

## Computer Networks

1. What is Data communication? Explain the components of Data communication?

Data communication is the process of transferring data from one place to another or between two locations.

### Components of Data communication

1. Message : A message is a piece of information that is to be transmitted from one person to another. It could be a text file, an audio or video file etc.

2. Sender : It is simply a device that sends data messages. (Ex - computer, laptop, smartphone etc.)

3. Receiver : It is a device that receive messages. It can be a computer, telephone etc.

4. Transmission medium / communication channels : They are the medium that connect two or more workstations. Workstation can be connected by either wired media or wireless media.

5. Set of rules (Protocol) : When someone sends the data, it should be understandable to the receiver also otherwise it is meaning less.

• Quick compare wireless and parallel communication

### parallel

- speed is typically slower for short distances

Typically faster  
but limitation  
bit rate sent  
at once.

- simple for long distances

simple for short distances

- typically slower for long distances

typically more responsive for long distances

- may suffer signal degradation over long distances

These are dedicated links often shared between nodes.

- reliable even using resistance along distances

These are provided at all times for sharing the connection among nodes.



↓



↓



### point - to - point

### multipoint

means that channel means that shared all channels open thus allows or makes

in this link is provided at all times for sharing the connection among nodes.

• what is the difference b/w point to point and multipoint transmission?

## Ques 4 Explain Synchronous & Asynchronous transmission media.

Ans 4 **Synchronous:** This is continuous transmission without any gaps between successive data items.

**Asynchronous:** There is a gap b/w the data due to the start and stop bit structure.

**Asynchronous:** This is transmission not regular intervals with no fixed gap above the transmission of successive data items.

**Ques 5 Explain the different transmission medium used in networks.**

## Types of transmission media

- 1) Guided media
  - Unguided media
- Twisted pair cable  $\rightarrow$  RJ-45 connector  
• coaxial cable  $\rightarrow$  BNC
- Optical fiber cable
  - Stripline
  - Multistripine

Category	Max. Bandwidth	Max Dist. Cat.	Normal app.
Cat 1	0.4 MHz	1 Mbps	No Distance supported. Telephone & modems in telephone
Cat 2	4 MHz	4 Mbps	-
Cat 3	16 MHz	10 Mbps	100 m 10Base-T Ethernet
Cat 4	20 MHz	16 Mbps	100m Token Ring
Cat 5	100 MHz	100Mbps	100 m 100Base-T Ethernet
Cat 5e	100MHz	1 Gbps	100 meters - Ethernet Home use
Cat 6	250MHz	1 Gbps	100 m 37m for 10Gb/s data rate
Cat 6A	500MHz	10 Gbps	100 m
Cat 7	600 MHz	10 Gbps	100 m
Cat 7A	1000 MHz (1.67 GHz)	10 Gbps	100 m 500 Gbps 600 Gbps Satisfactory
Cat 8A	2000 MHz	20 Gbps	Cat 8.1: 25Gbps Cat 8.2: 40Gbps

## optical fiber

- ↳ medium
- ↳ light source
- ↳ light encoder



but compare with wire & wireless transmission medium.

wired network      wireless network.

- ↳ wired network
  - without wire
  - means that we can link many to many via electric wire
  - the internet or another network
  - such as laptop or desktop PCs
  - or sensors will be present on all wireless devices.

↳ faster transmission speed

3, propagation delay  
↳ propagation delay is high.

↳ More secure & hence Reliable

## less expensive

- ↳ hub, switch etc
- ↳ devices are used

success routers, success points etc. are used.

Q what are the different type of wave propagation?

Network Topology

Network topology is a wiring layout of network nodes connected through various links. It can provide both physical and logical arrangement of nodes and connection in a network.

There are 4 types of network topology that are as follows:

1) Bus topology.



### Advantages

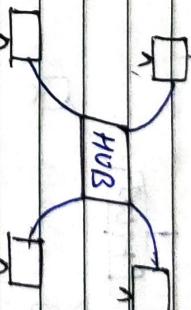
### Disadvantages

- 1) less expensive
- 2) Easier to connect new nodes without affecting rest of the network.

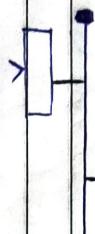
- 3) If one node failed, then it wouldn't affect the failure of other network.

- 4) If HUB failed, then the entire network will be failed.

- 5) Ring topology: in this topology each node is strongly connected with its adjacent node.



2) Star topology.



### Advantages

### Disadvantages

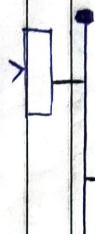
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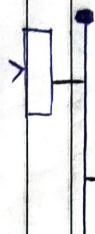
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4) Mesh topology.



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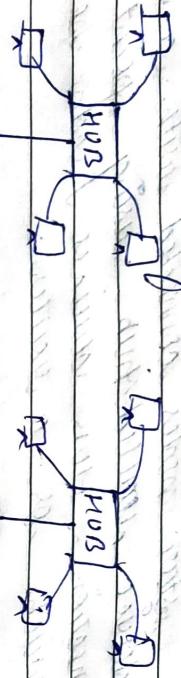
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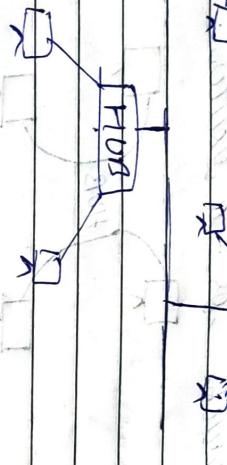
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↳ Tree Topology: all the nodes are connected like a branch of tree.



↳ Transmission media:

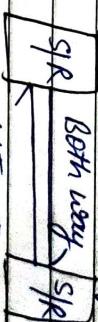
Simplex: data transferred in one direction.



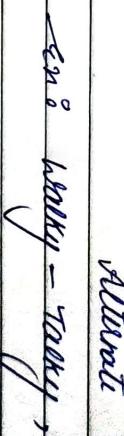
↳ Mesh topology: In this topology each node every computer is directly connected with

### Advantages

- very good topology for Subnet private net.
- Point to point connection
- multiple devices sender can't send data simultaneously.
- ↳ Hybrid topology: combination of various different topologies is called hybrid topology.

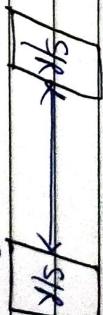


Full Duplex: both way simultaneous.



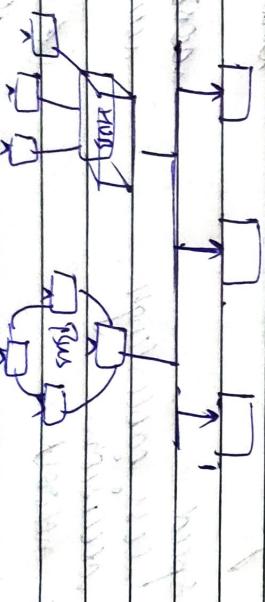
Half Duplex: data transmit in both direction alternately.

e.g. Radio, TV, Remote Device, Sprouts.



en: mobile communication system (mcs).

### Star



Protocol & standards : (ISO)

set of rule

facts or law

OSI

open system for  
interconnection

\* De facto :

\* De Jure : by the law.

TCP/IP model  
+ old  
Network

Transmission control  
protocol