19ECE311 - COMPUTER NETWORKS

ASSIGNMENT-1 & 2

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ROLL NO: AM.EN.U4ECE22018 **DATE:** 28/4/2025

AIM: To Simulate different network topologies using Cisco Packet Tracer software.

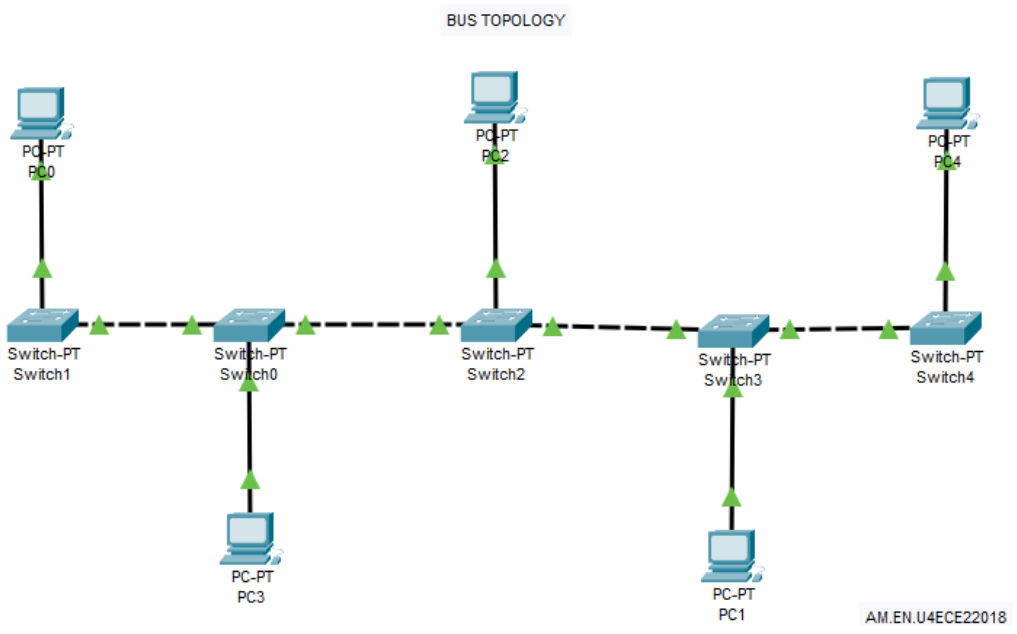
QUESTIONS:

1. Create all the topologies discussed in class in Cisco Packet Tracer (CPT).
2. Create 3 LAN networks connected via a single Router (CPT). Choose appropriate router, connection and configure it. Each LAN network is configured via Tree, Star and Ring topologies respectively.

Q1. Create all the topologies discussed in class in Cisco Packet Tracer (CPT).

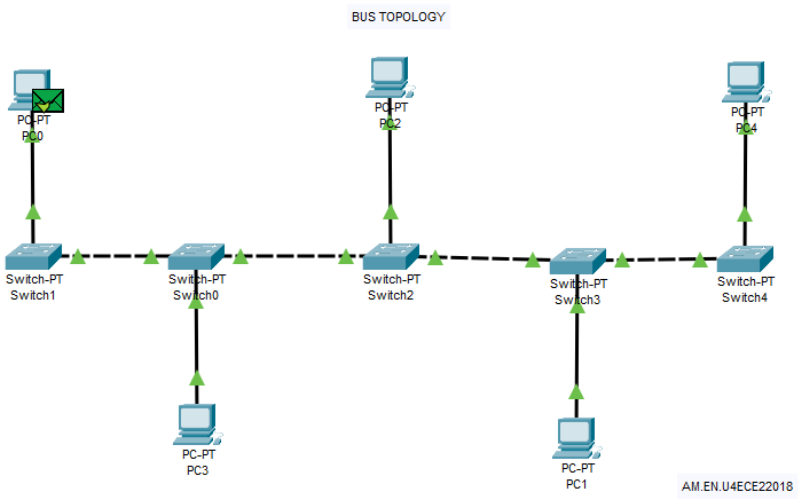
i. Bus
ii. Ring
iii. Star
iv. Mesh
v. Tree

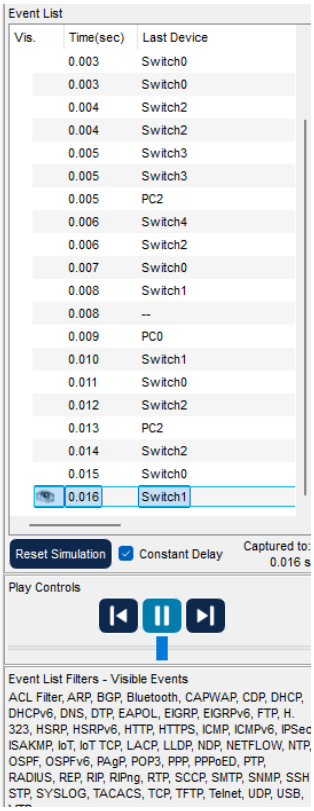
i. BUS TOPOLOGY:



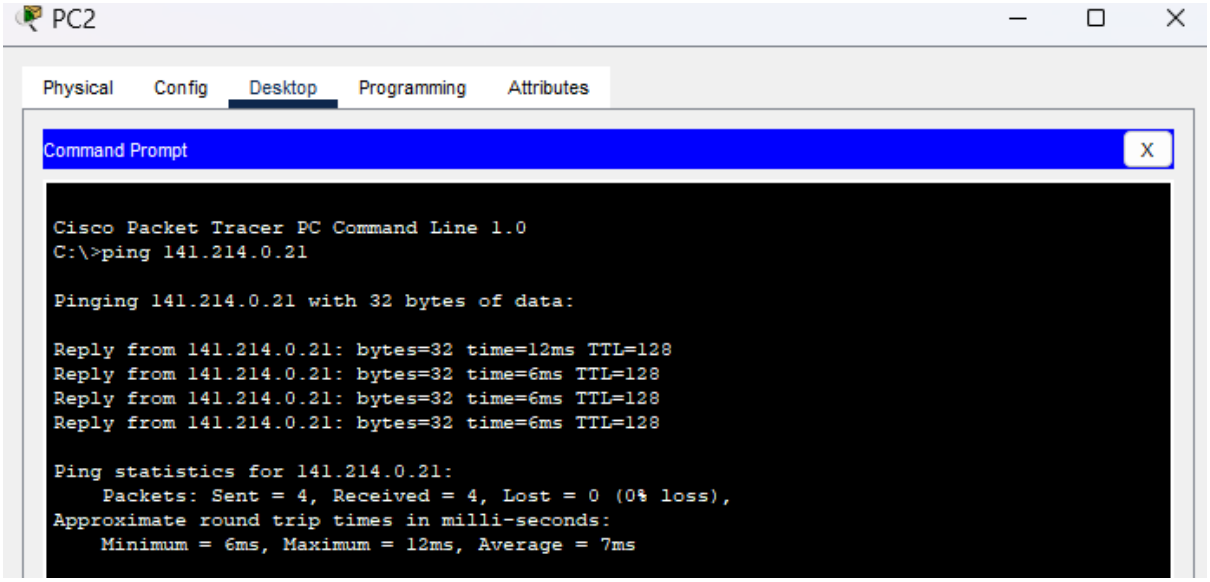
- Simulation:

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC2	ICMP		0.000	N	0	(edit)	

