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Section A

Q What is a network? Types of network.

Ans A computer network is a group of computers linked to each other that enables the computer to communicate with another computer and share their resources, data, and application.

A computer network can be categorized by their size. According to size it is mainly of 4 types.

1. LAN (Local Area Network)
2. PAN (Personal Area Network)
3. MAN(Metropolitan Area Network)
4. WAN(Wide Area Network.

Q Need of defining topology and factor considered.

Ans Network Topology plays a significant role in the functioning of the network.

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The performance of the network is totally dependent on the network topology we defined. It helps in reducing the operational, maintenance and cabling cost.

Factors to be considered are :-

1. Budget
2. Hardware resources.
3. Ease of Implementation.
4. Size of Network
5. Reliability

20) Why CSMA/CD cannot be used in wireless networks ?

Ans The CSMA/CD works well in wired networks. But for wireless networks, there is no way for the sender to detect collisions for the same way CSMA/CD does since

the sender is only able to transmit and receive packets on the medium but is not able to sense data traversing that medium.

Q2) What is Hamming distance? Explain with example.

A Hamming distance in information technology represents the number of points at which two corresponding pieces of data can be different. It is used in various kind of error detection.

Example :- The symbols may be letters, bits or decimals, digit, among other possibilities :-

- 1011101 and 1001001 is 2
- 2173896 and 2233796 is 3
- "Kathrin" and "Kerstin" is 4

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Section-B

5a) What is sliding window protocol explain with suitable example.

B) Sliding window protocols are data link layer protocols for reliable and sequential delivery of data frames. The sliding window is also used in Transmission Control protocol (TCP). In this protocol multiple frames can be sent by a sender at a time before receiving an acknowledgement from the receiver. The term sliding window refers to the imaginary boxes to hold frames. Sliding window method is also known as windowing

Example

Suppose that we have sender window and receiver window each of size 4. So the

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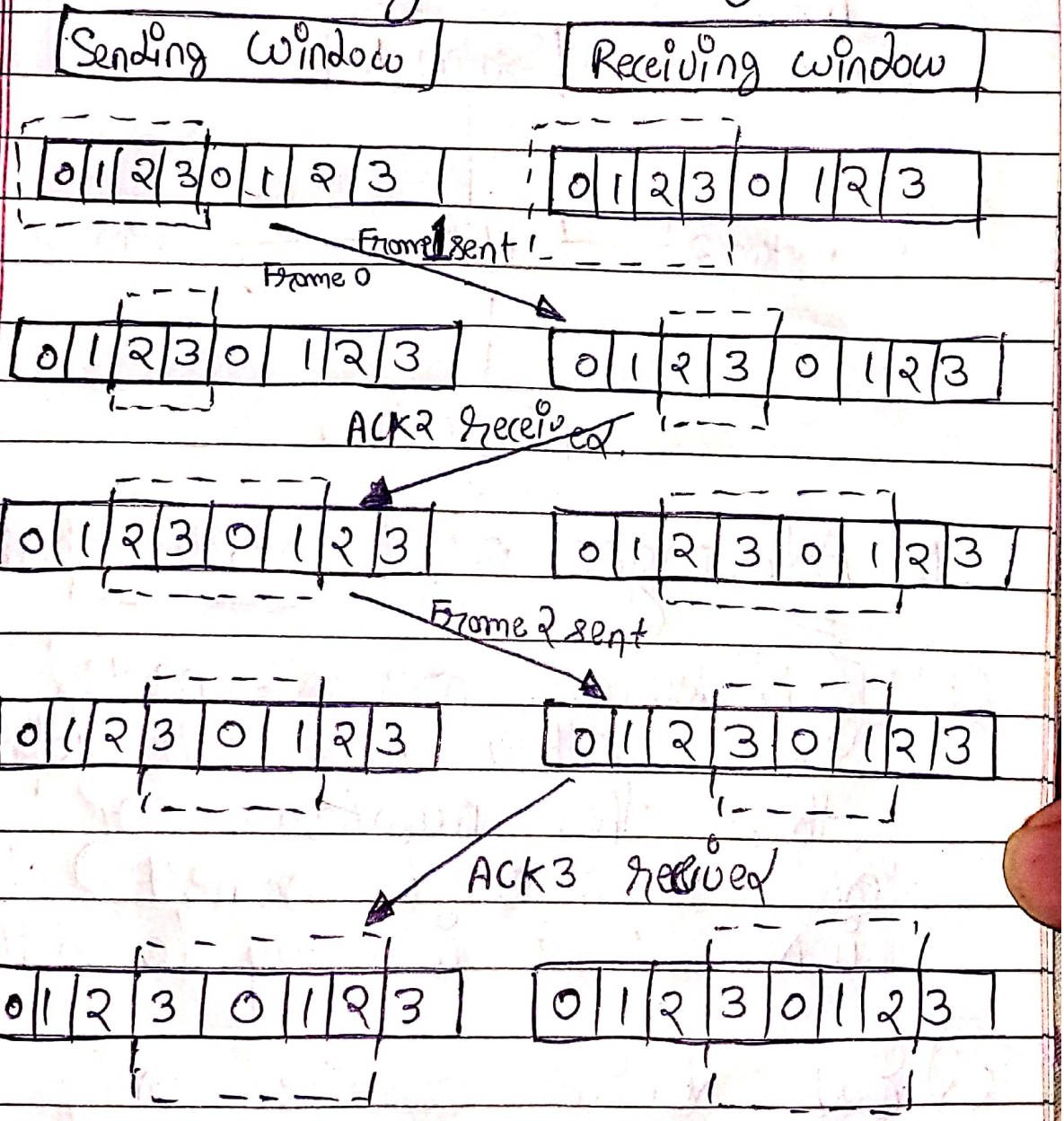
Sequence numbering of both the windows will be 0, 1, 2, 3, 0, 1, 2 and so on. The following diagram shows the positions of the windows after sending the frames and receiving acknowledgements



