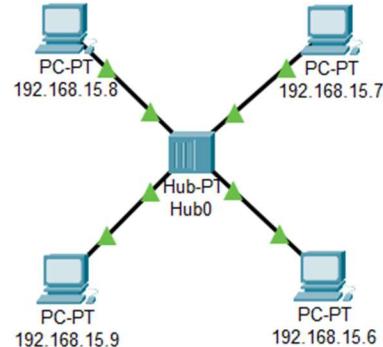
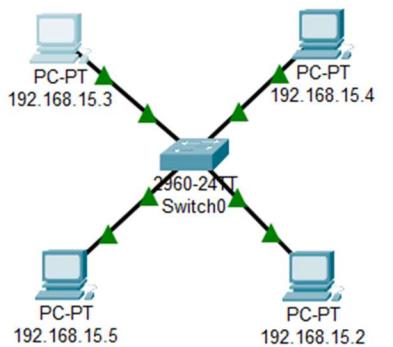


Q1: Star Topology using Hub and Switch

1. Network Topology Design

- Steps:

- Drag a hub and switch onto the workspace.
- Add 3–5 PCs.
- Connect PCs to the hub and switch using straight-through cables.



2. IP Address Configuration of PCs

Two side-by-side screenshots of a network configuration interface. Both windows have a title bar showing the IP address of the host: "192.168.15.3" on the left and "192.168.15.4" on the right. Each window has tabs for Physical, Config, Desktop, Programming, and Attributes, with the Config tab selected.

Host 1 (IP 192.168.15.3):

IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.15.3
Subnet Mask	255.255.255.0
Default Gateway	192.168.15.1
DNS Server	0.0.0.0

Host 2 (IP 192.168.15.4):

IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.15.4
Subnet Mask	255.255.255.0
Default Gateway	192.168.15.1
DNS Server	0.0.0.0

The image displays six separate windows of a network configuration application, each showing the IP Configuration for a host with the IP address 192.168.15.x. All hosts are configured with a static IP address of 192.168.15.x, a subnet mask of 255.255.255.0, and a default gateway of 192.168.15.1. The DNS server is set to 0.0.0.0. The interface for all hosts is FastEthernet0.

- Host 192.168.15.5:** IP Address: 192.168.15.5, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.15.1, DNS Server: 0.0.0.0
- Host 192.168.15.2:** IP Address: 192.168.15.2, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.15.1, DNS Server: 0.0.0.0
- Host 192.168.15.8:** IP Address: 192.168.15.8, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.15.1, DNS Server: 0.0.0.0
- Host 192.168.15.7:** IP Address: 192.168.15.7, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.15.1, DNS Server: 0.0.0.0
- Host 192.168.15.9:** IP Address: 192.168.15.9, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.15.1, DNS Server: 0.0.0.0
- Host 192.168.15.6:** IP Address: 192.168.15.6, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.15.1, DNS Server: 0.0.0.0

