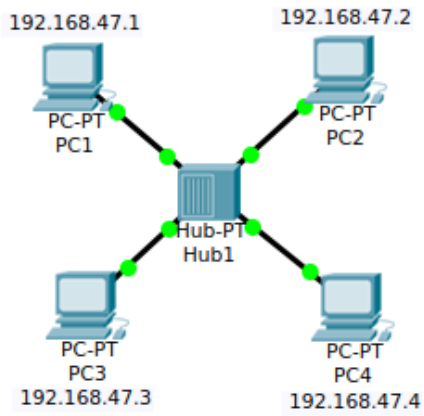
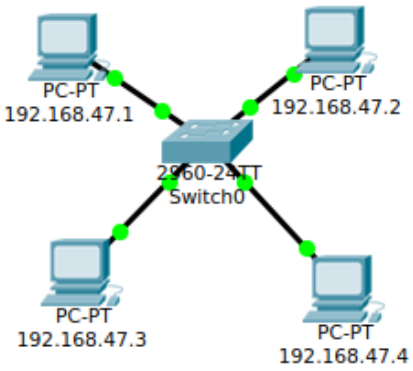
Star Topology

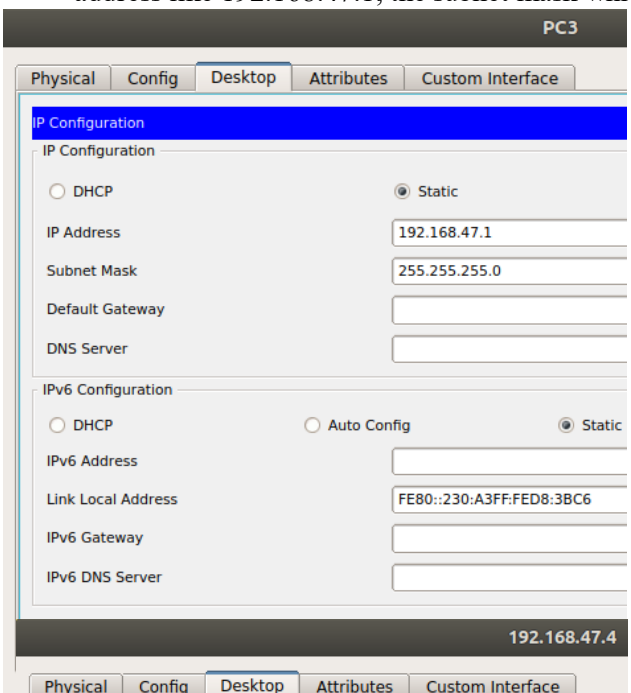
1.Network Topology

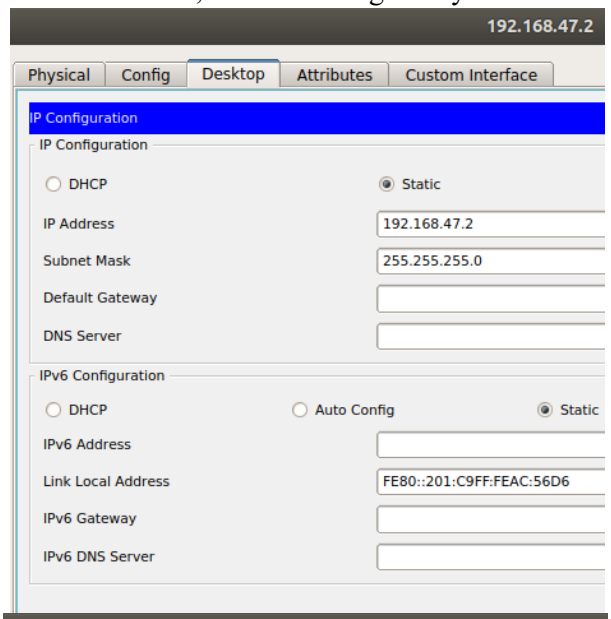


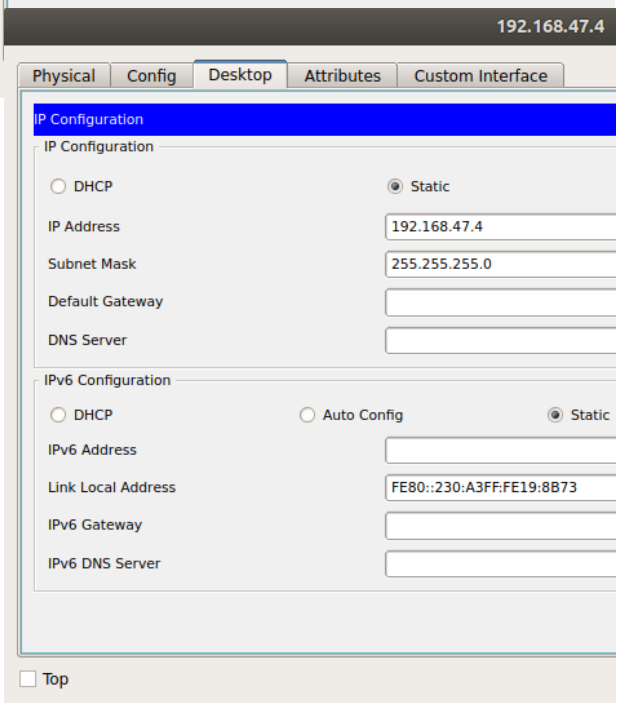


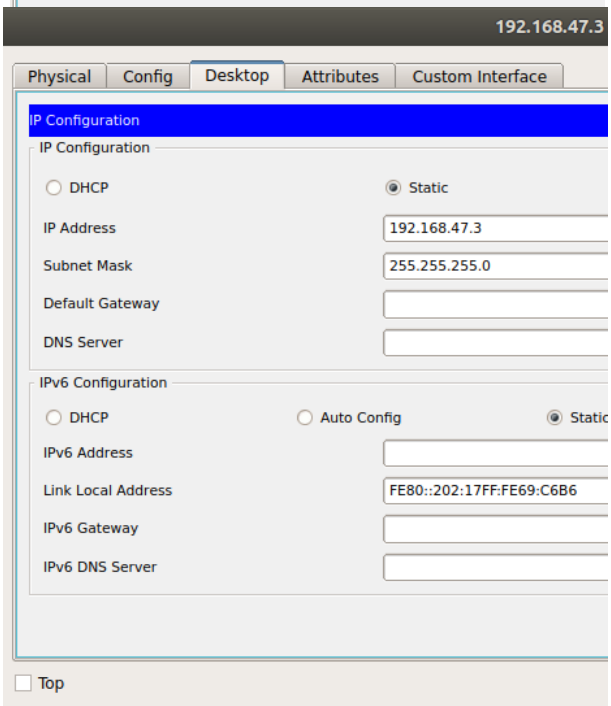
2.IP Address Configuration of PCs

To configure IP addresses in Cisco Packet Tracer, first drag and drop the required devices such as a PC and a router onto the workspace. For the PC, click on it, go to the "Desktop" tab, and open "IP Configuration". Enter a suitable IP address like 192.168.47.1, the subnet mask which usually autofills as 255.255.255.0, and a default gateway

