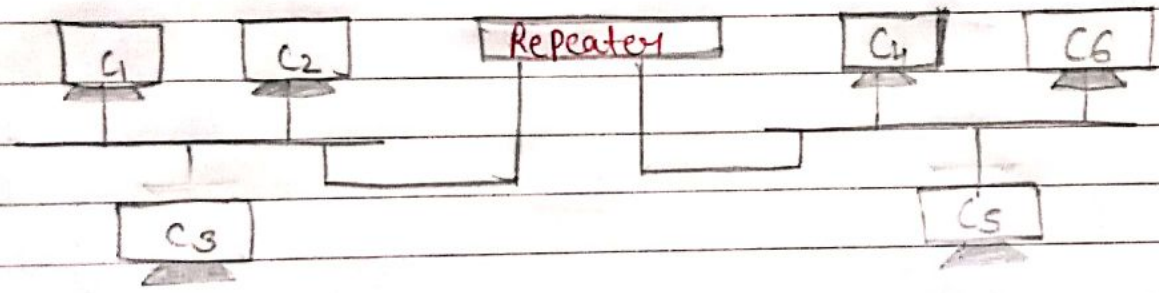


Basic Networking Terminology

Repeater: Repeaters are the devices that are used to amplify or regenerate the digital signal that they receive, while sending them to different parts of the network. They are useful if the computers in the network are located at longer distance.

In a wireless network the repeater consist of radio receiver, transmitters, amplifier, insulator and antennas.

fig



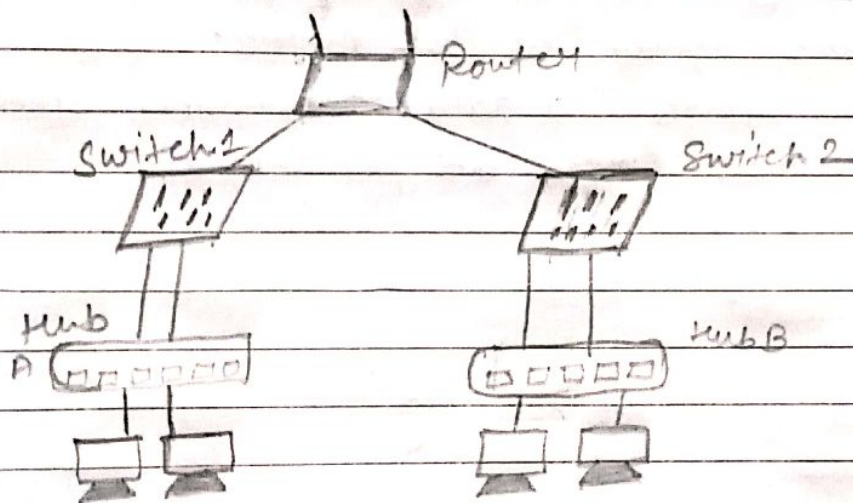
Hubs: A hub is a small, inexpensive device that is used to join multiple computers in a computer network.

It contains multiple ports and used to connect segments of a LAN.

Bridges: A bridge is a networking device that is used to connect two local area networks that use the same protocol. It reduces data traffic on a LAN by filtering content & dividing it into two segments.

Switch; A Switch is a multipoint bridge with a buffer and a design that can boost its efficiency & performance. A Switch is a data link layer device.

Routers: A router is a device like a Switch that routes data packets based on their IP addresses. Router is mainly a network layer device.



Firewalls: A firewall is a system designed to prevent unauthorized access to or from a private network. You can implement a firewall in either hardware or software form; or combination of both - firewall prevents unauthorized internet users from accessing private networks connected to the Internet, especially intranets. All messages entering or leaving the Internet must pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria.

Ethernet: Ethernet is a family of computer networking technologies commonly used in local area networks, metropolitan area networks and wide area networks. It was commercially introduced in 1980's & standardized in 1983 as IEEE 802.3.

