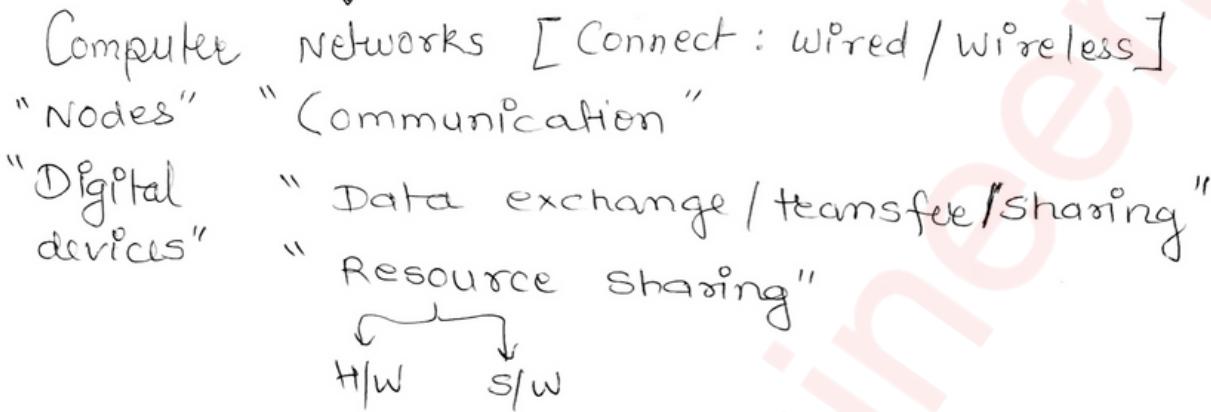


CN

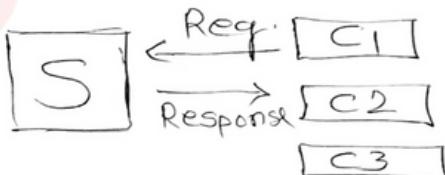


- Basic Terminologies

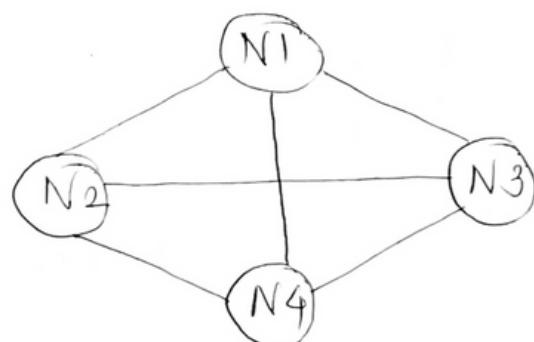
- * Nodes: Computer, printer, server, route, etc.
- * Protocol: Set of Rules. (TCP, IP, UDP, FTP, etc)
- * IP address: A unique identifier/Number sequence assigned to every device on n/w.

* DNS : Domain Name system is a protocol to translate Domain Names into IP addresses.

* Client-Server:



* Peer-to-Peer:



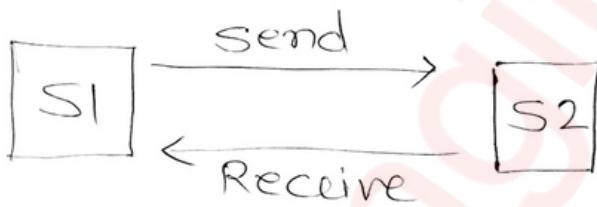
(No central server unit)

• Transmission Modes

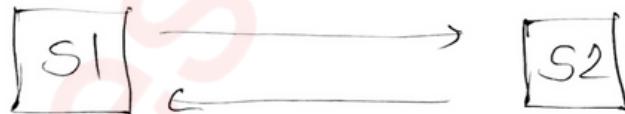
→ Simplex (one way)



→ Half duplex (Both direction)
But one at a time



→ full duplex (Both direction)
At same time



• Connection Types

→ Point - to - Point

(Direct dedicated link b/w
devices is provided)

→ Multipoint

[Shared link b/w 2 or
more devices]
"Shared channel"

- Topology

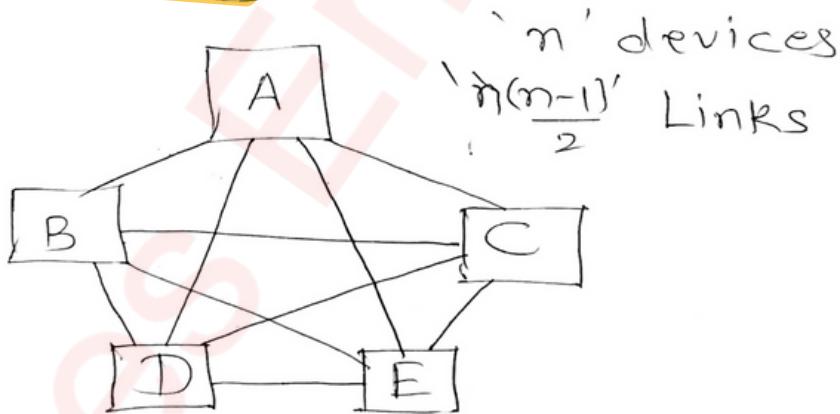
↳ Defines the structure.