3. Ping Testing

```

192.168.15.2
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.15.3

Pinging 192.168.15.3 with 32 bytes of data:
Reply from 192.168.15.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.15.4

Pinging 192.168.15.4 with 32 bytes of data:
Reply from 192.168.15.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.15.5

Pinging 192.168.15.5 with 32 bytes of data:
Reply from 192.168.15.5: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.15.6

Pinging 192.168.15.6 with 32 bytes of data:
Reply from 192.168.15.6: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.15.7

Pinging 192.168.15.7 with 32 bytes of data:
Reply from 192.168.15.7: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

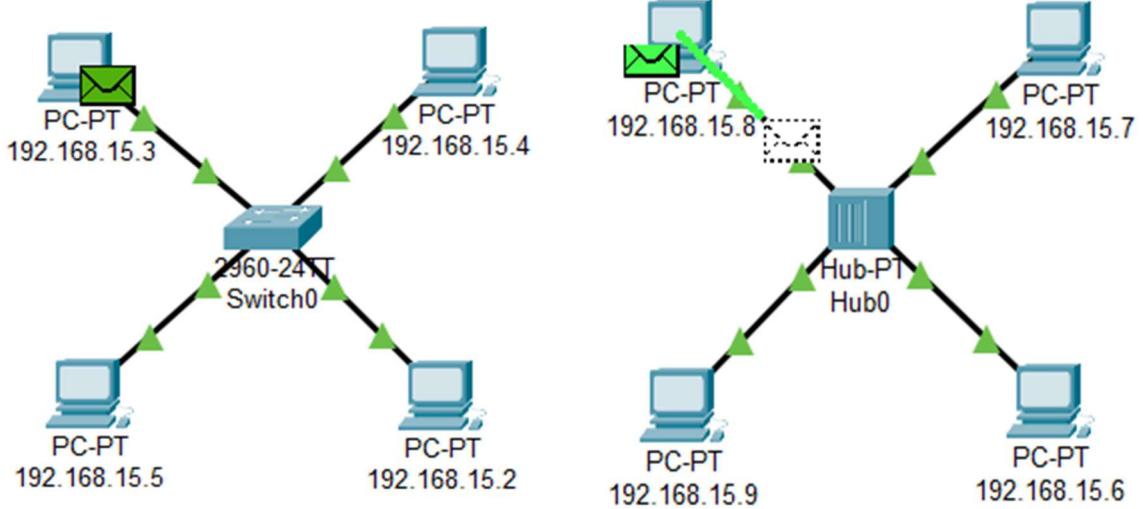
C:\>ping 192.168.15.8

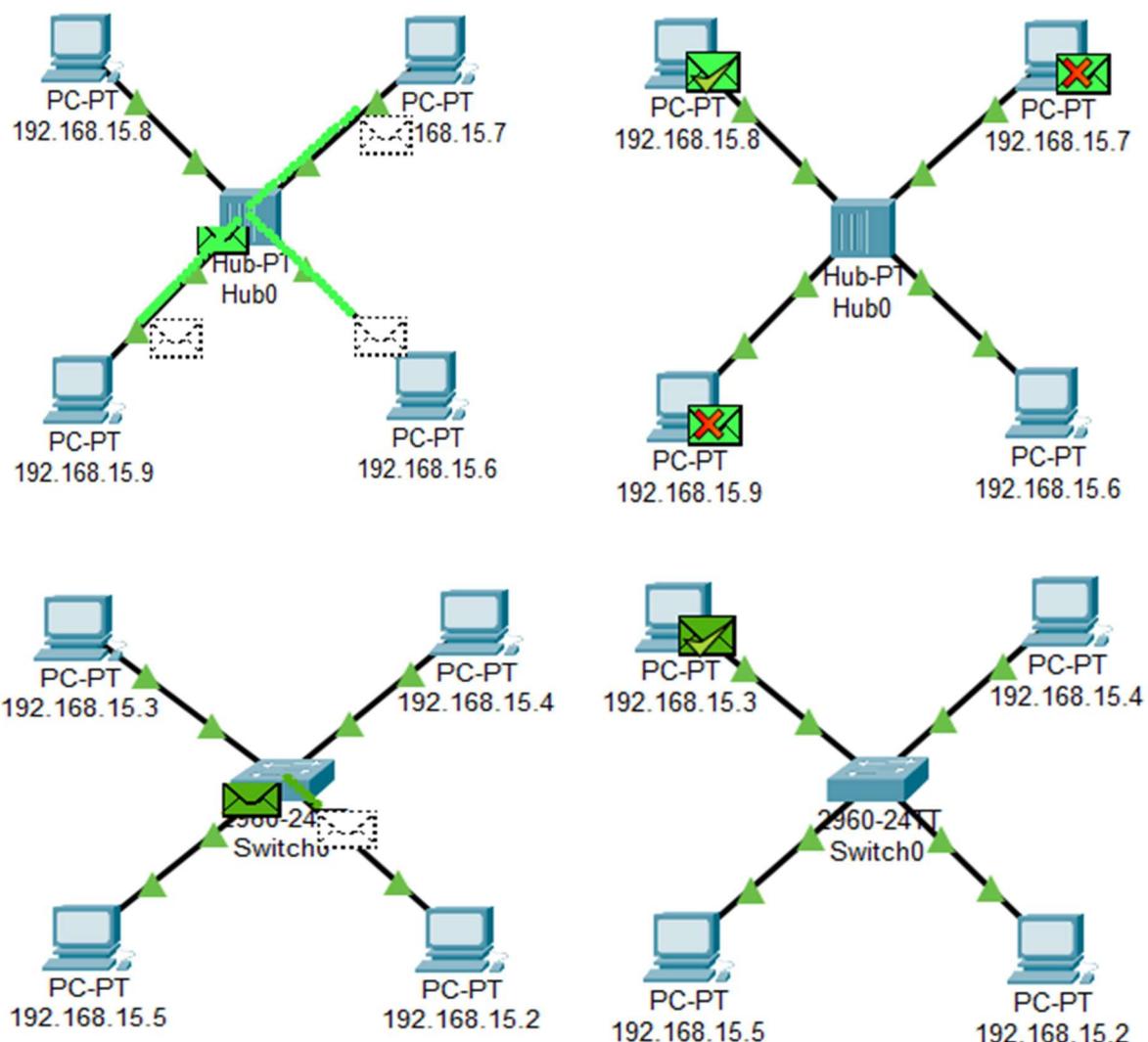
Pinging 192.168.15.8 with 32 bytes of data:
Reply from 192.168.15.8: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
  
```

4. Real-Time and Simulation Mode

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
Successful	Successful	192.168.15.3	192.168.15.2	ICMP	■	0.000	N	0	(edit)	(delete)
Successful	Successful	192.168.15.8	192.168.15.6	ICMP	■	0.000	N	1	(edit)	(delete)
Successful	Successful	192.168.15.4	192.168.15.5	ICMP	■	0.000	N	2	(edit)	(delete)
Successful	Successful	192.168.15.7	192.168.15.8	ICMP	■	0.000	N	3	(edit)	(delete)





5. Comparison: Hub vs Switch

Feature	Hub	Switch
Type	Layer 1 (Physical)	Layer 2 (Data Link)
Traffic Type	Broadcasts to all ports	Unicast to destination MAC
Speed	Slower	Faster due to frame switching
Security	Low	High

6. Advantages & Disadvantages of Star Topology

Advantages:

- Easy to install and manage
- Single cable failure doesn't affect others
- Easy to add/remove devices

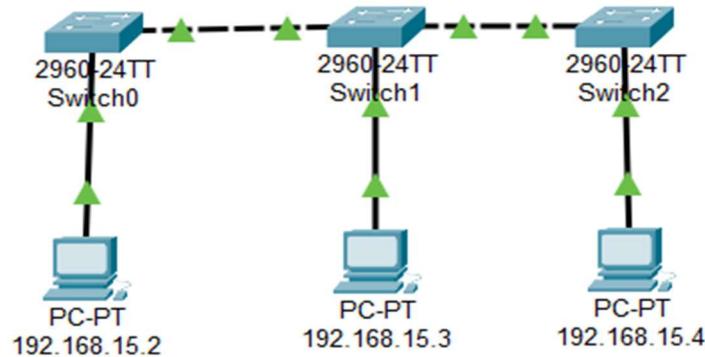
Disadvantages:

- Central device failure (hub/switch) brings down network
- Requires more cable length

Q2: Bus Topology using Switch

1. Design & Steps

- Arrange PCs in a line.
- Connect each PC to the same switch using straight-through cables.
- Set IPs in the same subnet.



2. IP Configuration

Two screenshots of network configuration software are shown side-by-side, illustrating the IP configuration for two PCs connected to different switches.