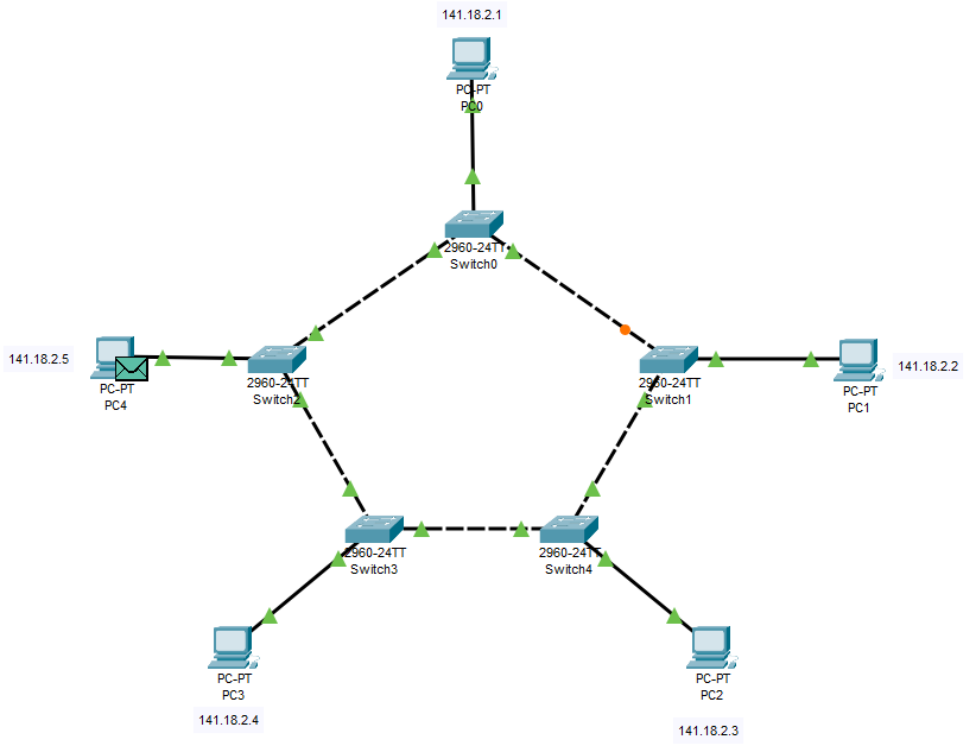




- Command Prompt:

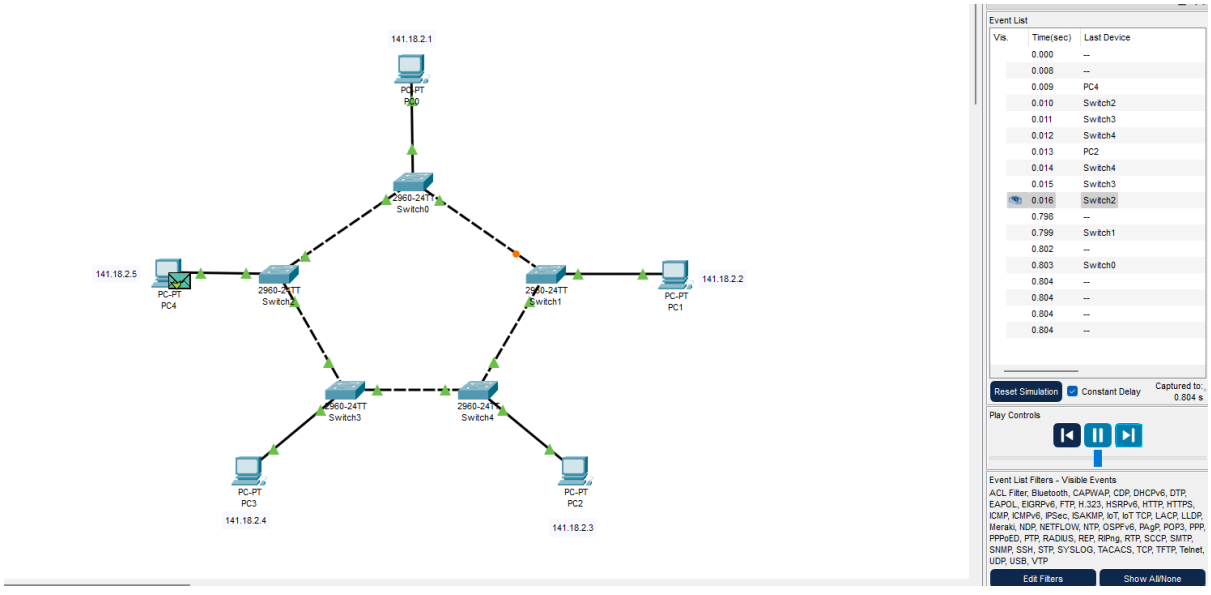


ii. RING TOPOLOGY:

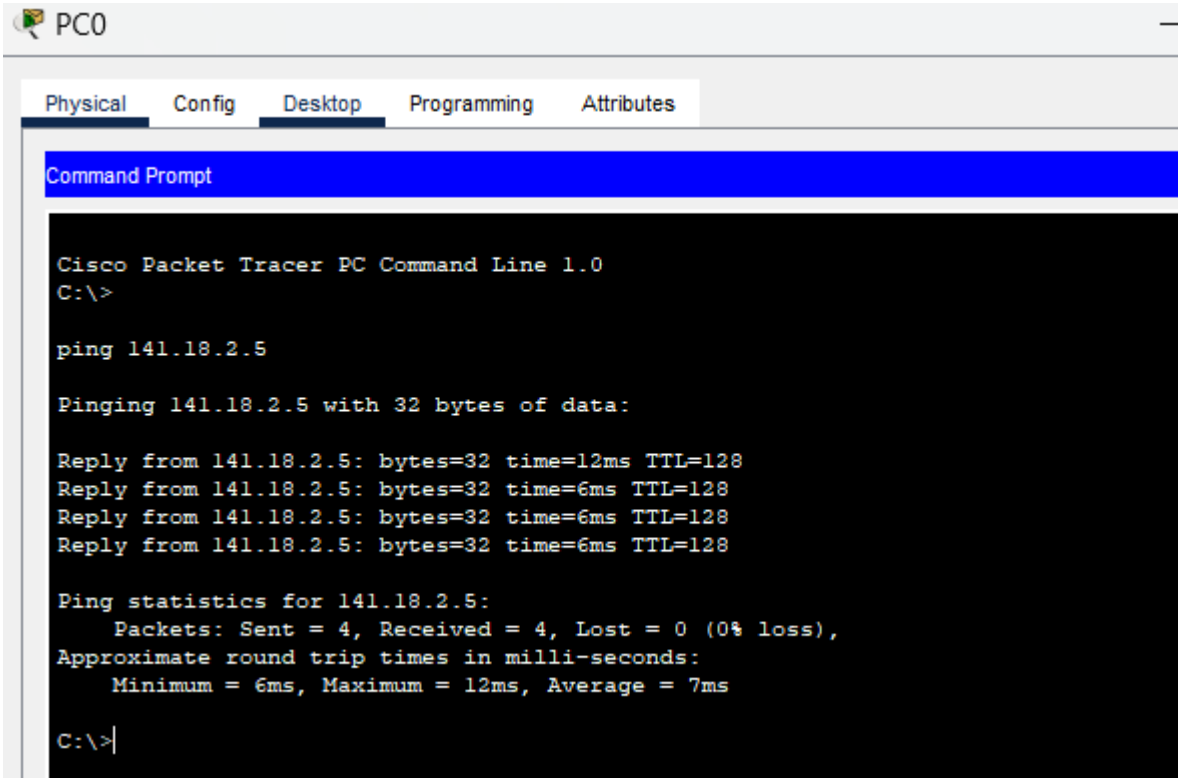


- Simulation

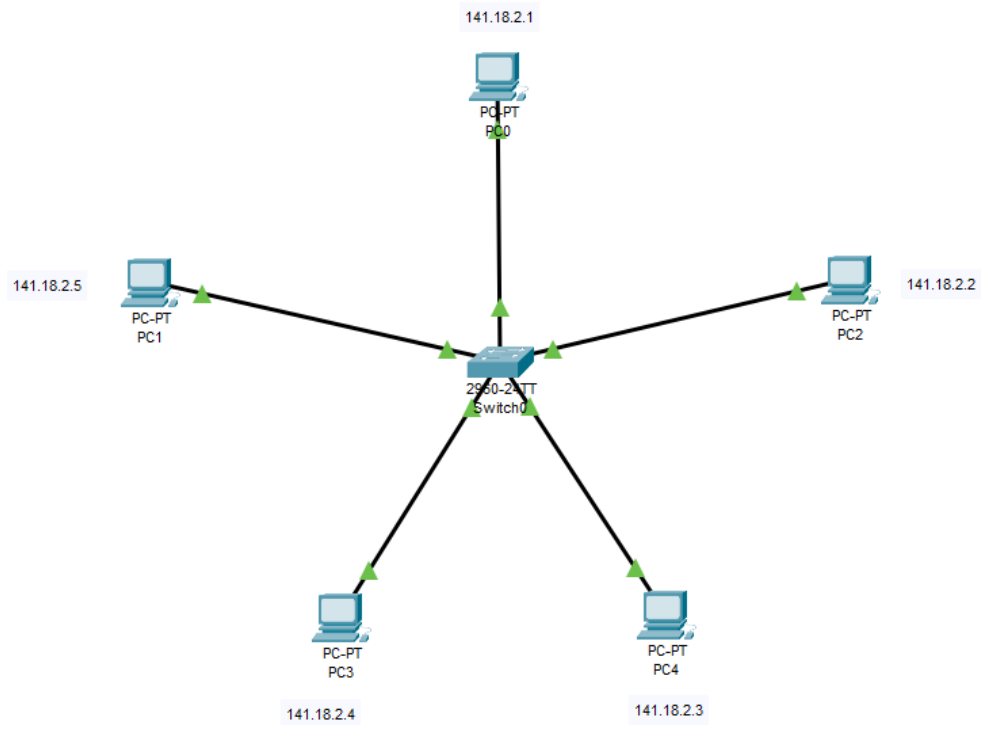
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC4	PC2	ICMP		0.000	N	0	(edit)	(delete)



