

Class VIII

Chapter-1: Introduction To Computers: Networking, Operating System

Networking refers to inter-connection of various devices to share their resources.

A **network** is a collection of devices, peripherals, or other devices connected to one another to allow the exchange of data.

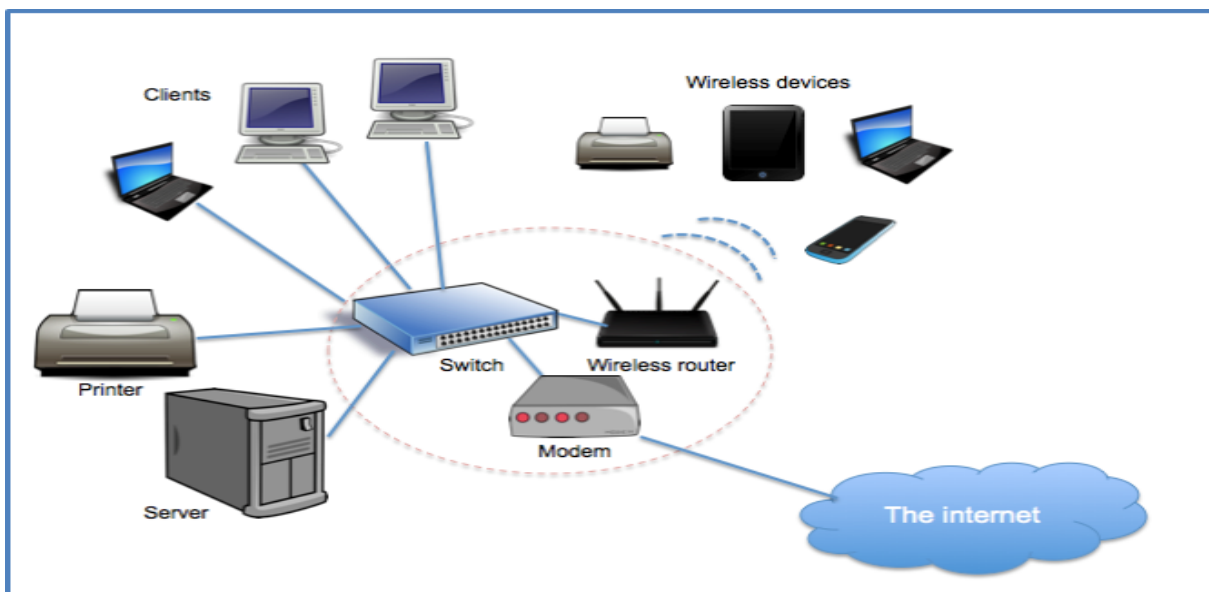
Eg: cable networks, television networks, telephone networks etc.

An excellent example of a network is the Internet, which connects millions of people all over the world.



COMPUTER NETWORK

A computer network is a collection computers and peripheral devices (known as network components) connected by communication links.



BENEFITS OF NETWORKING

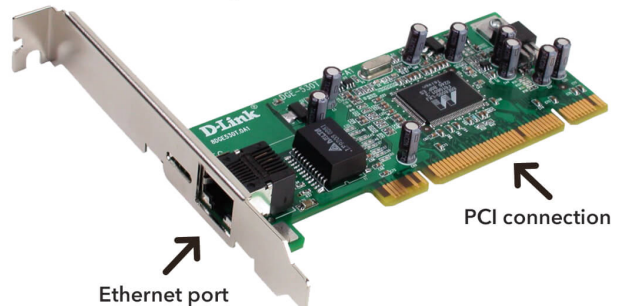
- Ease of Access
- Work from Home
- Sharing Resources
- Sharing Information
- Increase Productivity
- Sharing Programs
- Administration
- Security

HARDWARE REQUIRED FOR NETWORKING

- **Computer** or similar devices like Smart phones, Laptops etc.
- **Cables** are the wires that connect computers and resources on a network
- **Connectors** is a device that connects two computers or networks together
- **Network Interface Card (NIC)** is a device that joins cable to a computer.