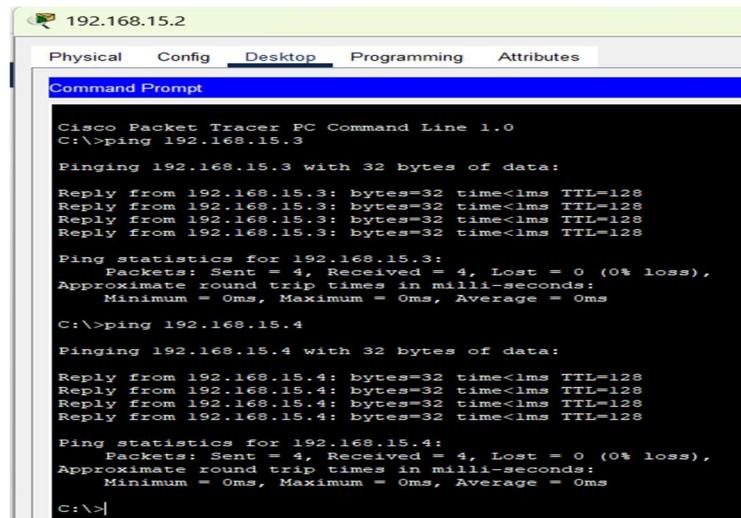
Left Screenshot (PC-PT 192.168.15.2):

Setting	Value
IP Configuration	Static
IPv4 Address	192.168.15.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.15.1
DNS Server	0.0.0.0

Right Screenshot (PC-PT 192.168.15.3):

Setting	Value
IP Configuration	Static
IPv4 Address	192.168.15.3
Subnet Mask	255.255.255.0
Default Gateway	192.168.15.1
DNS Server	0.0.0.0

