



**K.R. MANGALAM UNIVERSITY**  
THE COMPLETE WORLD OF EDUCATION

## COMPUTER NETWORKS LAB

**(ENCS352)**



**K.R. MANGALAM UNIVERSITY**

## ASSIGNMENT - 1

**For Bachelor Of Technology In Computer Science  
Engineering Specialization (AI & ML)**

**Submitted By :**

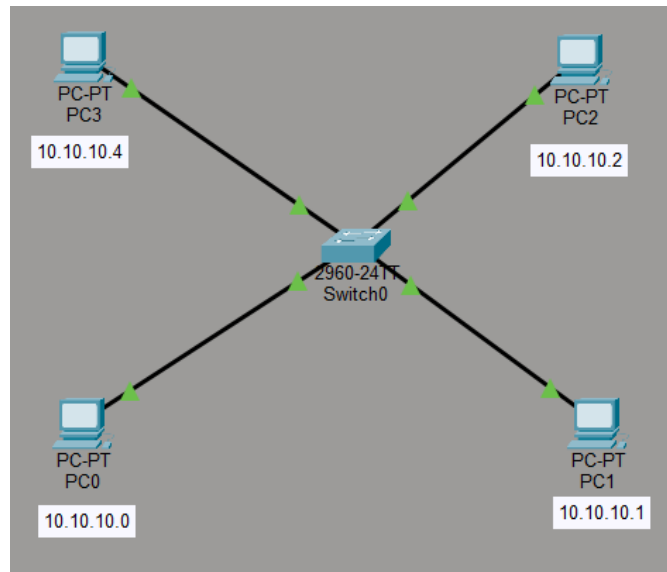
**Aditi Gairi**

**2301730104**

**Submitted To :**

**Ms. Rity Devi**

# TASK 1: Star Topology (Switch)



## Ping Result:

The screenshot shows the Packet Tracer interface with the star topology diagram on the left and a command prompt window on the right. The command prompt window is titled "Command Prompt" and shows the following output:

```
Cisco Packet Tracer PC Command Line 1.0
C:\> ping 10.10.10.4

Pinging 10.10.10.4 with 32 bytes of data:

Reply from 10.10.10.4: bytes=32 time=13ms TTL=128
Reply from 10.10.10.4: bytes=32 time<1ms TTL=128
Reply from 10.10.10.4: bytes=32 time<1ms TTL=128
Reply from 10.10.10.4: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 13ms, Average = 3ms

C:\>
```

## Simulation:

The screenshot shows the Packet Tracer interface with the star topology diagram on the left and a simulation window on the right. The simulation window shows a list of events and a table of simulation data. The table has columns for "Time", "Source", "Destination", "Type", "Color", "Time(sec)", "Periodic", "Num", "Edit", and "Delete". The first row of data shows a successful ping from PC0 to PC2 at 0.000 seconds.

Time	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
0.000	PC0	PC2	ICMP		0.000	N	0	(edit)	(delete)

➤ Behavior (Normal Working)

All PCs communicate through the switch, which forwards data only to the intended destination using its MAC address table. ICMP ping between devices is successful, showing fast and collision-free communication.

➤ In Failure

If a single PC or its connecting cable fails, only that device is affected while the rest of the network continues to work normally. However, failure of the central switch causes the entire network to stop functioning.

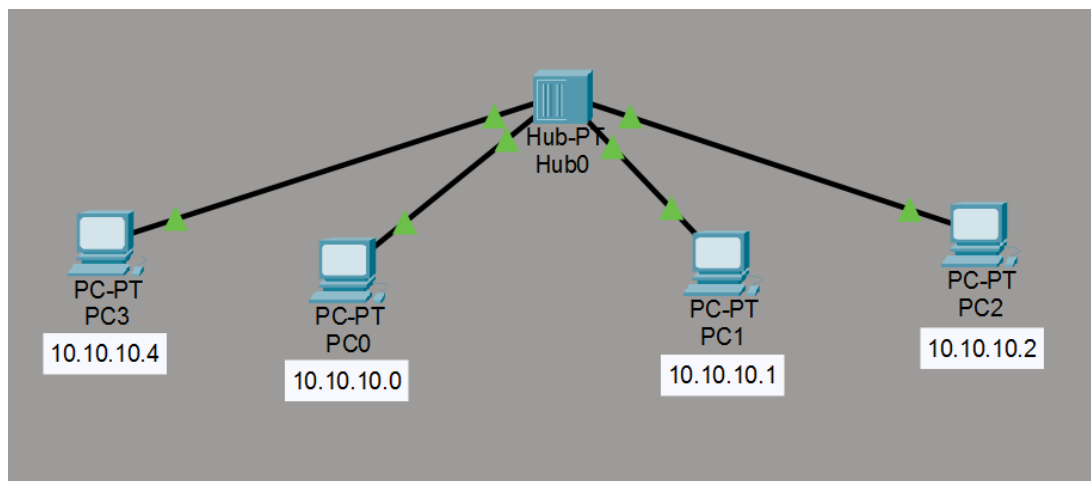
➤ Practical Applications (LAN Design)

