LECTURE NOTE

ON

COMPUTER APPLICATION

(Chapter-3)

For 1ˢᵗ year Diploma(All Branches)

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Computer Network and Internet

Network : It is a group of computer systems which are connected through communication channels/wires. It is helpful in ① communication ② resource sharing.
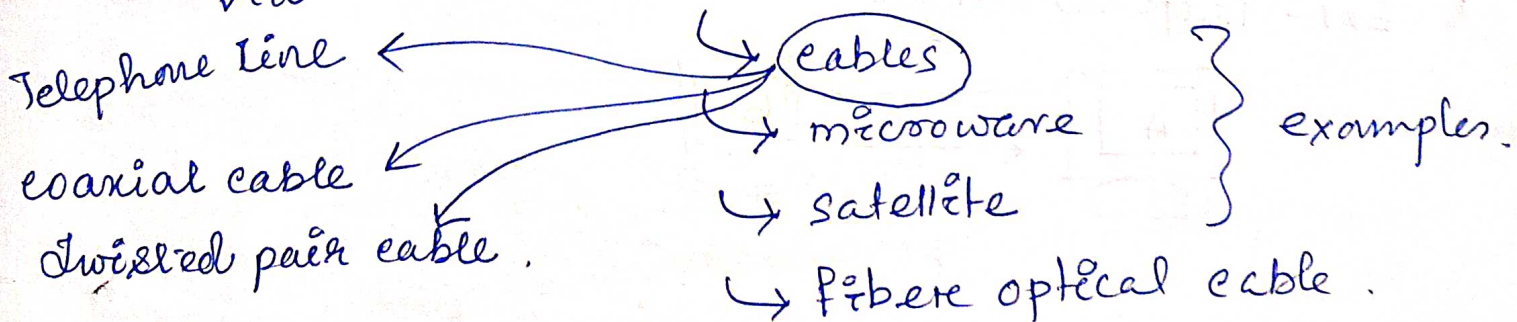
Networks are used to :

→ support communication via email, video conferencing, instant messaging etc.

→ Enable multiple users to share single hardware device like printer or

→ Allows sharing softwares.

→ Easier access of information.

There are many types of Networks :

① Local area Network (LAN)

② Personal area Network (PAN)

③ Home area Network (HAN)

④ Wide area Network (WAN)

⑤ Metropolitan area Network (MAN) etc.

Connecting Media :

- Data is transmitted from one computer to another via different media / communication channel.

Telephone Line ←

coaxial cable

twisted pair cable.

→ cables

↳ microware

↳ satellite

↳ fibre optical cable.

} examples.

Mode of Data Transmission :

→ It means the direction of the flow of information between two communicating devices.

→ There are 3 modes of data transmission

        → Simplex
        → Half duplex
        → full duplex

Simplex : communication can take place in one direction only.
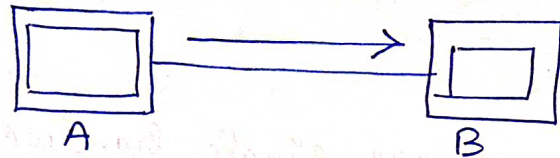
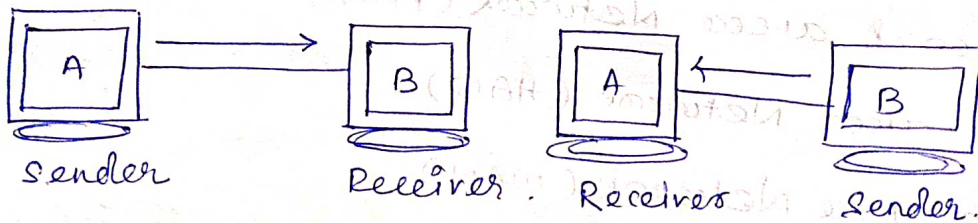
→ Unidirectional communication

→ Ex/- TV broadcasting.

Half duplex : Data transmission can be in both directions, but only one direction at a time.

→ Both the connected devices can send and receive data, but not at the same time.

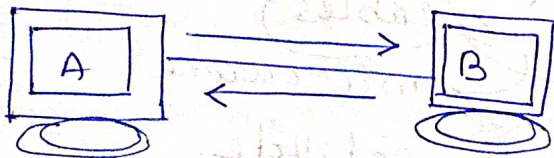→ Data transmission is in only one direction at a time.

    Ex/- walkie-talkie.

Sender   Receiver   Receiver   Sender.

Full duplex : Data can be transmitted simultaneously in both directions on the communication path.

→ Both the connected devices can send and receive data simultaneously at in both direction.
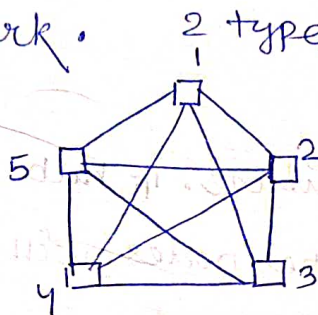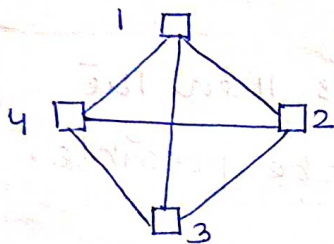
    Ex/- Telephone network

Network Topology

→ It is arrangement of the devices ore nodes in the network physically or logically.

