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TY BTech EXTC
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CCN - Assignment I

Q1] Describe the components of data communication system with suitable diagram.

→ Message :- A message is an information that is to be communicated Popular forms of information include text, numbers, pictures, audio and video.

Sender :- The sender is the device that sends the data message. It can be a computer, workstation, telephone handset, video camera, etc.

Receiver :- It is a device that receives the message. It can be a computer, telephone handset, television, etc.

Transmission Medium :- It is a physical path by which the message travels from sender to receiver. Some examples of transmission medium includes twisted pair cable, co-axial cable, fibre optic cable, etc.

Protocol :- A protocol is a set of rules that governs data communication. It represents an agreement between a communicating device. Without a protocol, two devices may be connected but not communicating

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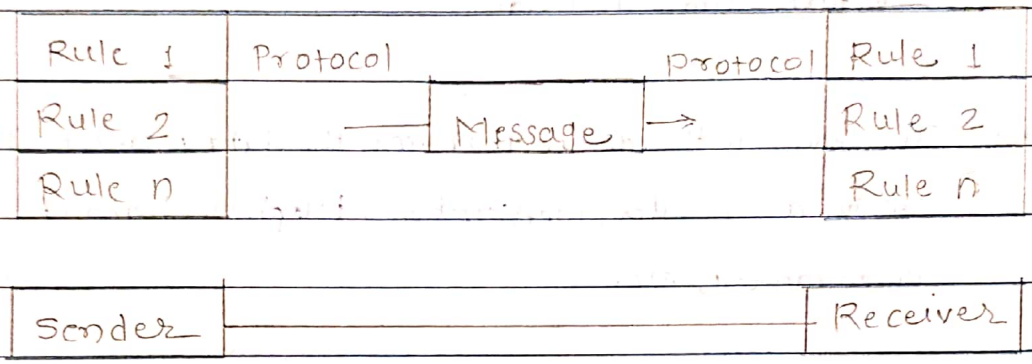
Example :- Its just as if two people are conversing with each other in different languages, and hence could not understand anything that the other person says. Hence, protocols are important.

Diagram:- Five components of Data Communication System

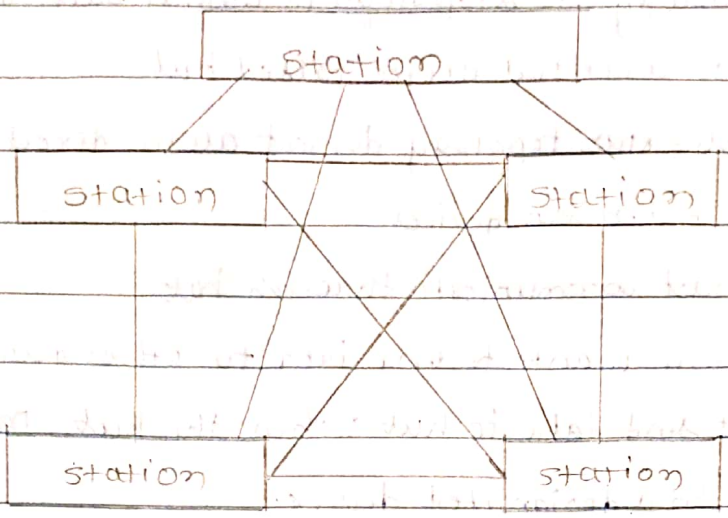


Q2.] Describe the different topology of network.