6Q Discuss 2 advantages and disadvantages of different topologies in a network

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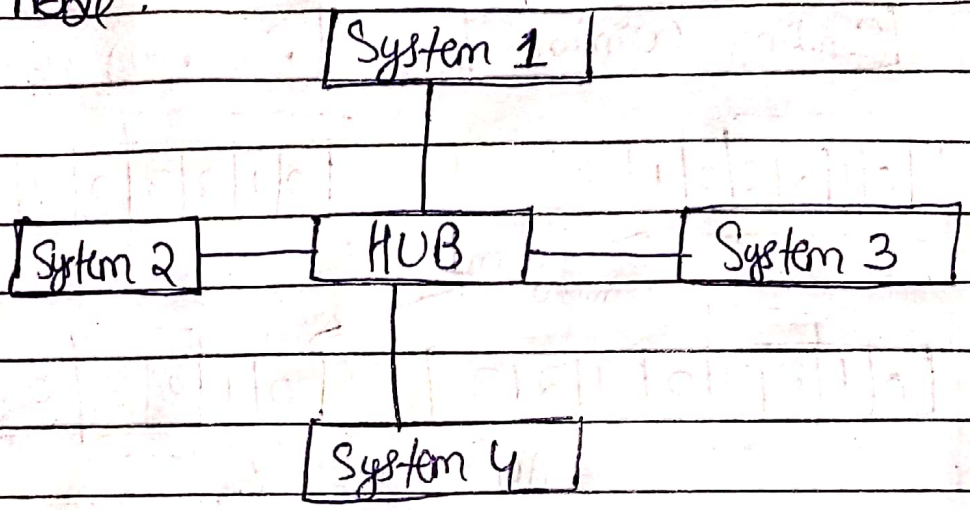
1. **Star Topology :-** In Star topology all the devices connected to single hub through a cable. This hub is the central node and all other nodes are connect to the central node.