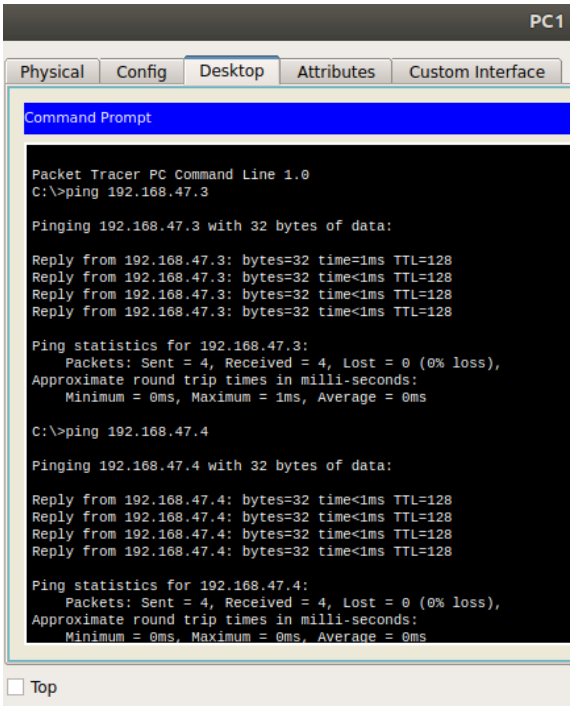






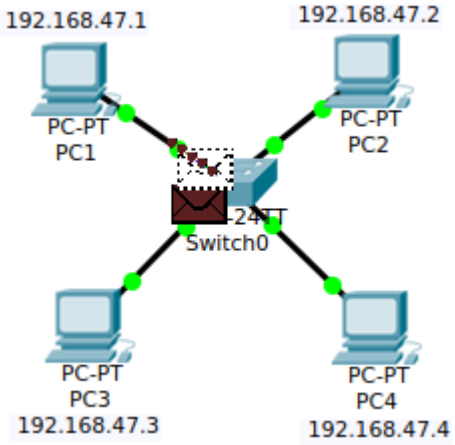


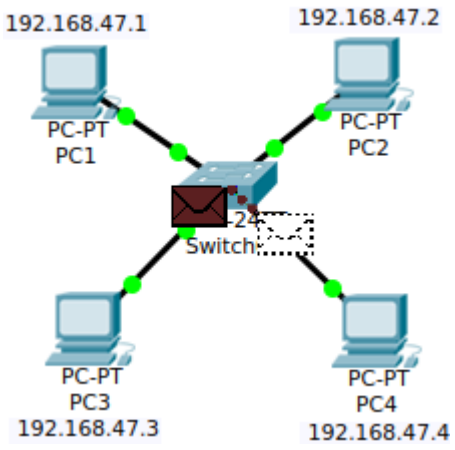
3. Ping Testing

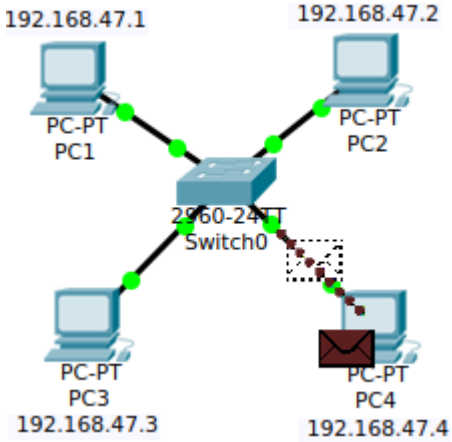


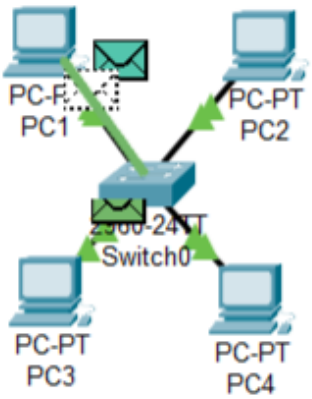
4. Real Mode Simulation and Event Simulation

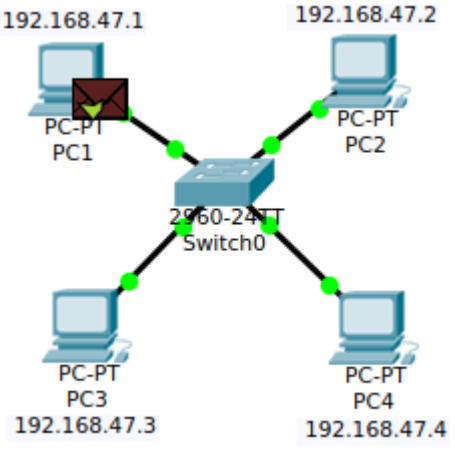
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC1	PC4	ICMP		0.000	N	0	(e...	(delete)
	Successful	PC1	PC3	ICMP		0.000	N	1	(e...	(delete)
	Successful	PC2	PC3	ICMP		0.000	N	2	(e...	(delete)
	Successful	PC3	PC2	ICMP		0.000	N	3	(e...	(delete)