→ There are five types of topology in a computer network :-

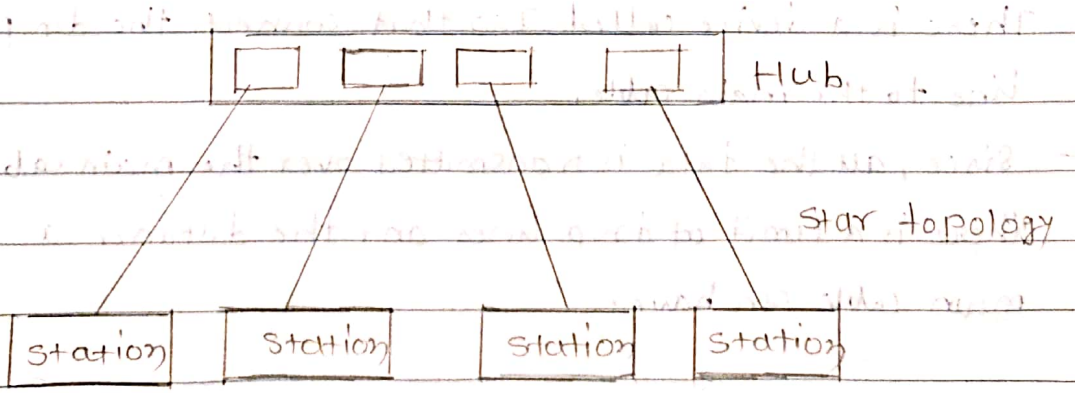
i) Mesh topology
ii) Star topology
iii) Bus topology
iv) Ring topology
v) Hybrid Topology

i) Mesh topology :-



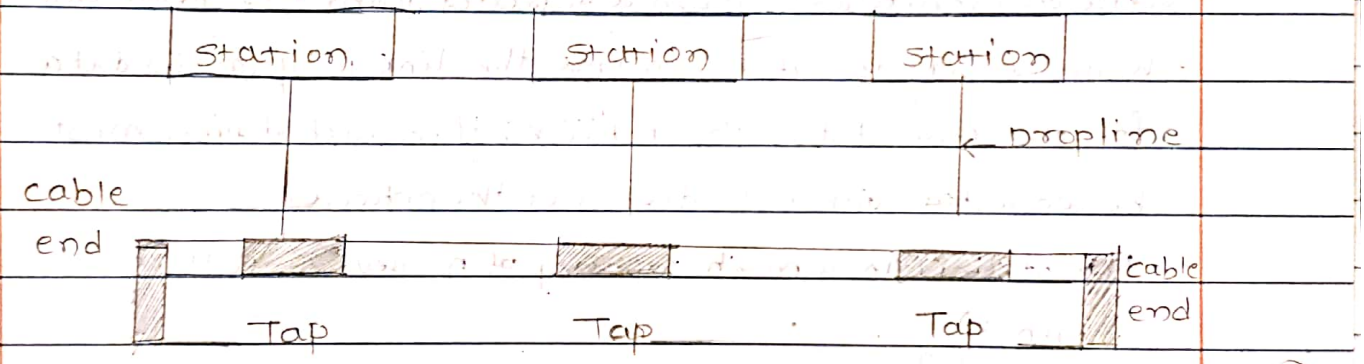
- In mesh topology each device is connected to every other device on the network through a dedicated point-to-point link.
- When we say dedicated, it means the link only carries data for two connected in the network; then each device must be connected with (n-1) devices of the network.
- No. of links in a mesh topology of n-devices will be $(n)(n-1)/2$.