Advantages of Star Topology

1. If N devices are connected to each other in Star topology then the number of cables required to connect them is N. So it is easy to setup.
2. Each device require only 1 port i.e to connect with the HUB.

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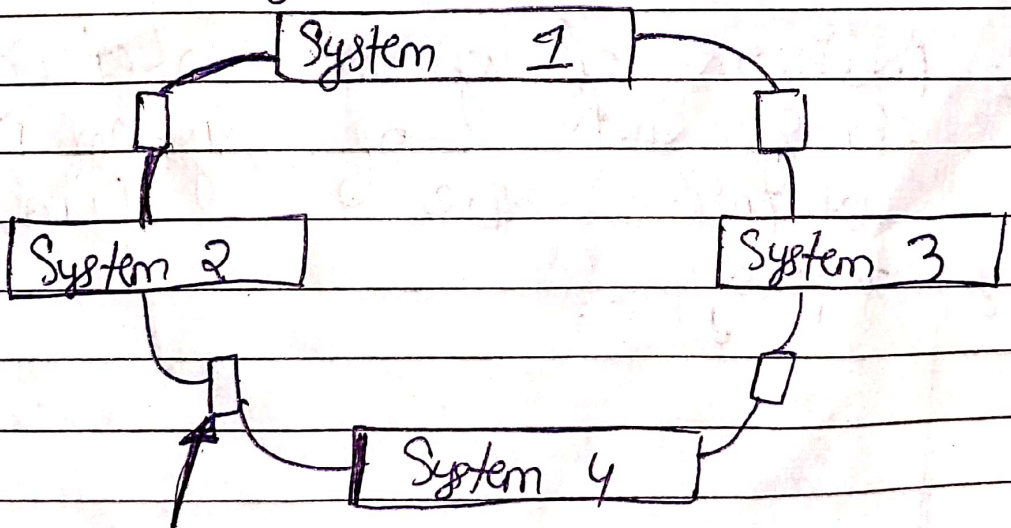
Disadvantages of Star Topology :-

1. If the HUB (concentrator) on which whole topology relies if it fails, the whole system will crash down.
2. Cost of installation is high due to an extra device. i.e HUB

Ring Topology :-

In this topology, it forms a ring connecting devices with exactly two neighboring devices.



Terminators / Repeaters

Ring Topology

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Advantages of Ring Topology

1. The possibility of collision in medium of this type of topology.
2. It is very cheap to install and expand.

Disadvantages of Ring Topology :

1. Troubleshooting is very difficult in the Ring Topology.
2. Addition of system inbetween or removal of system can disturb the whole topology.

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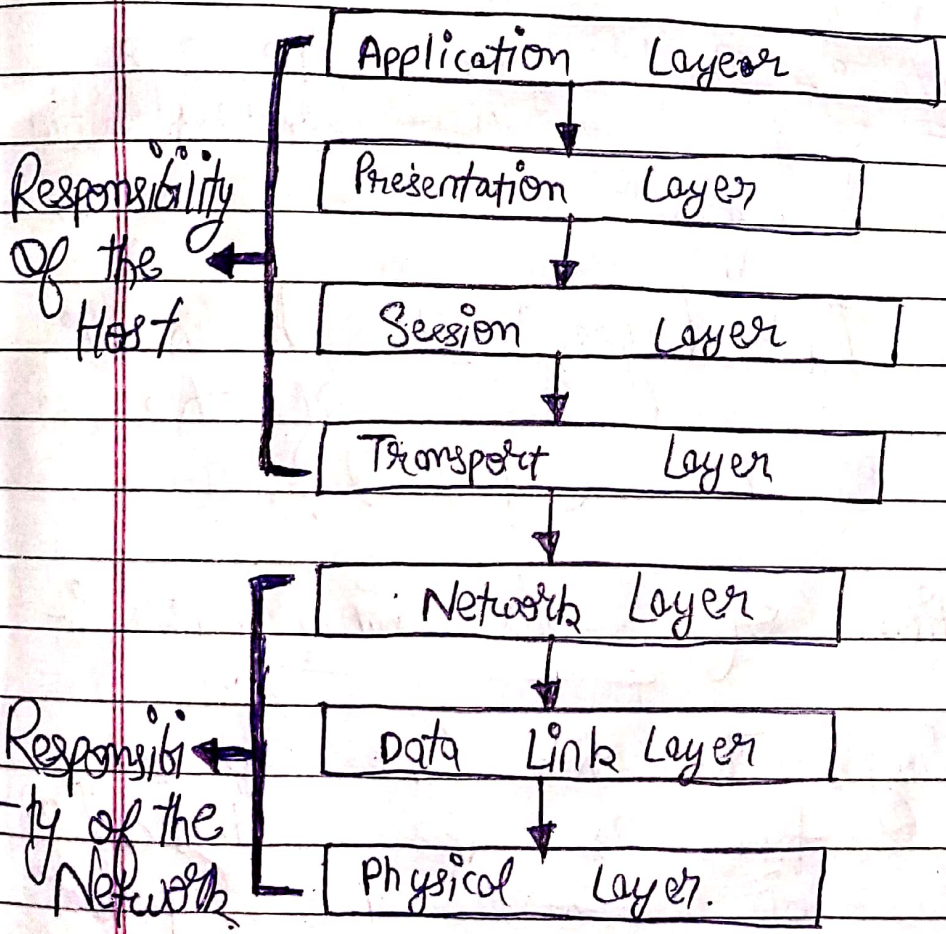
Section-C