Gigabit Ethernet NIC



TechTerms.com

TYPES OF NETWORKS

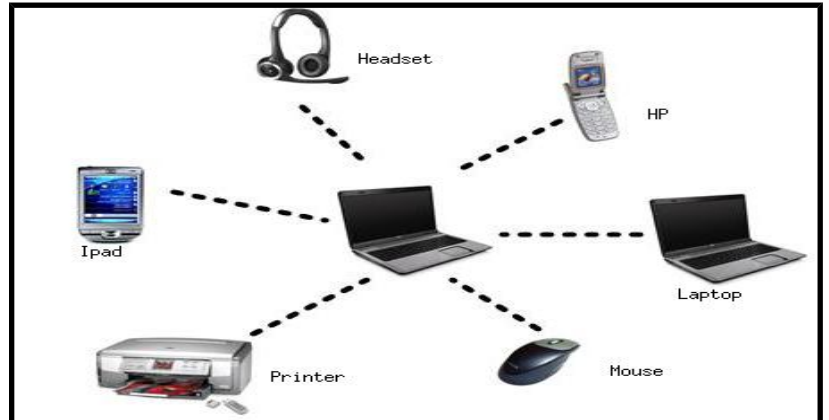
There are several different types of computer networks. Computer networks can be characterized by their size as well as their purpose.

The size of a network can be expressed by the geographic area they occupy and the number of computers that are part of the network. Networks can cover anything from a handful of devices within a single room to millions of devices spread across the entire globe.

Some of the different networks based on size are:

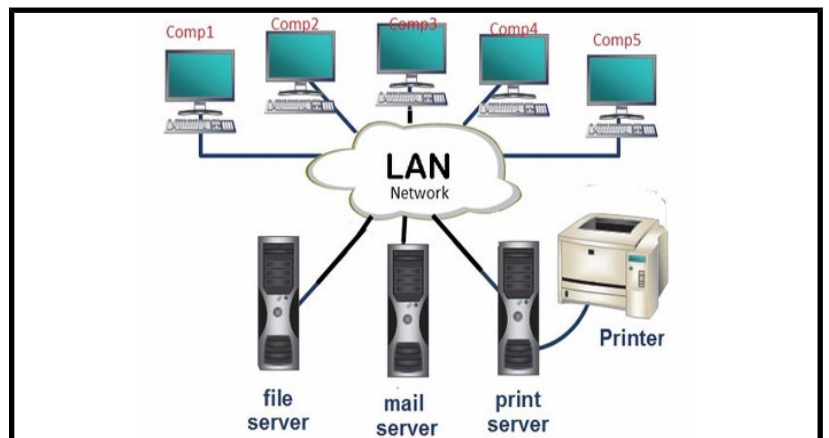
- **Personal area network, or PAN**

is a computer network organized around an individual person. A typical PAN would include one or more computers, telephones, peripheral devices, video game consoles and other personal entertainment devices.



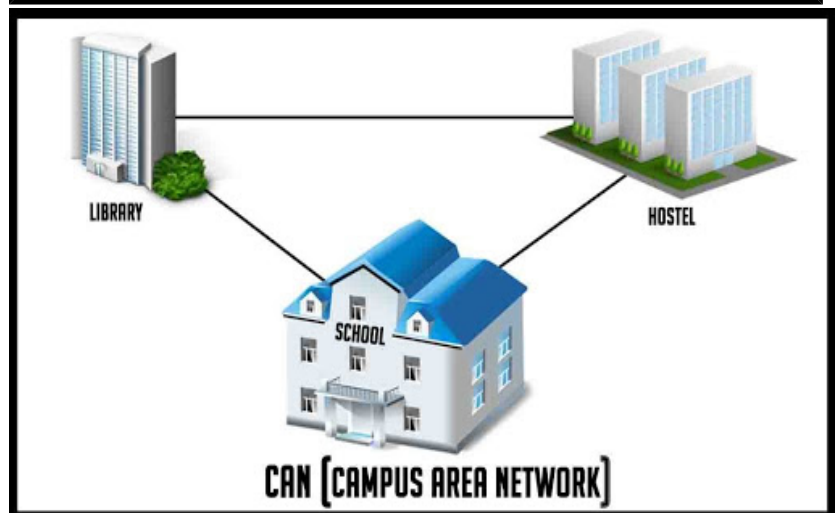
- **Local area network, or LAN**

consists of a computer network at a single site, typically an individual office building. Usually it does not consist of more than 100 computers.