"how the nodes are connected to each other in a network".

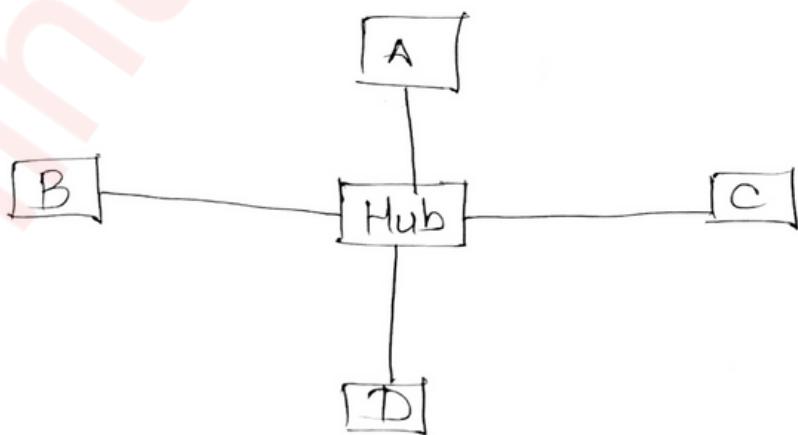
① Point-to Point Topology



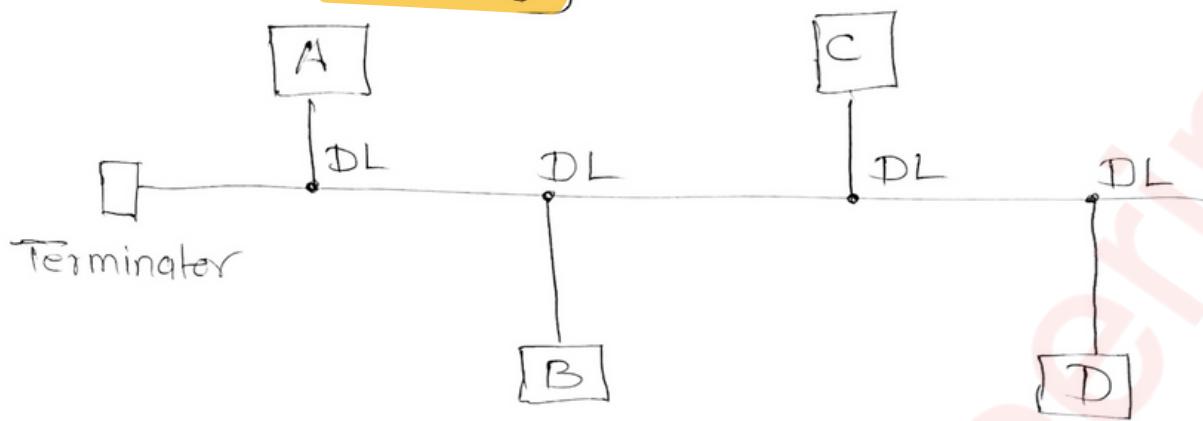
② Mesh Topology



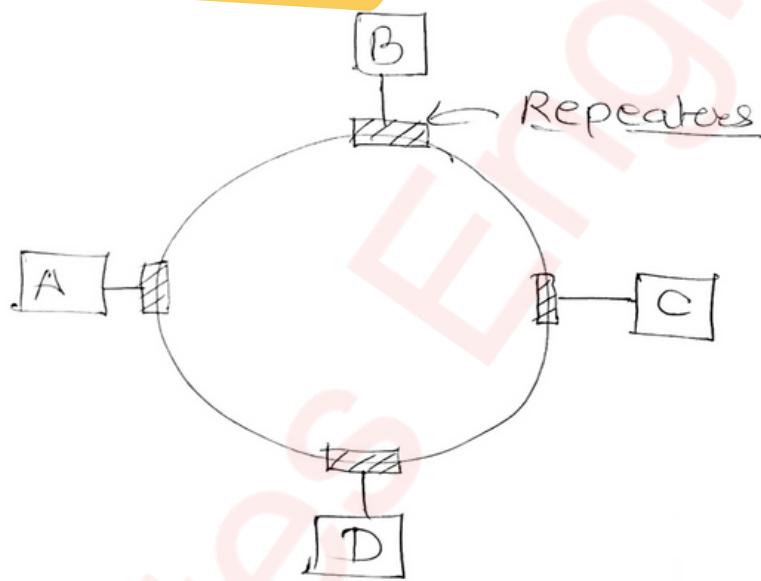
③ Star Topology



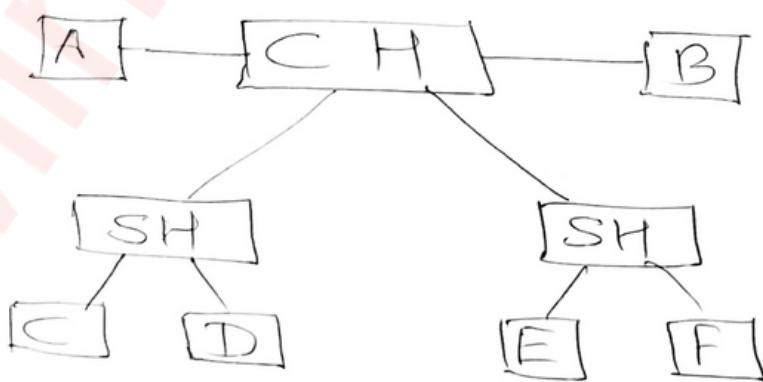
④ Bus Topology



⑤ Ring Topology



⑥ Tree Topology



Types of CN

PAN

- Personal

- 100 m

- Home/Rome

- EH Speed

- Private

LAN

- Local

- 2 Km

- Office

- VH Speed