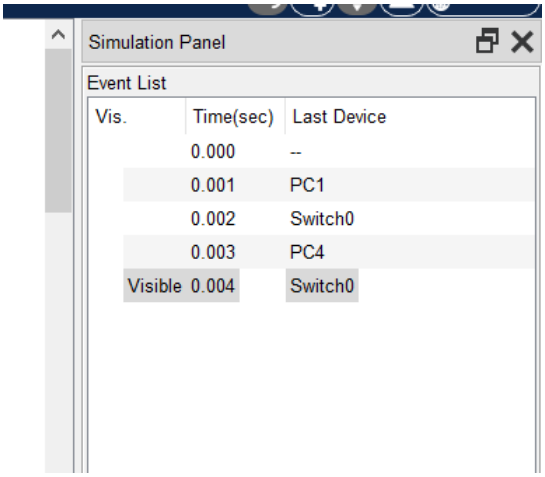


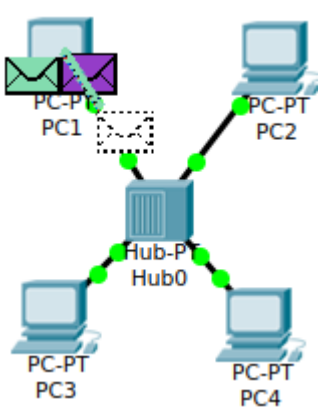


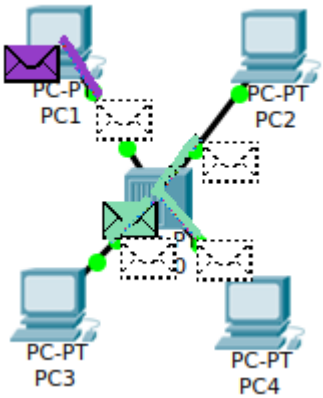


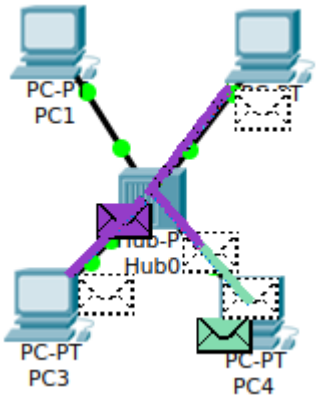


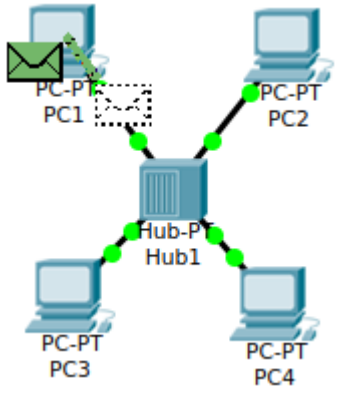


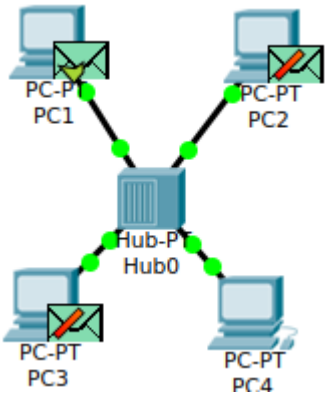


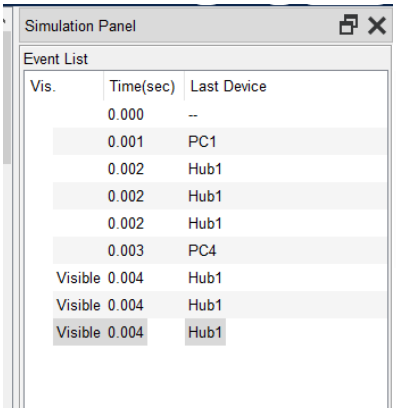


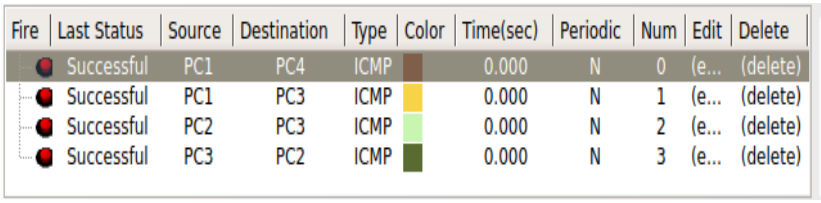












5.Comparison between hub and switch

Feature	Hub	Switch
Working Type	Sends data to all devices	Sends data to correct device only
OSI Layer	Works on Layer 1 (Physical Layer)	Works on Layer 2 (Data Link Layer)
Speed	Slow, due to more traffic	Fast, less traffic and no collision
Traffic Handling	Creates more traffic	Creates less traffic
Collision	Yes, more chance of data collision	No, data goes directly to target
MAC Address Use	Does not use MAC address	Uses MAC address to send data
Cost	Cheaper	Costlier
Intelligence	Not smart, just broadcasts	Smart, sends data properly
Usage	Used in small, simple networks	Used in modern, larger networks