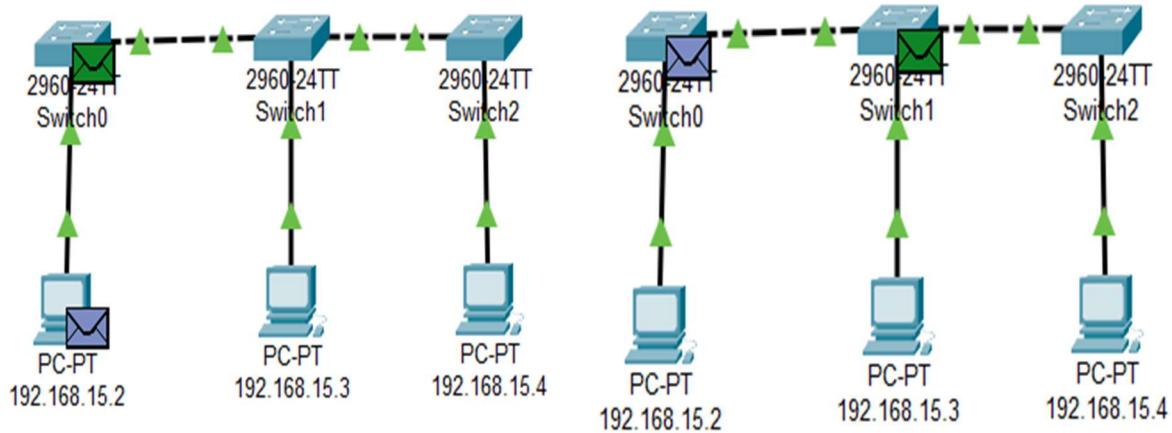
3. Ping testing

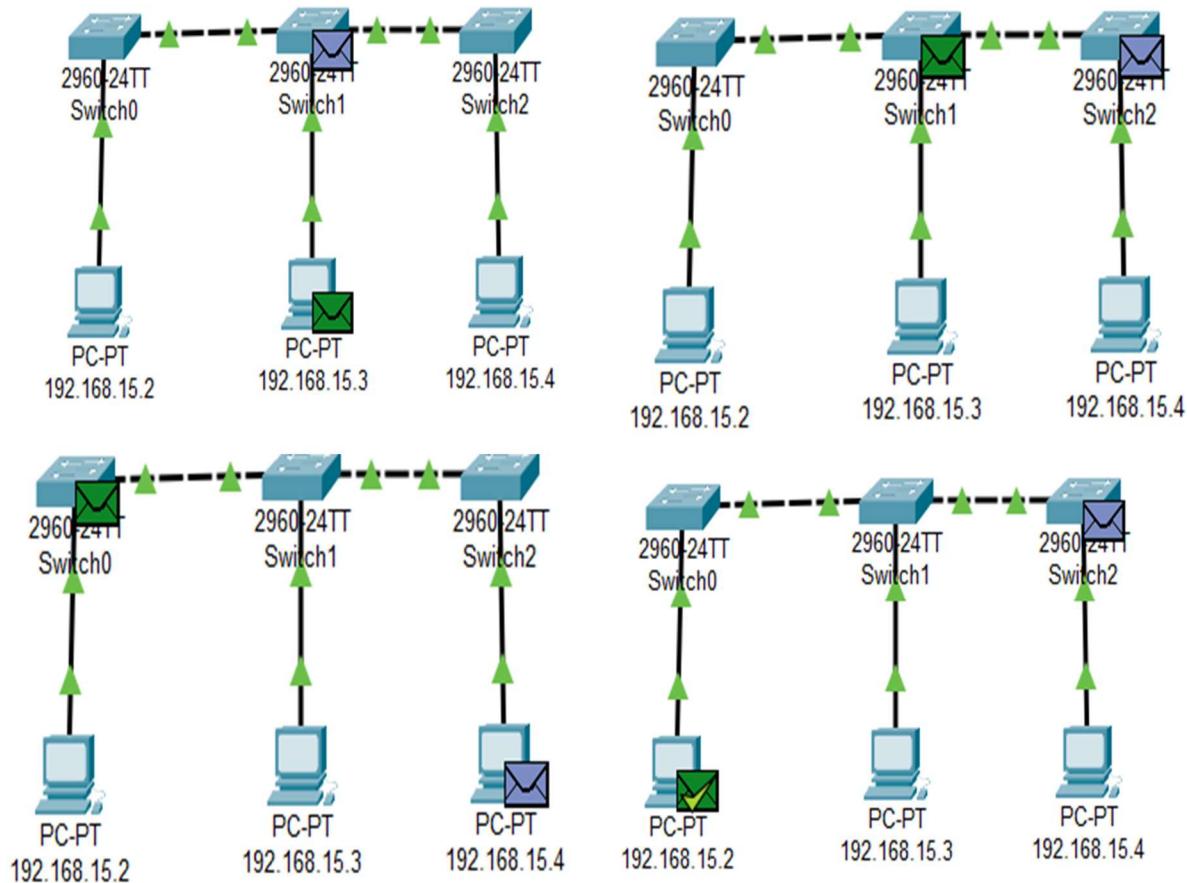


Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.15.3
Pinging 192.168.15.3 with 32 bytes of data:
Reply from 192.168.15.3: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.15.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>>ping 192.168.15.4
Pinging 192.168.15.4 with 32 bytes of data:
Reply from 192.168.15.4: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.15.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>

4. Real-Time and Simulation Mode

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete	
	Successful	192.168.15.2	192.168.15.3	ICMP		0.000	N	0	(edit)		
	Successful	192.168.15.2	192.168.15.4	ICMP		0.000	N	1	(edit)		





Advantages:

- Easy to implement for small networks
- Less cable length than star

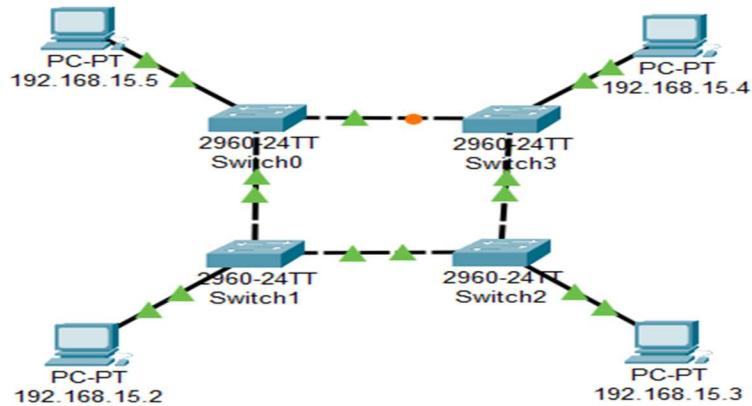
Disadvantages:

- Network performance degrades with traffic
- Entire network goes down if main cable fails

Q3: Ring Topology using Switch

1. Design & Steps

- Connect each PC to a switch.
- Use multiple switches in a loop to simulate ring topology.
- Assign proper IPs.



2. IP Configuration

IP Address	Interface	IPv4 Address	Subnet Mask	Default Gateway	DNS Server
192.168.15.2	FastEthernet0	192.168.15.2	255.255.255.0	192.168.15.2	0.0.0.0
192.168.15.3	FastEthernet0	192.168.15.3	255.255.255.0	192.168.15.1	0.0.0.0
192.168.15.4	FastEthernet0	192.168.15.4	255.255.255.0	192.168.15.1	0.0.0.0
192.168.15.5	FastEthernet0	192.168.15.5	255.255.255.0	192.168.15.1	0.0.0.0