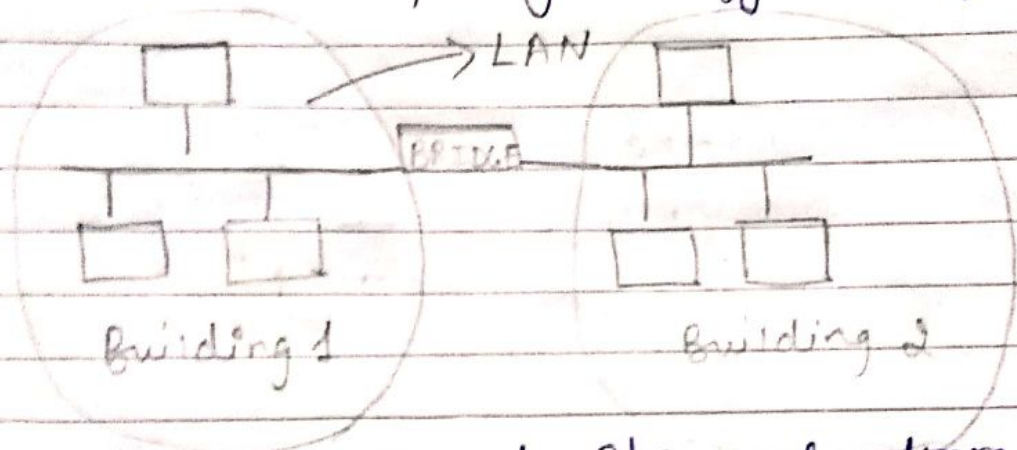
The Ethernet is used to connect computers in an office, school, college etc. to form a LAN as well as it is used to connect a home PC to connect to internet using a cable modem or DSL modem.

Ethernet supports a data transmission speed upto 100 mbps (mega bits per second)

Types of Networks:

① Local Area network

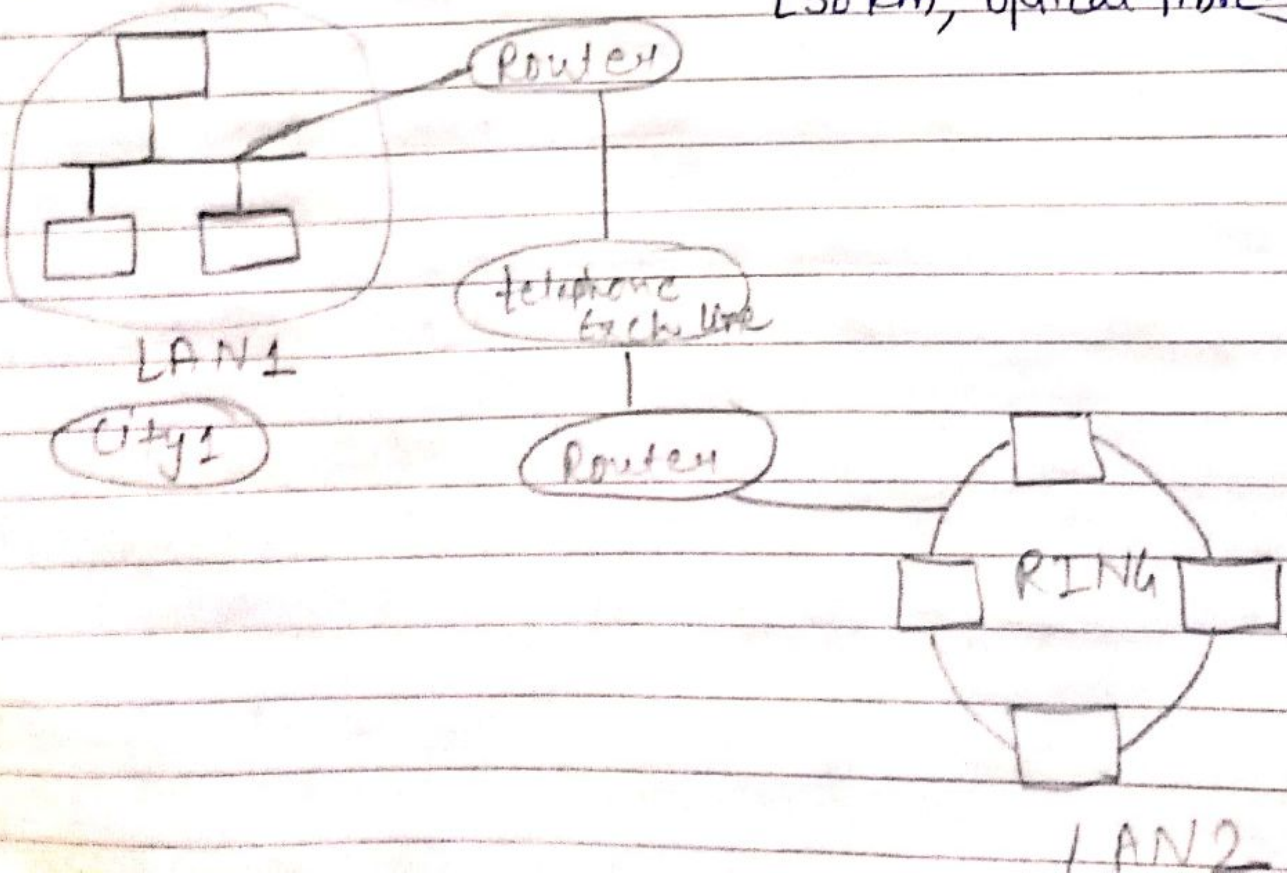
- ↳ Operate over small physical area such as office, society, in hospital etc.
- ↳ Easy to design and troubleshoot.
- ↳ Bus, Ring topology are generally used.