6.Advantages and Disadvantages of Star Topology

Advantages

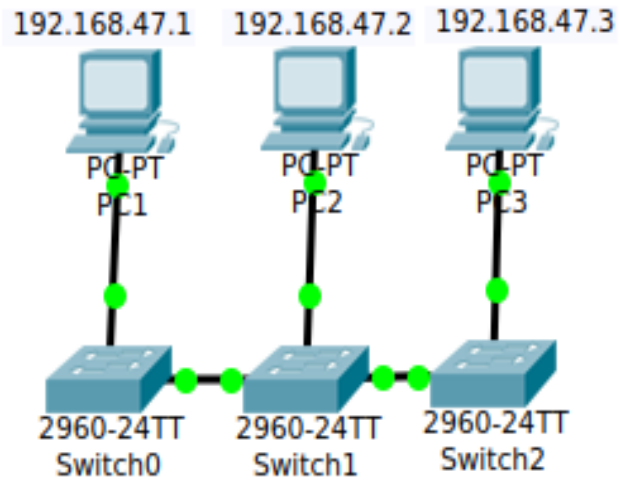
- Easy to Setup and Manage – Devices are connected to a central hub or switch, so it is simple to manage
- If one device fails, others work fine – Failure of one computer does not affect the whole network
- Easy to find problems – Since each device has its own cable, it's easy to find and fix issues.
- High performance – Data directly goes to the central device, so performance is good and fast.
- Easy to add new devices – You can easily add new computers without disturbing the network.

Disadvantages

- Central device is important – If the hub or switch fails, the whole network stops working
- Costly – Needs more cables and a central device, so it's more expensive than bus or ring topology
- More cabling required – Each device needs a separate cable to connect to the hub or switch
- Limited by central device – Speed and performance depend on the capacity of the hub or switch.

