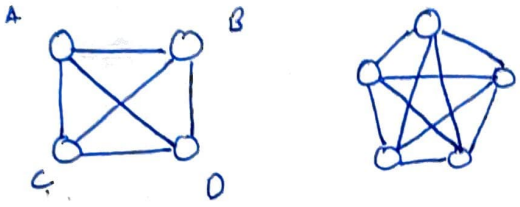
Lec 1.1 Topology

↳ tells about arrangement of devices.

→ Mesh topology

All devices are connected to each other.



How many cables ?

n → no. of nodes

$\binom{n}{2}$.

- no of ports ?
  - place where cable is connected.
  - thus ports needed at each device $= (n-1)$

Reliability - suppose cable AD is snapped, is their still a way to reach from A to D.

Yes, from ABD, ACD

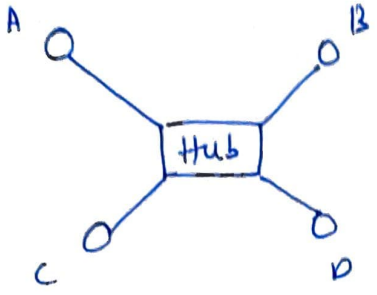
- mesh topology is highly reliable.

Cost → depends upon number of cables required.

Security → Yes, because if message is transferred through AD, B and C wouldn't even know.

- It supports point to point connection. (dedicated communication)

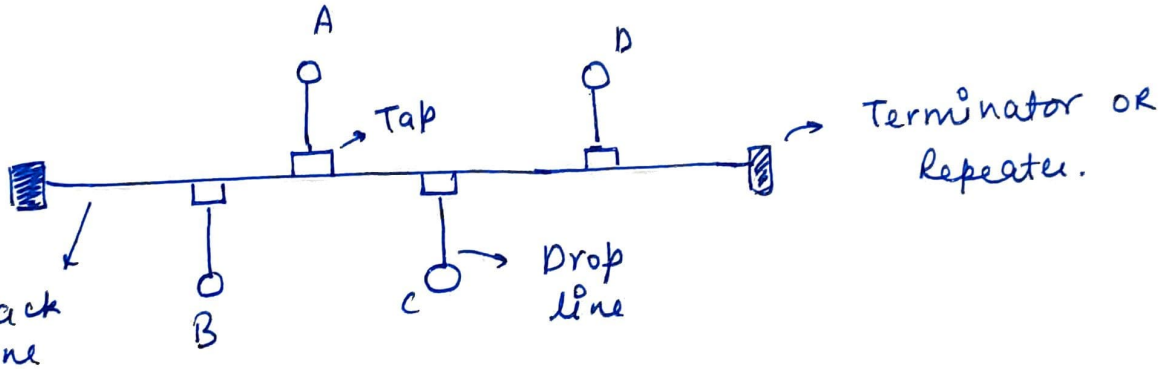
→ Hub / star Topology



Hub → multiport device

- Cables required = n
- ports on each device = 1
- reliability - very low if failure in hub.
- Cost - lower than mesh.
- security - Less
- Point to point communication

⇒ Bus topology

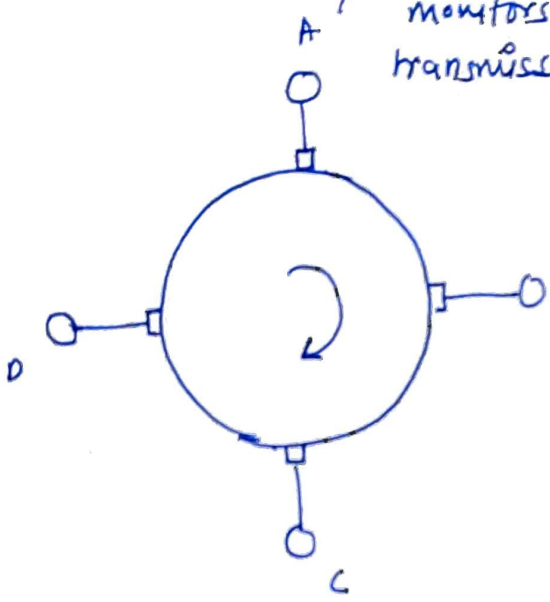


(Thick ethernet cable)

- no of cables → (n+1)
- no of ports in each device → n
- cost - cheap.
- reliability → less, as backbone is single point of failure
- security → less because message from B to D is sent to A, C also.

