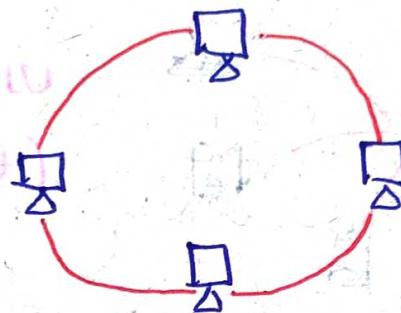


Networking

Q) What is Computer Network?

A) A group of Computers which are connected to each other for the purpose of Sharing their resources is called Computer Network.



• First Computer Network → ARPANET

Advance Research Projects Agency Network.

• Characteristics of Computer Network:

- i) Resource Sharing vi) S/N & H/W sharing
- ii) Communication speed. vii) Security.
- iii) Back-up
- iv) Scalability
- v) Reliability

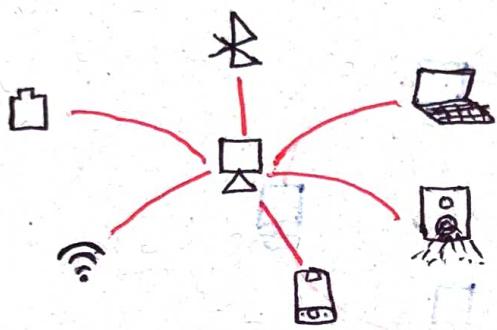
• Network Devices:-

HUB, switch, BRIDGE, Gateway, Modem, Router, Repeater etc.,

• Network types:-

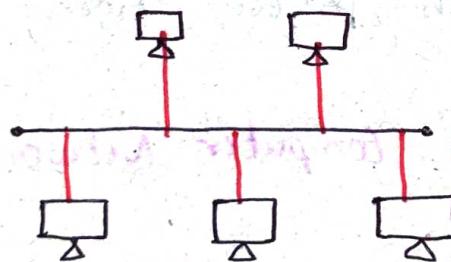
① PAN :- Personal Area Network.

Range → ($< 10m$)



Use → Home
(for personal use)

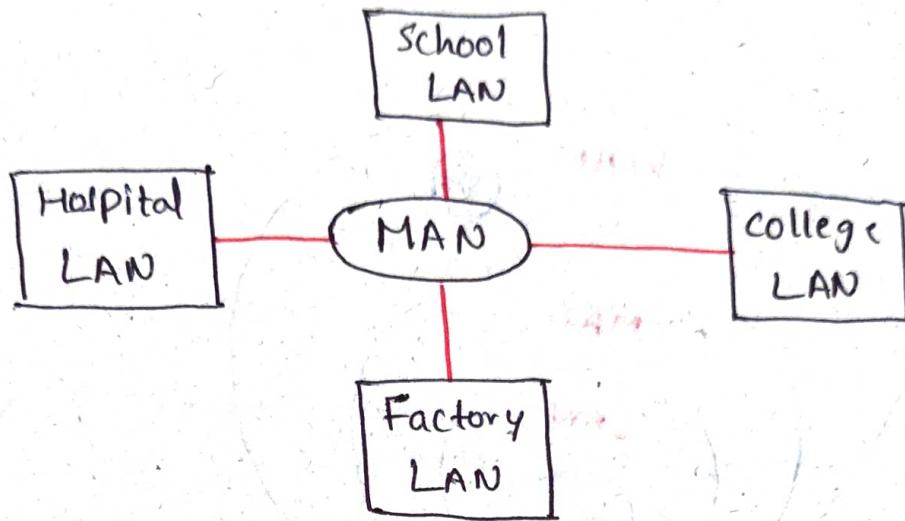
② LAN :- Local Area Network



Range → < 100 meter

Use → office (building)

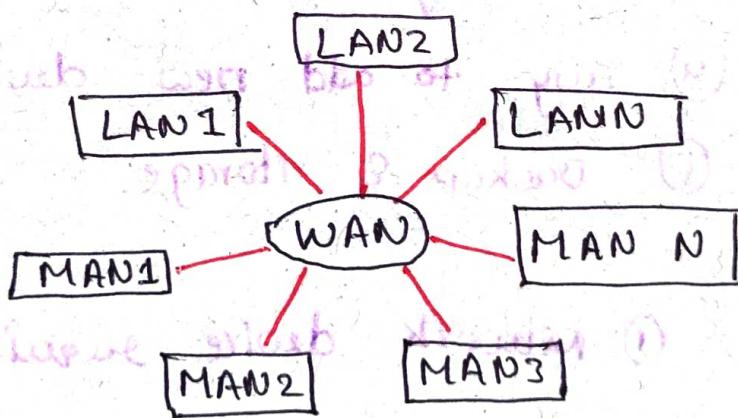
③ MAN :- Metropolitan Area Network (Combination of LAN's).



Range :- $< 50 \text{ km}$

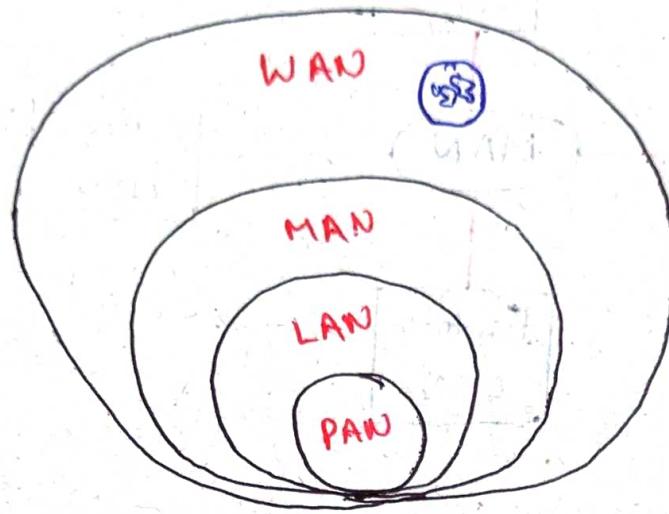
Use :- Within city.

④ WAN :- Wide Area Network



Range \rightarrow $< \text{Not Fixed} >$

Use \rightarrow for countries or all around world.



Advantages :-

- ① open to everyone
- ② File sharing
- ③ Security
- ④ Easy to add new devices.
- ⑤ Backup & storage.

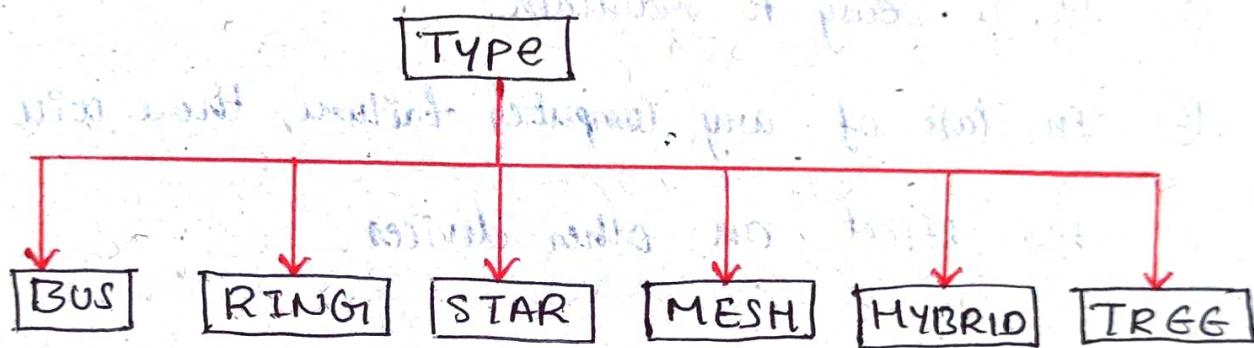
Disadvantages :-

- ① Network device required.
- ② Virus attack.
- ③ Required Handling
- ④ High speed Internet
- ⑤ Server.

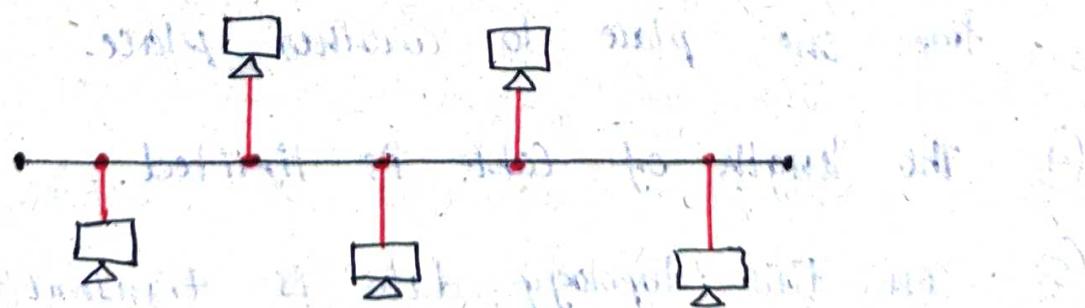
Network Topology.

Q) What is Topology?

A) The physical arrangement of the Computer System / node, which is connected to each other via communication medium is called topology.



① Bus topology:- IN Bus topology, one long cable acts as a single communication channel & all the devices are connected to this cable.



Advantages:- ① Easy to add/remove nodes in a network.

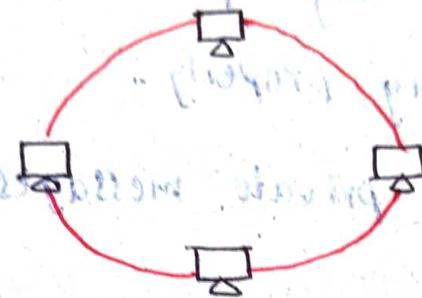
- ② Required only cable.
- ③ It is less expensive.
- ④ It broadcast the messages to each which are connected through the cable.
- ⑤ It is easy to maintain.
- ⑥ In case of any computer failure, there will be no effect on other devices.