ii) Star Topology :-



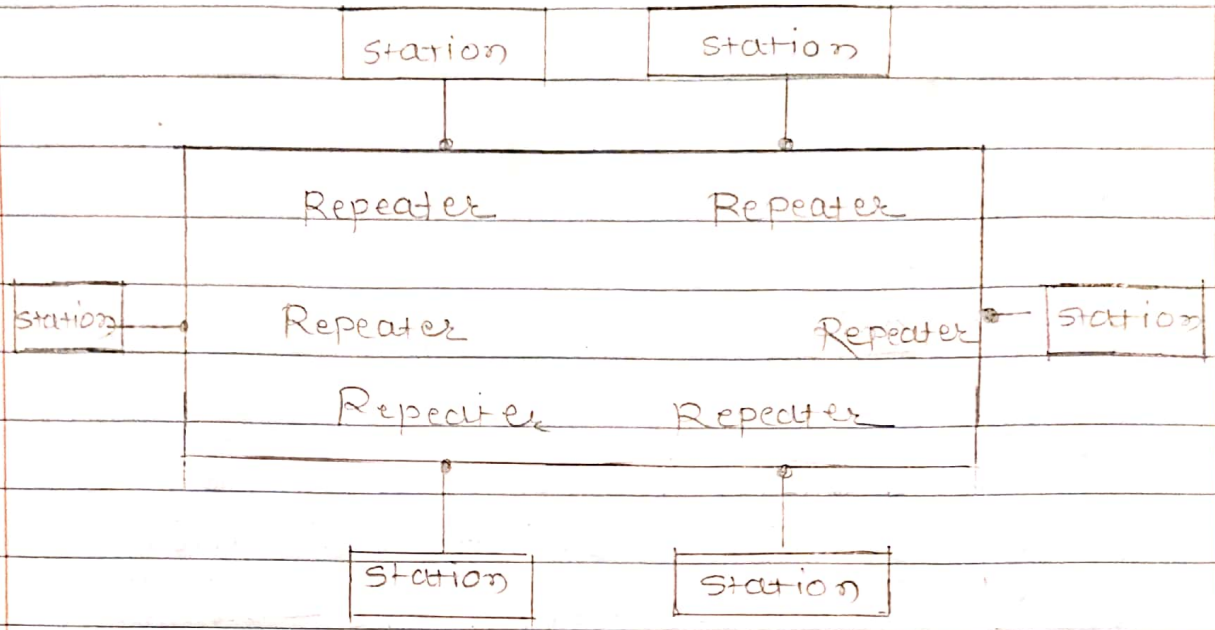
- A star topology, is a topology in which each device is connected to a central device called hub.
- Unlike mesh, star topology doesn't allow direct communication between devices.
- A device must communicate through hub.
- If one device wants to send data to other device it has to first send data to hub & then the hub transmits that data to a designated device.

iii) Bus Topology :-



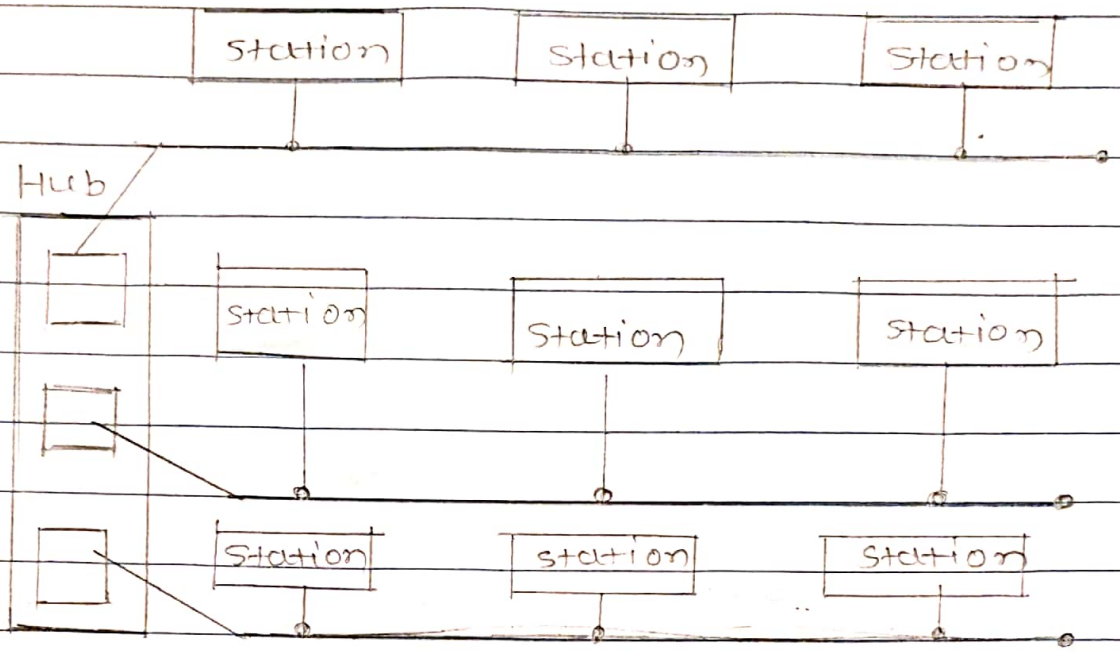
- In bus topology, there is a main cable and all devices are connected to this main cable through drop lines.
- There is a device called Tap that connects the drop line to the main cable.
- Since, all the data is transmitted over the main cable, there is a limit of drop lines and the distance a main cable can have.