3. Ping testing

```
C:\>ping 192.168.15.3
Pinging 192.168.15.3 with 32 bytes of data:
Reply from 192.168.15.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.15.4
Pinging 192.168.15.4 with 32 bytes of data:
Reply from 192.168.15.4: bytes=32 time<1ms TTL=128

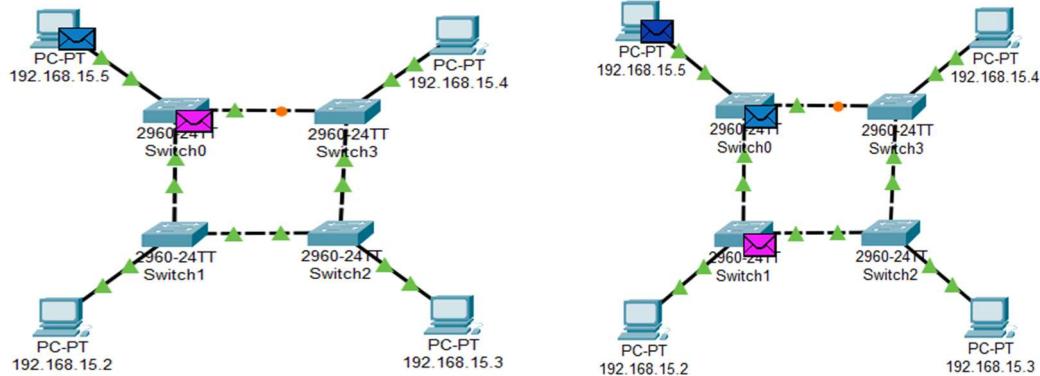
Ping statistics for 192.168.15.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

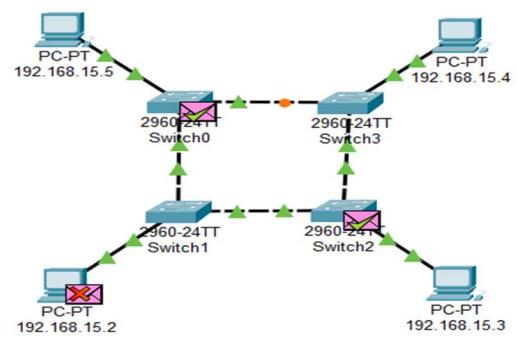
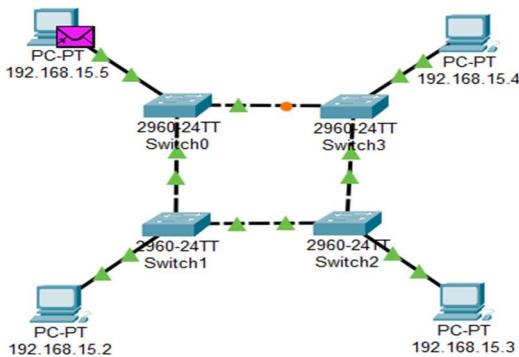
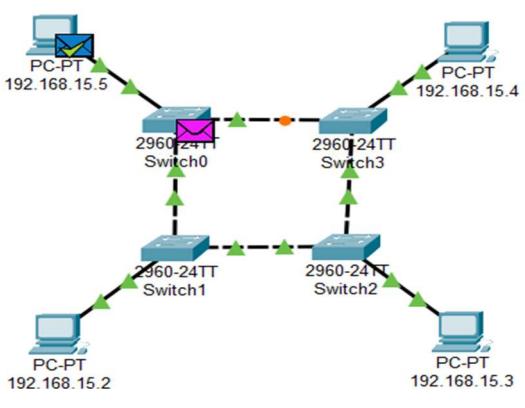
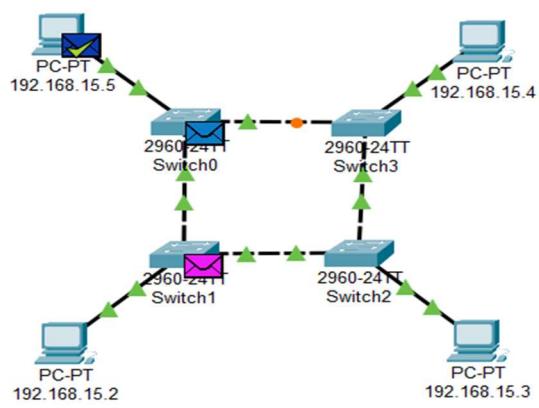
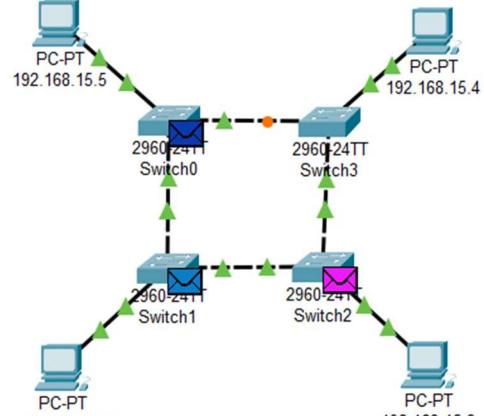
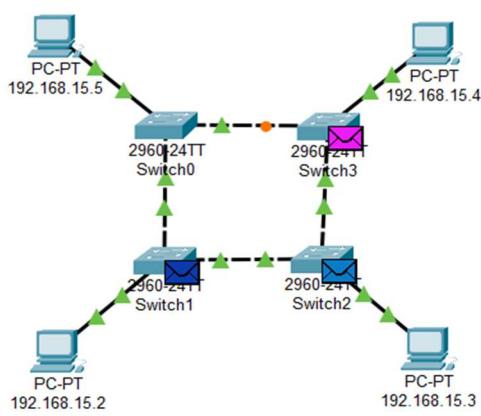
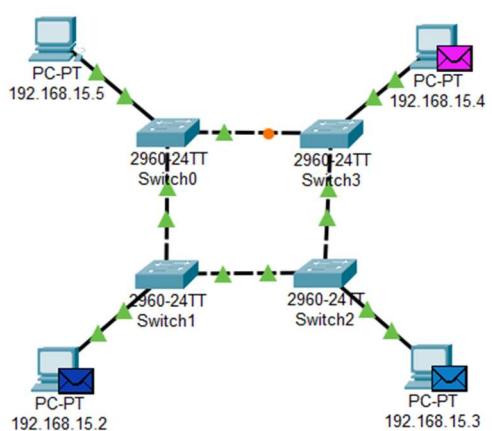
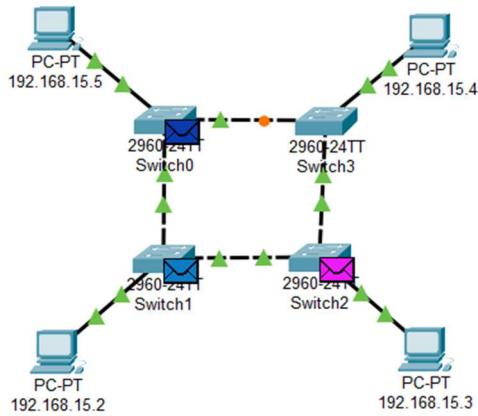
C:\>ping 192.168.15.5
Pinging 192.168.15.5 with 32 bytes of data:
Reply from 192.168.15.5: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

4. Real-Time and Simulation Mode