This topology is widely used in office LANs, computer labs, and educational institutions where reliable and fast communication is required. It is suitable for environments that need easy expansion and centralized management.

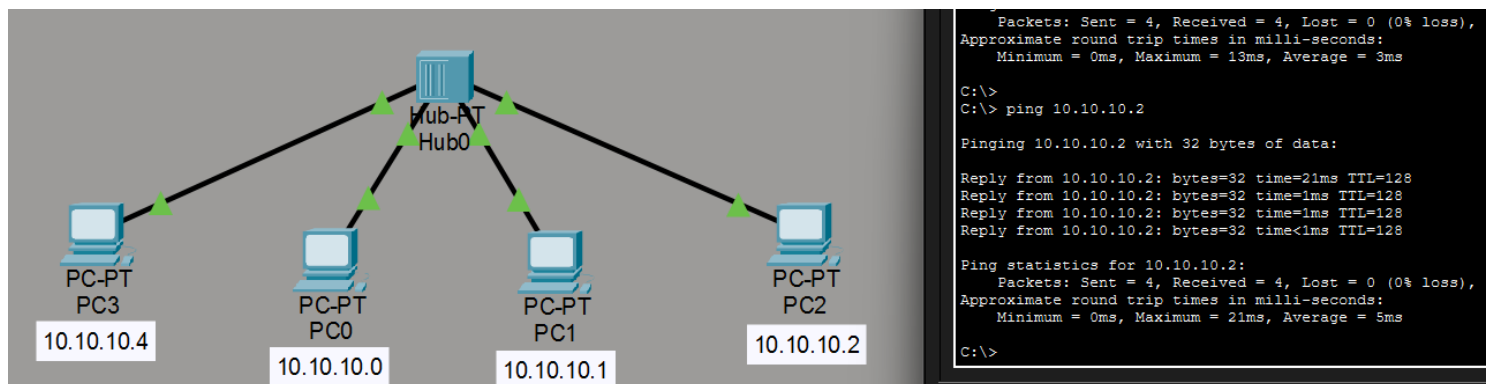
➤ Conclusion

Switch-based star topology offers reliable, efficient, and scalable network communication. Because of its performance and fault isolation, it is the preferred choice for modern LAN design.

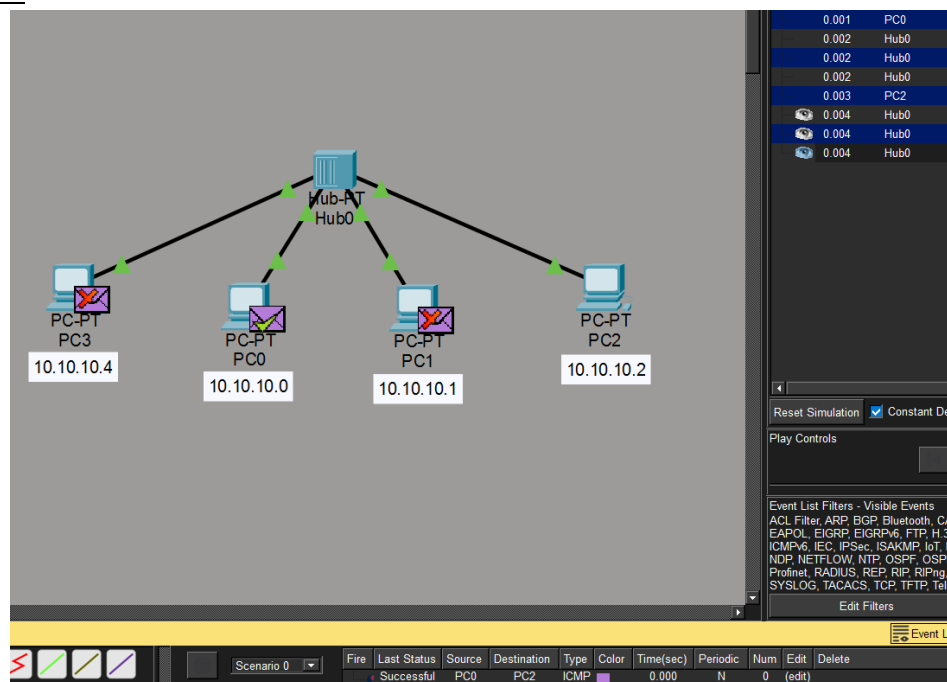
## TASK 2: Bus-like Topology (Hub)



