

Q1. Define the Computer network

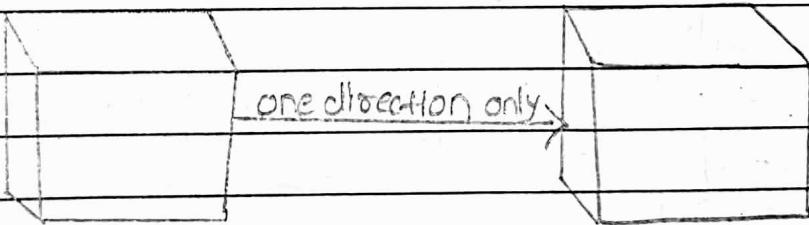
→ A computer network is defined as a system that connects two or more computing devices for transmitting and sharing information. This article explains computer network in detail, along with its types, components, and best practices.

Q2. Explain the different data flow techniques
simple duplex, half duplex, full duplex,

→

1] Simplex duplex :

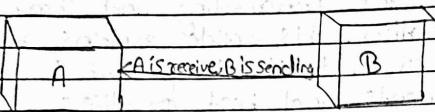
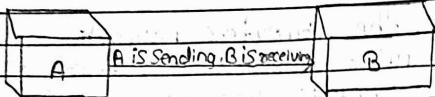
In simple duplex sender can send the data but the sender can't receive the data. It is a unidirectional communication.



Simple duplex

2] Half duplex :

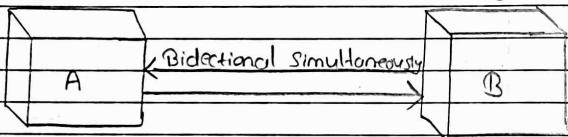
In half duplex sender can send the data and also can receive the data one at a time it is two-way directional communication but one at a time



Half duplex

3] full duplex:-

In full duplex Sender can send the data and also can receive the data simultaneously. It is two-way directional communication simultaneously.



full duplex

Q3. Define the following terminologies

1. Data Communication
2. protocol
3. Network
4. point to point connection
5. multipoint connection.

1] Data Communication :-

Data communication are the exchange of data between two device via some form of transmission media such as wire cable or wireless.

2] Protocol :-

A protocol is a set of rules and guidelines for communicating data. Rules are defined for each step and process during communication between two or more computers. Networks have to follow these rules to successfully transmit data.

3] Network :-

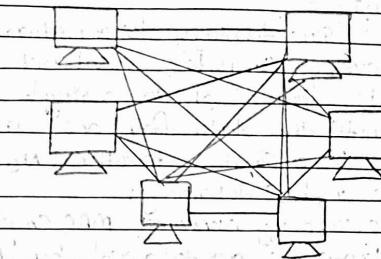
Computer networking refers to interconnecting computing devices that can exchange data and share resources with each other. These networked devices use a system of rules called communications protocol to transmit information over physical or wireless technologies.

4] Point-to-point connection :-

A point-to-point connection is a permanent direct communication link between two parties. Unlike a dial-up connection, it does not need to be established via dial-up or disconnected following communication.

5) Multipoint Connection :

Multipoint communication means the channel is shared among multiple devices or nodes. In this communication, there is no dedicated link between two nodes. In this communication, link is provided at all times for sharing the connection among nodes.



Mesh topology

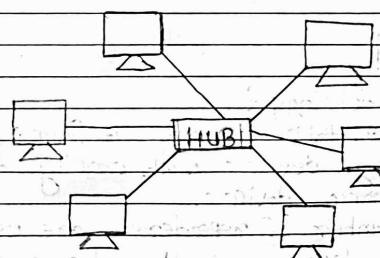
Q4. What do you mean by topology? Explain the different types of topology.

→ The term network topology refers to the arrangements, either physical or logical, of nodes and connections within a network.

6) Star Topology :

A star topology is a network setup where each computer and network device is interconnected with one another.

This topology setup allows for most transmissions to be distributed even if one of the connections goes down. It is a topology commonly used for wireless networks.



Star topology

5] Multipoint Connection :

Multipoint communication means the channel is shared among multiple devices or nodes. In this communication, there is dedicated link between two nodes. In this communication, link is provided at all times for sharing the connection among nodes.

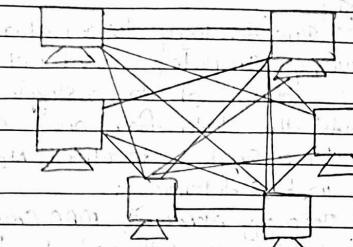
Q4. What do you mean by topology? Explain the different types of topology.