Dis-advantages:- ① If the cable is failed,

then the entire network will be failed.

- ② The messages are broadcast so, we can't send private messages.
- ③ It takes more time to pass the messages from one place to another place.
- ④ The length of cable is limited.
- ⑤ In this topology, data is transmitted only one direction.

② RING TOPOLOGY: It is called ring topology because it forms a ring. In this topology each node is strongly connected with its adjacent nodes.



Advantages: ① It forms a strong network.

② Each and every node can share data with another node connected through a ring topology.

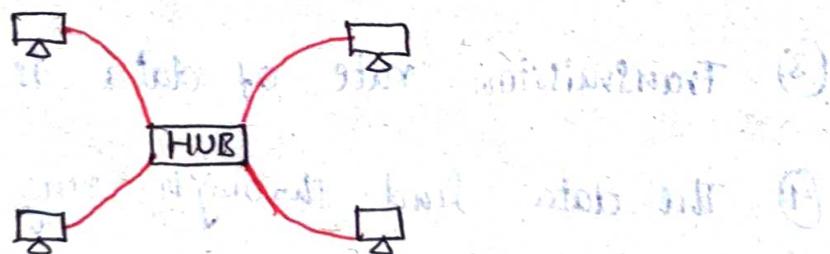
③ Transmission rate of data is very speed.

④ The data send through ring topology will be broadcast.

Dis-advantages: ① It is very difficult task to add some new computer.

② If we want to send data from a source to destination machine then data will unnecessarily passed to all nodes.

- ③ Single point of failure, that means if a node goes down entire network goes down.
- ④ It is very difficult to recover the ring topology, if any particular machine is not working properly.
- ⑤ we can't send private messages.
- ⑥ STAR Topology: In star topology all the nodes are connected with a central device called HUB. And the sharing of data is only possible through HUB.



- Advantages:
- ① It broadcasts the message.
 - ② It is less expensive due to less cable.
 - ③ Easy to connect new nodes without affecting rest of the network.
 - ④ If one node failed, then it would not be failure of entire network.

Dis-advantages :- ① In star topology we must

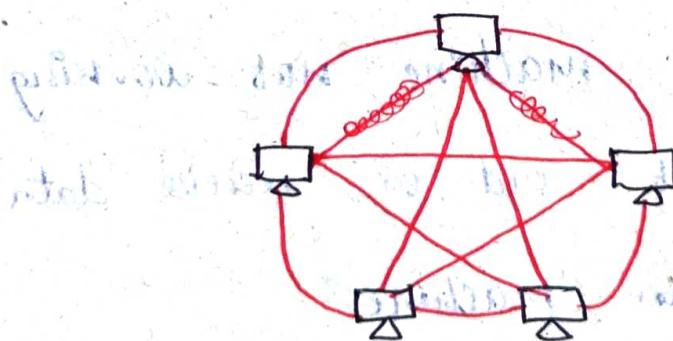
required a network device like HUB, Switch, router etc.

② If two nodes want to share the data, sharing is possible only through HUB.

③ If HUB is failed the entire network will be failed.

④ We can't send private data.

④ MESH Topology :- In this topology each and every computer is directly connected with each other, we can directly send the data to the destination machine without going to intermediate machine.



Advantages:- ① It is very good topology
to send the private messages.

② All nodes are directly associated with
another node so, it provides point to
point connection.

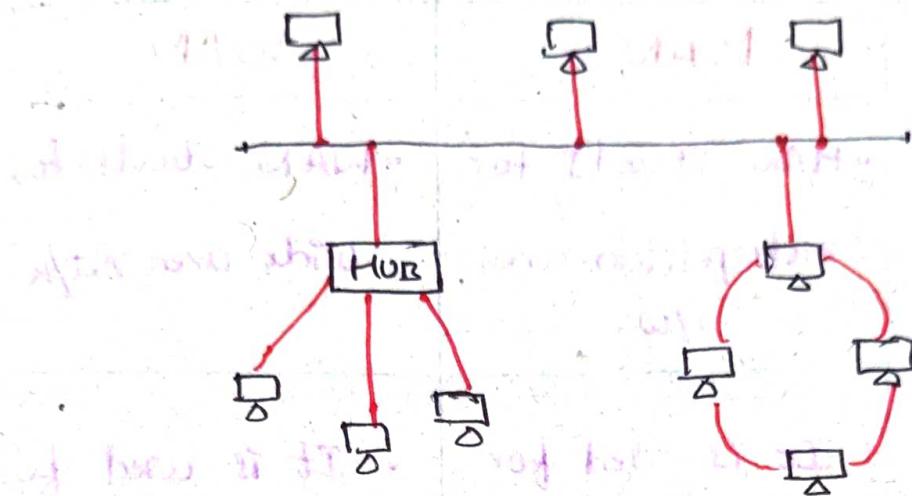
③ Unlike ring topology, if a particular
machine is failed then entire network
will not fail.

④ Multiple devices can send or receive
data simultaneously.

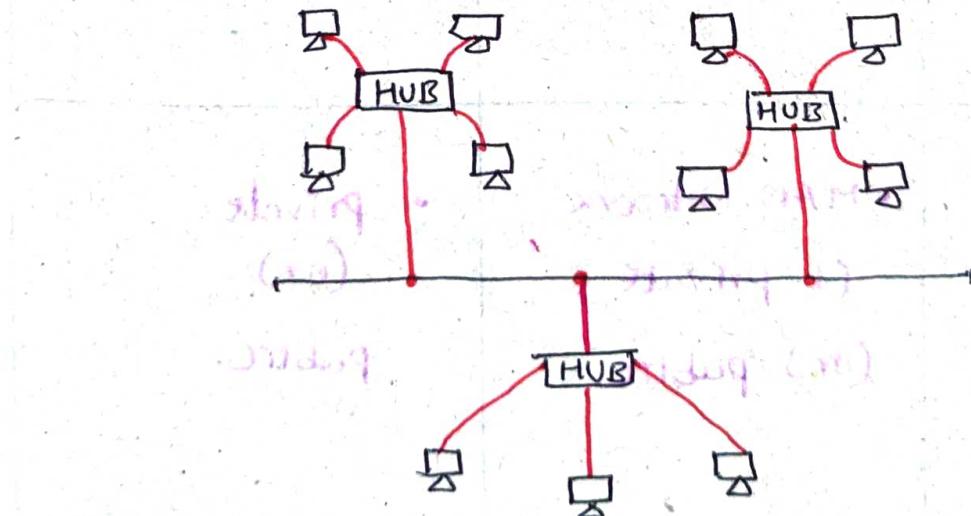
Dis-advantages:- ① It is very difficult to
add some new nodes because
each and every computer directly connected
with another one.

② If a particular machine not working
then, we can't send or receive data
from the failure machine.

⑤ Hybrid Topology :- Combination of various different topology is called hybrid topology.



⑥ TREE Topology :- In this topology , all the nodes are connected like a branches of tree. The combination of Bus & STAR topology is called TREE Topology.



LAN MAN & WAN

Q) Difference among LAN MAN & WAN?

A)

| LAN | MAN | WAN |
|---|---|--|
| <ul style="list-style-type: none"> • LAN Stands for local area n/w • It is used for building like offices. • Transmission speed of data is high • LAN network range 0 to 150 meters. • LAN network ownership is private. | <ul style="list-style-type: none"> • MAN stands for metropolitan area n/w • It is used for city like Kolkata. • average • 5 to 50 km • MAN network is private (or) public. | <ul style="list-style-type: none"> • WAN stands for wide area net/n • It is used for countries. • low • not fixed. • private (or) public. |

| | | |
|--|---|---|
| <ul style="list-style-type: none"> • Easy to maintain | <ul style="list-style-type: none"> • Difficult to maintain | <ul style="list-style-type: none"> • Difficult than MAN & LAN. |
| <ul style="list-style-type: none"> • LAN network error rate & setup cost is low. cost of each node is less. | <ul style="list-style-type: none"> • average distance of link is less. | <ul style="list-style-type: none"> • very high. |

• more nodes drop down at long distance which makes it difficult to maintain.

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• more nodes drop down at long distance which makes it difficult to maintain.

HUB NETWORK DEVICE.

Q) What is HUB ? full explanation.

A)

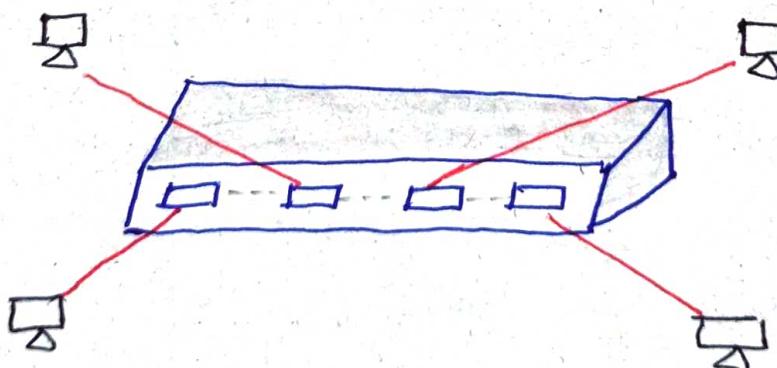
HUB: ① HUB is a Network device that is used to connect multiple computers in a network.

② All the information send to the HUB is automatically send to each port to every device.

③ A HUB is less expensive, less intelligence & less complicated.

④ HUB generally used to connect computers in a LAN.

⑤ Transmission mode of HUB is half duplex



HUB N/W Device.

- Advantage:-
- ① The HUB can broadcast the msg.
 - ② It is less expensive that anyone can use it.
 - ③ Easy - Installation.
 - ④ Robust.

Dis-advantage's

- ① If the HUB is failed the Entire network will be failed.

- ② We can't send private / personal data through hub.
- ③ HUB doesn't provide any security.
- ④ HUB can't support full duplex transmission mode.

Sending & receiving at Same time.