Bus Topology

1.Network Topology

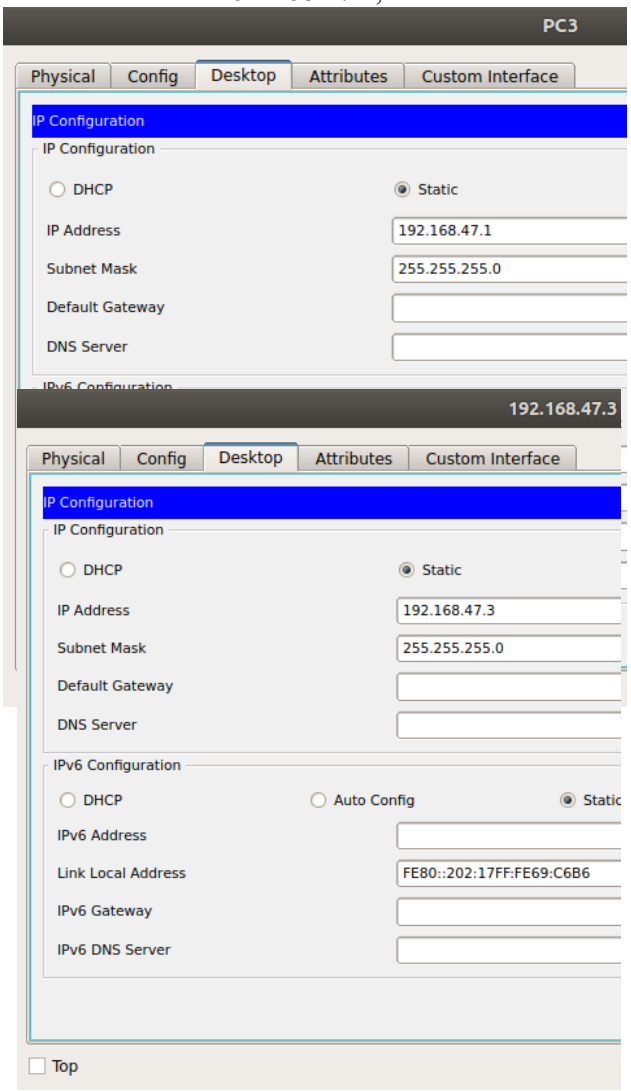


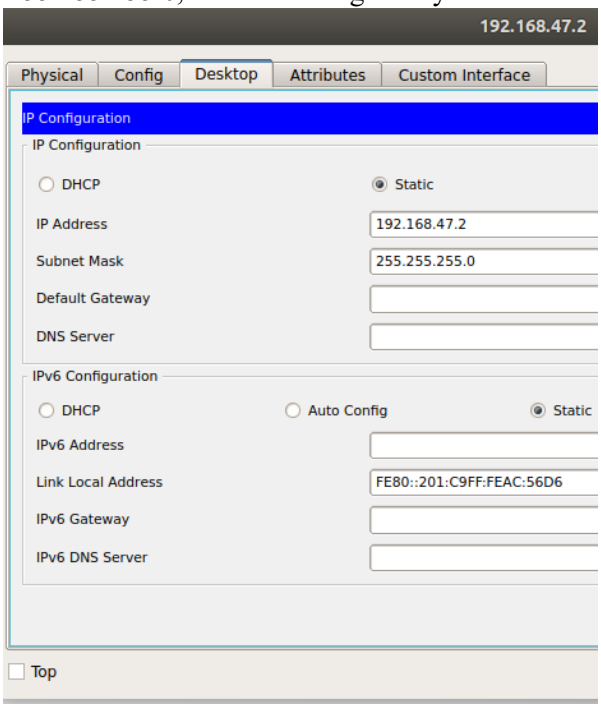
Design & Steps

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

2.IP Address Configuration of PCs

To configure IP addresses in Cisco Packet Tracer, first drag and drop the required devices such as a PC and a router onto the workspace. For the PC, click on it, go to the "Desktop" tab, and open "IP Configuration". Enter a suitable IP address like 192.168.47.1, the subnet mask which usually autofill as 255.255.255.0, and a default gateway