- Command Prompt:

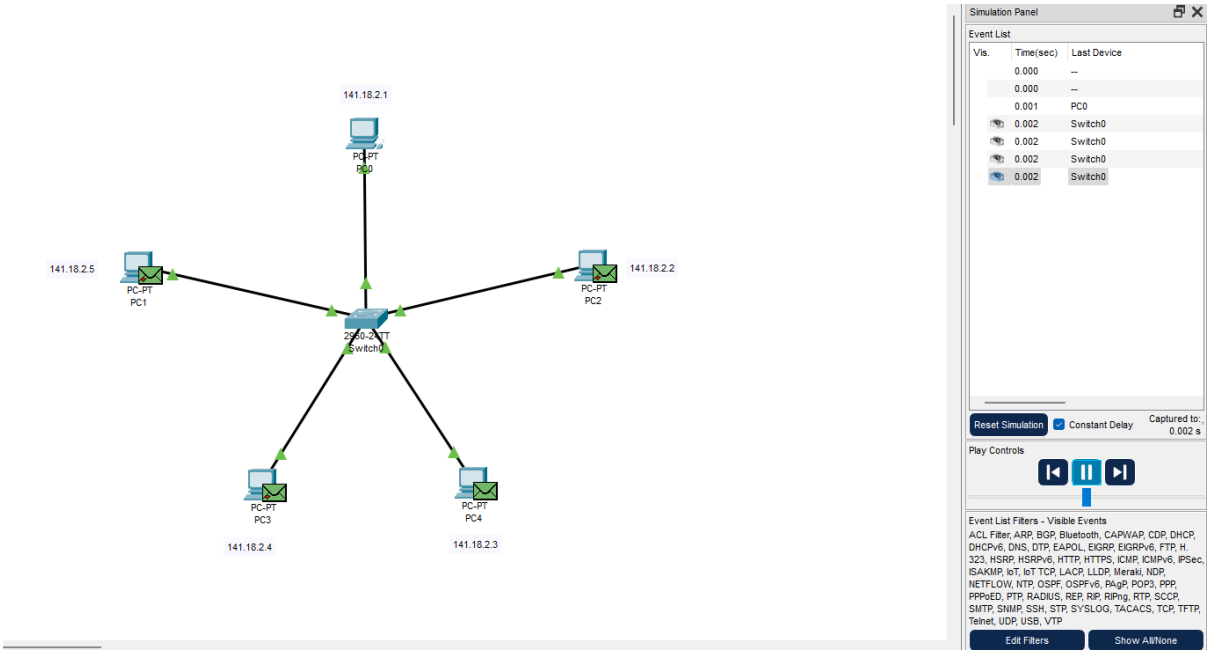


iii. STAR TOPOLOGY:

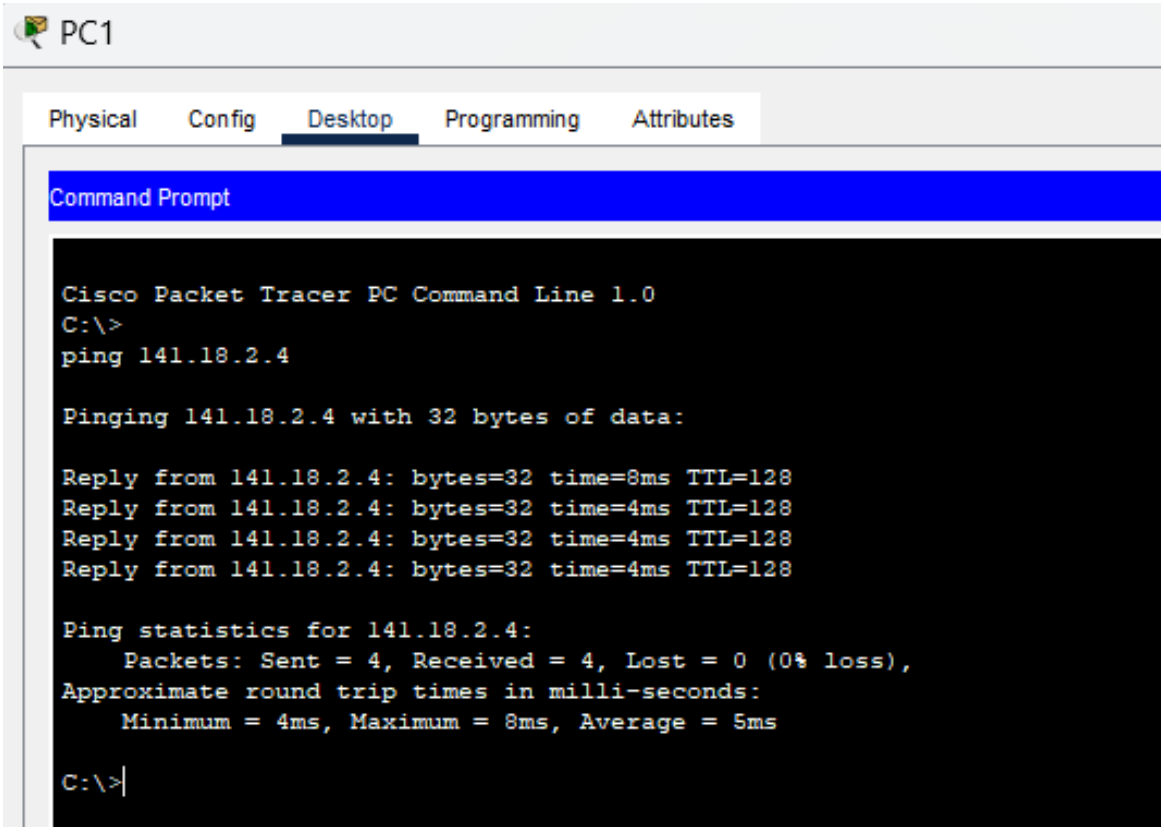


- Simulation

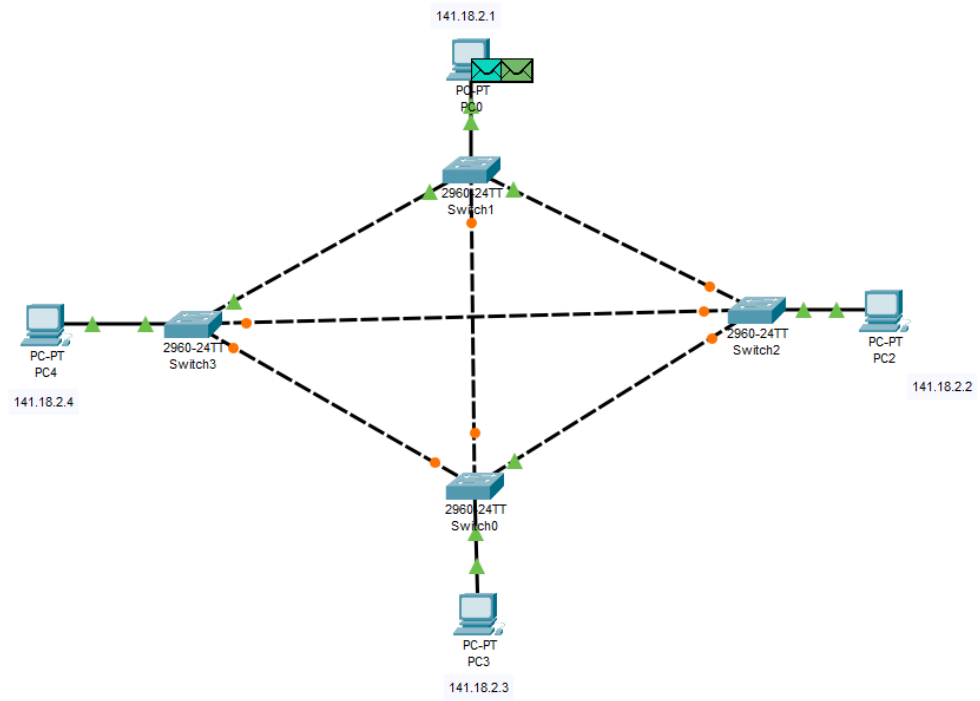
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC4	ICMP		0.000	N	0	(edit)	(delete)