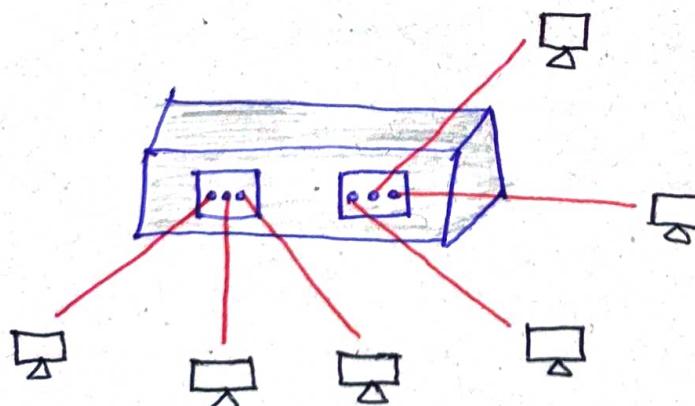
SWITCH NETWORK DEVICE

Q) What is Switch? full explanation.

A) Switch: ① Switch is a network device that connects multiple computers together in the network.

② It is mainly used to send the private message as well as there is no wasting of data.

③ Switch can easily identify that which device is connected with which port by using MAC Address, That's why it delivers message on particular destination machine.



Switch N/W Device.

Note: Switch is more intelligent than HUB.

Advantages: ① It generally used to Unicast the msg.

[unicast → To a particular network]

[Broadcast → To all networks]

② It provides more security than HUB.

③ Switch Support full duplex data transmission mode.

④ It is used to send the data packet based on MAC address.

⑤ If a node fails, There will be no effect in the entire network.

Dis-advantage: ① If switch is failed then entire network will be failed.

② It is more expensive.

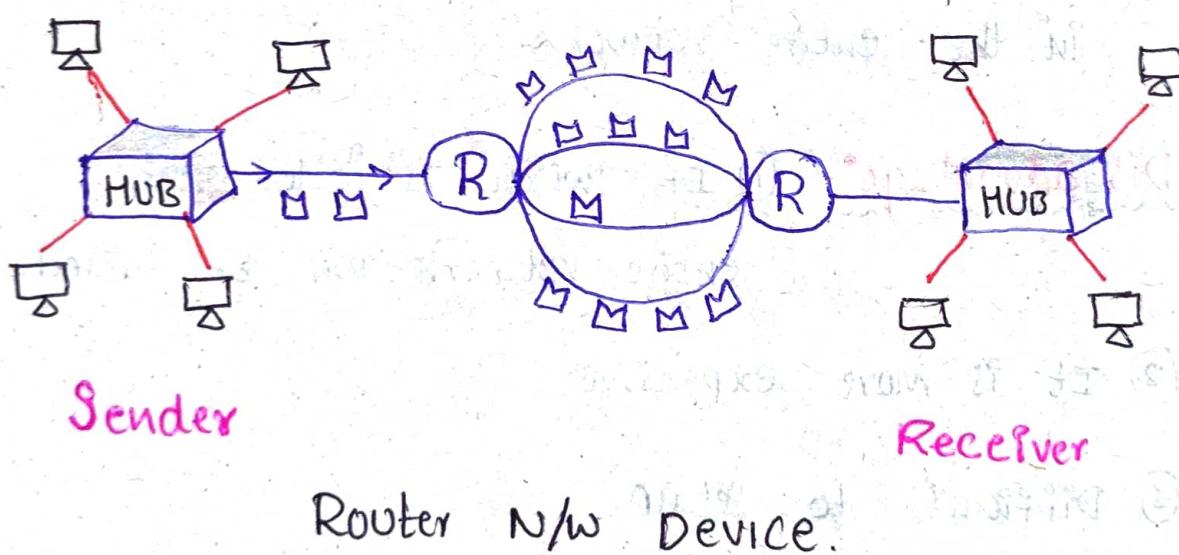
③ Difficult to set up.

ROUTER NETWORK DEVICE

Q) What is Router? Full Explanation.

A) Router is a network device which works as a traffic controller. A main work of router is to choose a congestion free path through which the data packet will travel.

Router receives data packets from the sender, analyze and forwards those data packets to receiver.



Note :- Router uses both LAN & WAN Network.

- Advantages:-
- ① It provides connection b/w two dis-similar type of network.
 - ② Transmission rate is very high.
 - ③ It internally uses some algorithm to findout congestion free path.
 - ④ It provides both wire or wireless facility.

- Dis-advantages:-
- ① Router is more expensive compared to other N/w devices.
 - ② Routers are complex to maintain.
 - ③ Security issues.
 - ④ It only work with routable protocol.

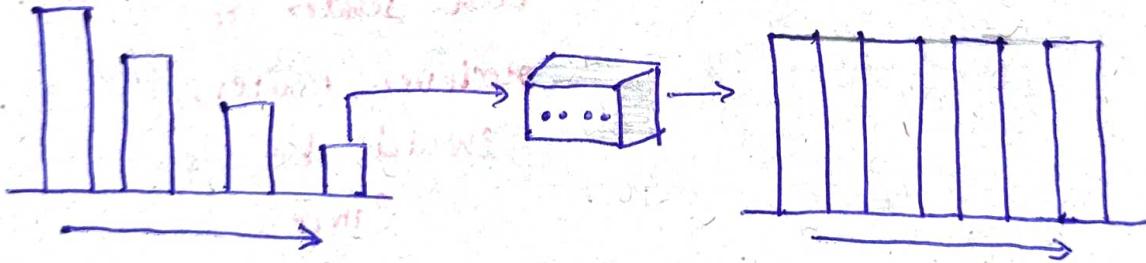
both Sender &
Receiver Routers
should be
Same.

Repeater Network Device

Q) What is Repeater? full explanation.

A) Repeater is a network device through which we can "boost up the weak signals". When the signal travels in the network, after travelling some distance the intensity of the signal becomes low.

In order to regenerate the weak signal we should use repeater device.



Repeater.

Note :- It is used in wired & wireless.

- Advantages:-
- ① It is used to regenerate the weak Signal.
 - ② It is cheaper than other n/w devices.
 - ③ Repeaters has the ability to extend the length of signal.
 - ④ Increase / Maintain the signal performance.

- Dis-advantages:-
- ① It requires new repeater after some distance to maintain the signal, as its scope is less.
 - ② Repeaters also unable to connect dis-similar type of n/w.
 - ③ They can't reduce n/w traffic.

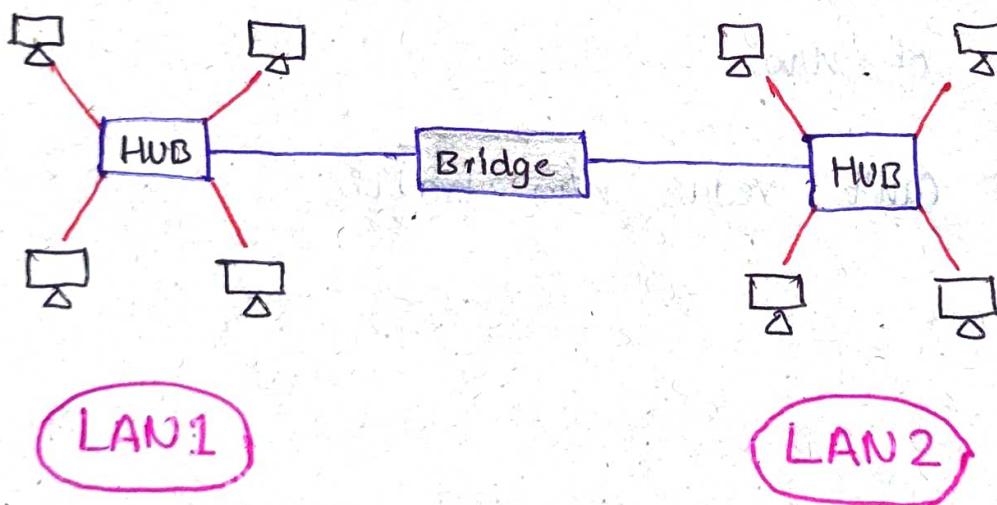
BRIDGE NETWORK DEVICE.

Q) What is Bridge? full explanation.

A) Bridge: ① Bridge is a network device

that is used to separate LAN into no.of Section.

② When the receiver sends data through bridge, It first notes MAC & PORT Address of the destination and then the msg will be broadcasted.



Bridge. N/w device.

Note:- It operates both physical as

= well as data link layer of

OSI Model.

Advantages:- ① By using bridge device we can extend network.

- ② It broadcast the data to each node like HUB & repeater.
- ③ Collision can be reduced easily.
- ④ It is more intelligent.

Dis-Advantages:- ① It doesn't establish connection between two different network.

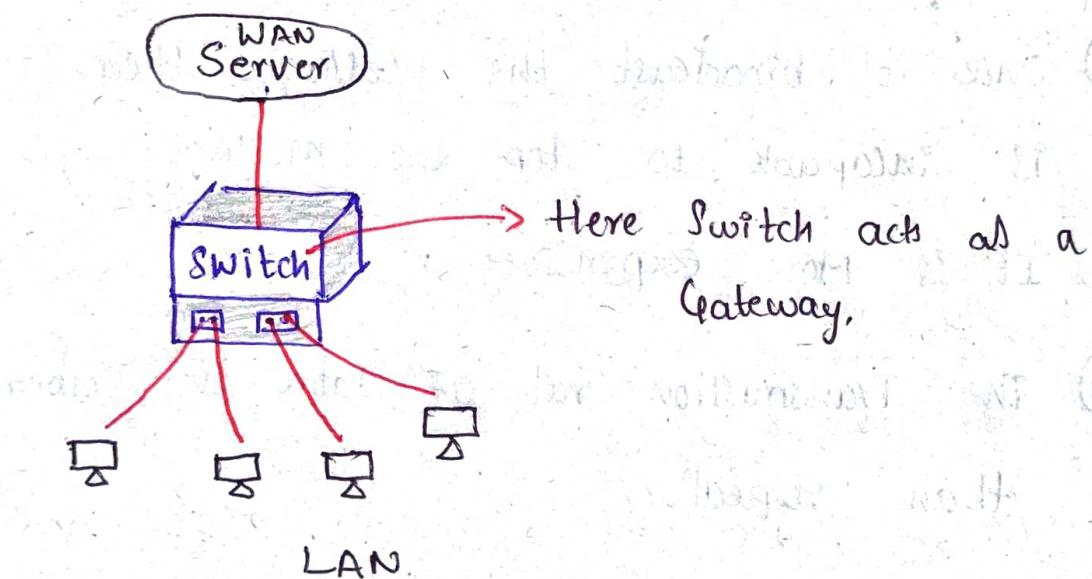
- ② Once it broadcast the messages then it is incapable to stop the messages.
- ③ It is more expensive.
- ④ The transmission rate of data is slower than repeater.