8Q Name and discuss ~~different~~ layers of OSI model.

Ans OSI Model :- OSI model stands Open System Interconnection. It is a reference model that describes how information from a software application in one computer moves through a physical medium to the software application in another computer.

- OSI consists of seven layers, and each layer performs a particular network function.



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1. Physical layer :- It is the lowest layer of the OSI model. It establishes, maintains and deactivates the physical connection.

Functions of a physical layer are :-

1. Line Configuration :- It defines the way how two or more devices can be connected easily.
2. Topology :- It defines the way how network devices are arranged.
3. Signals :- It determines the type of the signal used for transmitting the information.

2. Data Link Layer :- It defines the format of the data on the network.

Functions of Data link layer :-

1. Framing :- The data link layer translates the physical's raw bit stream into packets known as Frames.

② Flow control :- Flow control is the main functionality of the Data-Link layer.

③ Error Control :- Error control is achieved by adding a calculated value CRC that is placed to the Data link's layer trailer.

3. Network layer :- This protocol layer was to route the network traffic and location of devices on the network. Its functions are :-

① Addressing :- A network layer adds the source and destination address to the header of the frame.

② Internetworking :- An internetworking is the main responsibility of network layer.

4. Transport layer :- The transport layer is a layer 4 that ensures that messages are transmitted in the order in which they are sent and there is no duplication of data. Two protocols are in this layer.

① Transmission control protocol

② User Datagram Protocol.

Functions of transport layer:-

1. It provides the service-point addressing.
2. Segmentation and reassembly.
3. Connection control.
4. Flow control and error control is also done in transport layer.

5. Session layer :- The session layer is used to establish, maintain and synchronizes the interaction between devices

Functions of session layer :-

1. Dialog control :- Session layer acts as a dialog controller that creates a dialog between two process
2. Synchronization :- Session layer adds some checkpoints when transmitting the data in a sequence.

6. Presentation layer :- A presentation layer is mainly concerned with the syntax and semantics of the information exchanged between the two systems.

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Functions of presentation layer:-

(1) Translation :- The processes in two systems exchange the information in the form of character strings and so on.

(2) Encryption and Compression :- Encryption is needed to maintain privacy and Data Compression is process of compressing the data.

(7) Application layer :- An application layer serves as a window for users and appliation processes to access network service.

Functions of Application layer :-

(1) File transfer, access, and management (FTAM)

An application layer allows a user to access the files in a remote computer or to manage files in computer.

(2) Mail Services :- An appliation layer provides the facility of email forwarding and Storage.