↳ Help users to share hardware as well as software through LAN.

② MAN (Metropolitan Area network)

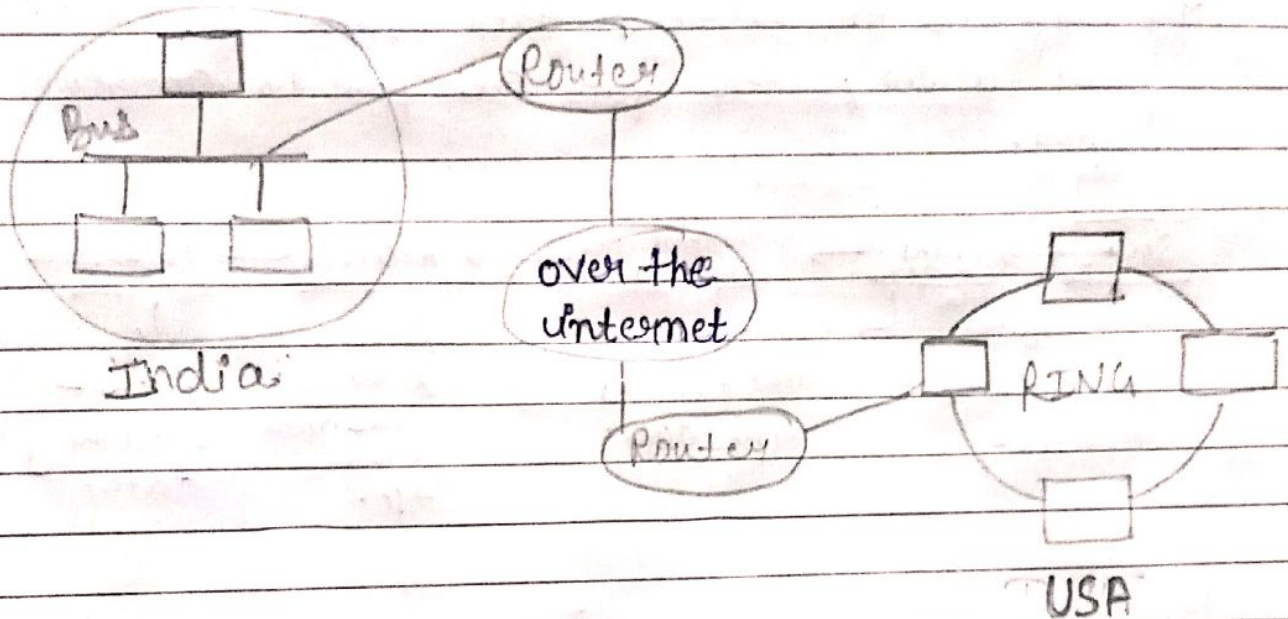
- ↳ It extends over entire city. [50 km, optical fibre.]



↳ A MAN acts as a high speed network to enable users share regional resources.

③ Wide Area Network.

↳ Large distance such as country/states.



