1. What is internetworking?

Internetworking is the process of connecting two or more different types of computer networks so they can work together and communicate with each other as a single large network. For example: LAN and WAN.

2. Write down the differences between a hub and a switch?

The differences between a hub and a switch are as follows:

Hub	**Switch**
Hub broadcasts data to all devices in the network.	Switch sends data to the intended recipient device.
It sends one data packet at a time to all ports.	It can send multiple data packets simultaneously.
It is less efficient.	It is more efficient.
One collision domain (all ports share it).	Each port has its own collision domain.
It does not learn to store MAC addresses.	It learns and stores MAC addresses to forward data properly.

3. What are the possible reasons for traffic congestion?

The possible reasons for traffic congestion are as follows:

High network traffic: Too many devices sending data at once can exceed the network's capacity.

Insufficient bandwidth: Limited bandwidth can't handle large data loads, leading to delays.

Network Bottlenecks: Slow devices or links in the network path reduce overall speed.

Poor network design: Unoptimized layout or outdated infrastructure can restrict data flow.

4. What Are Collision Domains and Broadcast Domains?

Collision Domain:

- A collision domain is a part of the network where data packets can "collide" when two devices try to send data at the same time.
- This usually happens in older systems or networks using hubs.

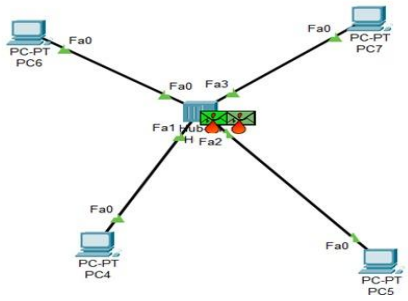
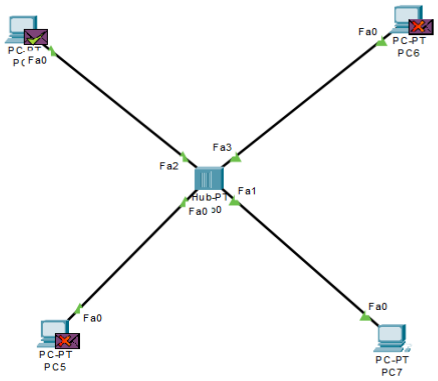
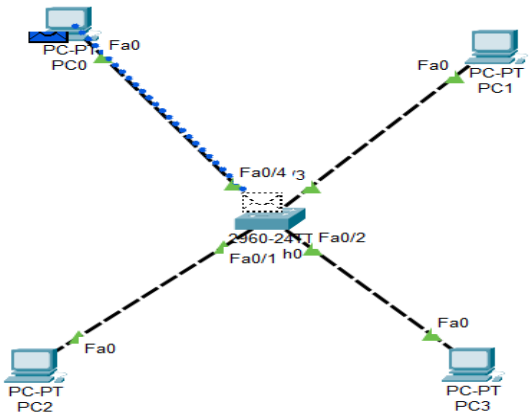


Figure of hub and it shows the data collision between internal networks while data transferring in this figure this shows the disadvantage of hub. One of the drawbacks of makes it unreliable because it broadcast all message and it create data collision and data losses.

Broadcast Domain:

- A broadcast domain is a network segment where any broadcast message sent by a device is received by all other devices in the same segment.
    - Switches and routers are used to manage broadcast domains and unnecessary traffic


Fa0
PC-PT
PC6
Fa3
Fa2
Fa1
Hub-PT
Fa0
Fa0
PC-PT
PC5
Fa0
PC-PT
PC7


PC-PT
PC0
Fa0
Fa0
PC-PT
PC1
Fa0/4
2960-24TT
Fa0/2
Fa0/1
Fa0
PC-PT
PC2
Fa0
PC-PT
PC3

In the above figure it shows the switch and it transfer data to the only one which one Is assigned to the operator and switch sends to the only one computer which is assigned.

Qn.5 Research about CSMDA/CD and its algorithm.

CSMA/CD (Carrier Sense Multiple Access with Collision Detection) is a protocol used in Ethernet networks to manage how devices share a common communication medium. It works by ensuring that devices listen to the network (Carrier Sense) to check if the channel is free before transmitting data. If the channel is idle, the device transmits; if not, it waits. The "Multiple Access" aspect allows several devices to share the medium, but this increases the likelihood of data collisions. During transmission, devices continuously monitor the medium for collisions. If a collision is detected, they stop transmitting immediately and send a jam signal to alert other devices about the collision. Afterward, each device calculates a random delay using the binary exponential backoff algorithm to reduce the likelihood of repeated collisions, and then attempts retransmission. If the device exceeds the maximum allowed attempts, it aborts and reports an error to the upper layers of the network stack. While CSMA/CD is simple and effective for moderate network loads, it struggles under heavy traffic and has been largely replaced by collision-free technologies like switches and full-duplex Ethernet.