- Private

CAN

- Campus

- 5 Km

- College/University

- High Speed

- Private

- Avg Speed

- Private/

MAN

- Metro-Politan

- 5-50 Km

- City

- Low Speed

- Private/

WAN

- Wide

- >50 Km

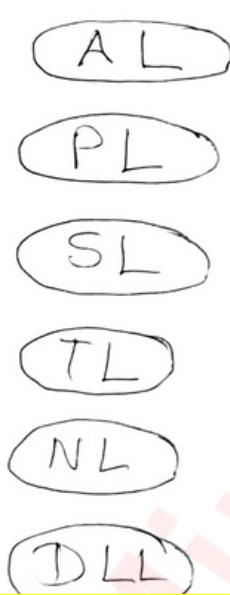
- Countries/states

- Public

- Private/

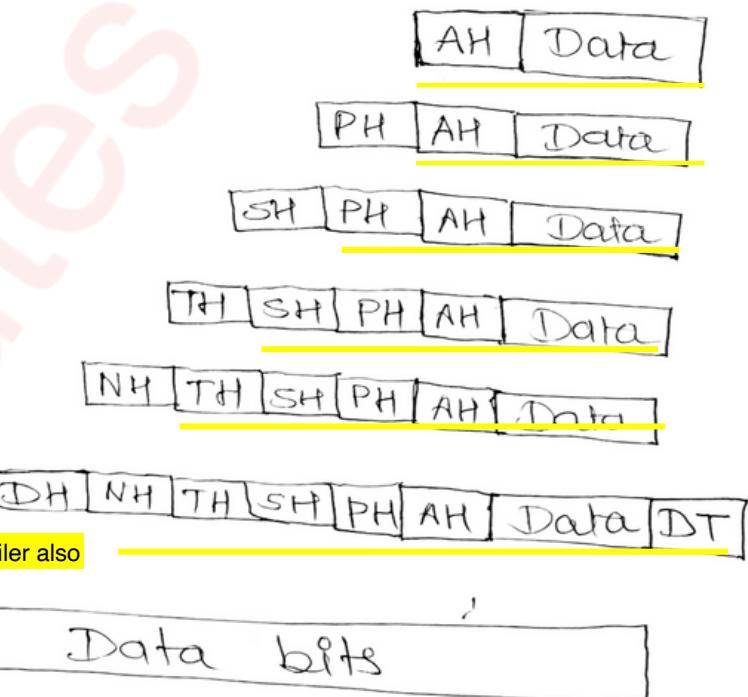
- Public

OSI Model



Sending

application layer ka header original data mae embed kiya jata h and then it as a packet for next layer and so on