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
●	Successful	192.168.15.5	192.168.15.4	ICMP	■	0.000	N	0	(edit)	(delete)
●	Successful	192.168.15.5	192.168.15.3	ICMP	■	0.000	N	1	(edit)	(delete)
●	Successful	192.168.15.5	192.168.15.2	ICMP	■	0.000	N	2	(edit)	(delete)





Advantages:

1. Predictable network load
2. Easy fault isolation

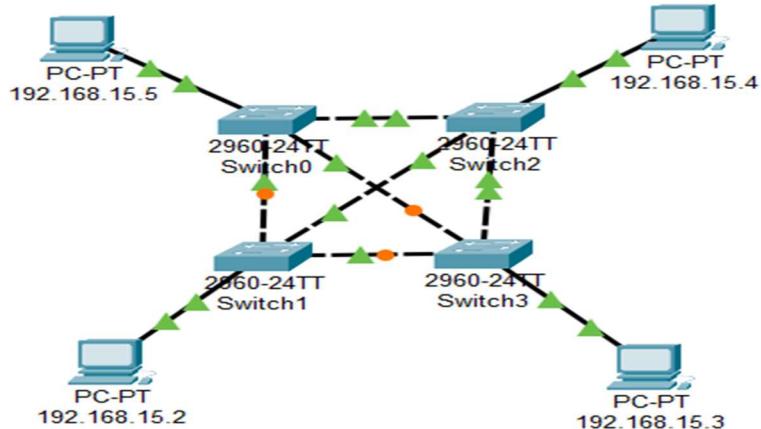
Disadvantages:

1. A single node failure can disrupt the entire network
2. More difficult to configure

Q4: Mesh Topology using Switch

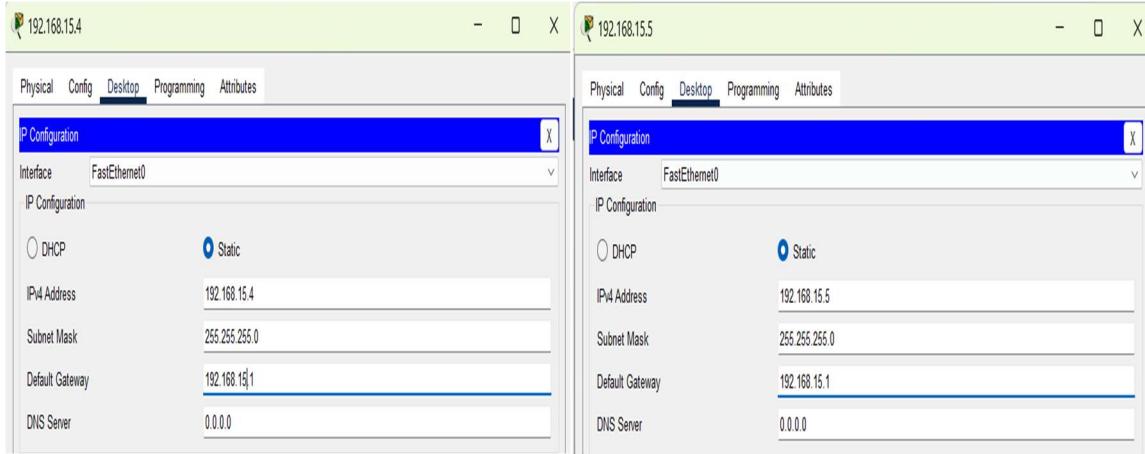
1. Design & Steps

- Connect each PC to every other PC via individual switches.
- Use crossover cables between switches if needed.



2. IP Configuration

Host	IP Address	Subnet Mask	Default Gateway	DNS Server
192.168.15.2	192.168.15.2	255.255.255.0	192.168.15.1	0.0.0.0
192.168.15.3	192.168.15.3	255.255.255.0	192.168.15.1	0.0.0.0



3. Ping testing