→ The term network topology refers to the arrangements, either physical or logical, of nodes and connections within a network.

6] Mesh :

A mesh topology is a network setup where each computer and network device is interconnected with one another.

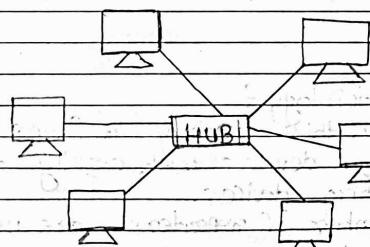
This topology setup allows for most transmissions to be distributed even if one of the connections goes down. It is a topology commonly used for wireless networks.



Mesh topology

7] Star topology :

A star topology, sometimes known as a star network, is a network topology in which each device is connected to a central hub. It is one of the most prevalent computer network configurations, and it's by far the most popular network topology.



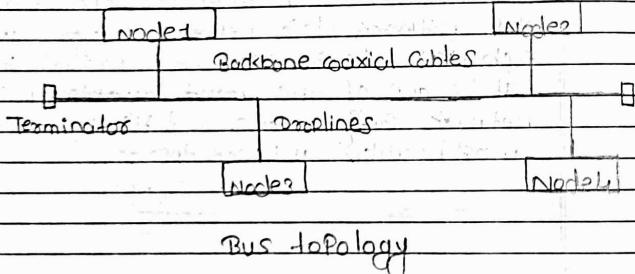
Star topology

3) Bus Topology :

Bus topology is a network type in which every computer and network device is connected to a single cable. It transmits the data from one end to another in a single direction. No bidirectional feature is in bus topology.

In Bus Topology, various MAC (Media Access Control) Protocols are followed by LAN ethernet connections.

- A multipoint topology
- All devices are linked through a backbone cable.



Bus Topology

4) Ring Topology :

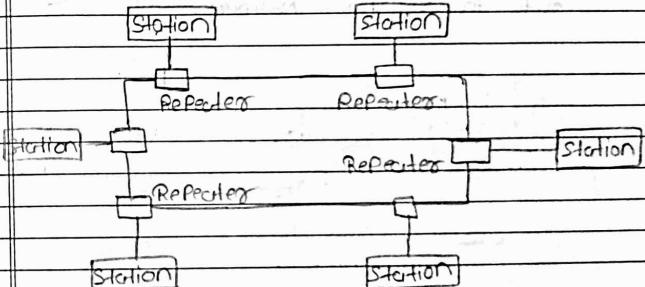
In this topology, it forms a ring connecting devices with exactly two neighbouring devices.

- 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 - each device is connected point-to-point connection only with the two devices on either side of it.

- A signal is passed along the ring in the direction from device to device, until it reaches its destination.
- Each device in the ring incorporates a repeater.



Q5.

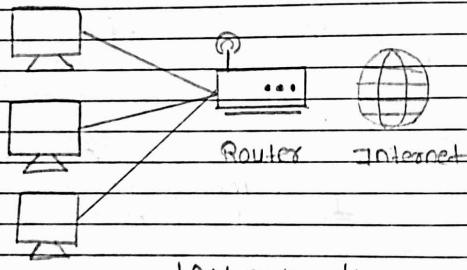
Explain the different types of network LAN, MAN, WAN, with dig. also compare LAN, MAN, WAN.

1) LAN (Local Area Network)

A local area network (LAN) is a computer network covering a small geographical area like home, office, group of buildings.

- It is less costly as it is built with inexpensive hardware such as hubs, network adapters & ethernet cables, etc.

The data transferred at an extremely fast rate in Local Area Network.

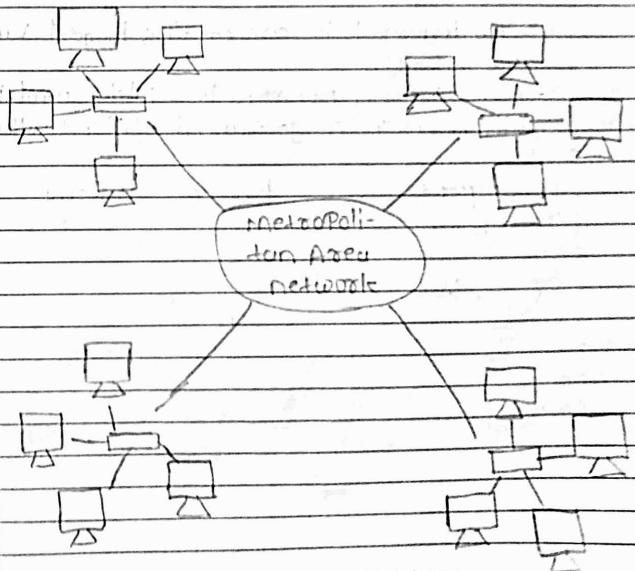


LAN network

2) MAN (Metropolitan Area Network)