in DL Layer it adds header as well as trailer also

Data bits

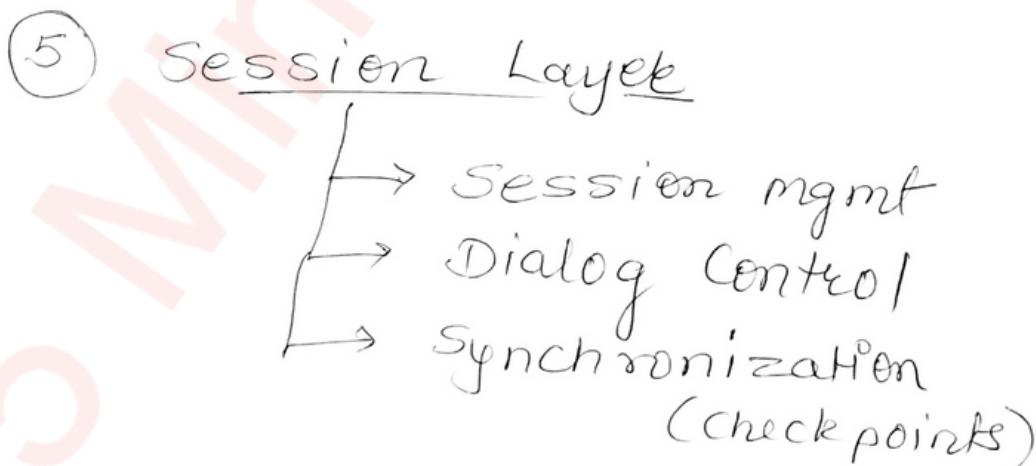