```

192.168.15.2
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.15.3
Pinging 192.168.15.3 with 32 bytes of data:
Reply from 192.168.15.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.15.4
Pinging 192.168.15.4 with 32 bytes of data:
Reply from 192.168.15.4: bytes=32 time<1ms TTL=128

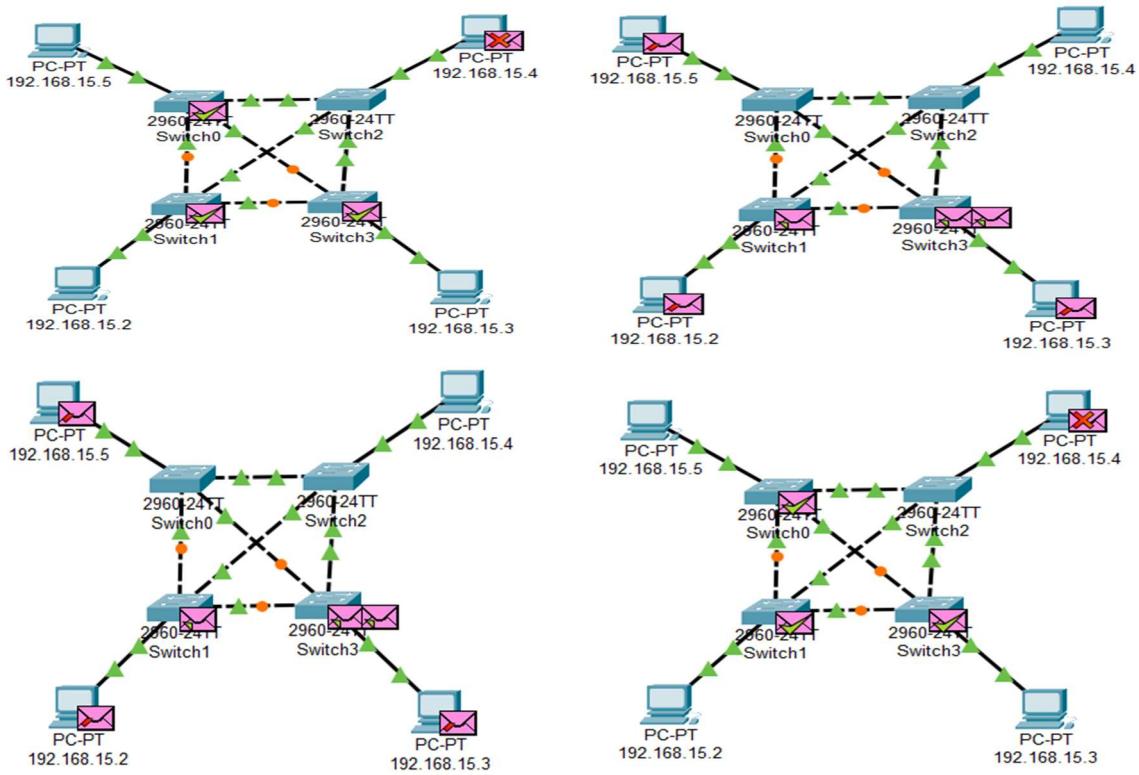
Ping statistics for 192.168.15.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.15.5
Pinging 192.168.15.5 with 32 bytes of data:
Reply from 192.168.15.5: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>

```

4. Real-Time and Simulation Mode

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete	
	Successful	192.168.15.5	192.168.15.3	ICMP		0.000	N	0	(edit)	(delete)	
	Successful	192.168.15.4	192.168.15.5	ICMP		0.000	N	1	(edit)	(delete)	
	Successful	192.168.15.2	192.168.15.4	ICMP		0.000	N	2	(edit)	(delete)	



Advantages:

1. High fault tolerance
2. Robust and reliable

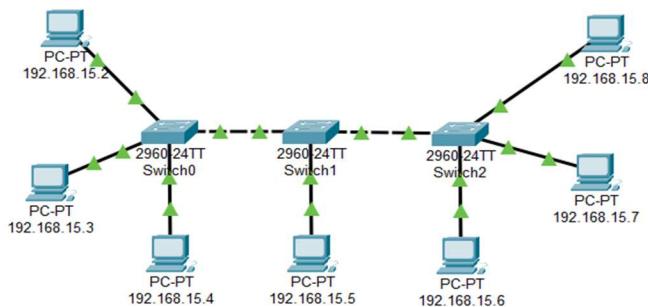
Disadvantages:

1. Complex setup
2. High cabling cost

Q5: Hybrid Topology using Switch

1. Design & Steps

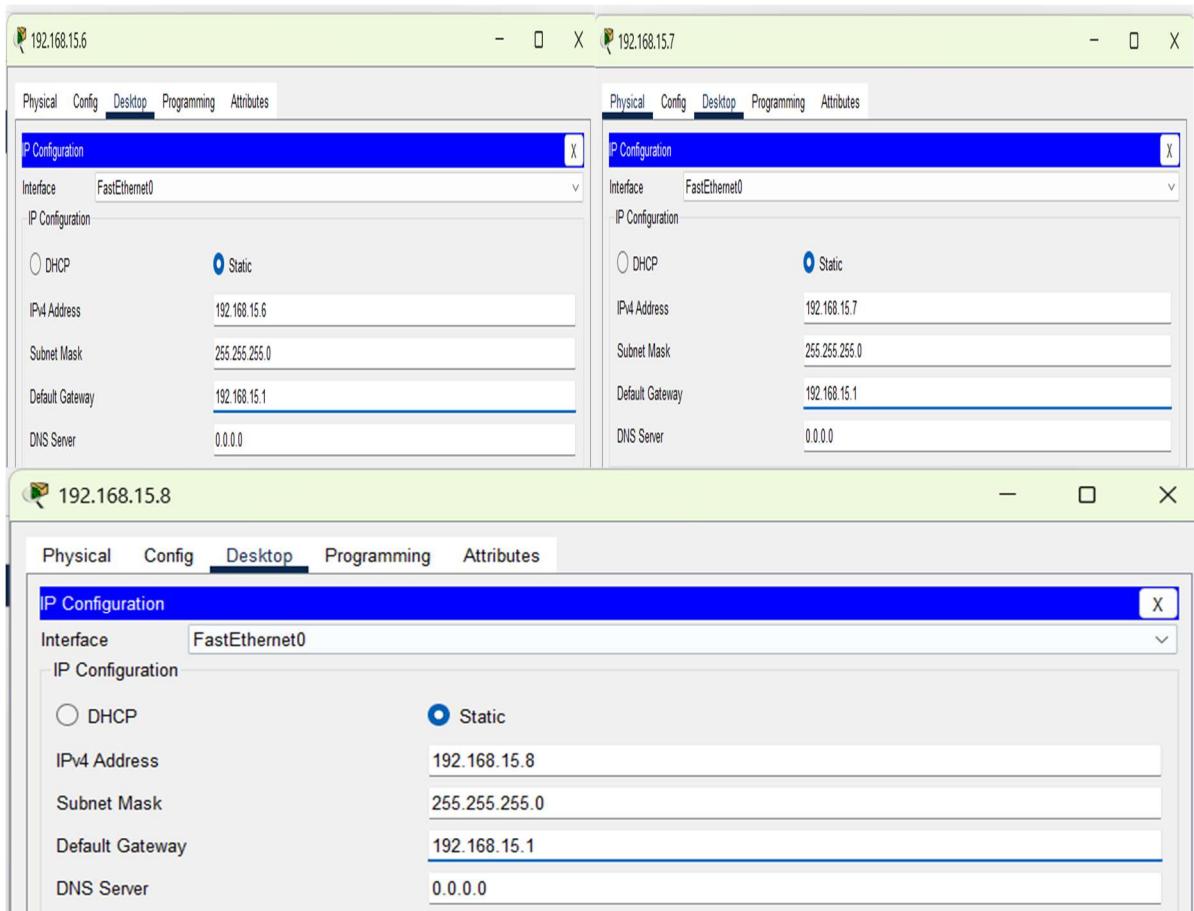
- Combine star and ring (or any two) using switches and hubs.
- Configure IPs from appropriate subnets.



2. IP Configuration

The following screenshots show the IP configuration for each PC in the network. Each window displays the 'Config' tab of the interface configuration tool.

- PC-PT 192.168.15.2:** IP Address 192.168.15.2, Subnet Mask 255.255.255.0, Default Gateway 192.168.15.1, DNS Server 0.0.0.0.
- PC-PT 192.168.15.3:** IP Address 192.168.15.3, Subnet Mask 255.255.255.0, Default Gateway 192.168.15.1, DNS Server 0.0.0.0.
- PC-PT 192.168.15.4:** IP Address 192.168.15.4, Subnet Mask 255.255.255.0, Default Gateway 192.168.15.1, DNS Server 0.0.0.0.
- PC-PT 192.168.15.5:** IP Address 192.168.15.5, Subnet Mask 255.255.255.0, Default Gateway 192.168.15.1, DNS Server 0.0.0.0.