iv) Ring Topology :-



- In ring topology, each device is connected to two devices which are connected on either side of it.
- There are dedicated point to point links.
- The structure form a ring thus it is known as ring topology.
- If a device wants to send data to the another device then it sends data in one direction.
- Each device in a ring topology has a repeater. If the received data is intended for the other device repeater, then repeater forwards this data until the intended device receives it.

v) Hybrid Topology :-



- A combination of two or more topology is a hybrid topology.
- Eg: A combination of a star & mesh topology is hybrid topology.

Q3] How are OSI and ISO related to each other?

→ i) ISO stands for International Standards Organisation & OSI stands for Open System Interconnections.

ii) ISO is a multinational organization that tries to standardize network communication protocol at the international level.

iii) OSI is a model that ISO put together as a Network Communication Standard.

Q4] Match the following to one or more layers:

a) Route Determination :

Route determination is carried out in the Network layer, i.e., layer 3.

b) Flow control :

Flow control is done in transport layer; i.e., layer 4

c) Interface to transmission media

It is seen at Physical layer, i.e., layer 1.

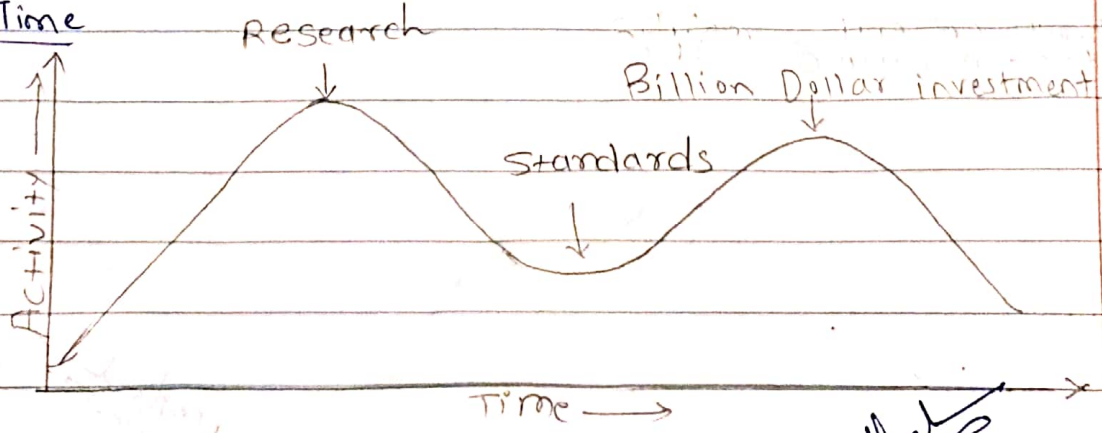
d) Provide access for the end user

It happens at Application layer (layer 7)

Q5] Explain the critiques of OSI model and protocols and TCP/IP reference model.

→ Neither OSI model & its protocol nor TCP/IP protocol & its model are perfect.

1) Bad Time



1. Standard that has been written in between through. If written too early, subject is poorly understood. If written too late, it is ignored by companies.
2. It now appears that OSI protocols got crushed.
3. TCP/IP is already wide spread by research universities.
4. While the billion dollars wave of investment is not yet hit, the academic market was large enough that under or were offering TCP/IP products.
5. With every company waiting for other company; to go first, OSI never happened.