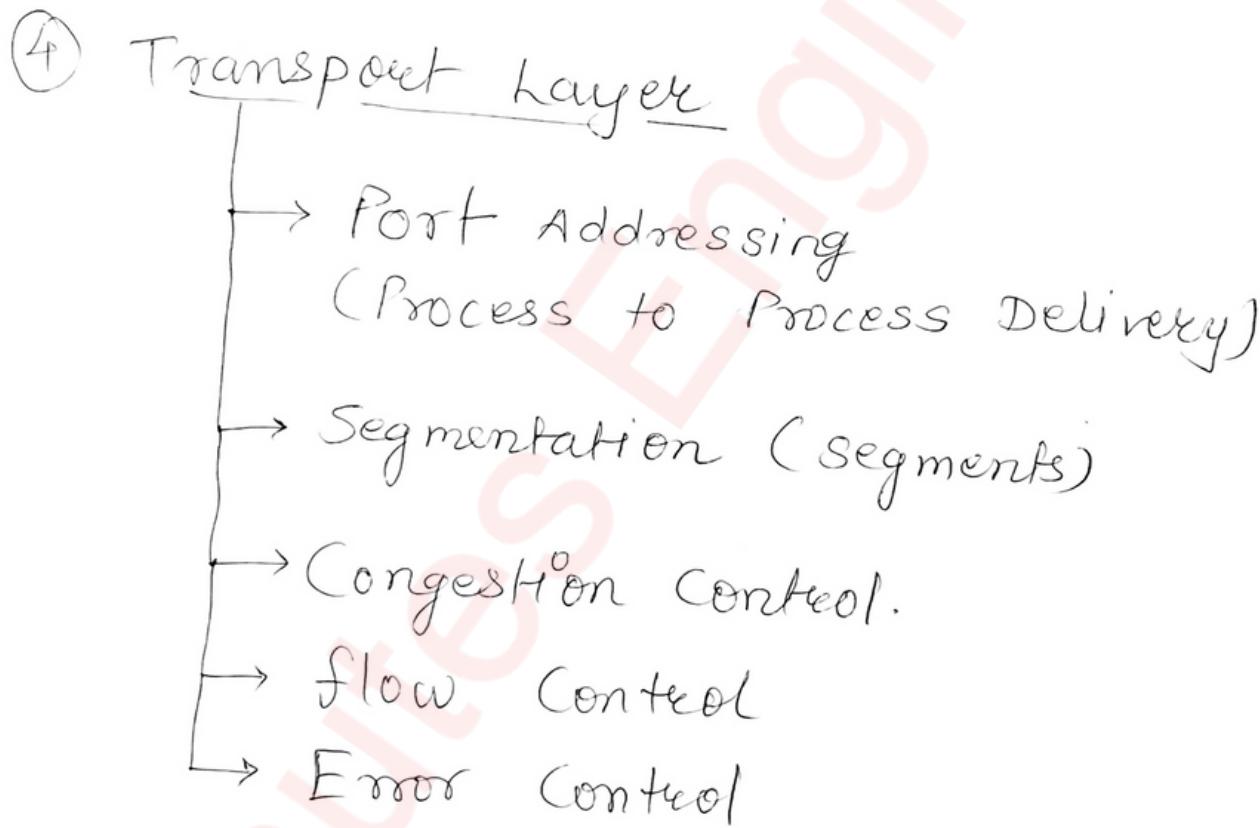
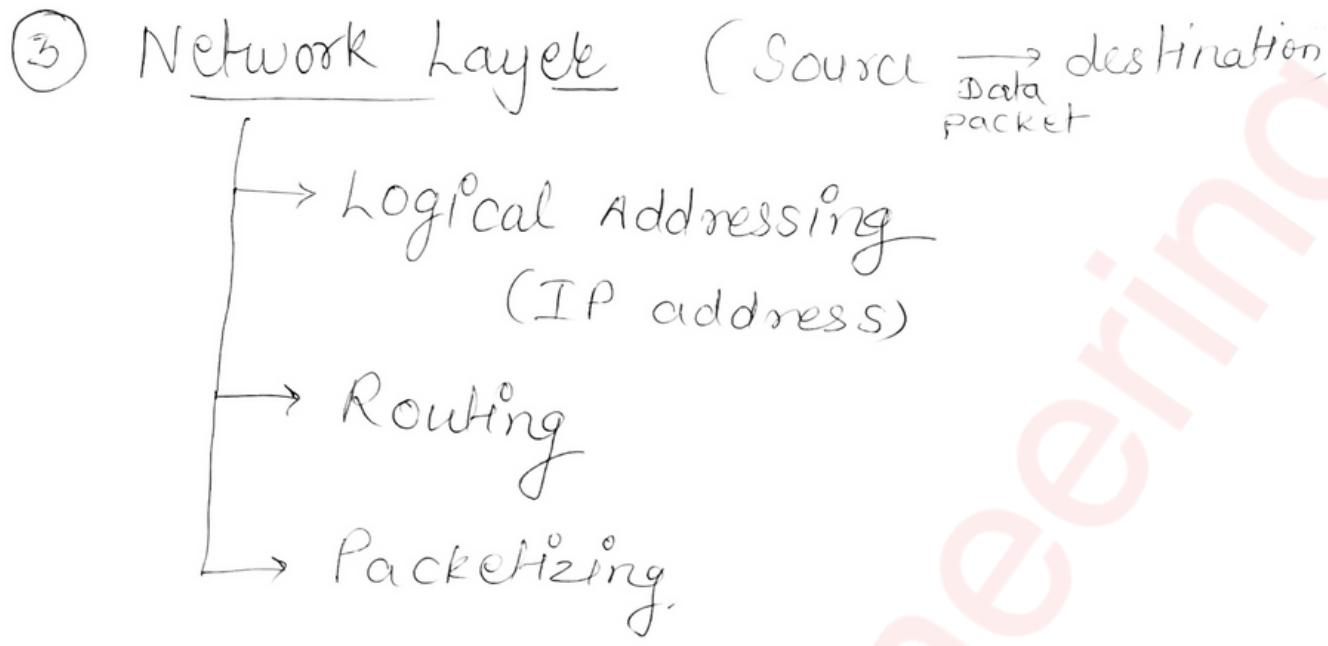
Receiving