GATE WAY NETWORK DEVICE.

Q) What is gateway? full explanation.

A) Gateway is a hardware device that is used to connect two dissimilar type of Network.

It allows us to see & receive data through the internet even it is a LAN Network.



Note:- It operates all 7 layers of

- OSI Model.
- 1) Application Layer
- 2) Presentation Layer
- 3) Session Layer
- 4) Transport Layer
- 5) Network Layer
- 6) Data Link Layer
- 7) physical Layer

- Advantages:-
- ① It connects two network which has different protocol.
 - ② It operate all 7 layer of protocol (OSI model).
 - ③ We can't access the internet without a gateway.
 - ④ It provide some security.

- Dis-Advantages:-
- ① It is more expensive.
 - ② Data transmission rate is slower.
 - ③ Difficult to maintain as well as very complex.
 - ④ It is less intelligent.

NIC NETWORK DEVICE.

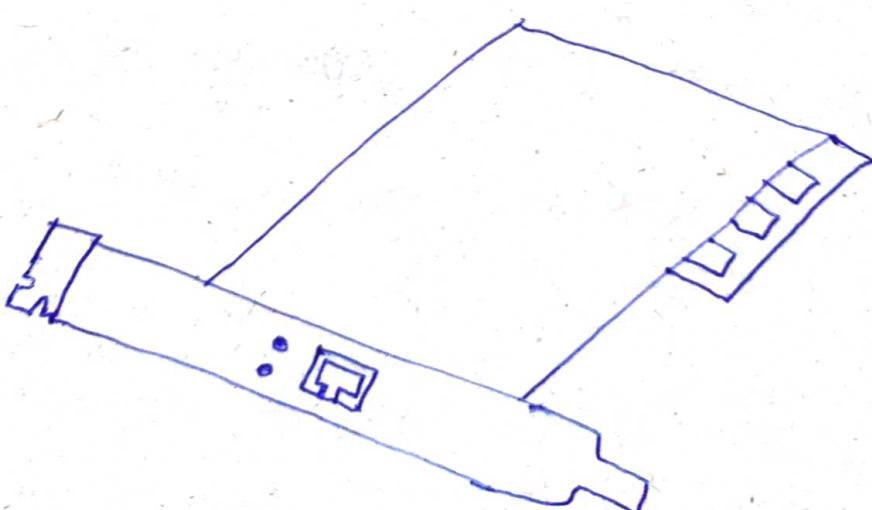
Q) What is NIC ? full explanation.

A) NIC stands for Network Interface Card. It is hardware device without which we can't connect Computer to the network/internet.

Types: ① Internal network card

② External network card.

① Internal network card :- In this card the Motherboard has a slot for the n/w card where it can be inserted. It requires a network cable (RJ45) to provide n/w access.



② External network card :-

In desktop & laptop that don't have an internal NIC, External NIC's are used.

It is two types: 1> wireless



2> USB cable



Advantages: ① Useful to connect Computer to any other device.

② It supports both wire & wireless to connect to the network.

③ NIC also allows to connect through IP address and even by LAN we can connect to any other Network through NIC.

Dis-Advantages: ① Data is not secured.

② Configuration should be better.

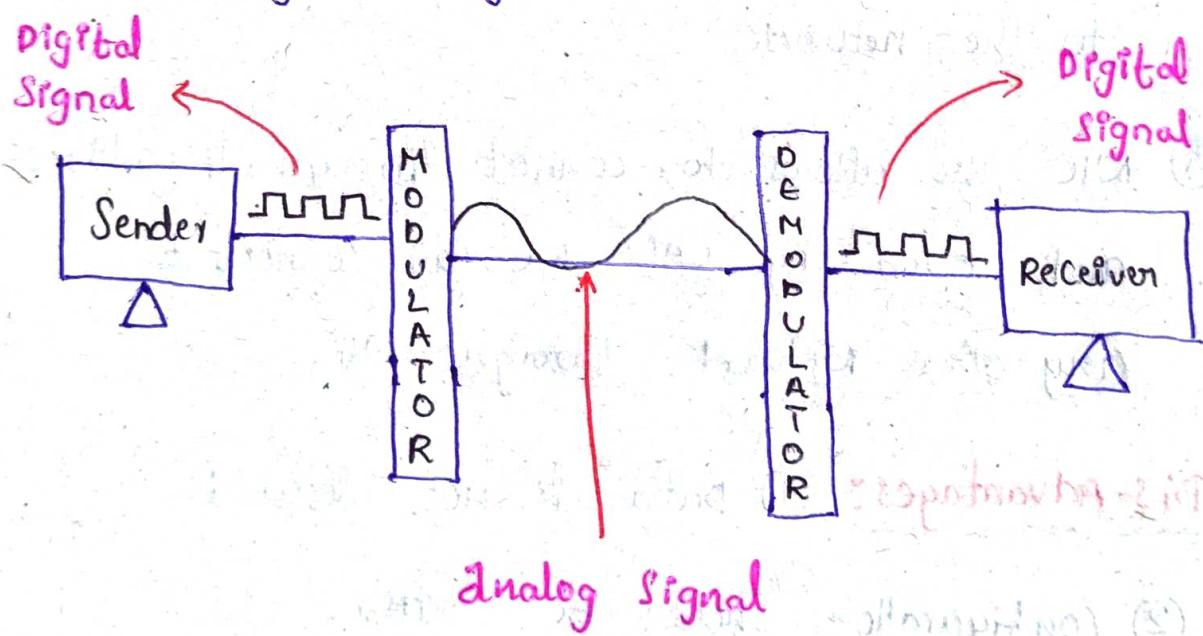
③ It is not portable in wireless connection of NIC.

Note:- MAC Address of NIC is of 48-bits.

MODEM NETWORK DEVICE

Modem :- Modem Stands for modulator & demodulator, it is a network device that is placed between the computer system and telephone line.

It has two parts Modulator & demodulator. Modulator convert digital signal to analog signal where as demodulator convert analog to digital signal.



Note :- It allows Computer to Connect to the Internet.

Advantages :- ① MODEM Consumes Digital signals

and also Liberates Digital signals.

② used to transfer data for Long Distances.

③ Transmission Rate is faster.

Dis-Advantages :- ① without Telephone line/wire we cannot send or receive the data.

② Transmission Rate is slow when the distance is More.

NETWORK PROTOCOL

Q) What is protocol? full explanation.

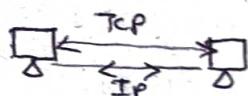
A) Protocol is a "Set of Rules" which are used in digital communication to connect network devices and exchange information between them.

Types of protocol :-

1) TCP / IP (Basic protocol).

Tcp : Used to Establish Connection b/w devices.

Ip : Used to Share data.



2) HTTP (Hyper Text Transfer protocol).

3) SMTP (Simple Mail Transfer protocol).

4) POP (Post office protocol).

5) IMAP (Internet Message Access protocol).

6) UDP (User Datagram protocol).

7) PPP (Point - to - Point Protocol)

8) FTP (File Transfer protocol).

TYPES OF PROTOCOL

As we know protocol is nothing but
"Set of Rules".

TYPES OF PROTOCOL :-

1) TCP/IP:-

TCP stands for Transmission Control protocol.

where as IP stands for Internet protocol.

TCP is used to transfer the data over the internet. It divides the data into small packets and sends it to the destination through the network.

While IP is used for addressing through which data reaches the final destination.

2) HTTP:-

HTTP is an application protocol that is used in the address bar of the web browser before www. whenever we search anything in the address bar of browser so it brings that website in front of us.

3) FTP:- FTP stands for file transfer

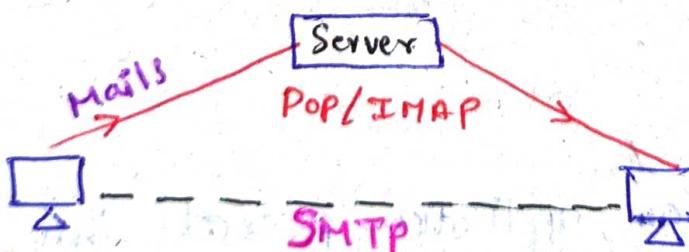
Protocol. It is used to transfer the file from Server to client and vice-versa. It uses the TCP/IP protocol to enable data transfer.

4) SMTP:-

SMTP stands for simple mail transfer protocol.

It is used to send and receive the emails in the network.

There are two more protocols used with SMTP (POP & IMAP). All these protocols work with the help of TCP/IP.



5) POP :- POP stands for post office protocol.

It is a Mail box which is actually a message access protocol through which a user can fetch the email from the server.

POP Protocol works up on TCP/IP Protocol and helps the SMTP Protocol from End to End communication. If the mail is Deleted, Backup is not possible from the Server as it pops the mail after sending mail to the receiver. There will be no duplicates remain if receiver Delete's mail.

6) IMAP :- IMAP stands for Internet mail access protocol. It is also a mail box which is actually an improved version of POP.