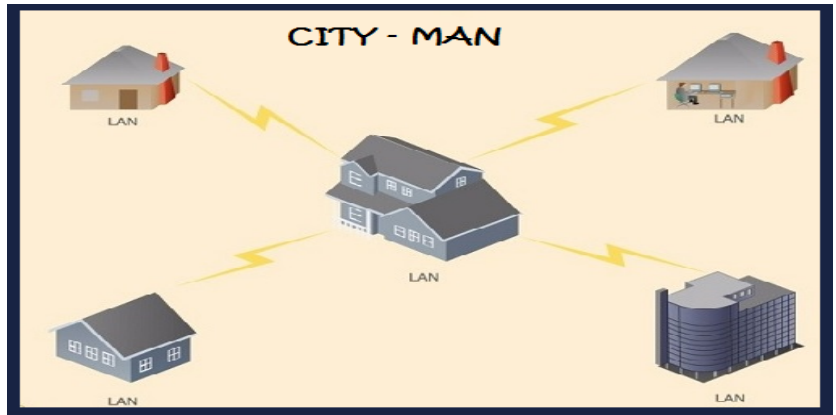


- **Campus area network, or CAN**

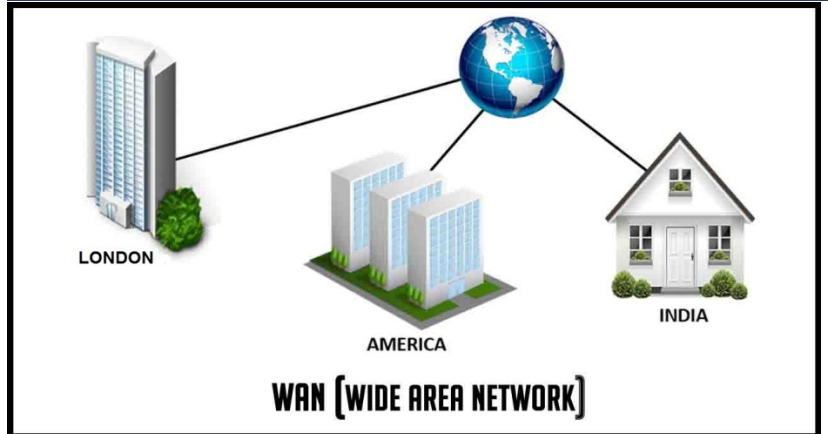
consists of a computer network across a college campus or small region connecting two or more LANs.



- **Metropolitan area network, or MAN** consists of a computer network across an entire city.

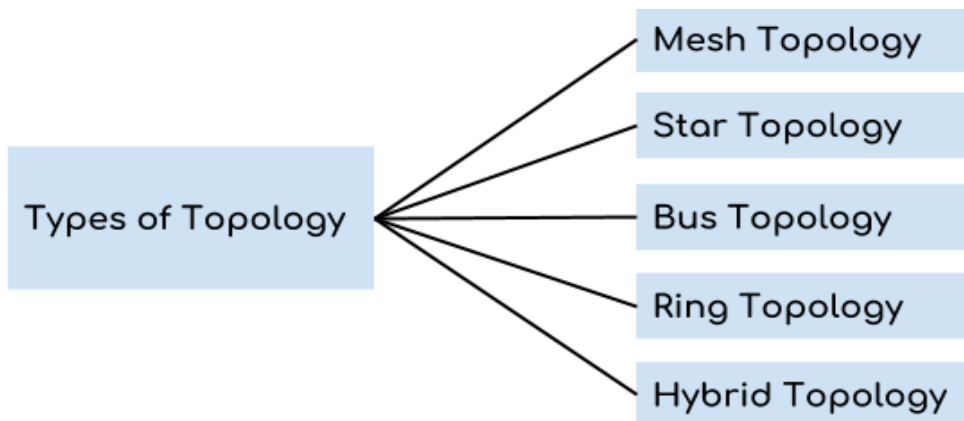


- **Wide area network, or WAN** occupies a very large area, such as an entire country or the entire world. A WAN can contain multiple smaller networks, such as LANs or MANs. The Internet is the best-known example of a public WAN.

