile Disk Rewritable
52. DBMS - Data Base Management System
53. DRAM - Dynamic Random Access Memory
54. DDL - Data Definition Language
55. DHTML - Dynamics Hyper Text Markup Language
56. DML - Data Manipulation Language
57. DNS - Domain Name System
58. DPI - Dots Per Inch
59. DNA - Distributed Internet Architecture

60. DARPANET - Defense Advanced Research

Project Agency Network

61. DVR - Digital Video Recorder

62. E-Commerce - Electronic Commerce

63. EDGE - Enhanced Data Rate for GSM (Global
System for Mobile Communication) Evolution

64. EDI - Electronic Data Interchange

65. EDP - Electronic Data Processing

66. EDSAC - Electronic Delay Storage Automatic
Calculator

67. EDVAC - Electronic Discrete Variable Automatic
Compute

68. EB - EXA BYTE

69. EROM - Erasable Read Only Memory

70. EPROM - Erasable Programmable Read Only
Memory

71. EEPROM - Electronically Erasable
Programmable Read Only Memory

72. E-Mail - Electronic Mail

73. EFS - Encrypted File System

74. EDC - Electronic Digital Computer

75. ENIAC - Electronics Numerical Integrator and
Calculator

76. FDC - Floppy Disk Controller

77. FDD - Floppy Disk Drive

78. FORTRAN - Formula Translation

79. FTP - File Transfer Protocol

80. FS - File System

81. FAT - File Allocation Table

82. FPS - Frames Per Second

83. FLOPS - Floating Point Operations Per Second

84. FM - Frequency Modulation

85. GB - Giga Byte

86. GIF - Graphic Interchangeable Format

87. GDI - Graphical Device Interface

88. GPRS - General Packet Radio Service

89. GUI - Graphical User Interface

90. GBPS - Gigabytes/Gigabits Per Second

91. 3GP - 3rd Generation Project

92. 3GPP - 3rd Generation Partnership Project

93. GML - Geography Markup Language

94. GSM - Global System for Mobile

Communication

95. GHz - Gigahertz

96. GIGO - Garbage In Garbage Out

97. HDMI - High Definition Multimedia Interface

98. HTTP - Hyper Text Transfer Protocol

99. HTTPS - Hyper Text Transfer Protocol Secure

100.

HTML - Hyper Text Markup Language

101HD - Hard Disk

102.HDD - Hard Disk Drive

103.HPC - Handheld Personal Computer/High Performance Computer

104 HP - Hewlett Packard/Horse Power

105.HSDPA - High Speed Downlink Packet Access

106.IMAP - Internet Message Access Protocol

107.INTEL - Integrated Electronics

108.ISP - Internet Service Provider

109.IP - Internet Protocol

110.IPV4 - Internet Protocol Version 4

111.IPV6 - Internet Protocol Version 6

112.IO - Input Output

113.IOP - Input Output Processor

114.IBM - International Business Machines

115 IC - Integrated Circuit

116.IT - Information Technology

117.

JAR - Java Archive

118.

J2EE - Java 2 Platform Enterprise Edition

Shortcut Keys of Computer A to Z (Basic)

When a user works on the computer system, selecting text, copying, pasting, and deleting are the basic and frequently done tasks. Instead of using your cursor, you must be practicing Computer Keyboard Shortcut Keys. All the basic computer shortcut keys to be used on daily basis are mentioned in the table below. Check out the table given below to know the all basic computer keyboard shortcut keys from A to Z.