By using IMAP the main advantage is we can retrieve our deleted email from the server i.e., Backup is possible.

Duplicates ~~Remains~~ in Server.

7) PPP :- PPP stands for point-to-point protocol. It is used to transfer data between two directly connected devices.

8) UDP :- UDP stands for User datagram Protocol. It is an unreliable and connectionless protocol so, in order to send the data from one machine to another machine . we did not establish any connection in compare to TCP/IP protocol.

It is used to transfer the data in a short distance.

Protocols

Port No.

FTP → 21

SMTP → 25

PPP → 110

IMAP → 143

HTTP → 80

HTTPS → 443

Difference Between TCP and UDP.

A) TCP

TCP is a connection oriented Protocol.

It is reliable.

It is slower than UDP.

The header size of TCP is 20 bytes.

Retransmission of lost packets is possible.

It uses HTTPS, HTTP, SMTP, FTP, etc.

UDP

UDP is a connectionless protocol.

It is not reliable.

It is faster than TCP.

UDP header size is 8 bytes.

Not possible.

It uses video conferencing, DNS (Domain name server) etc.

TRANSMISSION MODE

Q) What is transmission mode?

A) Transmission mode means transferring of data b/w two devices connected over a network.

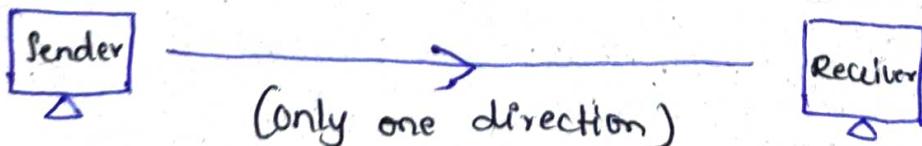
It is also known as Mode of Communication.

There are three types of transmission modes:

- I > Simplex
- II > Half-duplex
- III > Full duplex

I) Simplex Mode- In this Mode of Communication data can be sent only one direction. (Uni-directional).

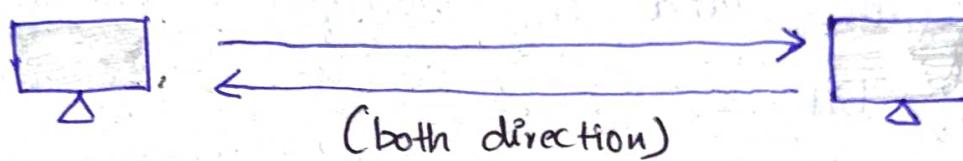
Ex :- loudspeaker, keyboard, monitor etc...



[Simplex mode.]

② Half-duplex Mode:- In this Mode of communication a Sender can send the data as well as receives the data but not at the same time.

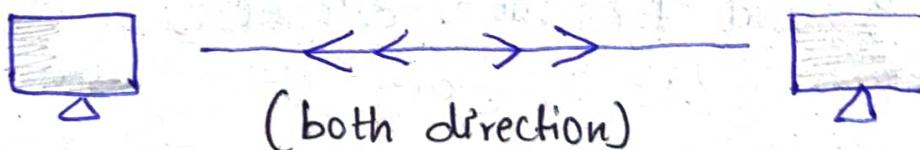
Ex :- Walkie-talkie



[Half-duplex mode.]

③ full-duplex Mode:- In this mode of communication the Sender can send as well as receive the data, on the other hand the receiver can receive as well as send the data at the same time.

Ex :- Telephone network.



[Full-duplex mode.]

Data Transmission

Q) What is Data transmission? full explanation.

A) Data transmission refers to the process of transferring the data b/w two or more digital devices in Analog OR digital format. This data is transferred in the form of bits.

types of Data transmission :-

Data transmission

Parallel

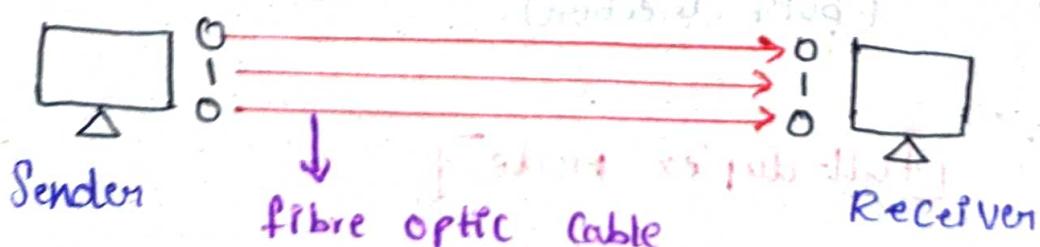
Serial

Synchronous

Asynchronous

Parallel Data transmission

Parallel Data transmission Sends multiple data bits at the same time over "multiple channels". used for short distance.

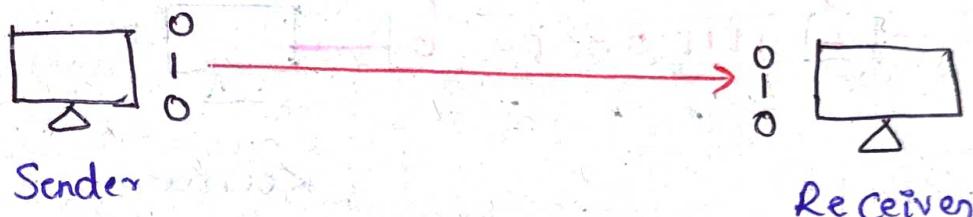


Advantages: Data will be transferred at one time.

Disadvantages: It is expensive, as we need separate cable for each bit of data.

Serial data transmission :-

Serial data transmission sends data bits one after another over a single channel.

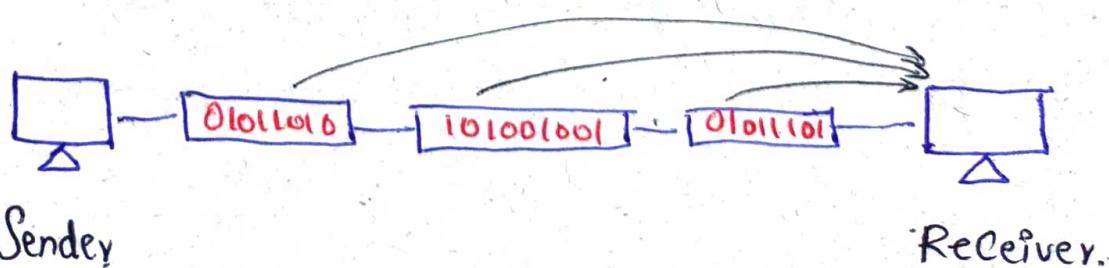


Advantages: Less Expensive

Disadvantages: Takes more time to transfer,
Used in long distances.

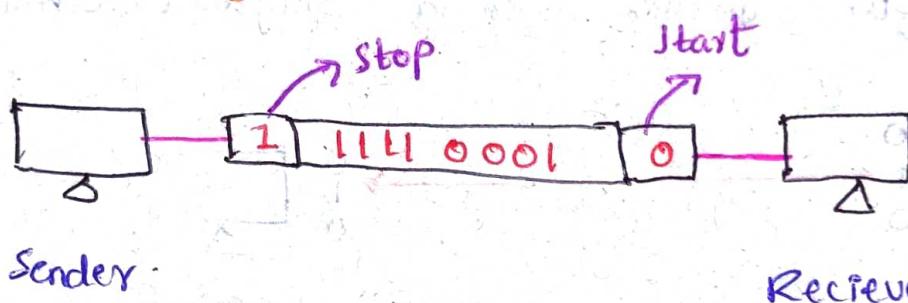
Synchronous:- In Synchronous transmission,
a lot of data is sent in a block.

Each block has many characters.



Asynchronous:- The asynchronous transmission only one character is sent at a time. Whether that character is a number or alphabet.

It uses start & stop bits for transferring data.



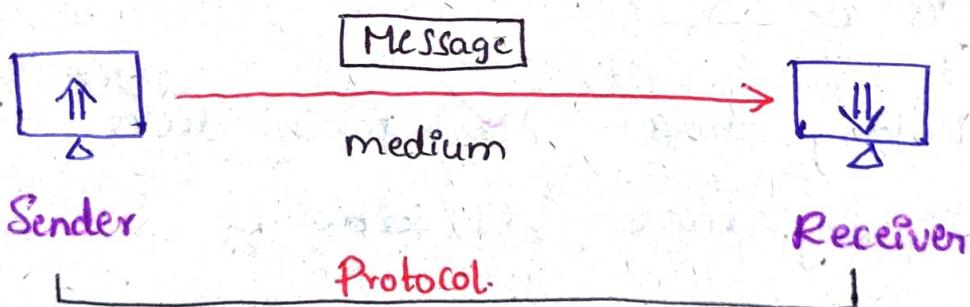
Data Communication

Q) What is data communication? full explanation.

A) Data communication is the process of sending or receiving digital data between two or more computers via transmission medium such as a wire cable or wireless.

Components of Data-Communication:

- Data Communication System has five components.
 - I) Message
 - II) Sender
 - III) Receiver
 - IV) Transmission Medium
 - V) protocol.



Without a protocol we can't connect or share data.

Networking MCQ's

- Q) What was the first computer network name?
- (a) ARPANET (b) UNIVAC
(c) SNOBOL (d) All of above.
- Q) POP stands for ____?
- (a) protocol of post (b) post office protocol
(c) pre office protocol (d) None.
- Q) How many layers are in the OSI Model?
- (a) 1 layer (b) 3 layers
(c) 5 layers (d) 7 layers.
- Q) HUB is a ____?
- (a) Calculating device (b) Network device
(c) Computing device (d) software.
- Q) IP stands for ____?
- (a) Internet protocol (b) Intranet protocol
(c) Internal protocol (d) Internet post

Q) _____ is a network of networks?