2.) Bad Technology:-

i) The reason that OSI never caught is that model and protocol both were flawed. Presentation & session layer were nearly empty.
ii) OSI model was complex.
iii) The functions like flow control, error control reappears again and again.
iv) Bulky solutions which were difficult to understand.

3.) Bad implementations :-

i) Because of the complexity of model, and protocol ; initial implementation were huge, unwidely & slow.
ii) In contrast, one of the first implementation TCP/IP was part of Berkeley UNIA & was quite good.

4.) Bad Politics :-

i.) TCP/IP & UXIX was much loved in academia.
ii) ISO & OSI 7 layer model thought to be a creation of :-
   (.) European Telecommunication
   (.) European Community
   (.) Government of USA
   (.) Thought to be inferior to TCP/IP
iii) People on the ground reacted badly & supported TCP/IP.

Critiques of the TCP/IP model :-

1. Service, interface & protocols are not clearly distinguished.
2. TCP/IP model is not at all general and is poorly suited to describe protocol stack other than TCP/IP.
3. The link layer is not really at all not in the normal sense.
4. The TCP/IP model doesn't distinguish between physical & data link layer.

5. The protocols implementation were distributed free & resulted in becoming widely used deeply entrenched & thus hard to replace.

Q6.] What is the difference between Network layer delivery & Transport layer delivery.

Network layer Delivery	Transport layer Delivery
i) The unit of communication at the network layer is datagram (packet)	i) The unit of communication at the transport layer is a segment, depends on protocol used in this layer.
ii) It is related to the delivery of packets across various networks from source to destination.	ii) It is related to the delivery of entire message from source to destination.
iii) It provides connection services, flow control, error control & packet sequence control.	iii) It can be either connection less or connection oriented.
iv) It translates logical network address into physical machine address.	iv) It divides each message into packets at sources & reassembles them at the destination.

Q7.) What is the difference between port address, logical address and physical address?

→

a.) Logical address :-

i) An IP address is called logical address.

ii) It is the combination of net ID & host ID.

iii) Through logical address the system identifies a network.

iv) Logical address can be changed by changing the host position on the network. So, it is called logical address.

b.) Physical address :-

i) After identifying the network, physical address is used to identify the host on that network.

ii) Each system has Network Interface Card (NIC) through which 2 systems are physically connected to each other.

iii) The address of NIC is called Physical or MAC address.

iv) This is specified by the manufacturer company of card.

v) It is used by data link layer.

c.) Port Address :-

i) Port address is used to identify the particular application running on the destination machine.

ii) Various applications run on compiler. Each application on port no.

iii) Port number is decided by the Kernel of the OS.

Q8.] Name the services provided by the application layer in internal model.

→ The service provided by the application layers in internet model are:-

(i) Network Virtual Terminal.
(ii) File transfer, Access & Management
(iii) Mail services
(iv) Directory Services.

Q9.] What are the two reasons for using layered protocols? What is one possible disadvantage of using it?

→ Reasons for using layered protocols are:-

i) Protocol layering enables us to divide complex task into smaller & smaller tasks.
ii) You can make changes to one layer with one affecting the other layer. This is referred to as modularity.
iii) It allows to separate the services from implementation.

Disadvantages of using Layered Protocols are:-

i) The processing & data overhead.
ii) When there are 5 layers involved in sending something out, could negatively affect the performance.
iii) The whole system is very expensive.

Q10:] List two advantages & two disadvantages having an International Standards for Network Protocol.

→ Advantages:-

i) Many computers from all over the world can connect together, because they are using international standard.
ii) Easier maintenance & installation.

Disadvantages:-

i) If problems occur in standards then it will be an international problem.
ii) All companies and manufacturers must follow the standards instead of developing new techniques.