Basic Computer Keyboard Shortcut Keys A to Z	
Shortcuts	Uses of Shortcut keys
Alt + F	File menu options in the current program
Alt + E	Edits options in the current program
F1	Universal help (for any sort of program)
Ctrl + A	Selects all text
Ctrl + X	Cuts the selected item

Basic Computer Keyboard Shortcut Keys A to Z	
Shortcuts	Uses of Shortcut keys
Ctrl + Del	Cut selected item
Ctrl + C	Copy the selected item
Ctrl + Ins	Copy the selected item
Ctrl + V	Paste the selected item
Shift + Ins	Paste the selected item
Home	Takes the user to the start of the current line
Ctrl + Home	Go to the beginning of the document
End	Go to the end of the current line
Ctrl + End	Go to the end of a document
Shift + Home	Highlight from the prevailing position to the start of the line
Shift + End	Highlight from the prevailing position to end of the line
Ctrl + (Left arrow)	Move one term to the left at a time
Ctrl + (Right arrow)	Move one term to the right at a time

Computer Shortcut Keys for Microsoft Windows

Computer shortcuts are keys or combinations of keys that assist you in an alternative way to do something that you typically do with a mouse or cursor. All the computer shortcut keys for Microsoft Windows are given below. Let's have a look at the computer keyboard shortcut keys for Microsoft Windows from the below table.

Shortcut Keys	Uses of Shortcut keys
Ctrl + Plus Key	Adjust the widths of all columns automatically, in Windows Explorer
Alt + Enter	Open the properties window for the selected icon or program
Alt + Print Screen	Take a screenshot of the current page.
Ctrl + Alt + Del	Reboot/Windows task manager
Ctrl + Esc	These keys allow you to activate the start menu
F4	Its purpose in Windows 95 to XP is to open the locate window
F5	Refresh the contents of your windows system
F3	Find anything from your system's desktop
Alt + Esc	Switch between desktop applications on the taskbar
F2	Rename the selected icon
Alt + Shift + Tab	It allows you to switch back between ongoing applications
Alt + Tab	Switch between open applications/ programs.
Shift + Delete	When you press the Shift and Delete keys together, your program or files will be deleted permanently
Alt + F4	It is used to close the ongoing program
Ctrl + F4	It's used to swiftly close a document or a file that's currently open.

Computer Shortcut Keys for MS Excel

Preparing a lengthy sheet in MS Excel and then revising the data or editing any single piece of information in the complete sheet would be time-consuming if you are not aware of the shortcut keys for MS Excel. All Computer Keyboard Shortcut Keys for MS



Office programs have been discussed below. Check out the table given below to know the shortcut keys used in MS Excel.

Shortcut keys	Uses of shortcut keys
Alt + Shift + F1	When you wanna insert new worksheet use these keys together
Shift + F3	With the help of these keys, you can open the MS-Excel formula window
Shift + F5	When you press these keys together it will open the search box
F11	The F11 key is used to create a chart in MS-Excel
Ctrl + Shift +;	With the help of these keys, you can enter the current time
Ctrl +;	Use these keys together to enter the current date
Ctrl + K	When you want to Insert a link, you can use these keys together
Ctrl + F	These keys are used to open find and replace options in MS-Excel
Ctrl + G	Use these keys together to open go-to options
Ctrl + B	When you press these keys together it will bold highlighted selection.
F2	When you want to edit the selected cell using this key
F5	With the help of this key, you can go to a specific cell
F7	With the help of this key, you can check the spell of selected text
Ctrl + I	These commands are used to Italicize highlighted selection.
Ctrl + Space	Use these keys together to select the entire column
Shift + Space	Use these keys together to select the entire row
Ctrl + W	Use these keys together to close the document

Ctrl + H	Use these keys to open find and replace options
Ctrl + U	With help of these keys, you can underline highlighted text.
Ctrl + Y	With help of these keys, you can underline highlighted text.
Ctrl + Z	With the help of these keys, you can undo the last deleted action
Ctrl + F9	Use these keys to minimize a current window in MS-Excel
Ctrl + F10	Use these keys to maximize the currently selected window in MS-Excel
Ctrl + Tab	With the help of these keys, you can move between two or more open MS-Excel files
Alt + =	With the help of these keys, you can initiate the formula to add all of the above cells
Ctrl +	With the use of these keys together you can insert the value in the current cell from the above
Ctrl + (Right arrow)	With the help of these keys, you can jump on to the next section of text
Ctrl + O	Use these keys to open options in MS-Excel
Ctrl + N	Use these keys together to open the document in MS-Excel
Ctrl + P	Use these keys together to open the print dialogue box in MS-Excel

Computer Shortcut Keys for MS Word

Though MS Word is the basic computer software and seems to be the easiest one to work on it. However, there is a complete list of Computer Shortcut Keys that makes typing on MS Word easier and enjoyable. All Computer Shortcut Keys related to MS Word are given below. Check out the table given below to know the shortcut keys used in MS Word.