Comparison b/w LAN and WAN

LAN (Local Area Network)

- ① Owned by a person - privately
- ② Designed to operate over small area.
- ③ Easy to design & maintain
- ④ co-axial cables are used
- ⑤ Minimum propagation delay
- ⑥ High data rate (small area)

WAN (wide Area Network)

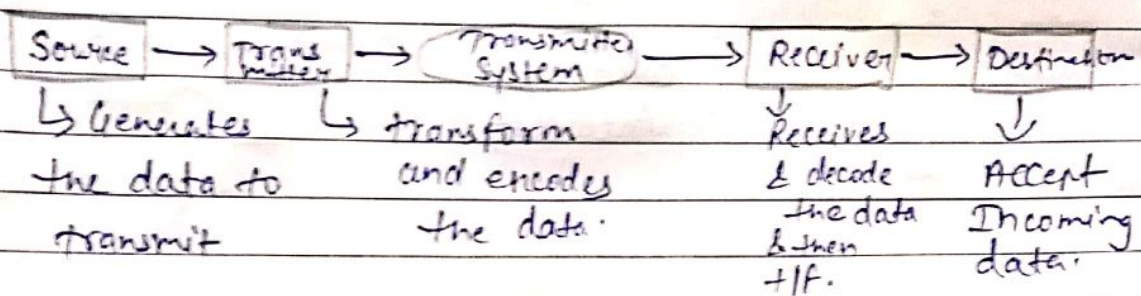
- Can be private or public.
- to operate over large distance.
- Not so Easy to maintain.
- Satellite links are used.
- Expensive
- Low data rate

Network Topology -

Definition of Network.

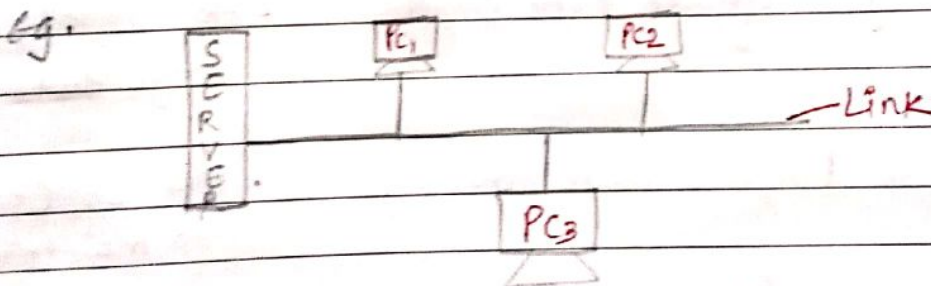
A network is a set of devices (nodes) connected by media links.

Using communication channels, the aim is to exchange data such as text audio / videos from one point to another point.



Types of Network Topology. Topology describes appearance of network.

(1) Bus Topology: Multipoint connection mean more than 2 devices share a single link.

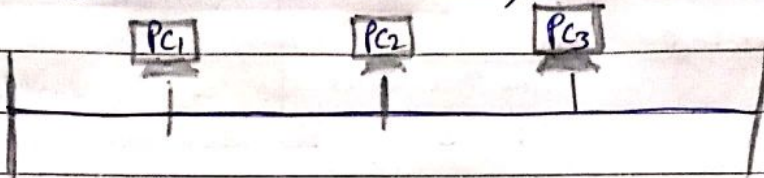


Show Multipoint Connection.

- Easy to install, useful for small network.
- Cheap
- slow speed as only one system can transmit at a time.

Bus Topology:

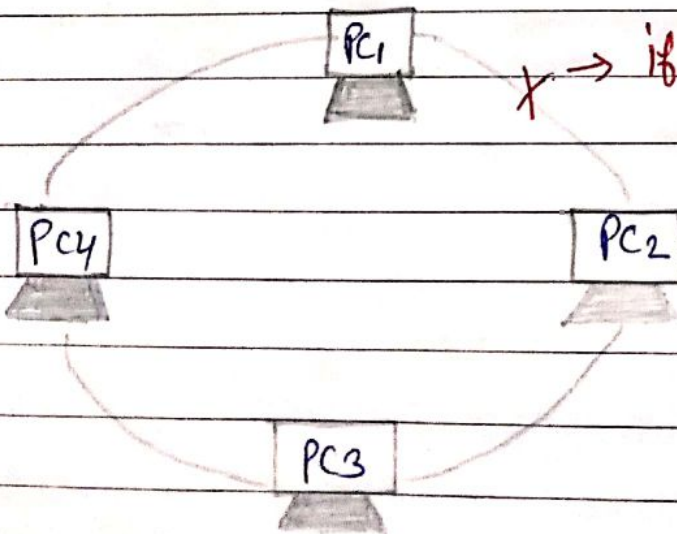
- Faulty cable bring down whole network & transmission can be done in one direction only.