### Ping Result:



### Simulation:



➤ Behavior (Normal Working)

When a PC sends data, the hub broadcasts the packet to all connected devices, regardless of the destination. ICMP pings are successful, but every device receives the packet even if it is not the intended receiver.

➤ In Failure

If one PC fails or its cable is disconnected, the remaining devices can still communicate normally. However, if the hub fails, the entire network stops functioning because all communication depends on the hub.

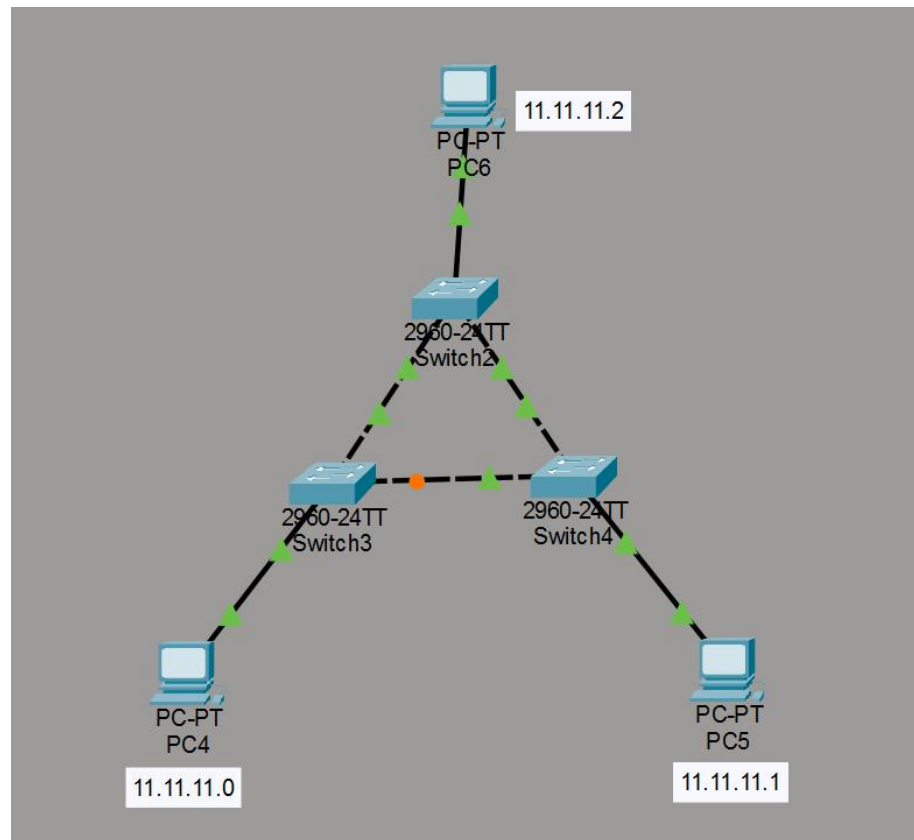
➤ Practical Applications (LAN Design)

Hub-based networks were used in early small office or home LANs with limited devices. Today, they are mainly used for learning and demonstration purposes rather than real deployments.