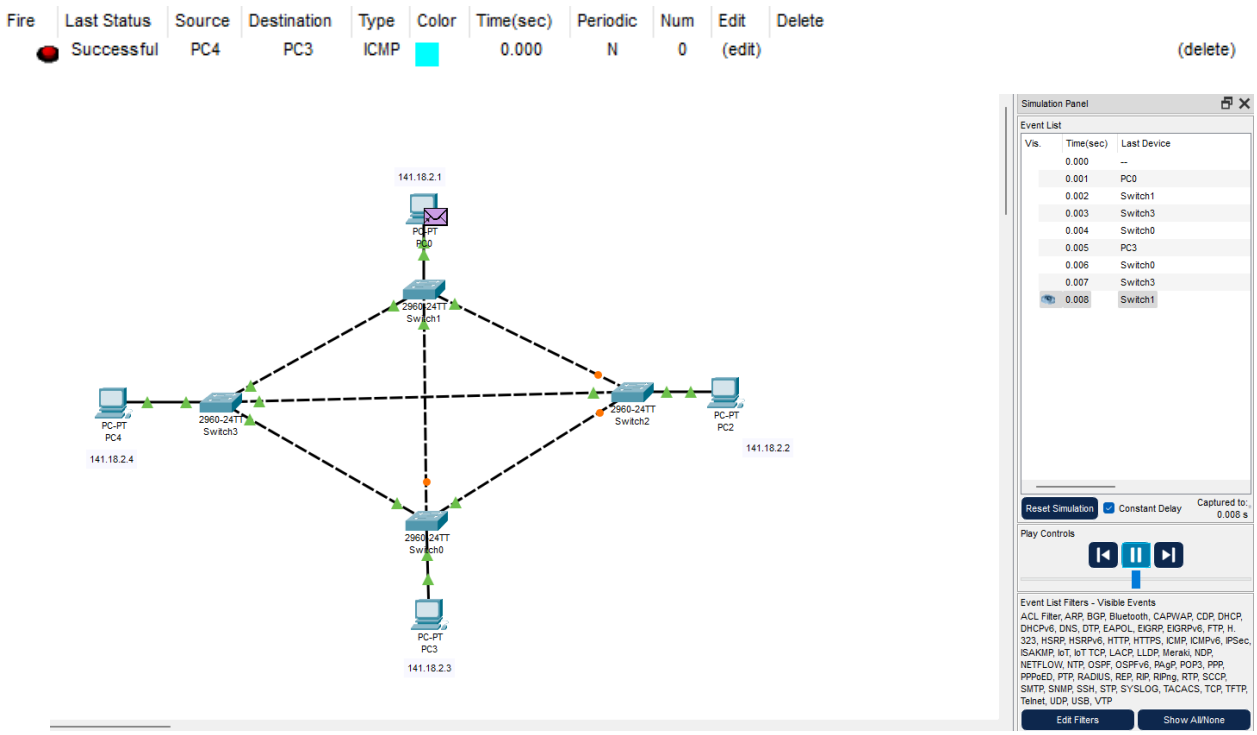
- Command Prompt:



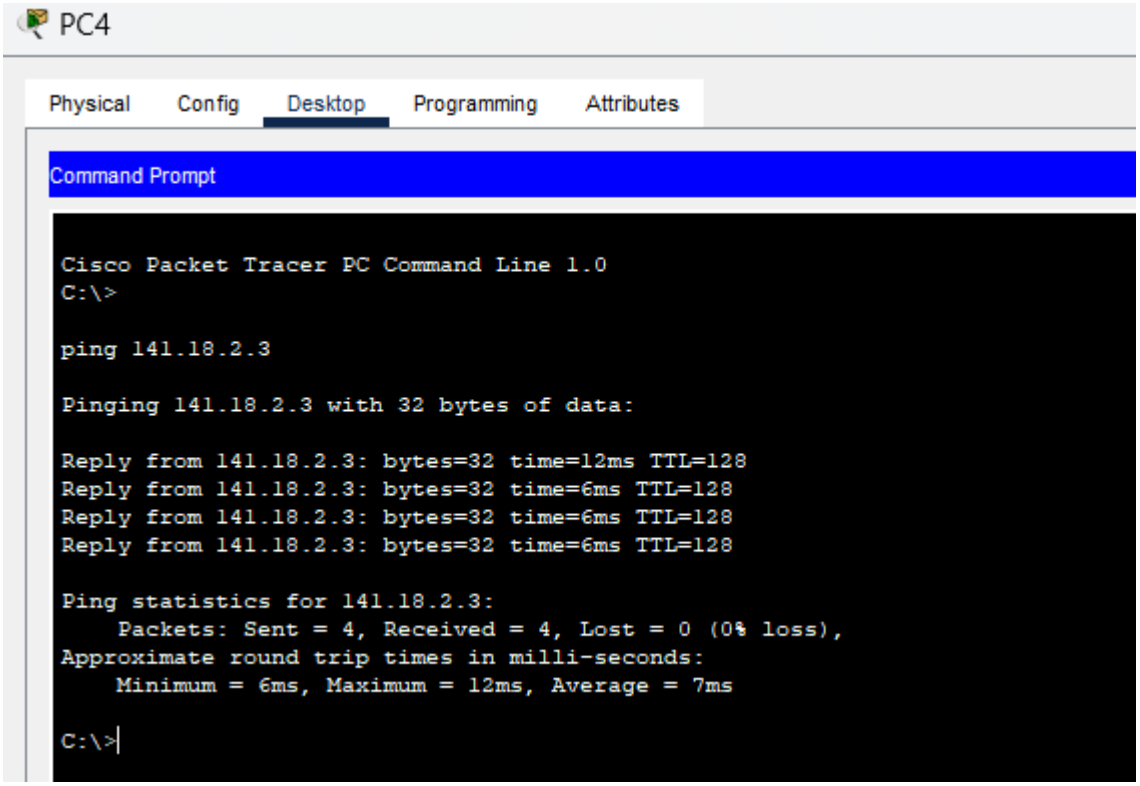
iv. MESH TOPOLOGY:



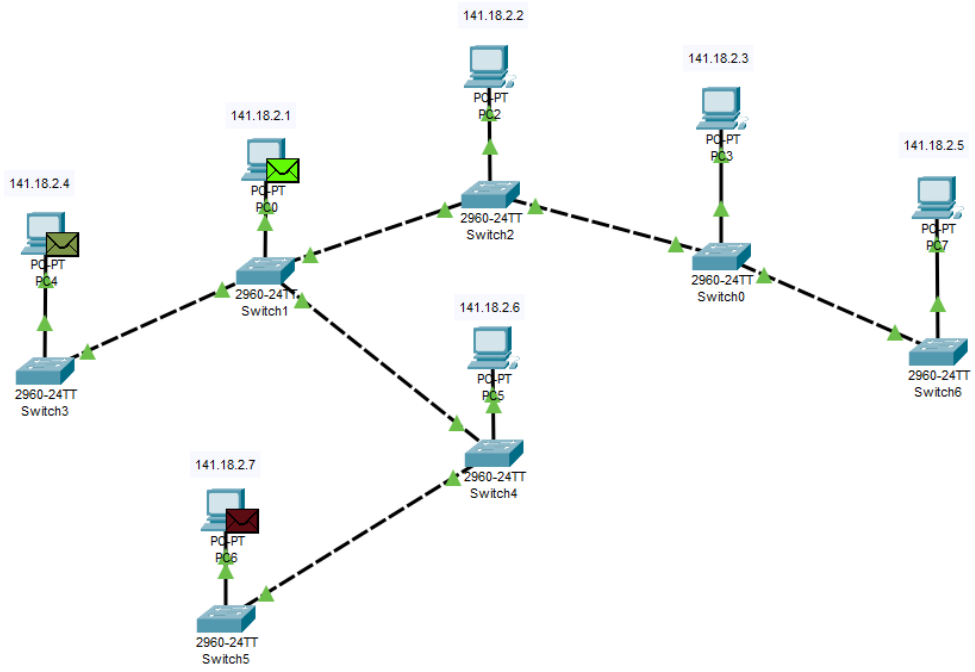
- Simulation



- Command Prompt:

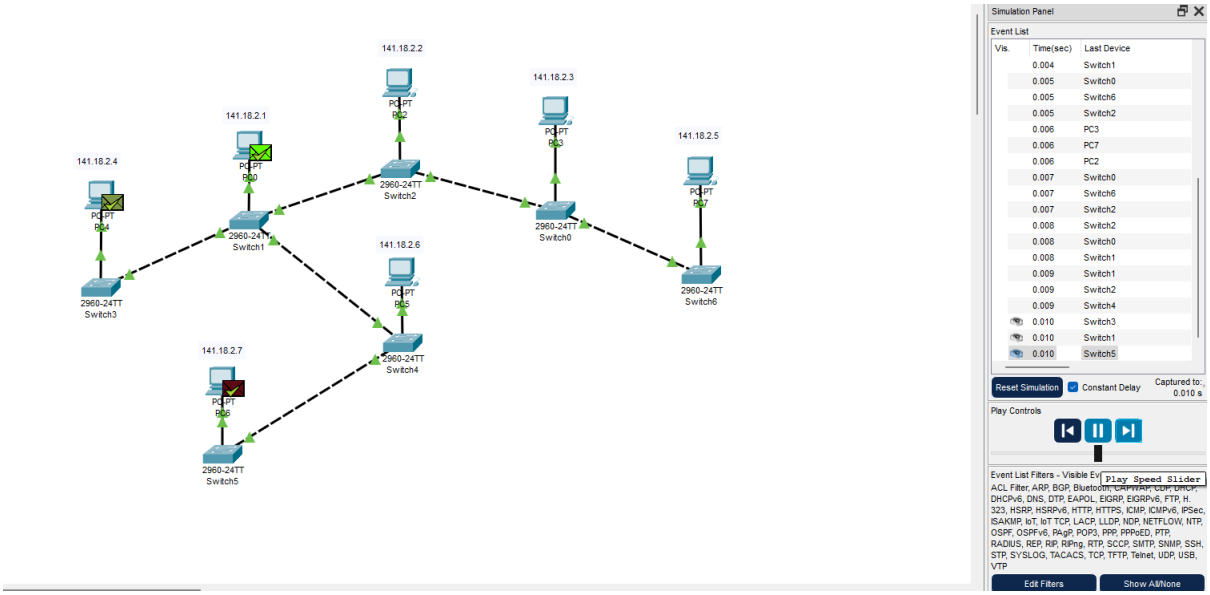


v. TREE TOPOLOGY:

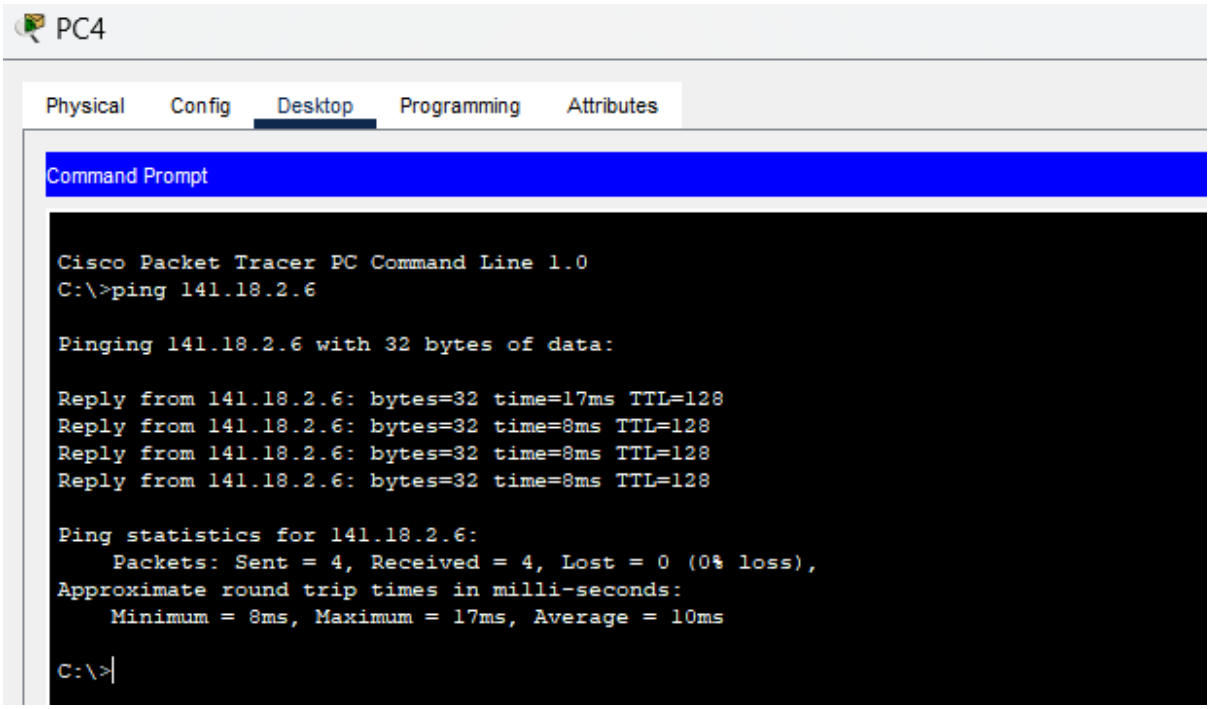


- Simulation

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	In Progress	PC4	PC3	ICMP		0.000	N	0	(edit)	(delete)
	In Progress	PC0	PC7	ICMP		0.000	N	1	(edit)	(delete)
	In Progress	PC6	PC2	ICMP		0.000	N	2	(edit)	(delete)

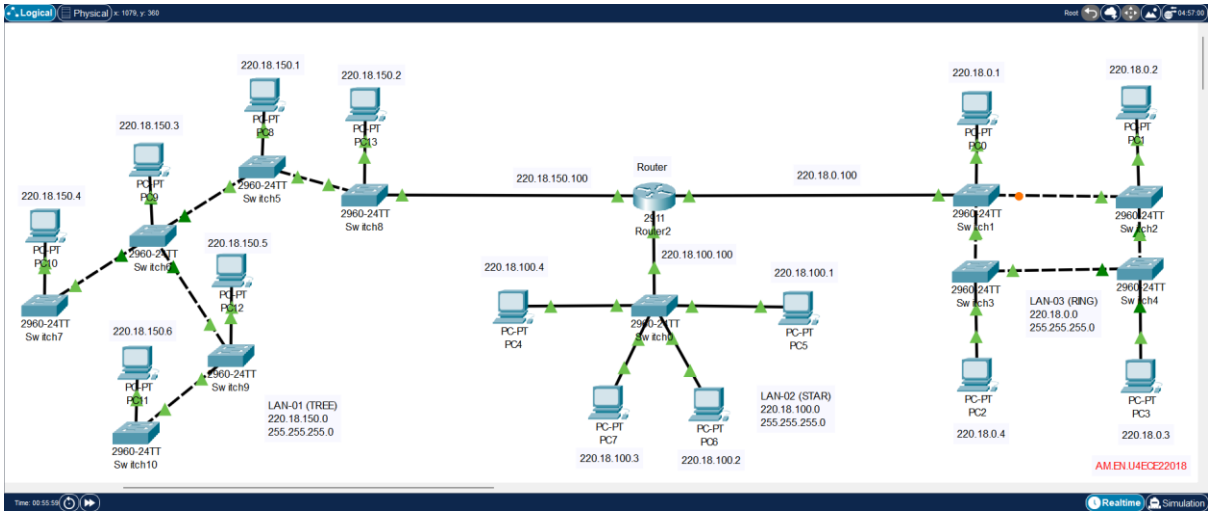


- Command Prompt:

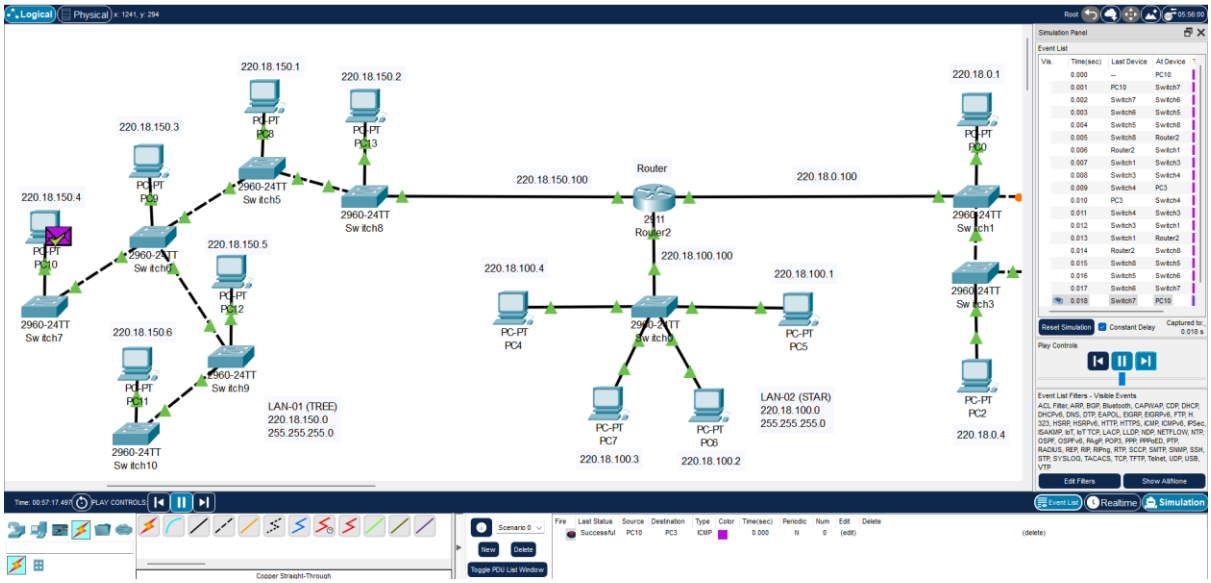


Q2: Create 3 LAN networks connected via a single Router (CPT). Choose appropriate router, connection and configure it. Each LAN network is configured via Tree, Star and Ring topologies respectively.

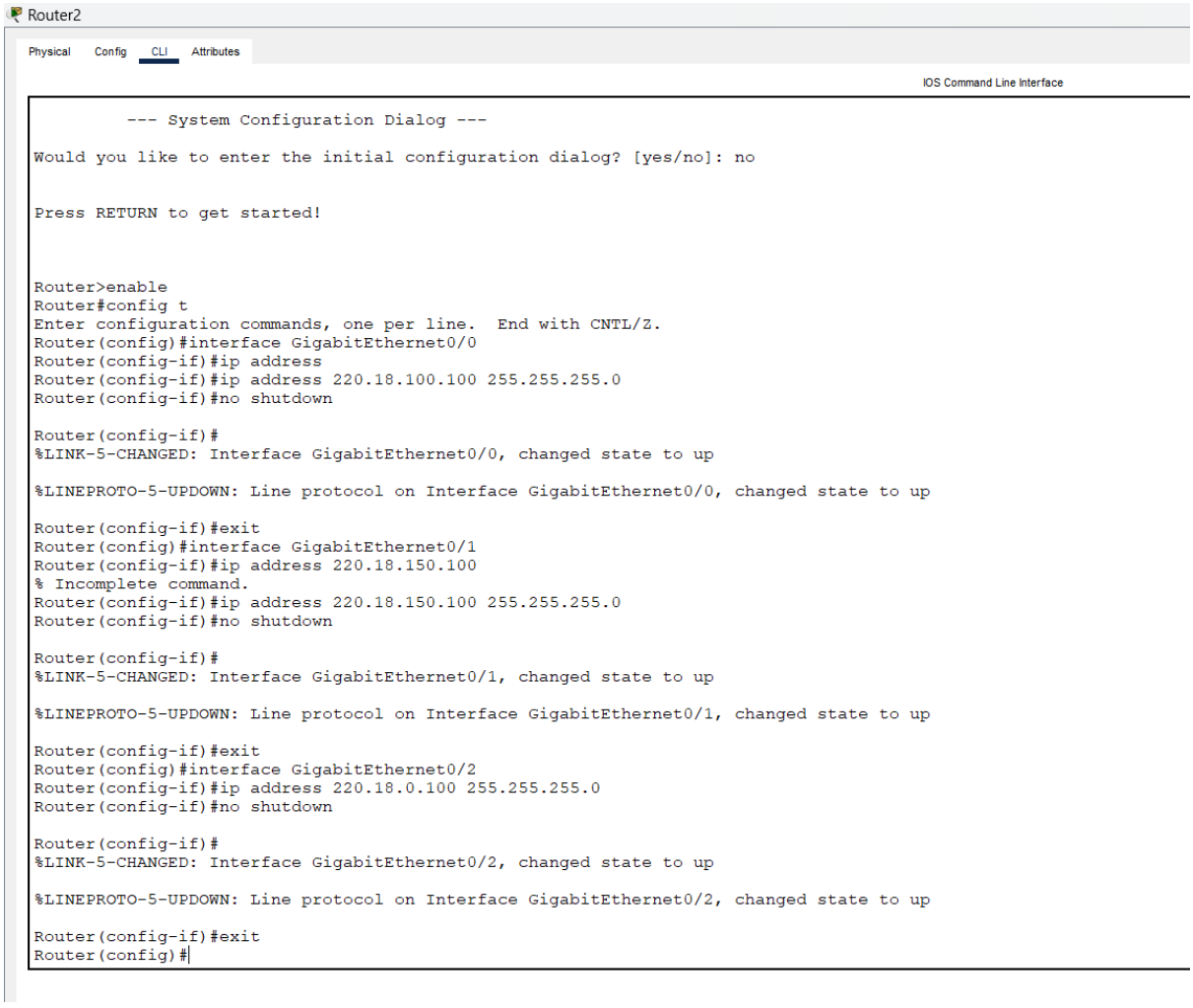
- 3 LAN network – (Tree, Star, Ring)
- Topology



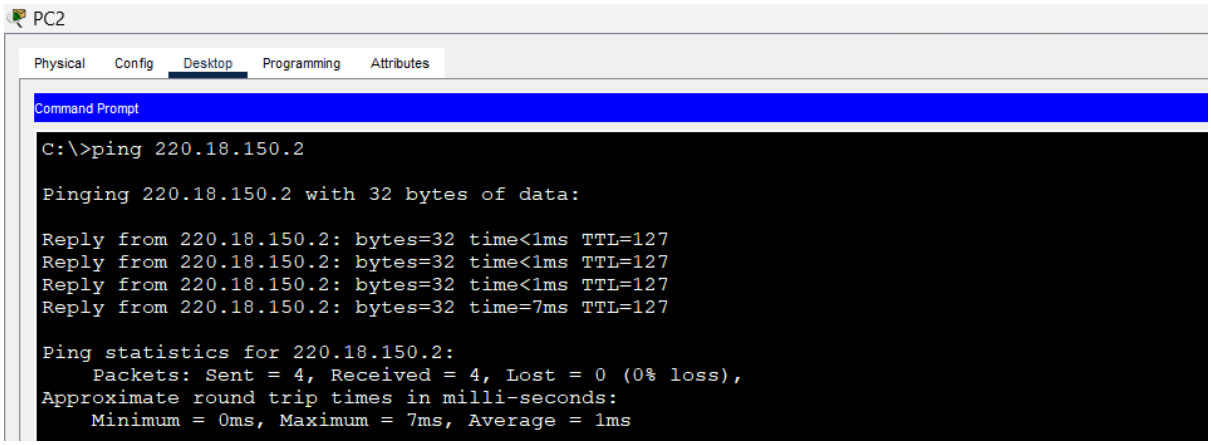
- Simulation



- CLI commands (Configuration)