- (a) webpage
- (b) Intranet
- (c) Cookies
- (d) Internet

Q) _____ was the first network based on TCP/IP protocol.

- (a) Ethernet Card
- (b) Hub
- (c) Router
- (d) None of these

Q) Home page is in form of _____?

- (a) Text
- (b) Hypertext
- (c) Hyperlink
- (d) All of these.

Q) A collection of hyper linked documents on the internet called _____?

- (a) WWW
- (b) Internet
- (c) Email
- (d) HTML

Q) WWW stands for world wide web.

Q) The location of a resource on the internet is given by its _____.

- (a) protocol
- (b) URL
- (c) IP
- (d) Email

- Q) URL stands for _____
- (a) Uniform Research Locator (b) Uniform Resource Location
 (c) Uniform Resource Locator (d) None.
- Q) Web browser is/are _____
- (a) Google Chrome (b) Firebox
(c) Opera (d) All of above.
- Q) Which of the following is the most common Internet protocol.
- (a) SMTP (b) PPP
(c) FTP (d) TCP/IP
- Q) FTP refers to File transfer protocol.
- Q) X.25 is _____?
- (a) layer (b) scheme
 (c) protocol (d) packeting
- Q) Which of the following is not a network topology?
- (a) STAR (b) BUS
(c) RING (d) Peer-to-Peer

a) The port no. of FTP is —?

- (a) 21 (b) 23
(c) 110 (d) 143

Q) How long is an IPv6 address?

- (a) 16 bits (b) 32 bits
(c) 48 bits (d) 128 bits

Q) How long is an IPv4 address?

- (a) 16 bits (b) 32 bits
(c) 64 bits (d) 128 bits

Q) How many versions available of IP?

- (a) 6 (b) 4 (c) 2 (d) 1

Q) LAN refers to Local area network.

Q) Full form of ARPANET?

• Advance Research project agency network.

Q) Which of these is part of network identification?

- (a) User ID (b) Password (c) O.T.P (d) Fingerprint.

Q) When the Mail Server sends mail to Other mail Server it is called ____?

(a) TCP/IP (b) SMTP

(c) MIME (d) FTP

Q) MIME Stands for ____?

• Multipurpose Internet mail extension.

Q) 143 port no. refers to ____?

(a) FTP (b) SMTP

(c) IMAP (d) Pop

Q) bps stands for ____?

(a) byte per second (b) bit per second.

(c) butane per second (d) All of above.

Q) Bps stands for ____?

(a) Byte per second (b) bit per second

(c) Bitcoin per second (d) None.

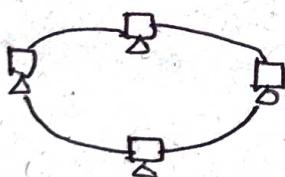
Q) Bluetooth is a example of ____?

(a) VPN (b) LAN

(c) WAN (d) PAN

- Q) Server provides —?
- (a) Security (b) back-up
(c) Storage (d) All
- Q) The collection of h/w that can be joined together?
- (a) intranet (b) Extranet
(c) Internet (d) ARPANET
- Q) Which h/w device is used to connect two dis-similar type of network.
- (a) HUB (b) SWITCH
(c) BRIDGE (d) Gateway

Q)



is the example of —?

- (a) STAR topology (b) RING topology
(c) Mesh topology (d) TREE topology

- Q) Which device converts digital signal to analog signal and vice-versa?
- (a) MODEM (b) ROUTER
(c) REPEATER (d) None

Q) Which device is used to boost-up the weak signal?

(a) Router (b) ~~Repeater~~

(c) Gateway (d) Switch

Q) node also known as ____?

(a) Computer (b) data

(c) Link (d) None

Q) PPP stands for ____?

(a) pre plane project (b) Primary Pre Position

(c) point-to-point protocol (d) None

Q) How long is an MAC address?

(a) 16 bits (b) 32 bits

(c) 64 bits (d) ~~48 bits~~

Q) FM stands for

(a) file model (b) frequency model.

(c) frequency modulator (d) none

Q) AM stands for

• Amplitude Modulation

Q) Set of rules defines?

- (a) FTP (b) HUB (c) protocol (d) None.

Q) NIC stands for —?

- Network Interface Card.

Q) Wi-Fi stands for —?

- Wireless fidelity.

Q) Work station also known as —?

- (a) node (b) WWW (c) Internet (d) none

Q) Port no. of SMTP is —?

- (a) 143 (b) 25 (c) 110 (d) 99

Q) Port no. of POP is —?

- (a) 110 (b) 43 (c) 25 (d) 48

Q) Which of one is the not type of computer networks?

- (a) LAN (b) MAN (c) HUB (d) PAN.

Q) _____ allocate and manage resources for a network.

- (a) Server (b) node (c) bluetooth (d) none.

Q) _____ are the most common medium of communication.

- (a) Satellite (b) Cables (c) HUB (d) Switch

Q) Types of Serial Data transmission?

- Synchronous
- Asynchronous

IP Address

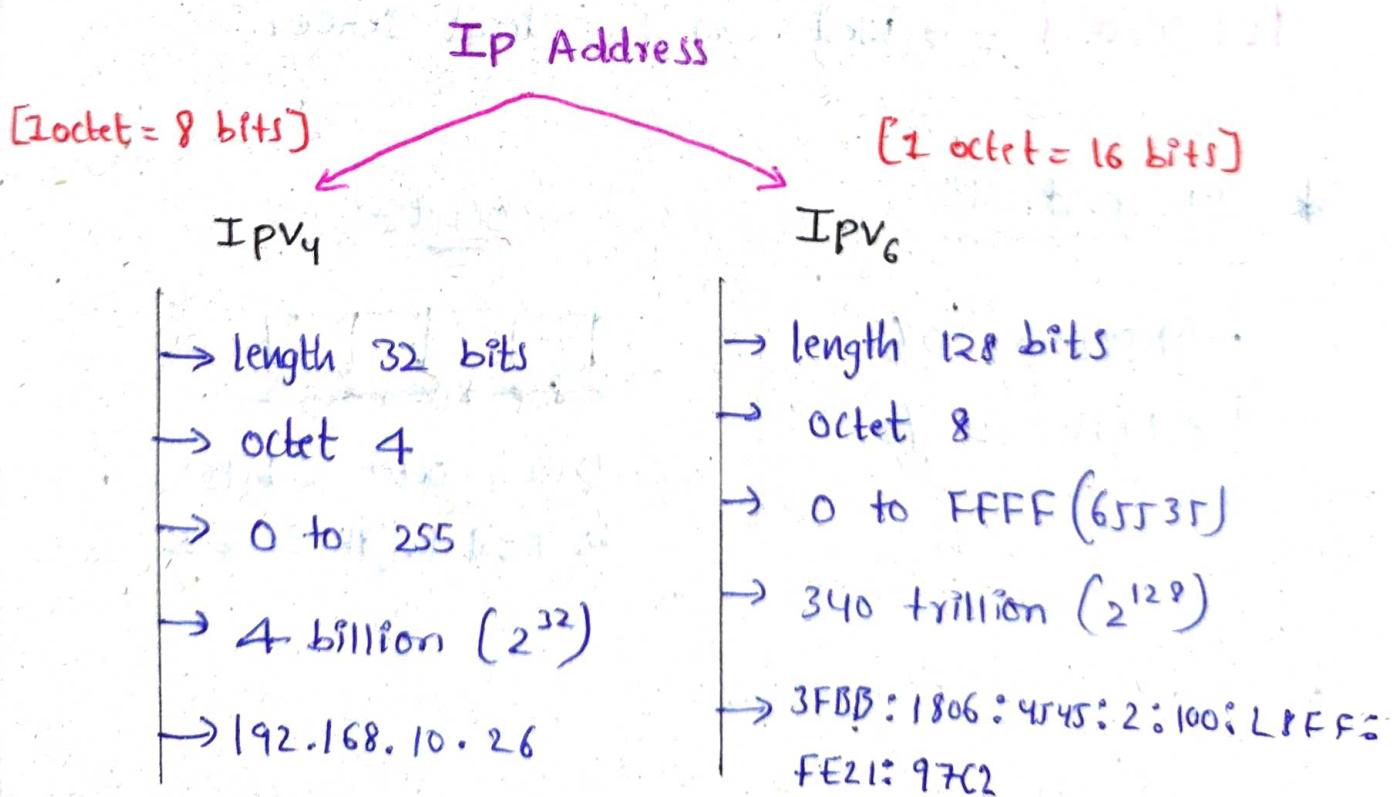
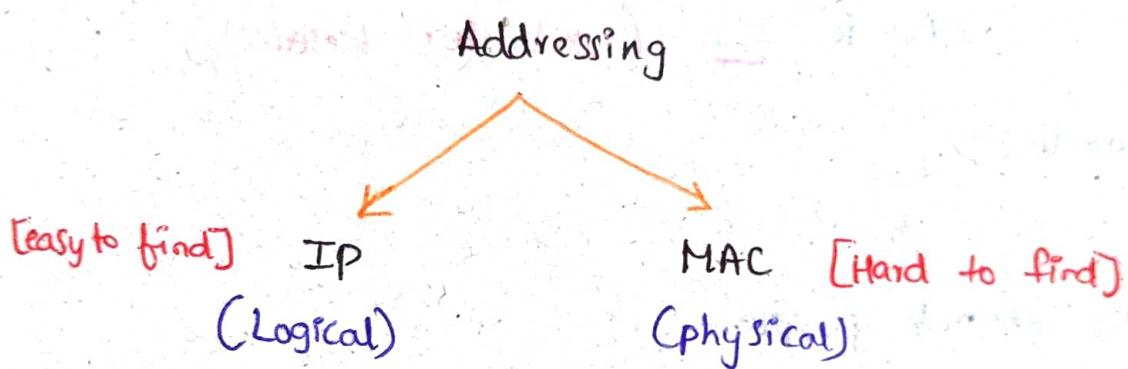
Q) What is IP address? full explanation.