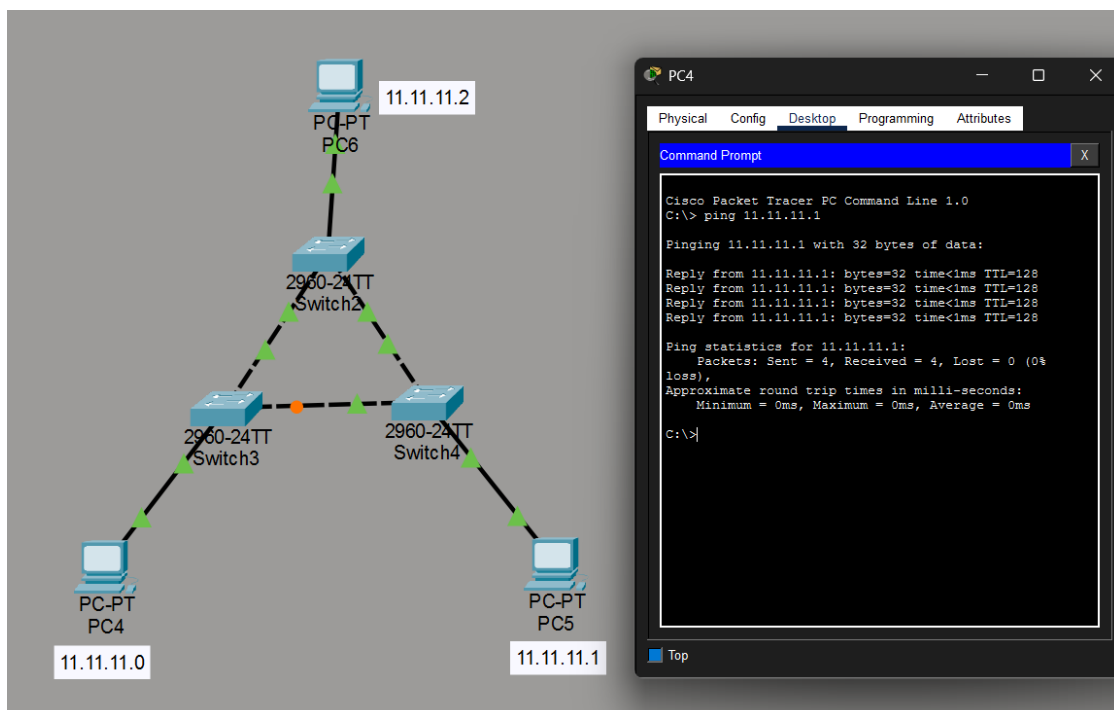
➤ Conclusion

Bus-like topology using a hub allows basic network communication but provides poor performance and reliability. Due to these limitations, it has been largely replaced by switch-based star topology in modern LANs.

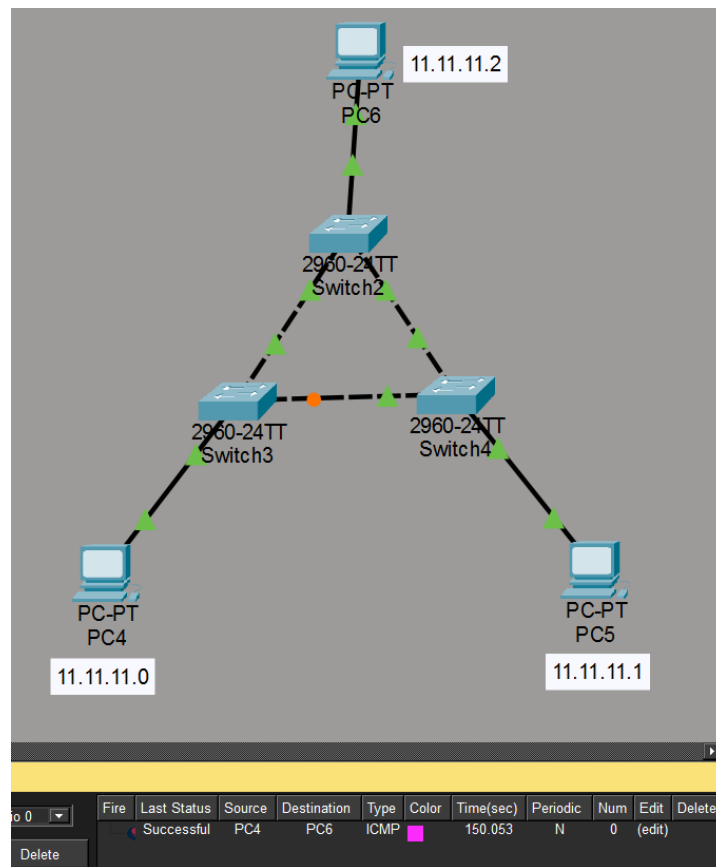
### TASK 3: RING-LIKE TOPOLOGY (LOOP)



Ping Result:



## Simulation:



### ➤ Behavior (Normal Working)

Data packets travel through multiple switches in a circular path to reach the destination. ICMP ping between PCs is successful, showing that packets can reach the destination through either side of the loop.