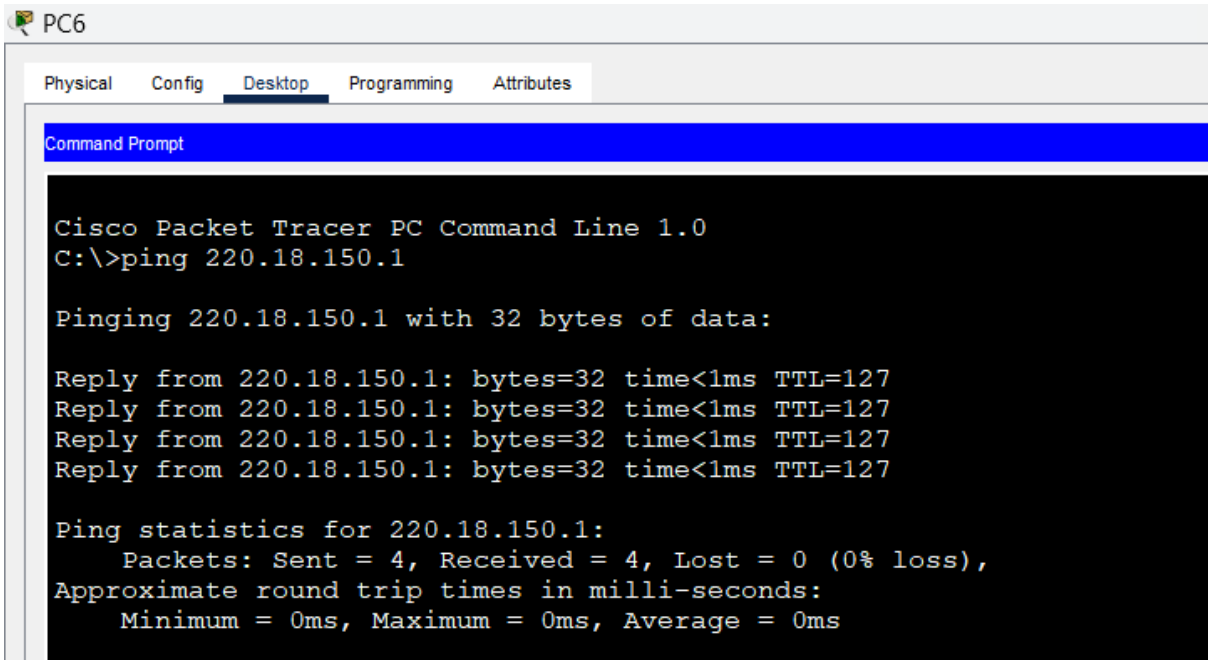


- Command Prompt (Realtime) – PC from LAN-03 (Ring)



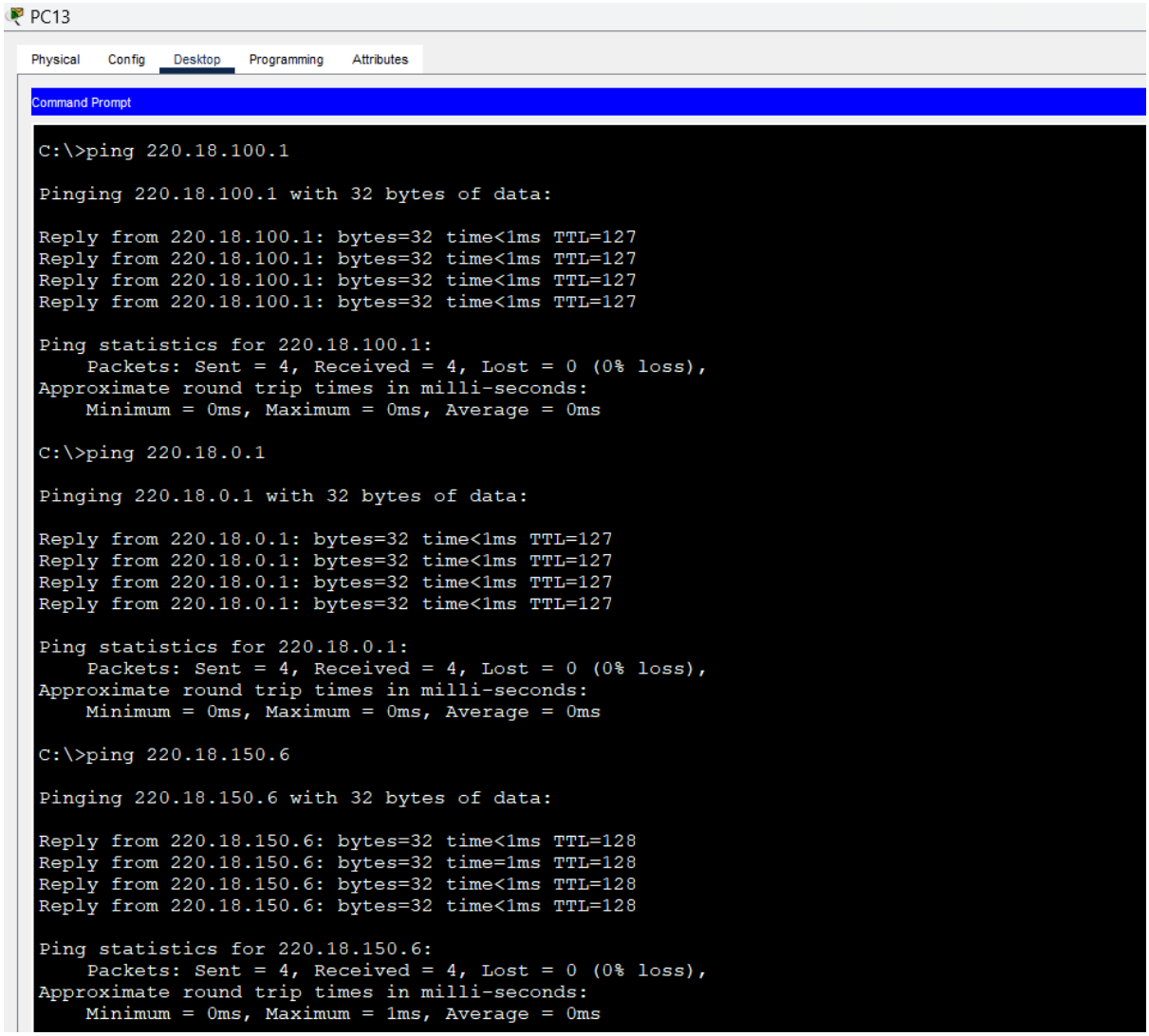
```
C:\>ping 220.18.100.3

Pinging 220.18.100.3 with 32 bytes of data:

Reply from 220.18.100.3: bytes=32 time<1ms TTL=127
Reply from 220.18.100.3: bytes=32 time<1ms TTL=127
Reply from 220.18.100.3: bytes=32 time<1ms TTL=127
Reply from 220.18.100.3: bytes=32 time<1ms TTL=127

Ping statistics for 220.18.100.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 220.18.0.3

Pinging 220.18.0.3 with 32 bytes of data:

Reply from 220.18.0.3: bytes=32 time<1ms TTL=128
Reply from 220.18.0.3: bytes=32 time<1ms TTL=128
Reply from 220.18.0.3: bytes=32 time<1ms TTL=128
Reply from 220.18.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 220.18.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

- Command Prompt (Realtime) – PC from LAN-02 (Star)

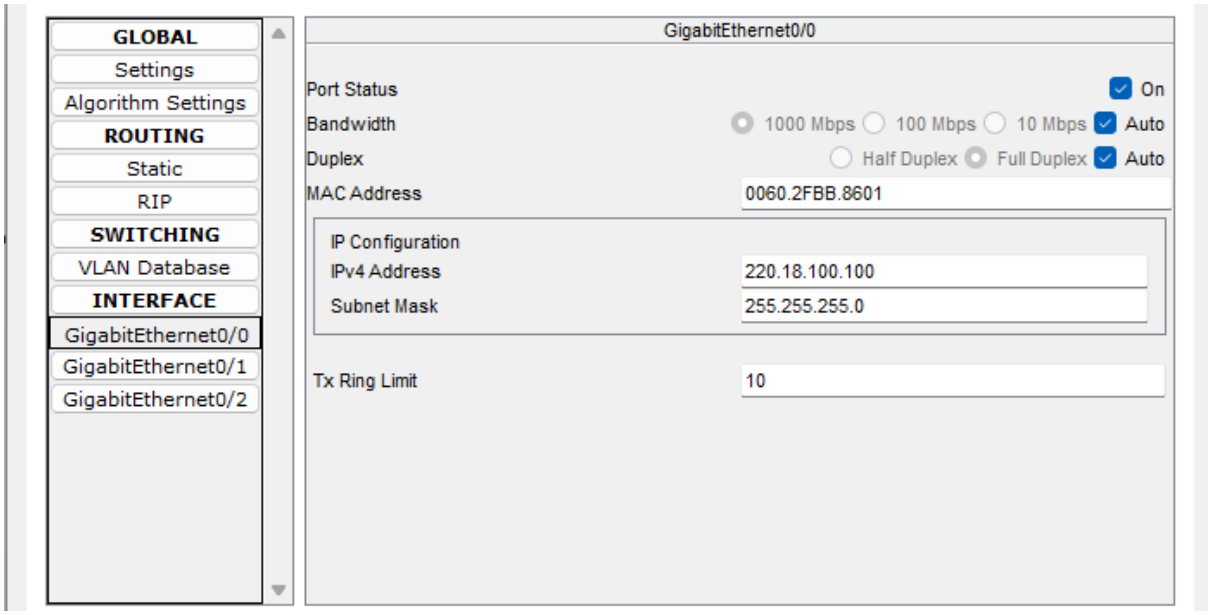


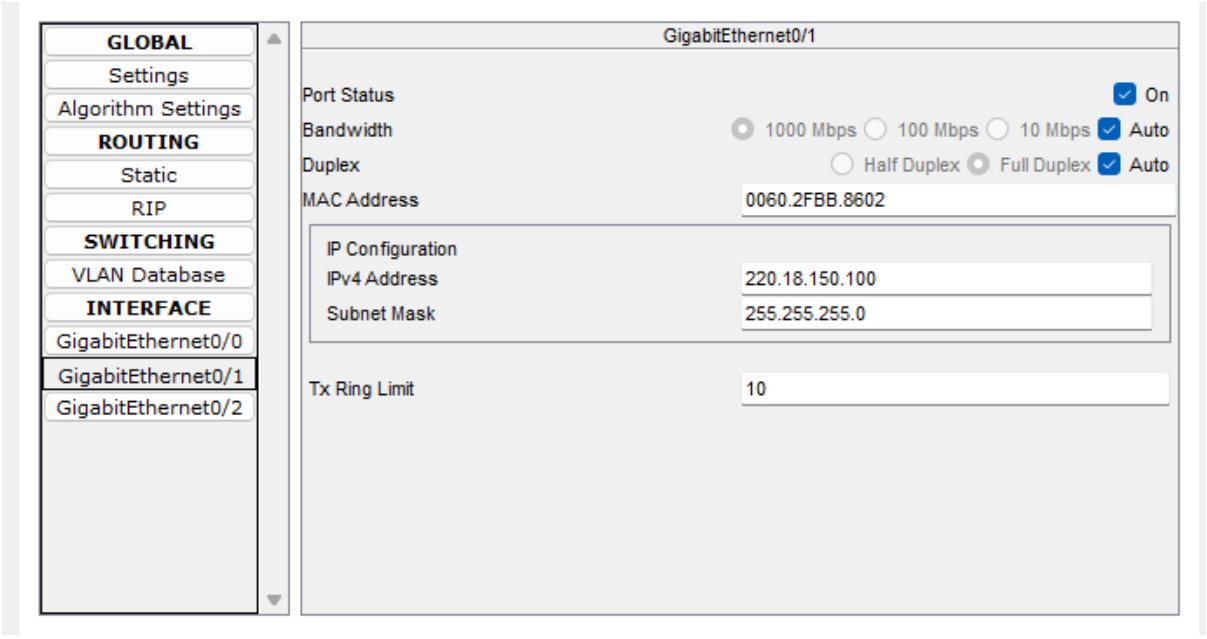