- PC-PT 192.168.15.6:** IP Address 192.168.15.6, Subnet Mask 255.255.255.0, Default Gateway 192.168.15.1, DNS Server 0.0.0.0.
- PC-PT 192.168.15.7:** IP Address 192.168.15.7, Subnet Mask 255.255.255.0, Default Gateway 192.168.15.1, DNS Server 0.0.0.0.
- PC-PT 192.168.15.8:** IP Address 192.168.15.8, Subnet Mask 255.255.255.0, Default Gateway 192.168.15.1, DNS Server 0.0.0.0.



3. Ping Testing

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.15.2
Pinging 192.168.15.2 with 32 bytes of data:
Reply from 192.168.15.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.15.4
Pinging 192.168.15.4 with 32 bytes of data:
Reply from 192.168.15.4: bytes=32 time<1ms TTL=128
Reply from 192.168.15.4: bytes=32 time<1ms TTL=128
Reply from 192.168.15.4: bytes=32 time=10ms TTL=128
Reply from 192.168.15.4: bytes=32 time<1ms TTL=128

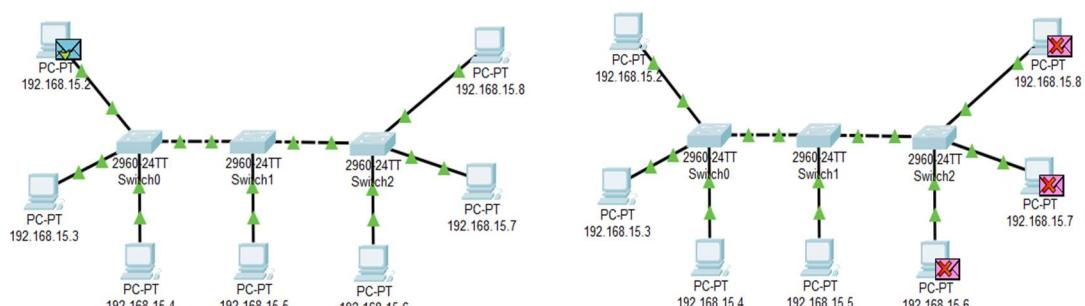
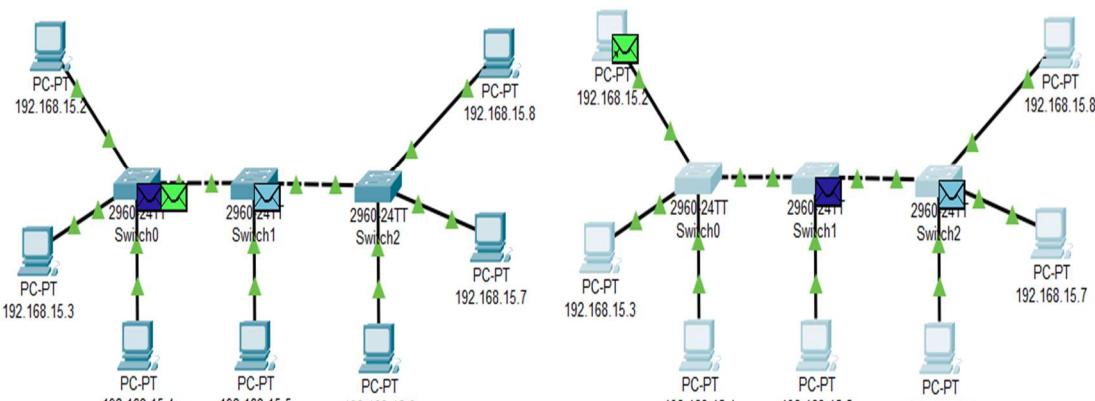
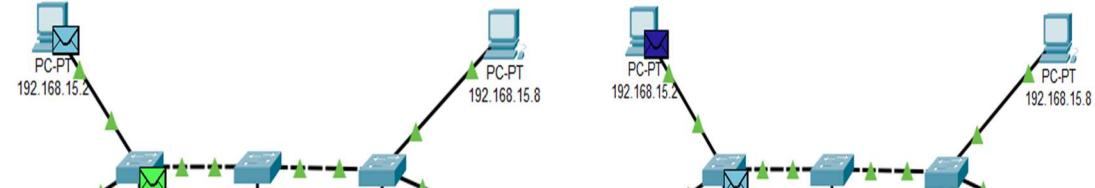
Ping statistics for 192.168.15.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>ping 192.168.15.8
Pinging 192.168.15.8 with 32 bytes of data:
Reply from 192.168.15.8: bytes=32 time<1ms TTL=128
Reply from 192.168.15.8: bytes=32 time=<1ms TTL=128
Reply from 192.168.15.8: bytes=32 time<1ms TTL=128
Reply from 192.168.15.8: bytes=32 time=<1ms TTL=128

Ping statistics for 192.168.15.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
  
```

4. Real-Time and Simulation Mode

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	192.168.15.2	192.168.15.4	ICMP	Green	0.000	N	0	(edit)	(delete)
	Successful	192.168.15.2	192.168.15.7	ICMP	Cyan	0.000	N	1	(edit)	(delete)
	Successful	192.168.15.2	192.168.15.5	ICMP	Dark Blue	0.000	N	2	(edit)	(delete)



Advantages:

1. Flexible
2. Scalable and fault-tolerant

Disadvantages:

1. Complex design
2. Difficult to manage