① Physical Layer

- Data is sequence of 0s & 1s
- Encoding : Bits \leftrightarrow signals
- Data Transfer Rate.
- Connection type . (Line configuration)
- Topology
- Transmission Mode

② DLL (Data Link Layer)

- framing (divide data into frames)
- Physical Addressing (MAC Address)
- Access Control
- flow control
- Error control.



⑥ Presentation Layer

- Translation
- Encryption & Decryption
 $PT \rightarrow CT$ $CT \rightarrow PT$
sending Receiving
- Compression

⑦ Application Layer

- Protocols
 - HTTP
 - FTP
 - POP
 - SMTP

• Transmission Media

→ Physical Path betn T & R
(channel)

→ Types

10 Mbps (BW)
Baseband
 $T = 100 \text{ M wire length}$.

→ Guided Media (wired)
(Cables)

- (10 Base T)
- (100 Base T)
- (10 Base 2)
- (10 BASE5)

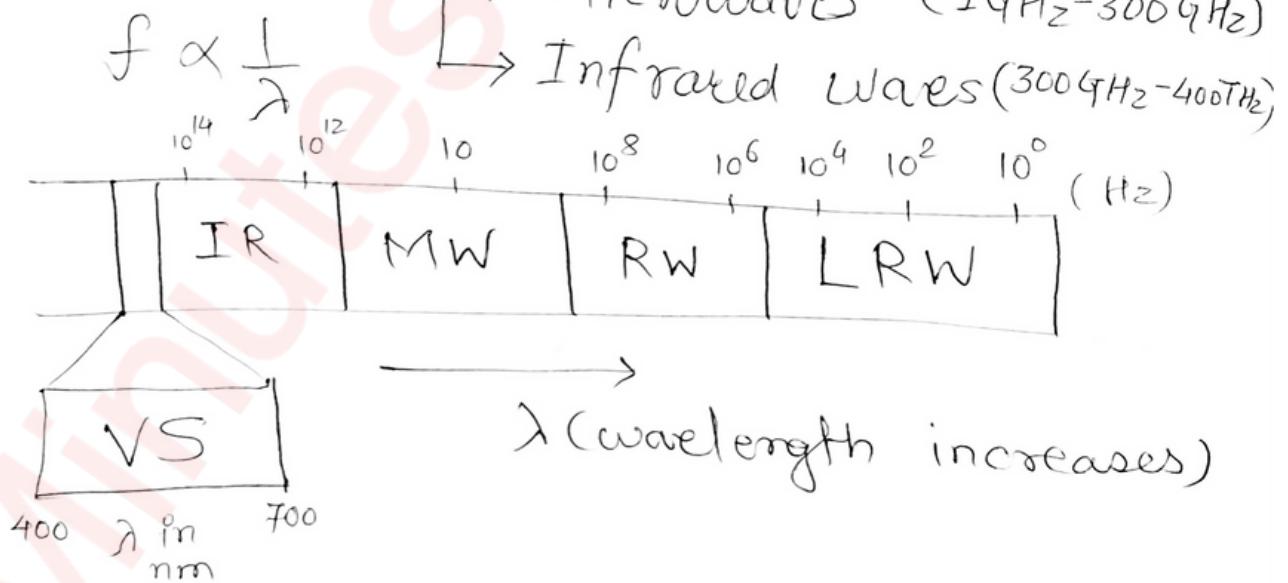
→ Twisted pair cable

→ Coaxial Cable

→ Optical fiber cable
(100 Base FX) 2 km Full duplex

→ Unguided Media (wireless)

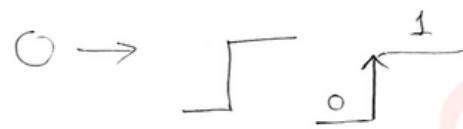
- Radio Waves (3 kHz - 1 GHz)
- Microwaves (1 GHz - 300 GHz)
- Infrared Waves (300 GHz - 400 THz)



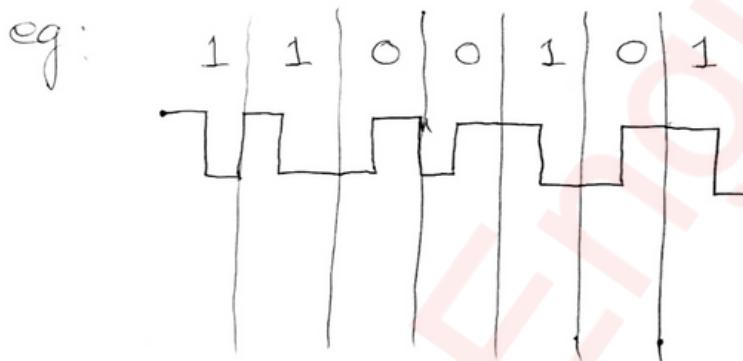
o Encoding (Manchester Encoding)

↓
(Differential Manchester
Encoding)

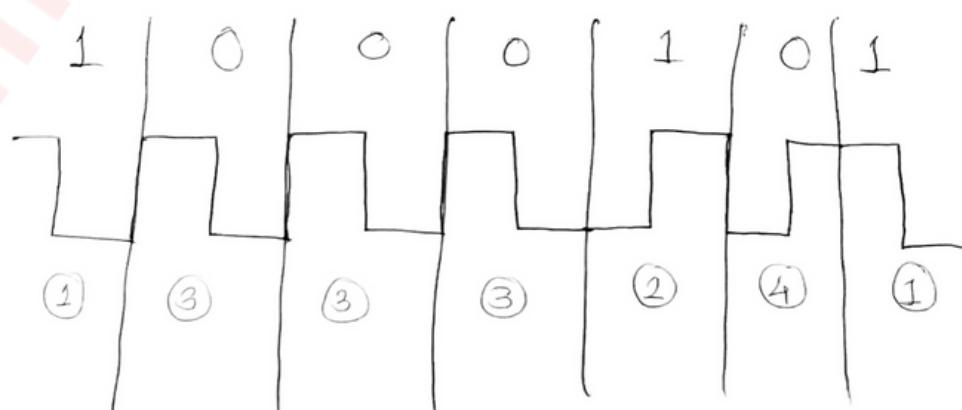
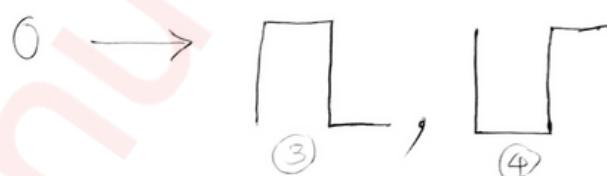
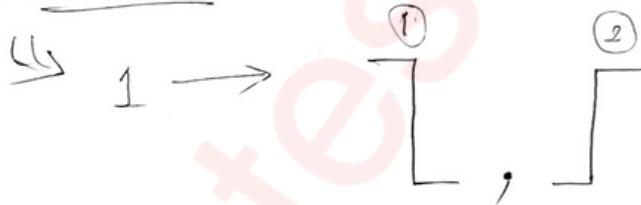
a) Manchester E'