→ Types : ① Mesh topology ③ Ring topology ⑥ Hybrid
              ② Star topology ④ Bus topology
                                    ⑤ Tree topology

Mesh :-

→ Each node is connected with every other node in the network.   2 types → full mesh
                                                                              ↳ Partial mesh

Full Mesh topology

• every node is connected to every other node in the network.

• It is very expensive.

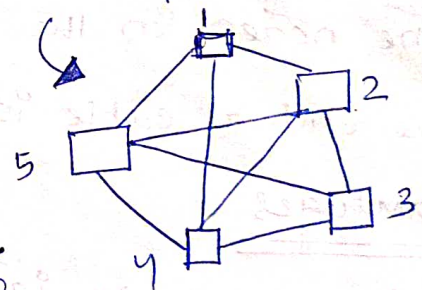**Partial mesh**
• Some nodes are fully connected and some other nodes are only connected to one or two node in n/w.
• less expensive.

Advantages

• More robust and strong network. because, as there are more no: of cables.

• Due to more no. of links ore cables, this network is more reliable (less failure occurs)

Disadvantages

• Very expensive.

• very costly and complicated to set up mesh network.
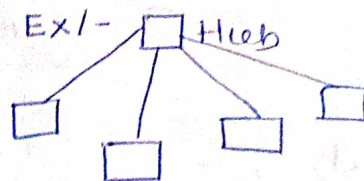
$n \rightarrow$ nodes.

$$Cables = \frac{n(n-1)}{2}$$

$n = 5$
$$Cables = \frac{5 \times 4}{2} = 10$$

Star :-

→ The nodes are connected to a central computer which is called as Hub.

→ The nodes communicate with each other via Hub.

Advantages

→ less no. of cables / connections are required.

Ex/- Hub

Disadvantages

→ Prone to single point failure. If Hub fails, then the communication among the nodes will not be possible.
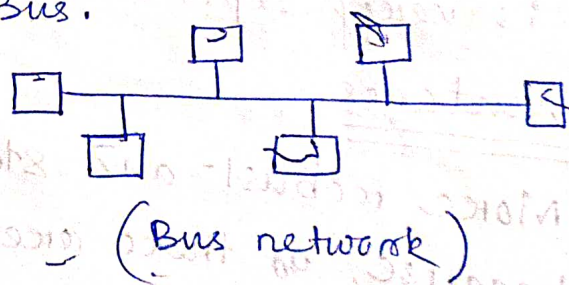
Bus :-

→ There is a central cable / main wire that connects all the nodes in the network. It is the backbone of the n/w.

→ The central cable is known as Bus.

Advantages

Ex/-

(Bus network)
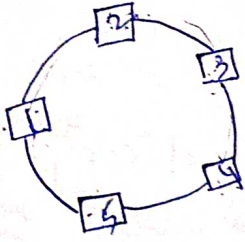
→ only one cable is required.

→ very Simple network.

→ less expensive.

Disadvantages

→ If the bus fails then the total network will fail. It will also face single point failure.

Ring :— All the nodes are connected in a closed loop. One node is connected to only its two neighbour nodes.

Advantages :—

→ less no. of connections are required.
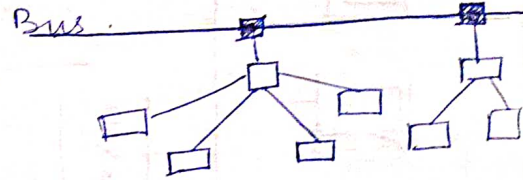
→ Simple network.

→ less costly.

Disadvantage ~~less~~

→

Tree :— It is a hybrid topology.

- It combines the characteristics of Bus topology and star topology.
- A group of star networks are connected to a liner bus.

Bus

Types of Network

Depending the coverage area computer networks are categorized into 3 types :

    (1) LAN   (2) MAN   (3) WAN

(1) LAN :

- Local Area Network.
- The computers are interconnected in a single room, building or buildings in one site.
- It is a privately owned network with in a single building or campus, with in few kilometers.
- The connected PCs can share files, applications, h/w resources among themselves.
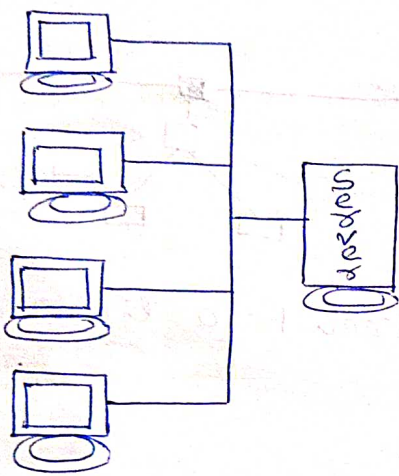
2 types : ① Server based LANS
　　　　　② Peer-to-peer LANS

Server based LANS : There is a separate computer
which ~~acts~~ is known as server.
→ It takes requests from clients (other connected computers)
　and processes the requests.