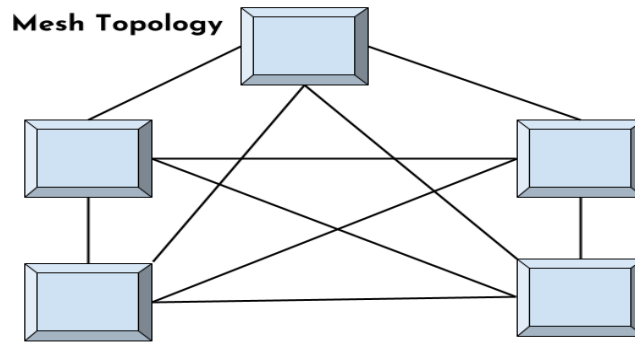


NETWORK TOPOLOGY

The art of connecting different computers in a network is known as topology.
There are mainly five types of topologies in computer networks:



Mesh Topology



In mesh topology each device is connected to every other device on the network through a dedicated point-to-point link.

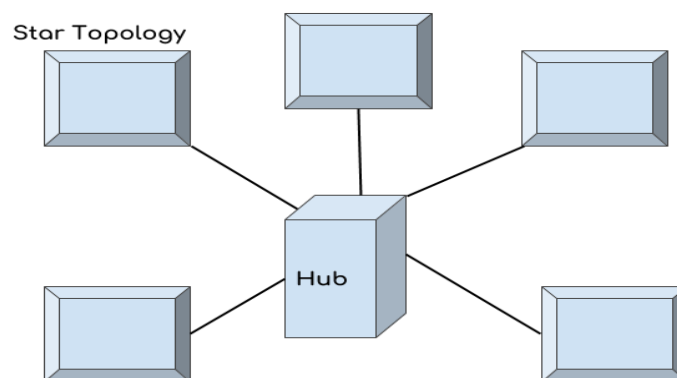
Advantages of Mesh topology

1. No data traffic issues as there is a dedicated link between two devices which means the link is only available for those two devices.
2. Mesh topology is reliable and robust as failure of one link doesn't affect other links and the communication between other devices on the network.
3. Mesh topology is secure because there is a point to point link thus unauthorized access is not possible.
4. Fault detection is easy.

Disadvantages of Mesh topology

1. Amount of wires required to connected each system is tedious and headache.
2. Since each device needs to be connected with other devices, number of I/O ports required must be huge.
3. Scalability issues because a device cannot be connected with large number of devices with a dedicated point to point link.

Star Topology



In star topology each device in the network is connected to a central device called hub.

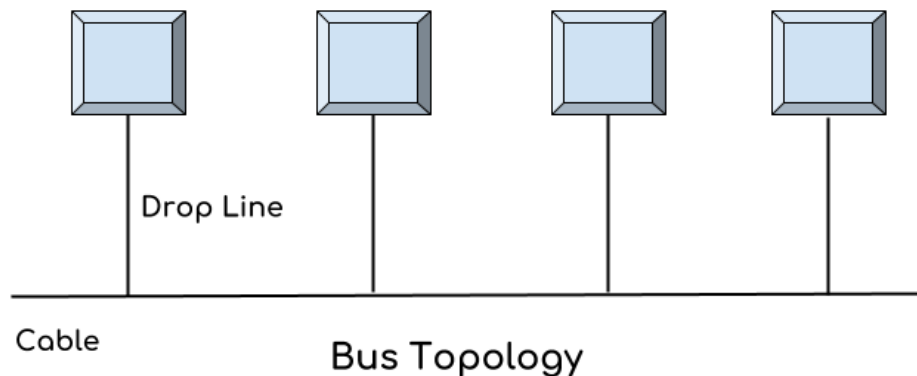
Advantages of Star topology

1. Less expensive because each device only need one I/O port and needs to be connected with hub with one link.
2. Easier to install
3. Less amount of cables required because each device needs to be connected with the hub only.
4. Robust, if one link fails, other links will work just fine.
5. Easy fault detection because the link can be easily identified.