eg:



b) DME

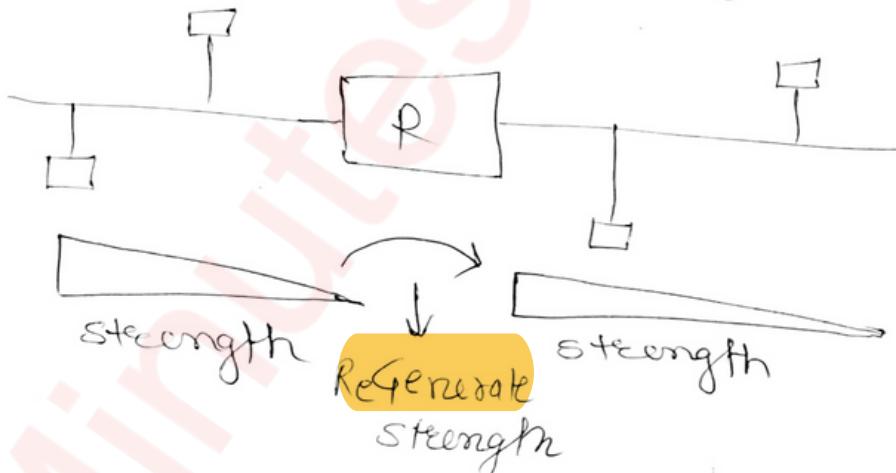


◦ Devices in CN

- Cables
- Repeaters
- Hubs
- Bridges
- Switches
- Routers

* Repeaters:

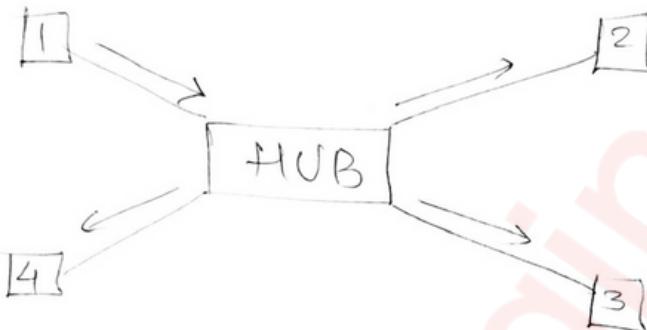
- Pure H/w
- NO filtering
- Forwarding
- 2 port Device



⇒ Collision Domain \Rightarrow 'n'
(no. of devices)

* Hub

- Pure H/W
- Multiport Repeater
- Forwarding
- NO filtering (Broadcast)



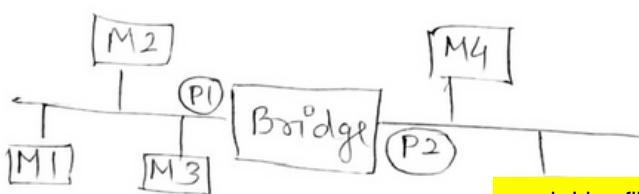
⇒ Collision Domain = 'n'

* Bridges

- H/W, S/W [store & forward]
- Connect 2 LANs
- Forwarding
- Filtration
- Physical & DLL

static (MAC address)

MAC	PORT
M1	P1
M2	P1
M3	P1
M4	P2
M5	P2



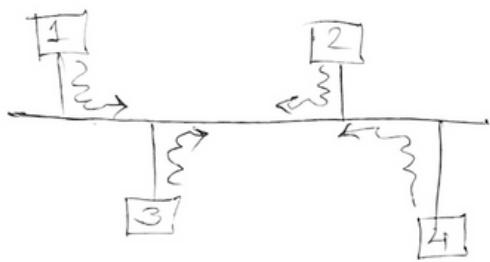
MAC(S) | MAC(D)

Source Destination

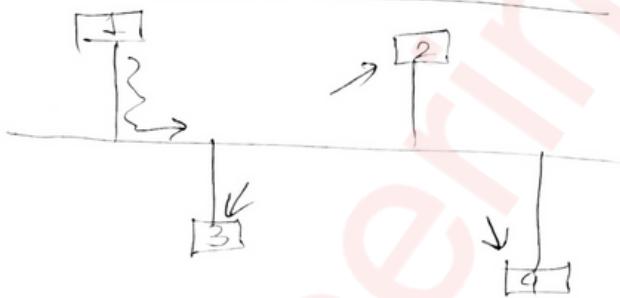
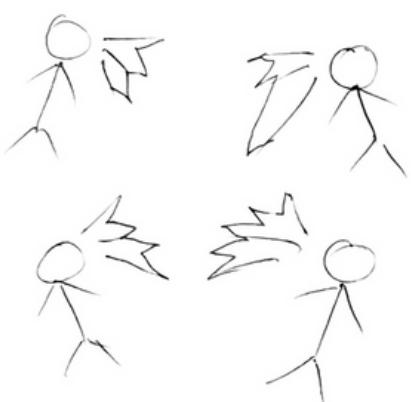
so bridge filter and do not forward msg to another side