### ➤ In Failure

If one link in the ring fails, the loop is broken and communication may stop or take an alternate path depending on configuration. Without redundancy protocols, a single link failure can disrupt network communication.

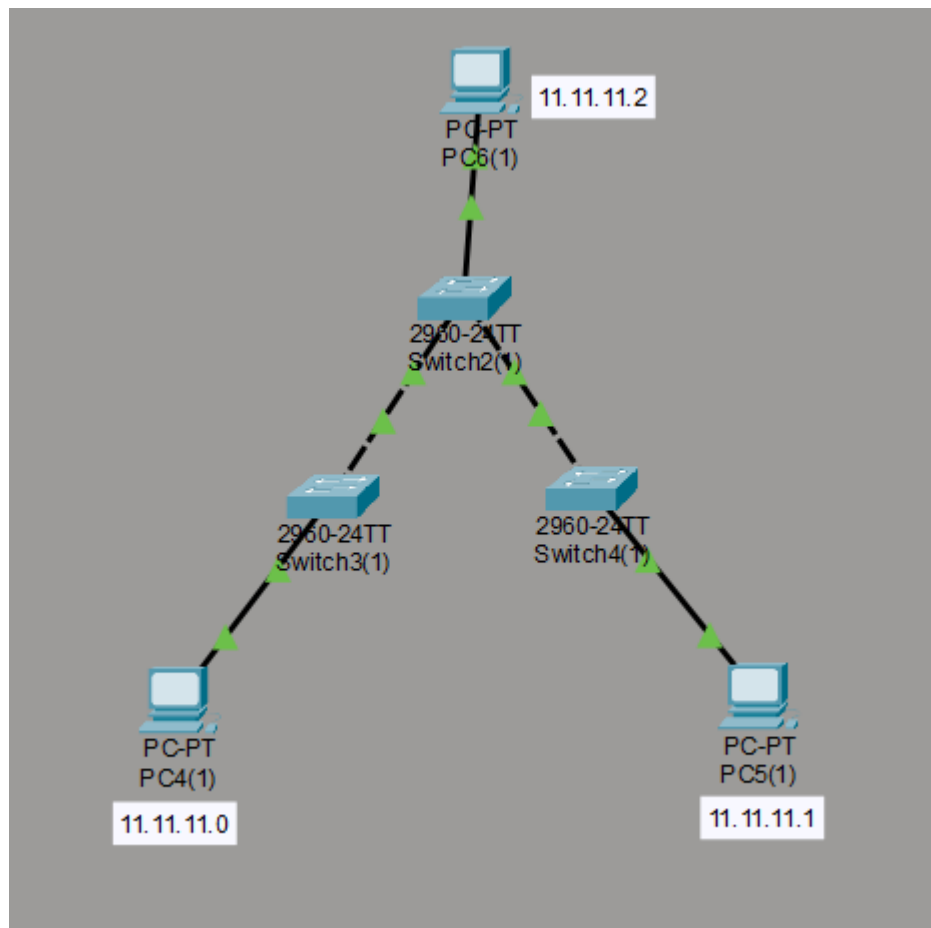
### ➤ Practical Applications (LAN Design)

Ring or loop topologies are used in metro networks, fiber rings, and backbone designs where redundancy is required. They are suitable for controlled environments rather than small office LANs.