```
C:\>ping 220.18.0.2

Pinging 220.18.0.2 with 32 bytes of data:

Reply from 220.18.0.2: bytes=32 time<1ms TTL=127
Reply from 220.18.0.2: bytes=32 time<1ms TTL=127
Reply from 220.18.0.2: bytes=32 time<1ms TTL=127
Reply from 220.18.0.2: bytes=32 time=1ms TTL=127

Ping statistics for 220.18.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

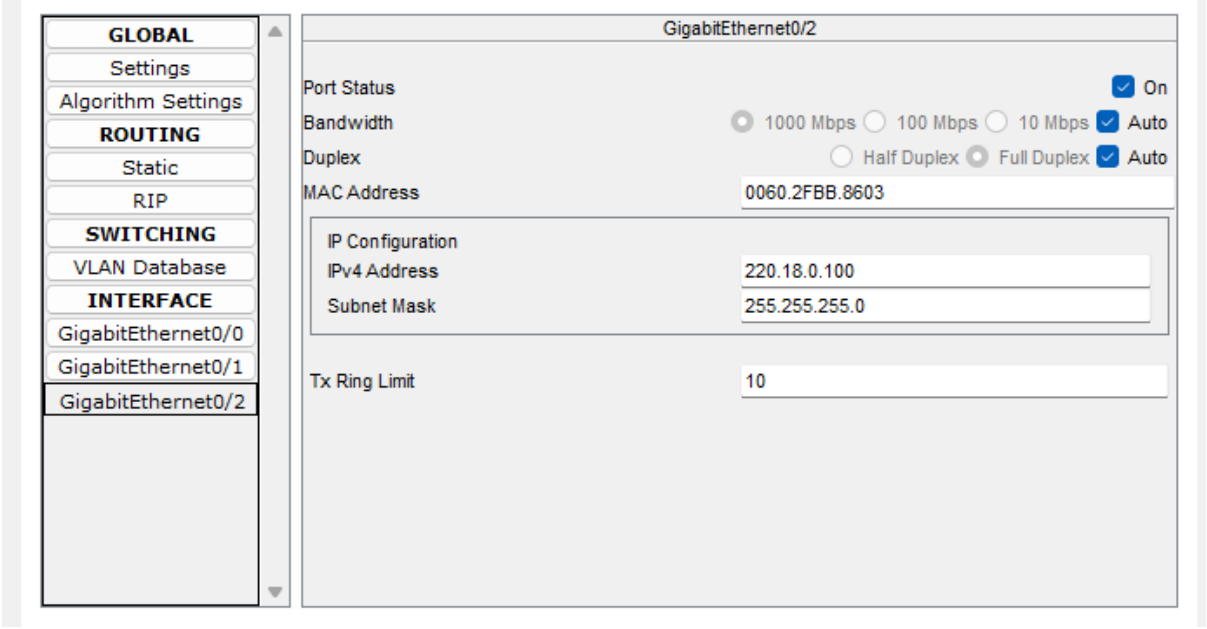
➢ Command Prompt (Realtime) – PC from LAN-01 (Tree)



➢ GigabitEthernet Configuration




GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/1
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0060.2FBB.8602
IP Configuration
IPv4 Address
220.18.150.100
Subnet Mask
255.255.255.0
Tx Ring Limit
10


GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/2
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0060.2FBB.8603
IP Configuration
IPv4 Address
220.18.0.100
Subnet Mask
255.255.255.0
Tx Ring Limit
10

INFERENCE:

Utilizing Cisco Packet Tracer (CPT) to design and simulate different network topologies was useful hands-on experience in learning actual network designs and their behaviours. Constructing all the topologies discussed in the first part—Bus, Star, Ring, Mesh, and Tree—allowed visualization of how devices talk to each other and how the topology of a network affects its performance, scalability, and fault tolerance. This made it possible to replicate fault identification and gain a thorough understanding of the drawbacks of various topologies.

In the second half, the creation of a network with three independent LANs (each with Tree, Star, and Ring topology respectively) and linking them together through a single router illustrated the real-world incorporation of various networks into an extended interconnected network. The selection of suitable routers, switches, and connection types was crucial and this emphasized the need for correct device selection according to network needs. Moreover, setting up the devices helps understand the importance of proper IP addressing, network segmentation, and routing to facilitate smooth communication among different LANs.

Cisco Packet Tracer is a useful simulation program for learning about the design, configuration, and troubleshooting of multiple network topologies in a safe, virtual format. It underlined the building blocks of networking and helped understand computer networking in relation to real world applications.

RESULT:

In this experiment, various network topologies including Bus, Star, Ring, Mesh, and Tree were successfully created and simulated using Cisco Packet Tracer. Three different LANs, each following Tree, Star, and Ring topologies respectively, were connected through a single router. Proper IP addressing and router configuration enabled both intra-LAN and inter-LAN communication without errors. The simulation verified successful packet transmission across different networks, demonstrating the practical application of network design principles and reinforcing the understanding of topology selection, network configuration, and device connectivity in a controlled environment.