Collision Domain

Vs Broadcast Domain

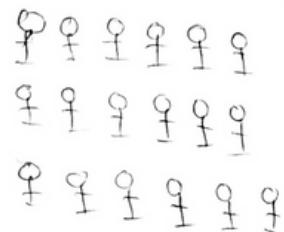


"Collision"

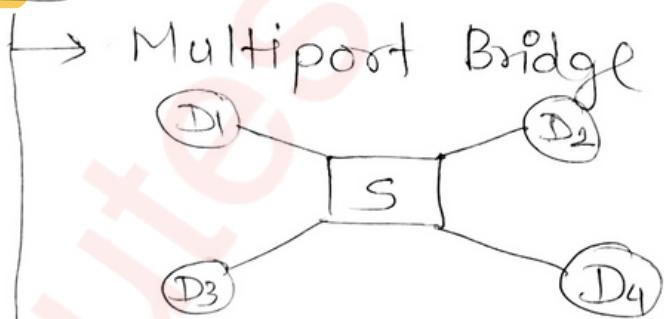


"Broadcast"

(Every mc, device receive it)



* Switch:



- Collision Domain is 'o'
- full duplex Links
- Low Traffic.

* Routes

- PL, DLL, NL
- IP address
- Connect 2 N/w.s.
- forwarding
- filtering
- Routing (Routing Table)
- Flooding

◦ Switching: Transfer of data packets from one device to other. In n/w.

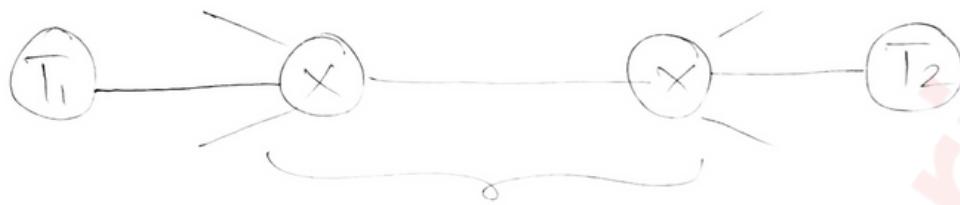
Types

- Message switching
- Circuit switching
- Packet switching

* Message switching

- Message / Data block is forwarded across entire n/w.
- Hop by Hop delivery
- High delay
- High Traffic

Circuit Switching (Physical Layer)



① { Connection setup (Dedicated path)

② } → Transmission time
+ Propagation delay

③ } Tear Down.

⇒ Inorder Transmission

⇒ Resources get reserved.
(cannot be used by others)

⇒ NO store & forward
Low Delay

Packet switching (DLL & NL)

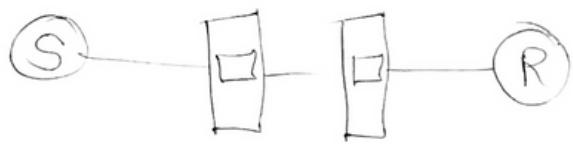
$$T_f = \frac{\text{Length}}{\text{BW}}$$

$$T_p = \frac{d}{v}$$

→ v
velocity

- Data is divided into packets
- store & forward
- High Efficiency
- Time = Transmission + Propagation Time (T_f) + Time (P.D.)
- NO Reservation
- High Delay

Virtual Circuit

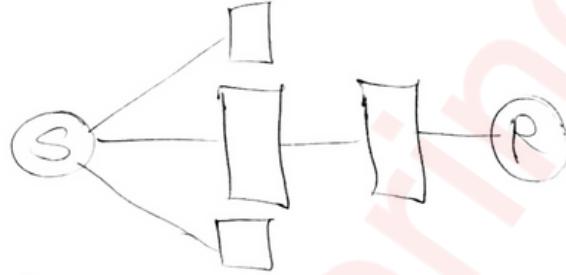


1) BW, CPU, Buffer
Reservation.

- 2) Path is same
(for all packet)
- 3) Inorder
- 4) Connection oriented
- 5) setup &
teardown
phase.

- 6) Costly
- 7) Reliable ↑↑

Datagram



1) NO Reservation

- 2) May or may not
- 3) out of order
- 4) Connection less
- 5) NO such phase
- 6) less costly
- 7) Less Reliable