Peer-to-peer LANS : There is no server.
→ All the computers in the network act as resource provider
　and user.

(Server based LANS)
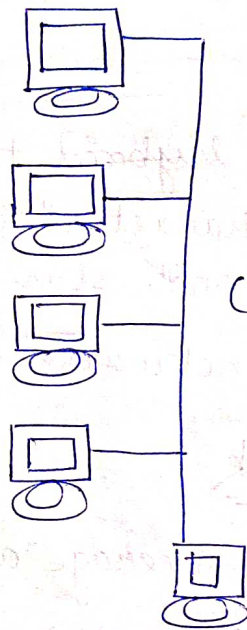
(Peer to Peer LANS)

(2) MAN :

- Metropolitan Area Network.

- Its size is between LAN and WAN.

- MAN covers an area 5 to 50 km.

- It covers the area within a city.

- MAN is a network that interconnects the users with
  computer resources in a geographic area larger than
  area covered by LAN and smaller than area covered by WAN.

- Interconnection of computers within a city.

WAN :
- Wide Area Network.
- Its coverage area is a large geographic area such as scale, country.
- It connects multiple smaller networks such as LAN /MAN
- World's most popular WAN is internet.
- For communication WAN uses high speed telephonelines or wireless technology such as satellites.

| LAN | MAN | WAN |

LAN
Local Area Network with in a small area, a building or campus.
Easy installation

MAN
- Metropolitan Area Network
- Located with in a city.
- Easy

WAN
- Wide Area Network.
- World wide coverage

Networking Devices

(1) Hub :

→ It is used to connect different segments of a LAN.

→ It contains multiple no. of ports.

→ when a packet of data arrives at one port, it is copied to other ports so that other segments of LAN can see those packets

→ Hubs handles the data known as frames.

→ when Hub passes a frame to every node of its port, it is called broadcasting.

→ It creates more traffic on network.

(2) Repeater :

→ It is a network device that regenerate or replicate a signal which are distorted by transmission loss.

→ Analog repeaters frequently amplify the signal.

→ Digital repeater reconstruct a signal near to the original quality.

→ A repeater can relay messages between subnetworks that use different protocol on cable.

(3) switch :

→ It is a networking device that is used to connect devices together on a computer network by performing packet-switching.

→ It is more advanced than hub.

→ switch will only send a message to that device that needs it instead of broadcasting it.

(4) Bridge :

→ It provides interconnection with other bridge networks that use same protocol.

→ It connects two different networks together.

→ It broadcasts data to every node.

(5) Router :

→ It is a device that forwards data packets along network.

→ A router is connected to atleast two networks.

→ Routers are located at gateways, the place where two networks connect.

→ Routers use headers and forwarding table (or routing tables) to decide the best path for transmission of data packet.

→ It finds out the most suitable path between any two nodes.

(6) Gateway :

→ It is the node on the network that acts as an entrance or entry point to another network.

→ It is the computer that routes the traffic from one node to the outside network.

→ Gateway is like the ISP that ~~acts as a~~ connects the user with the internet.

→ Gateway is associated with router and switch.

(7) NIC :

→ Network Interface Card.

→ It is the computer hardware component that allows a computer to connect to a network.

→ NIC is also known as Network Interface Controller, Network Interface Controller Card, expansion card, network card or LAN card.

Internet Services

(i) **e-mail** :- It is the most popular and useful feature of internet

→ It allows us to exchange text messages and computer files with any one with e-mail address.

→ It is cheap.

→ It is quick.

→ It can be delivered to a number of people around the world.

→ The delivery of messages is instantaneous.

→ Multiple copies of the same message can be sent to a group of people at the same time.

→ Pictures, documents and other files can also be attached to the message.

→ The message can be printable.

Disadvantage

→ Slight error in the mail-address prevent delivery of the message.

→ Security is a concern in e-mail system.

→ E-mail system depends on the electricity and telephone system.

Internet Conferencing / Online Conference

→ It works by using web-based software.

→ It allows participants to create a face-face meeting.

→ Every participant must have the software.

→ The participant has to log in first.

→ There will be one presenter and a group of participants who are viewing the presenter's desktop screen.

→ It has the voice conferencing, chatting, instant-messaging.

and video conferenceing feature.

⊗ → It provides a central meeting place.

→ There is no travelling expense, cost of renting a building etc

→ Internet conferenceing is cheap in comparison with traditional meetings.

E - newspaper :— Electronic newspaper.

→ It - is the online version of a printed pereodical.

→ It is like hared-copy newspaper.

→ It - has same legal boundaries, privacy and copyright.

Online shopping :— e-shopping.

→ It - is the form of electronic commerce which allows consumers to directly buy goods ore services from a seller over internet using a webprowser.

→ It is also called as e-shop, e-store etc.

→ In this case products ore services can be sold and purchased through internet.

→ The largest selling online shopping websites are amazon.in, snapdeal, flipkart, ebay, myntra etc.

Different types of Internet Connectivity

- Dial up Modem   - Wireless Modem

- DSL

- cable Modem

- Ethernet LAN

- ISDN

- leased line