A) IP Address Stands for "Internet protocol address".

An IP address is a unique number provided to each and every device.

It is in the form of integer number which is separated by dot(.)

Example:- 192.168.24.100



Uses of IP: 1) private IP
2) public IP

* Classes of IPs: **IPv4**

Class A \rightarrow 0 to 127 (125.255.23.17)

Class B \rightarrow 128 to 191 (191.23.28.144)

Class C \rightarrow 192 to 223 (192.204.10.114)

Class D \rightarrow 224 to 239 (Used for multicasting)

Class E \rightarrow 240 to 255 (Used for Research)

Special functioning

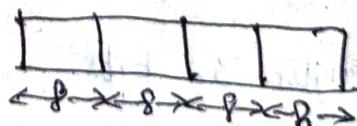
Used by us Normal people

127.0.0.1 \rightarrow Used as a local server.

* IP address:

- Network ID (1)
- Host ID (0)

Octet:



i) Each octet 8 bits

ii) Total length 32 bits

class A

| | | | |
|---|---|---|---|
| N | H | H | H |
|---|---|---|---|

class B

| | | | |
|---|---|---|---|
| N | N | H | H |
|---|---|---|---|

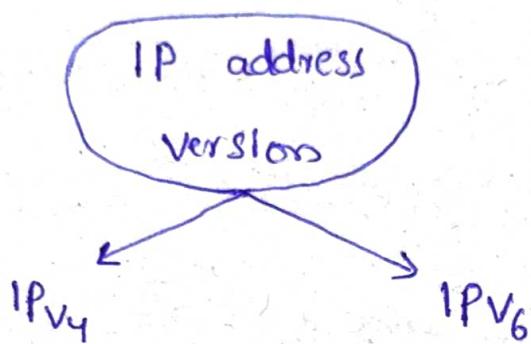
class C

| | | | |
|---|---|---|---|
| N | N | N | H |
|---|---|---|---|

IPV4 VS IPV6

IP address:- As we know IP address is a unique number which is provided to each and every devices.

Ex :- 192.168.243.120



Q) Difference b/w IPV4 & IPV6 ?

A)

IPV4

IPV6

① The length of IPV4 is 32 bit.

② The IPV4, around 4 billion Unique IP addresses are generated (2^{32}).

③ The range of IPV4 address is 0 to 255

① The length of IPV6 is 128 bit.

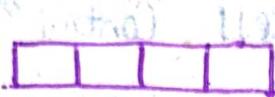
② In IPV6, around 340 trillion Unique IP address are generated (2^{128}).

③ The range of IPV6 address is 0 to FFFF (65535)

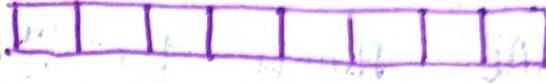
Ex :- 192.255.108.253

Ex :- 2001:13B8:1904:FB93:
1800:1751:CHBA:0

④ It consists of 4 octets, each has 8 bits.



④ It consists of 8 octets, each has 16 bits.



⑤ IPv4 is a numeric address separated by · (dot).

⑤ IPv6 is a alphanumeric number separated by colon (:).

⑥ IPv4 has total five classes

⑥ It doesn't have any class.

MAC Address

- Q) What is MAC Address? full explanation.
- A) MAC stands for "media access control" address, it is also known as physical address or hardware address.
MAC address is a unique and permanent address for all electronic and networking devices.

MAC address format :- S = Service
 M = manufacturer

I) MM : MM : MM : SS : SS : SS

II) MM - MM - MM - SS - SS - SS

III) MMM . MMM . SSS . SSS

Example:- 3C:D9:2B:6f:2b:9C

First 6 digits are manufacturer's ID.

If we Google these 1st 6 digits, It will give us the info of manufacturer.

The remaining will be unique.

The above 6 digit Mac is of HP Company.

The Starting 6 Digits is known as OUI

[Organisational Unique Identification.]

The Next Digits are unique and are assigned in NIC Card(Hardware).

- MAC address is a 12-digit Hexa-decimal number.
- Length is 48 bits
- It's hard to reach a device using MAC address without MAC address we can't connect to any Network or Internet.

Use :- ① Device tracking

② Connection

③ Security

3C : D9 : 2B : 6f : 2b : 9C

Country State Company what device?

IP VS MAC

Q) Difference between IP and Mac address?

A)

IP

Mac

- | | |
|---|---|
| <p>① IP stands for Internet protocol.</p> | <p>① Mac stands for Media access control.</p> |
| <p>② IP address is a logical address.</p> | <p>② Mac address is a physical address.</p> |
| <p>③ Easy to reach.</p> | <p>③ Hard to reach.</p> |
| <p>④ The length for IP is 32 bit for IPv4 and 128 bit for IPv6.</p> | <p>④ The length of Mac address is 48 bits.</p> |
| <p>⑤ Internet Service Provider (ISP) provides IP address.</p> | <p>⑤ NIC Manufacturer provides the Mac address.</p> |
| <p>⑥ We can change the ip address of any device at any time.</p> | <p>⑥ Mac address can be changed only, if we change the LAN card of that device.</p> |
| <p>⑦ Identifies a connection to a network.</p> | <p>⑦ Identifies a device.</p> |

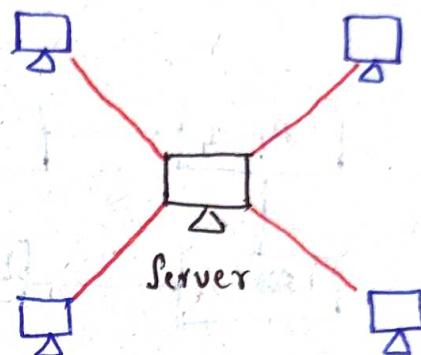
SERVER

Q) What is Server? full explanation?

A) Server is a main computer of any network that fulfills the request of other computers.

Advantage:-

- ① Back-up
- ② Works for Both LAN & WAN



Dis-Advantages:-

- ③ Security
- ④ Storage ↑
- ① Server fail → Network fail.
- ② Too Expensive

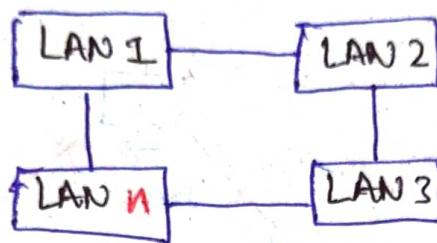
Types of Server:-

- I) File Server: Stores or Distributes files through ftp.
- II) Application Server: Used to Run Applications.
- III) Mail Server: Used to Send & Recieve Mails by SMTP.
- IV) Web Server: for fetching websites by https.
- V) Database Server: Stores the Data and we can access it.

INTERNET

Q) What is Internet? full explanation.

A) Internet is a network of Networks that is used to interlink many different types of computers all over the world.

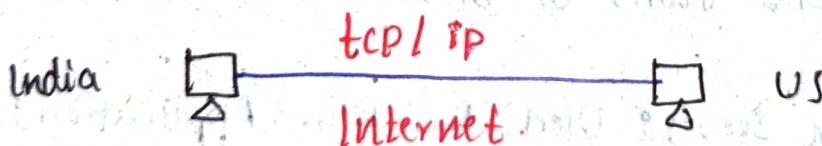


WAN (Internet).

American Defense invented the Internet first.

The first Internet (Network) is ARPANET.

Now this network is called Internet.



DNS

Q) What is DNS ? full explanation.

A) DNS stands for "Domain name system".

It is an automatic process that converts the domain name to its corresponding

ip address (number) so, that web browser

can understand which webpage you

want to access on the Internet.

Without DNS we can't access any website,

We need to enter the website ip address

to do so. Web browser understands websites

ip address only not the domain names.

→ Domain Name

Cricbuzz ↗

192.168.20.162 ↗

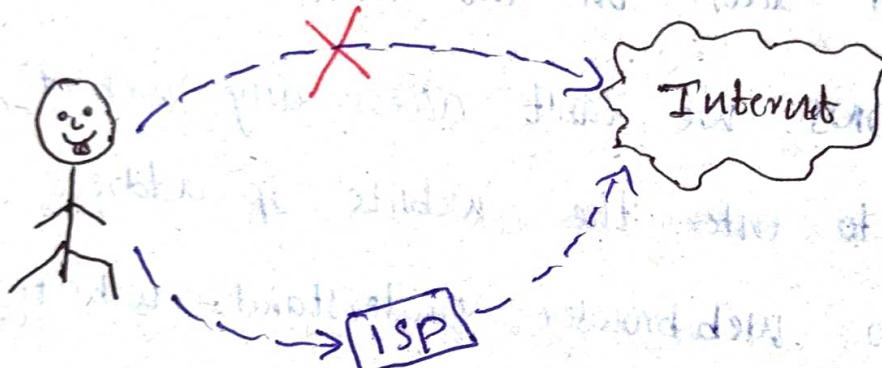
→ IP address

Remembering ip address is a tedious process
so DNS was invented.

ISP

Q) What is ISP? full explanation.

A) ISP stands for "Internet Service Provider". It is a company which provides internet service to its customers called ISP. Other than Internet ISP provides the privileges of Emailing, Webhost, Domain key, file transferring.



Category of ISP:-

- I > Tier 1 → for all over the World (AT & T, VSNL)
- II > Tier 2 → only for Country (JIO, airtel, idea, etc.)
- III > Tier 3 → only for City. (spectra, MTNL)

Internet VS Intranet

Q) Difference between internet & intranet?

A)

Internet

Internet is a public network.

Anyone can access the Internet

unlimited users

Internet is less secure.

Internet is a huge network consisting of LAN, MAN & WAN.

There is no owner of Internet.

Internet is a way to share information around the world.

Intranet

Intranet is a private network.

Only members of university, company can access intranet.

limited users.

Intranet is completely secure.

But, intranet is mostly dependent on LAN.