Bus topology,

② Ring Topology:

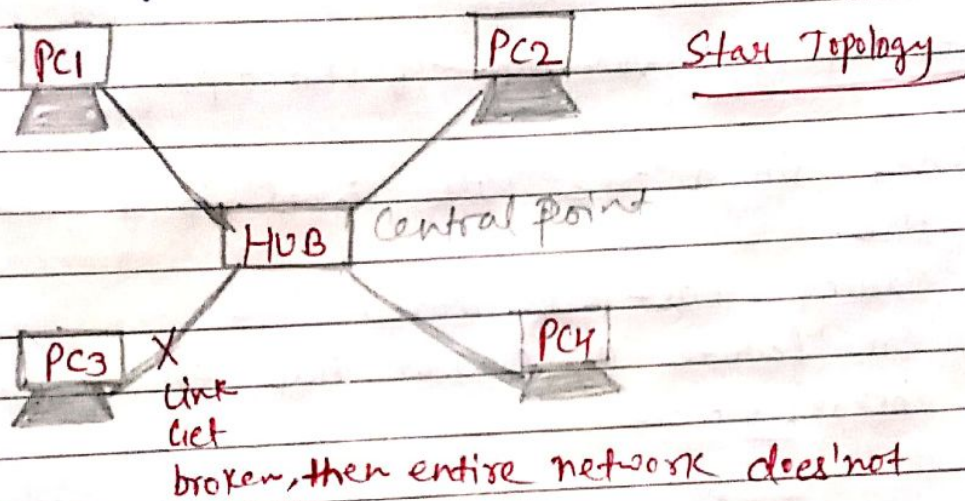
- ① In this each computer is connected to the next computer with the last one connected to the first.
- ② Multipoint data connection.
- ③ Token passing is used.
- ④ fault in any link disables entire network.
- ⑤ Difficult to troubleshoot the ring.



X → if link gets broken the entire N/w collapse.

③ STAR TOPOLOGY

- ↳ All the wires from the computers go to a central location having a device called Hub
- ↳ All Communication goes through HUB.
- ↳ If central ~~to~~ Hub fails, entire Network fail.
- ↳ Cabling Cost is more.

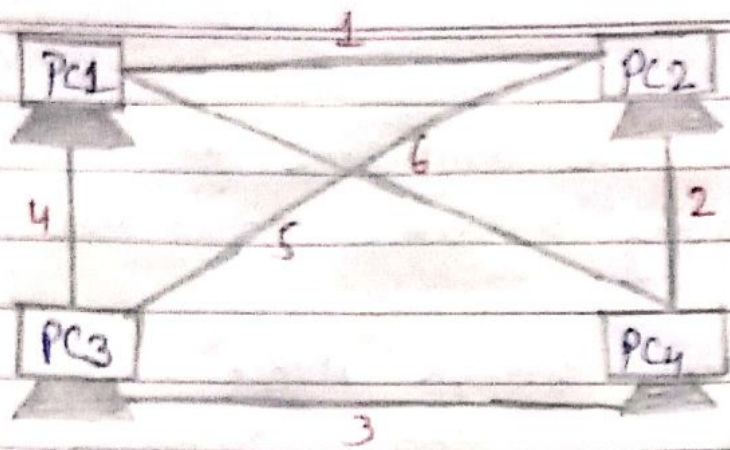


collapse.

④ Mesh Topology

- In this each device has a dedicated point to point link to every other device.
- due to dedicated links there is no Traffic problems.

- ↳ failure of one link doesn't affect entire Network.
 - More Secured and private.
 - Easy fault diagnose is possible (because of point to point).
 - Expensive due to higher cabling cost.
- No of links $\rightarrow \frac{n(n-1)}{2}$ links for n devices.



$$\begin{aligned}
 n &= 4 \\
 &= \frac{4(4-1)}{2} = \frac{4 \times 3}{2} \\
 \text{total links} &= 6
 \end{aligned}$$

Mesh Topology.

⑤ Tree Topology: variation of star topology.

- Nodes in a tree are linked to a central HUB.
- Cabling cost is more.
- On failure of central Hub, entire network breaks down.