Shortcuts	Uses of Shortcut keys
Ctrl + B	Bold highlighted selection



Ctrl + C	Copy selected text
Ctrl + X	Cut selected text
Ctrl + N	Open new/blank document
Ctrl + O	Open options
Ctrl + P	Open the print window
Ctrl + F	Open find box
Ctrl + I	Italicize highlighted selection
Ctrl + K	Insert link
Ctrl + U	Underline highlighted selection
Ctrl + V	Paste
Ctrl + G	Find and replace options
Ctrl + H	Find and replace options
Ctrl + J	Justify paragraph alignment
Ctrl + L	Align selected text or line to the left
Ctrl + Q	Align selected paragraph to the left
Ctrl + E	Align selected text or line to the centre
Ctrl + R	Align selected text or line to the right
Ctrl + M	Indent the paragraph
Ctrl + T	Hanging indent
Ctrl + D	Font options



Ctrl + Shift + F	Change the font
Ctrl + Shift + >	Increase selected font +1
Ctrl +]	Increase selected font +1
Ctrl + [Decrease selected font -1
Ctrl + Shift + *	View or hide non printing characters
Ctrl + (Left arrow)	Move one word to the left
Ctrl + (Right arrow)	Move one word to the right
Ctrl + (Up arrow)	Move to the beginning of the line or paragraph
Ctrl + (Down arrow)	Move to the end of the paragraph
Ctrl + Del	Delete the word to the right of the cursor
Ctrl + Backspace	Delete the word to the left of the cursor
Ctrl + End	Move the cursor to the end of the document
Ctrl + Home	Move the cursor to the beginning of the document
Ctrl + Space	Reset highlighted text to the default font
Ctrl + 1	Single-space lines
Ctrl + 2	Double-space lines
Ctrl + 5	1.5-line spacing
Ctrl + Alt + 1	Change text to heading 1
Ctrl + Alt + 2	Change text to heading 2
Ctrl + Alt + 3	Change text to heading 3

Shift + F3	Change case of selected text
Shift + Insert	Paste
F4	Repeat the last action performed (Word 2000+)
F7	Spell check selected text and/or document
Shift + F7	Activate the thesaurus
F12	Save as
Ctrl + S	Save
Shift + F12	Save
Alt + Shift + D	Insert the current date
Alt + Shift + T	Insert the current time
Ctrl + W	Close document
Ctrl+=	Set chosen text as a subscript.
Ctrl+Shift+=	Set chosen text as superscript.

Computer Shortcut Keys for PowerPoint

Beginning to work on Microsoft Powerpoint and wants to learn the shortcut keys to navigate and perform commands quickly, then have a look at the computer keyboard shortcut keys used in the PowerPoint program. All Computer Keyboard Shortcut Keys for PowerPoint programs are given below.

Shortcuts Keys	Uses of Shortcut Keys
Ctrl+Shift+<	Reduce the font size of the selected text by one size.
CTRL + G	Group things together

Ctrl+M	Create a new slide just after your chosen slide.
CTRL + D	Create a duplicate of your current slide.
Esc	Exit the ongoing slide show and it will redirect you to the earlier live view.
Ctrl+K	When you want to enter a hyperlink use these keys together.
Ctrl+Shift+>	These commands are used to maximize the font size of the selected text by one size.
F5	With the help of F5, you can start the presentation from the initial slide.
Ctrl+N	These commands are used in a different Powerpoint software window, create a new, blank slide.