But, intranet has some owner.

Intranet is a way to share confidential information within an organisation.

NETWORK ARCHITECTURE.

Q) What is network architecture?

A) Network architecture means network layout that tells us how computers are arranged and how task are allocated to the computer.

Types of Network architecture:

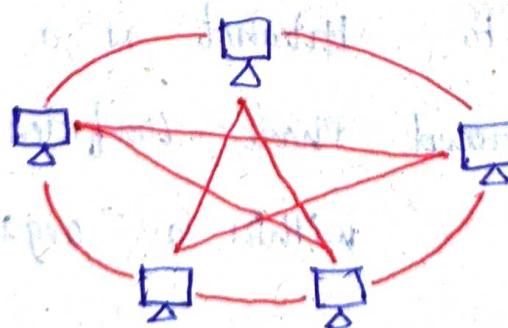
1) Peer - to - peer architecture.

2) Client - Server architecture.

Peer - to - peer architecture: Peer-to-peer network

also known as point - to - point network in which all the computers are directly linked together with equal privileges and responsibilities for sharing the data.

There is no server in it.



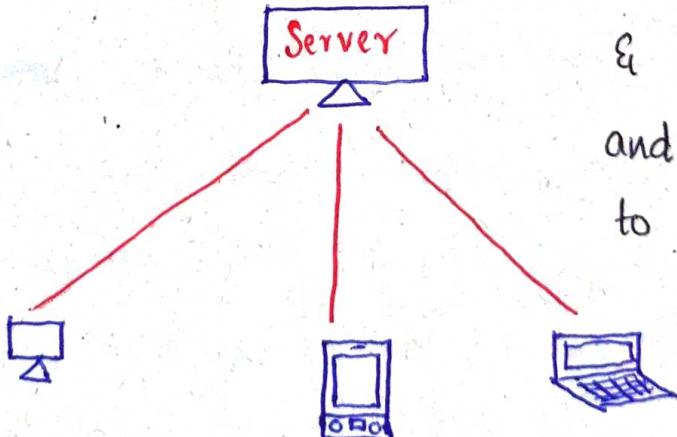
Advantages: ① It is a cheaper network, as it has no server.

- ② If one computer stops working it will have no effect on the other computers.
- ③ Its setup and maintenance is also easy.

Dis-Advantages: ① Security issues.

- ② We cannot backup the data because there is no server in this network.

Client - Server architecture: Client-server architecture also known as request-response architecture. In this architecture client makes a request to the server, an server will fulfill the response.



Server receives request & stores its ip address and sends the data to the computer with corresponding ip. address.

- Advantages :-
- ① It has a centralized system, from which data can be easily backed up.
 - ② Security is better in this network.
 - ③ entire system is maintained by the server.
 - ④ It also increases the speed of resource sharing.

- Dis-Advantages :-
- ① In case of Server failure entire network will be failed.
 - ② Server maintenance cost is high.

OSI MODEL

Q) What is OSI Model? full explanation.

A) OSI Stands for "Open System Interconnection" model, It has been developed by standard organization ISO (International organization for Standardization) in the year 1984.

Note :- ① It is a 7 layer architecture where each layer having specific functionality.

② All these 7 layer work Collaboratively to transmit the data from one place to another across the globe.

The 7 layers are:

1. Application layer: At the very top of the OSI

Reference Model stack of layers.

7th

- This layer produce data, which has to be transferred over the network.
- This layer also serves as a window for the application services to access the network.
- Ex: Application: Brower, whatapp, etc.

- Functions of Application Layer are:

- a) Network Virtual Terminal
- b) File Transfer Access and management
- c) Mail Services
- d) Directory Services.

2. Presentation layer :-

- Presentation Layer is also known as Translation Layer.
- The data from the application Layer is extracted here and manipulated as per the required format to transmit over the network.
- Functions of Presentation layer are:
 - a) Translation
 - b) Encryption / Decryption
 - c) Compression.

3. Session layer :-

- This layer is responsible for establishing Connection, maintenance of session, authentication, ensure security. Functions are:
 - a) Synchronization.
 - b) Dialog Controller - allows 2 systems to

Start Conversation / communication.

4. Transport Layer:-

- The data in the transport layer is transferred to as segments.
- It is responsible for the end to end delivery of the complete message.
- Functions of Transport Layer -
 - a) Segmentation and Reassembling of data.
 - b) Service point Addressing: In order to deliver the message to correct person, transport layer header includes a type of address called Service point address or port address.

4th

5. Network Layer:-

- Network layer works for the transmission of data from one host to the other located in different networks.
- It also takes care of packet routing i.e. Selection of the shortest path to transmit packet from the no. of routers available.

3rd

- Functions of network layer are -

- a) Routing
- b) Logical Addressing

6. Data Link Layer :-

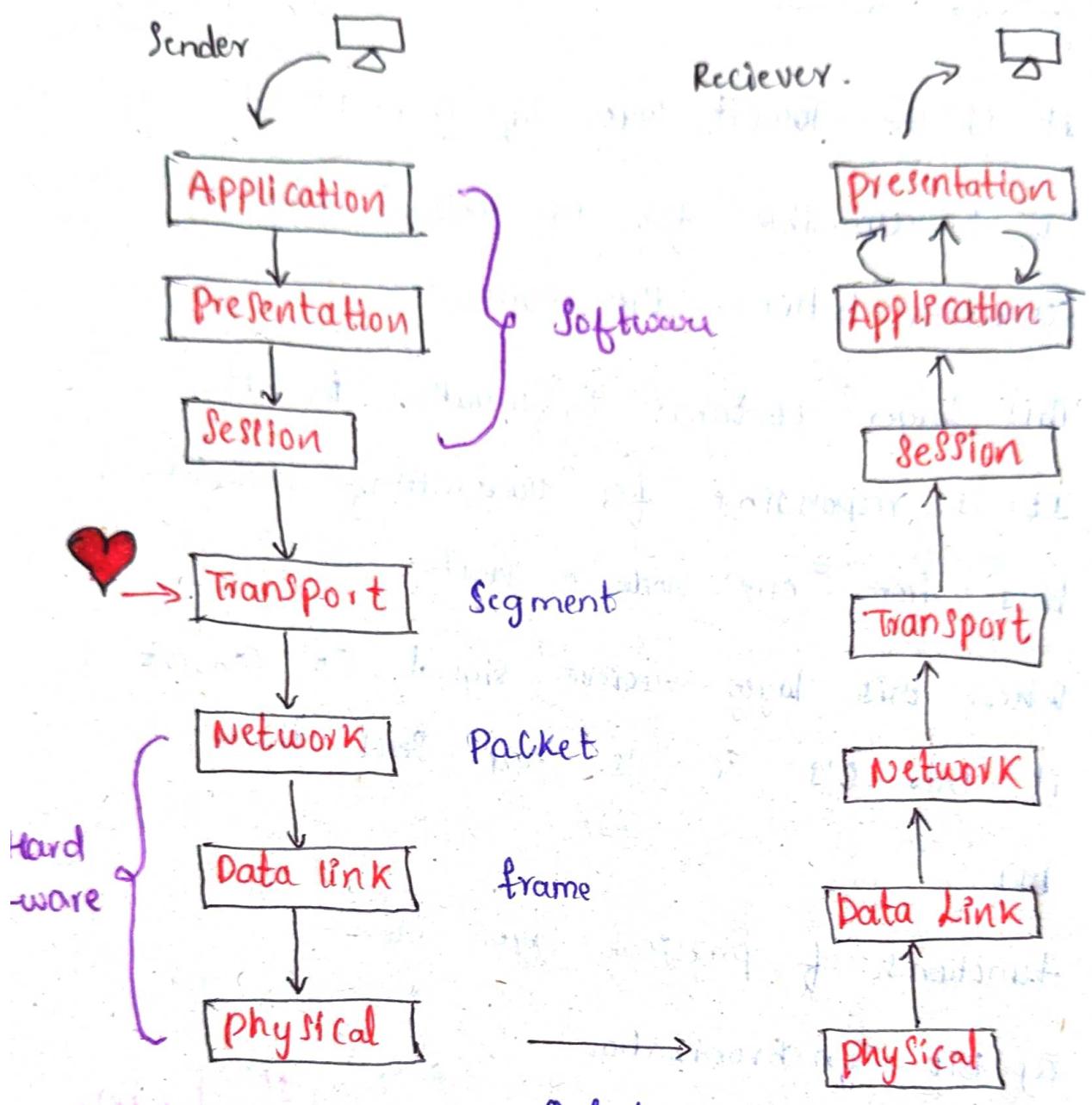
- This layer is responsible for the node to node delivery of message.
- The main function of this layer is to make sure data transfer is error free from one node to another.
- When a packet arrives in a network, it is responsibility of DLL (Data Link Layer) to transmit it to host using its MAC address [Media Access control Address].
- Functions of Data Link Layer -

- a) Framing
- b) physical Addressing
- c) Error control
- d) Flow control

7. Physical Layer:- Hub, Repeater, Modem are physical layer devices.

- It is the lowest layer of OSI model.
- It is responsible for the actual physical connection between the devices.
- This layer contains information in bits.
- It is responsible for transmitting individual bits from one node to next.
- When this layer receives signal, it converts it into 0's & 1's and send them to DLL.
- Functions of physical layer are -
 - a) Bit synchronization
 - b) physical Topologies.

1st layer.



GUIDED V/S UNGUIDED MEDIA

Q) Difference between Guided & Unguided Media?

A) Guided (Wired).

Guided media uses a physical path or conductor to transmit the signals.

It provides direction to signal for travelling
signal transmission speed
is generally faster.

Ex:- twisted pair cable,
Coaxial cable &
Optical fibre.

Unguided (Wireless).

Unguided media broadcast signal through the air.

It does not provide any direction.

Signal transmission speed is generally slower than guided media.

Ex:- radio wave, microwave
& infrared signals.

Transmission