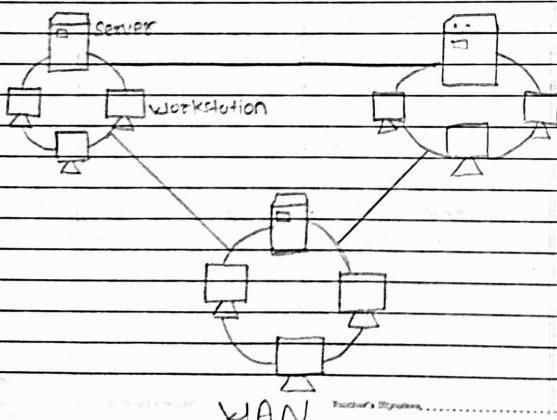
MAN is a network that interconnects users with computer resources geographic area region.

- Government agencies use MAN to connect to the citizens and private industries.
- In MAN various LANs are connected to each other through a telephone exchange line.
- It has a higher range than Local Area Network.
- MAN is used in communication between the bank in a city.
- It can be used in a airline reservation.



Q) WAN (Wide Area Network)

- WAN is a computer network that covers the broad Area i.e. Any network whose communication links cross metropolitan, regional.
- A Wide Area Network is a network that extends over a large geographical area such as states or countries.
- A Wide Area Network is quite bigger network than the LAN.
- The internet is one of the biggest WAN in the world.
- A wide Area Network is widely used in the field of business, government & education.



LAN

LAN is referred to as local Area network.

ownership LAN is private

LAN transmits data at high speed

LAN propagation delay rate short.

LAN tends to be less congested

LAN maintenance & design are easy

MAN

MAN is referred to as metropolitan area network.

ownership of MAN can be public or private

The speed of transmission of man is avg.

MAN propagation delay rate moderate

MAN tends to be congested

MAN maintenance & design are more difficult than LAN

WAN

WAN is referred to as wide Area network

ownership of WAN might not be owned by one organization

WAN transmits data at low speed

WAN propagation delay rate quite long

WAN more congested than MAN

WAN maintenance & design are also more difficult than LAN as well as MAN.

Q6 Explain the OSI model



Application layer
Presentation layer
Session layer
Transport layer
Network layer
Data link layer
Physical layer

1) Physical layer :

The physical layer is responsible for movements of individual bits from one hop (node) to the next.

Function :

- physical characteristics of interfaces & media.
- Representation of bits (0,1)
- rate, code
- synchronization of bits
- line configuration (point-to-point or multipoint)
- physical topology (mesh, star, ring or bus)
- transmission mode (simplex, half duplex or duplex).

2) Data link layer

The data link layer is responsible for moving frames from one hop (node) to the next.

function :

- framing
- physical addressing
- flow control
- Error Control
- Access Control

3) Network layer

The network layer is responsible for the delivery of individual packets from the source host to the destination host.

function :

- Source to destination delivery
- Responsible for the delivery of packets from the original source to the final destination.
- logical addressing
- routing

4) Transport layer

The transport layer is responsible for the delivery of a message from one process to another.

- Process to process delivery

Function:

- port addressing
- segmentation & reassembly
- Connection Control (connection oriented or less)
- flow control
- Error control

5) Session layer:

The session layer is responsible for dialog control and synchronization.

- It establishes, maintains & synchronizes the interaction between communicating systems.

Function:

- dialog control
- synchronization (checkpoints)

6) Presentation layer

The presentation layer is responsible for translation, compression and encryption.
- concerned with the syntax & semantics of the information exchanged between two systems.

Function:

- Translation (EBCDIC-coded text file → ASCII-coded file)
- Encryption & decryption
- Compression

7) Application layer

- The application layer is responsible for providing service to the user.

- To allow access to network resources

Function:

- Transferring and accessing files
- sending emails and engaging in other communication types.
- Accessing network and directories