Disadvantages of Star topology

1. If hub goes down everything goes down, none of the devices can work without hub.
2. Hub requires more resources and regular maintenance because it is the central system of star topology.

Bus Topology



In bus topology there is a main cable called **bus** and all the devices are connected to this main cable through drop lines. There is a device called tap that connects the drop line to the main cable.

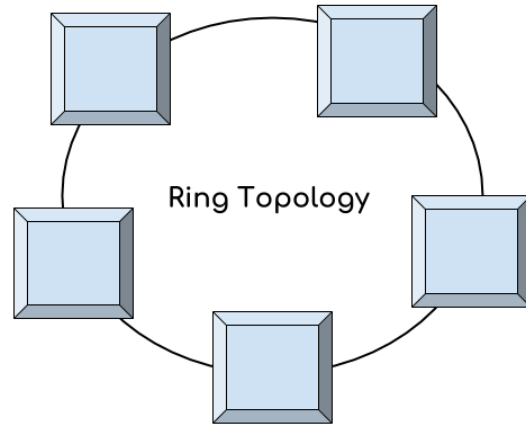
Advantages of bus topology

1. Easy installation, each cable needs to be connected with backbone cable.
2. Less cables required than Mesh and star topology

Disadvantages of bus topology

1. Difficultly in fault detection.
2. Not scalable as there is a limit of how many nodes you can connect with backbone cable.

Ring Topology



In ring topology each device is connected with the two devices on either side of it forming a loop or closed ring.

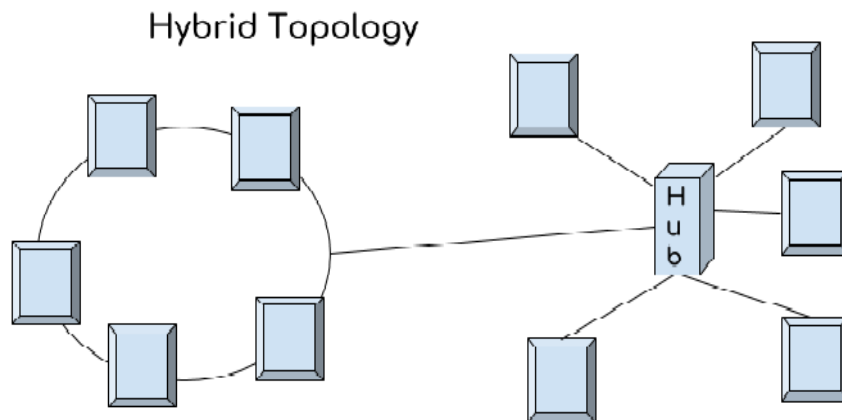
Advantages of Ring Topology

1. Easy to install.
2. Managing is easier as to add or remove a device from the topology only two links are required to be changed.

Disadvantages of Ring Topology

1. A link failure can fail the entire network as the signal will not travel forward due to failure.
2. Data traffic issues, since all the data is circulating in a ring.

Hybrid topology



A combination of two or more topology is known as hybrid topology. For example a combination of star and mesh topology is known as hybrid topology.

PROTOCOL

A **network protocol** defines the rules for communication between network devices.

Internet Protocol (IP) - It is the protocol for relaying data across network boundaries. Each computer on the Internet has at least one IP address that uniquely identifies that computer on the network. When we send or receive data, the messages are divided into packets. These packets contain both sender's and receiver's IP address.

IP has the task of delivering packets from the source host to the destination host solely based on the IP addresses in the packet.

Transmission Control Protocol (TCP) - This protocol puts the packets back in the right order.

Hyper Text Transfer Protocol (HTTP) - It is the set of rules for transferring files (text, graphic images, videos, and other multimedia files) on the World Wide Web.

WIRELESS COMMUNICATION

Wireless Communication is a method of transmitting information from one point to other, without using any connection like wires, cables or any physical medium.

Bluetooth

Bluetooth is a wireless technology standard used for exchanging data between fixed and mobile devices over short distances using short-wavelength UHF radio waves in the industrial, scientific and medical radio bands, from 2.400 to 2.485 GHz, and building personal area networks (PANs).