- multipoint connection (collisions can occur)
- maximum collisions = n.
  (If all devices start transmission at same time)

→ Ring topology



- cables - n+1
- ports - n
- reliability - low (if ring fails)
- security - low
  (message will go to all devices)
- cost - cheap.

collision is too much and is rectified using tokens

Manchester v/s Differential manchester encoding

- upper layers give data in digital form
- data needs to be encoded at physical level.
- manchester and differential manchester are used for digital to digital encoding.

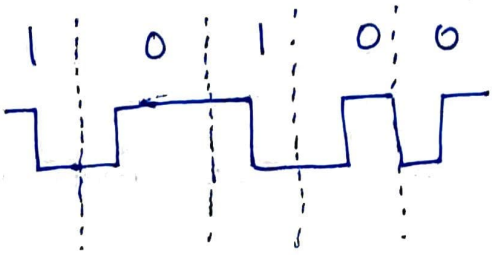
→ Manchester

1 → ⌊

0 → ⌋

Dr. Thomas

ex.



1 → ⌈

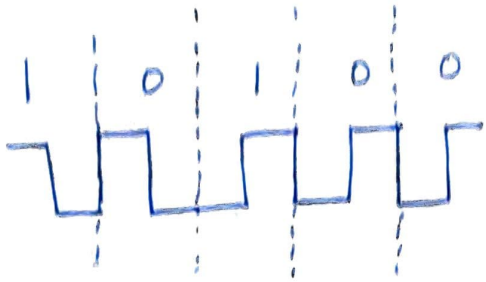
0 → ⌊

IEEE convention.

→ Differential Manchester

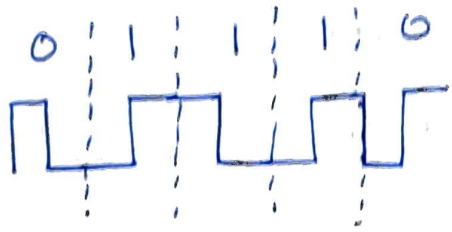
0 → ⊓, ⊔ } with edge

1 → ⌊, ⌈ } edge should not come.



If there is 1, no edge should be formed,

If 0, edge should be formed.



1 → means continuos

0 → edge must come.

Lec 1.4 Various Devices in Computer Networks

(1) Cables (2) Repeaters (3) Hubs (4) Bridges

(5) Switches (6) Routers (7) Gateway

(8) IDS (9) Firewall (10) Modem

- cables, repeaters, hubs

  pure hardware

- bridges, switches, routers

  hardware + software

- gateway → not actually a hardware, but a term

- IDS (Intrusion, Detection system), Firewall } → security

- Modem → Modulator Demodulator

digital to analog, analog to digital.

Lec 1.5 Types of Cables

(1) Unshielded twisted pair cable → used in Ethernet, LAN's

10 BaseT, 100 BaseT

10 → Mbps (mega bits)

Base → base band, broad band

↓ at a time only 1 signal can go

↳ multiple signals can go at 1 time

T → 100 metres

↳ If wire length is 100 mt., signal will be attenuated after 100 mts. Repeater would be needed after that

10 BaseT → used in LAN's

(2) Coaxial cable

10 Base 2

10 Base 5

2 → 200 mt

5 → 500 mt.

(3) Fibre optics

100 Base FX - ≃ 2km.

Is collisions possible ?

→ If n devices are connected on, what can be max. number of collisions ?

ans n (If all start transmitting at once)

→ Can cables filter ?

No, because cables are pure hardware.

Cables work in physical layer.