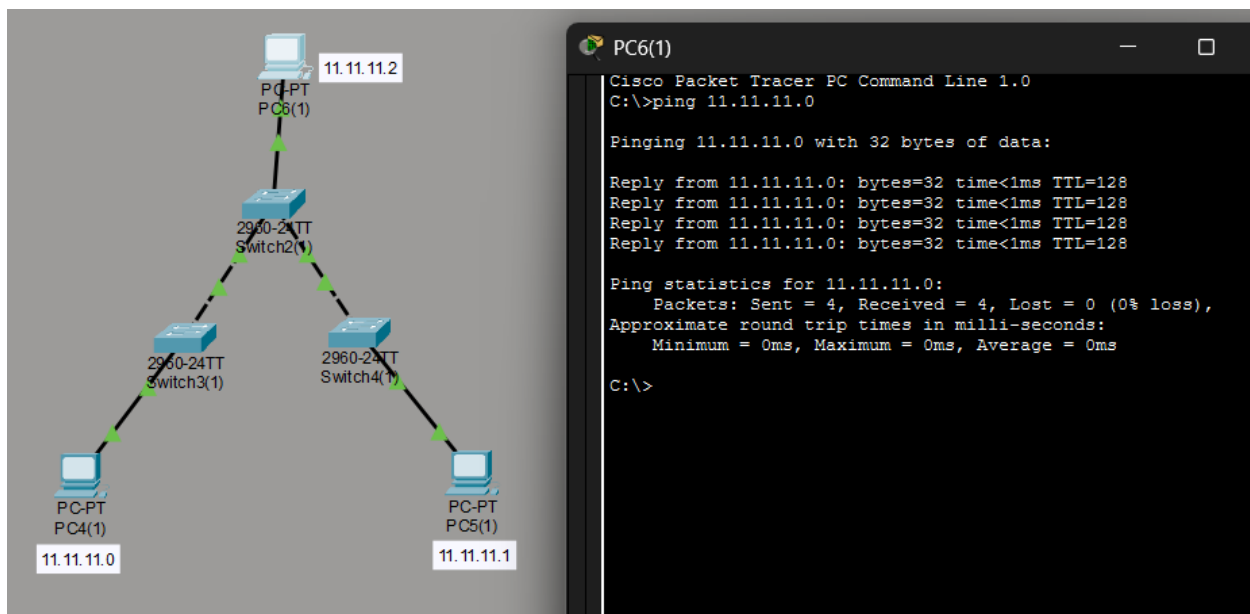
### ➤ Conclusion

Ring topology offers structured connectivity and potential redundancy but requires careful configuration. Due to its complexity, it is rarely used in small LANs and is mainly applied in backbone or specialized networks.

## TASK 4: RING TOPOLOGY FAILURE TEST

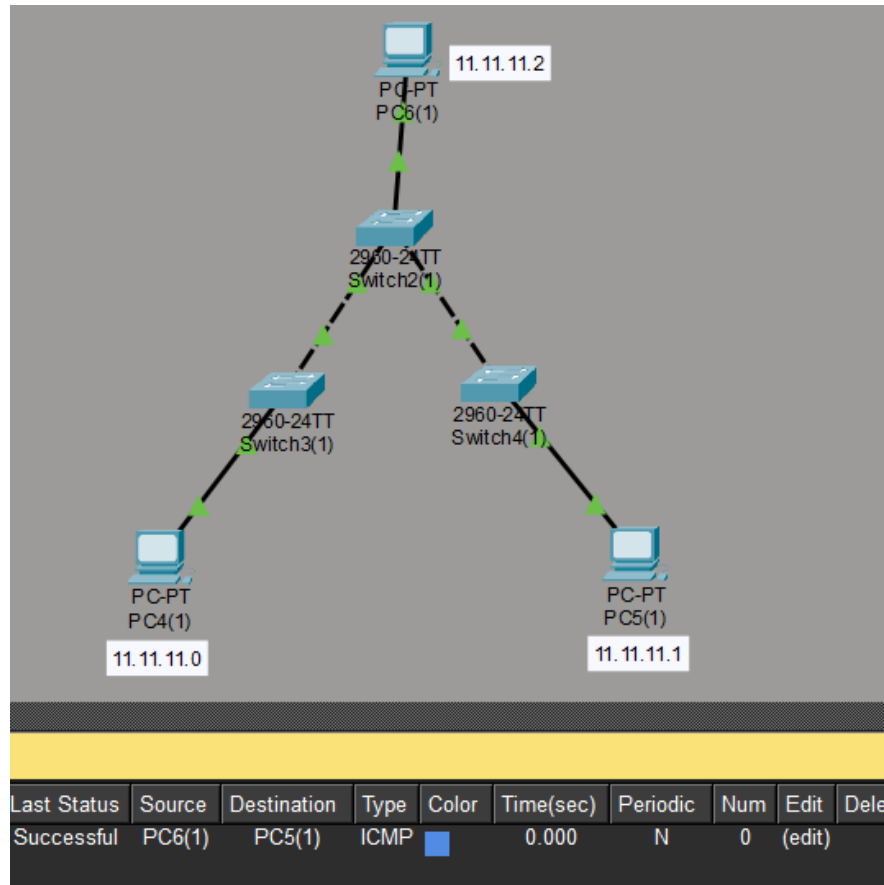


### Ping Result:





## Simulation:



### ➤ Observation

Even after removing one connection in the ring topology, the packet is still delivered successfully by taking the remaining available path. This indicates that the topology provides limited fault tolerance, allowing communication to continue as long as at least one path exists between devices. However, redundancy is reduced, and further link failures can completely disrupt the network.