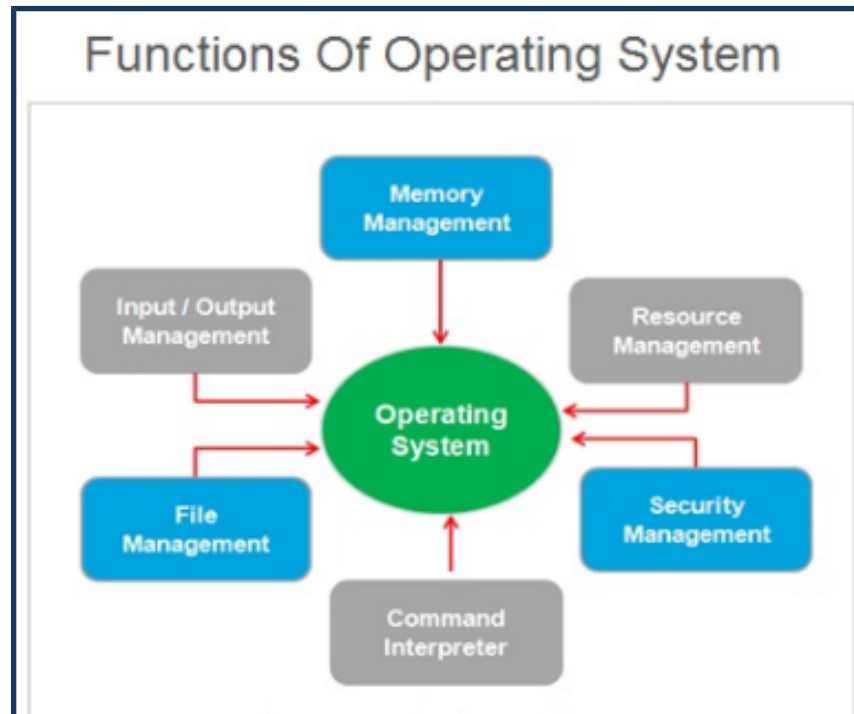
Wi Fi

Wi-Fi is the name of a wireless networking technology that uses radio waves to provide wireless high-speed Internet and network connections. A common misconception is that the term Wi-Fi is short for "**wireless fidelity**," however this is not the case.



OPERATING SYSTEM

An **Operating System** (OS) is an interface between a computer user and computer hardware. An **operating system** is a software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.



Types of Operating System

1. **CUI:** CUI stands for **Character User Interface**. This is a type of user interface where user interacts with computer **using only keyboard**. To perform any action **a command is required**. CUI is precursor of GUI and was used in most primitive computers. Most modern computers use GUI and not CUI. Eg: MS-DOS and Unix.
2. **GUI:** GUI stands for **Graphical User Interface**. This is a type of user interface where user interacts with the computer **using graphics**. Graphics include icons, navigation bars, images etc. Mouse can be used while using this interface to interact with the graphics. It is a very **user-friendly** interface and requires no expertise. Eg: Windows and Linux.

EXERCISES

Section–A

B. Multiple Choice Questions

1. Inter-connection of various devices is called _____.
(a) chatting **(b) networking** (c) Internet
2. Peripheral devices connected to the network are _____.
(a) servers (b) workstations **(c) resources**
3. Which of the following is the most expensive network topology?
(a) Star topology (b) Bus topology **(c) Mesh topology**

C. Fill in the blanks

1. A network can be of any size.
2. Your computer is a workstation on the network.
3. A NIC has a port where the network cable plugs in.
4. A MAN is a collection of Local Area Network within a city.
5. A Star topology has a minimal line cost.

D. Write full forms of the following

1. **NIC**-Network Interface Card
2. **PAN**-Personal Area Network
3. **LAN**-Local Area Network
4. **MAN**-Metropolitan Area Network
5. **WAN**-Wide Area Network
6. **HTTP**-Hypertext Transfer Protocol
7. **TCP/IP**-Transmission Control Protocol / Internet Protocol
8. **WiFi**-Wireless Fidelity

Section–B

A. Answer the following

1. What is a node?

Ans1. A node is a computer or any other device on a network that communicates with other devices.

2. What is a topology?

Ans2. The art of connecting different computers in a network is known as topology. The term topology refers to the way in which the nodes of a network are linked together.

3. Describe the network in your own words.

Ans3. Networking refers to inter-connection of various devices to share their resources.

For examples – Cable network, Television network, Telephone network.

A computer network is a collection of computers and peripheral devices.

4. Write at least three benefits of using a network.

Ans4. The benefits of using a network are:

- i) Computers connected to a network can share resources including printers and hard drives.
- ii) Network makes installing programs simple because only one copy of a program needs to be installed on a central computer.
- iii) Network increases productivity because computers connected to network share information and data.

5. Differentiate between LAN and WAN.

Ans5.

| LAN (Local area Network) | WAN(Wide area Network) |
|--|---|
| (i) computers located close to one another | (i) computes located across the world |
| (ii) not more than 100 computers | (ii) connects LAN and MAN networks together |

6. Write short note on the hardware parts required to establish a network.

Ans6. The hardware parts required to establish a network are as follows:

- i) Computer or similar devices like laptops
- ii) Cables – Cables are the wires that connect computers and resources on a network.
- iii) Connectors – A connector is a device that joins two computes on networks together.
- iv) NIC – A Network Interface Card (NIC) is a device that joins a cable to a computer. Most Network Interface Cards are installed inside a computer.

7. Explain the major functions of a computer system.

Ans7. Functions of an Operating System are:

An operating system provides a variety of services to your computer and its users. Some of the major functions of an operating system are :

1. **Program Execution** : It receives the commands from any application or system program, interprets it and then executes it.
2. **Device Management** : Allocation and de-allocation of all input and output devices are

done by the operating system. It controls the working of all the devices connected to your computer.

3. **File Management** : It helps you to organise all data in files/folders and allocates space for files on secondary storage devices as and when required. It keeps track of the location of every file on the disk.

4. **Memory Management** : Memory is a major part of the computer system and dictates the speed of the operations. The main memory is thus managed by the operating system ensuring the efficient functioning of your computer system.

8. Write the advantages and disadvantages of the following:

Ans8.

(a) Star topology

| Advantages of the Star Topology | Disadvantages of the Star Topology |
|---|--|
| (i) Star topology has minimal line cost. (ii) If any of the local computer fails, the remaining portion of the network remains unaffected. | (i) The system crucially depends on the central switch. If it fails, the entire network goes down. |

(b) Ring Topology

| Advantages of the Ring Topology | Disadvantages of the Ring Topology |
|---|--|
| (i) It works well where there is no central-site computer system. (ii) It is more reliable than a star topology. | (i) It requires more complicated control software. (ii) Failure of one node results in the failure of the entire network. |

(c) Bus Topology

| Advantages of the Bus Topology | Disadvantages of the Bus Topology |
|--|--|
| (i) It is quite easy to set up. (ii) Failure of one node does not affect the rest of the network. | (i) It offers limited flexibility for change. (ii) A signal on the bus must be strong enough to reach the receiver. |

(d) Mesh Topology

| Advantages of Mesh Topology | Disadvantages of Mesh Topology |
|---|--|
| (i) Failure of one node does not affect the rest of network (ii) Communication is very fast between any two nodes. | (i) It is the most expensive network as there are many redundant connections. (ii) Maintenance of this network is very difficult. |

| | |
|--|--|
| (iii) Changes in the network can be done easily without interrupting other nodes | |
|--|--|

9. What do you mean by wireless communication? Explain any one popular wireless technology.

Wireless means there is no physical path for the signals(data) to move. Wireless communication is one of the biggest contributions to humankind. It involves sending and receiving information over a distance without using wires or cables. The most popular wireless communication technologies are Bluetooth and WiFi.

Bluetooth

Bluetooth is a short range wireless technology used for communication between devices. It was developed to exchange data between devices within a short range of about 10m of one another. It works even if there is a wall in between. For example, a Bluetooth enabled phone will detect phones nearby and provide you a list of usernames.