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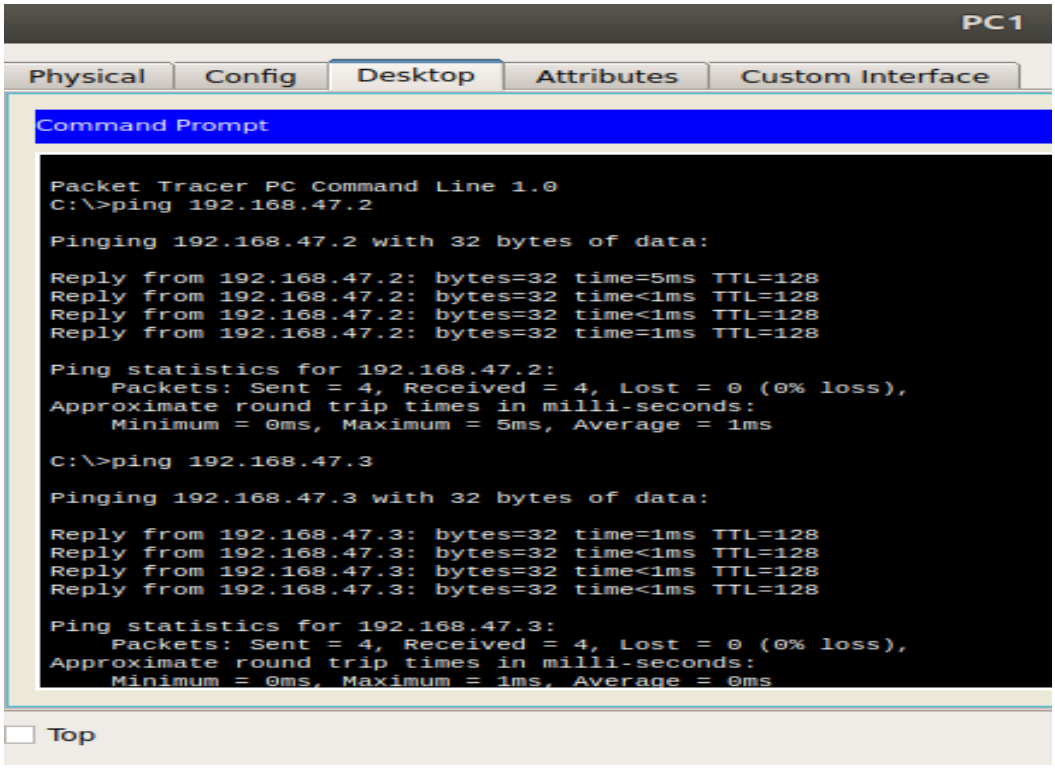
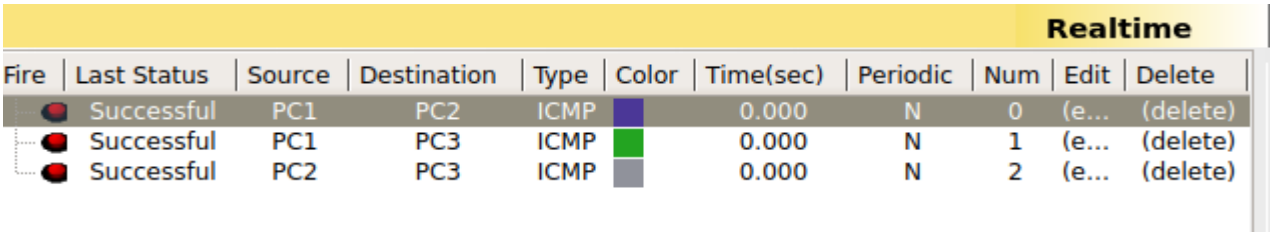
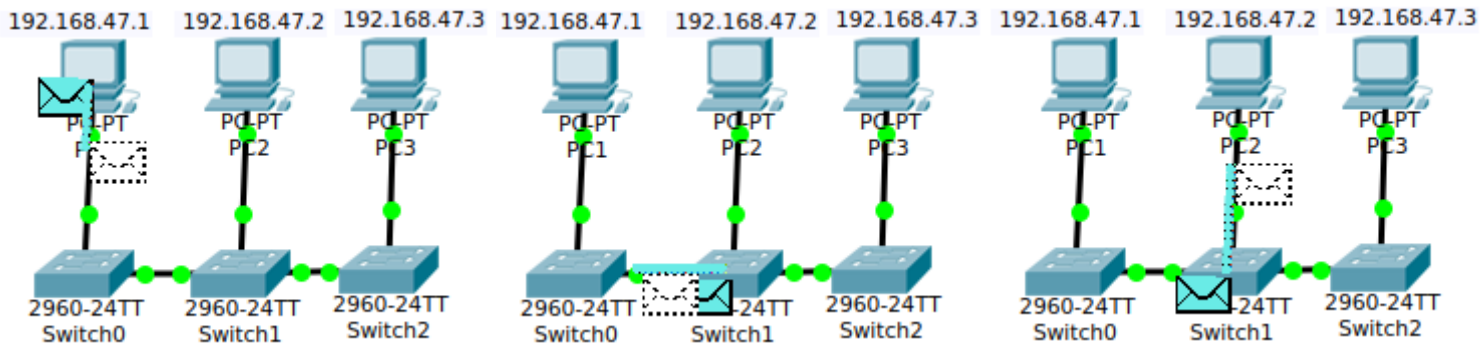
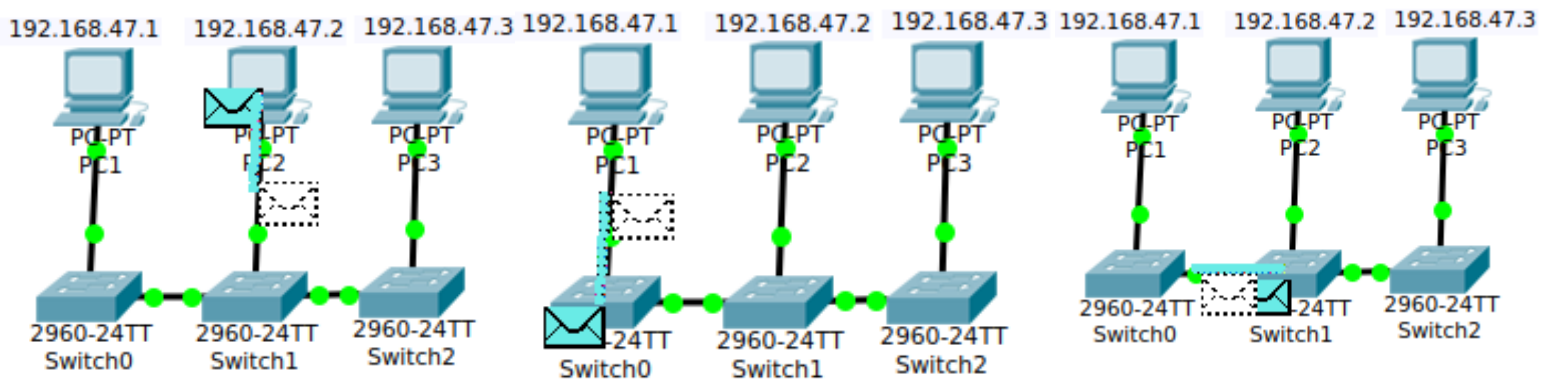
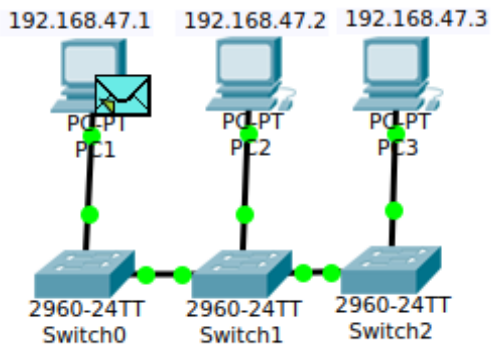


4. Real Mode Simulation and Event Simulation









Simulation Panel

Event List

Vis.	Time(sec)	Last Devic	At Device	Type	Info
	0.000	--	PC1	ICMP	
	0.001	PC1	Switch0	ICMP	
	0.002	Switch0	Switch1	ICMP	
	0.003	Switch1	PC2	ICMP	
	0.004	PC2	Switch1	ICMP	
	0.005	Switch1	Switch0	ICMP	
	0.006	Switch0	PC1	ICMP	
	0.212	--	Switch0	STP	
	0.213	Switch0	Switch1	STP	
	0.213	Switch0	PC1	STP	

5.Advantages and Disadvantages of Bus Topology

Advantages

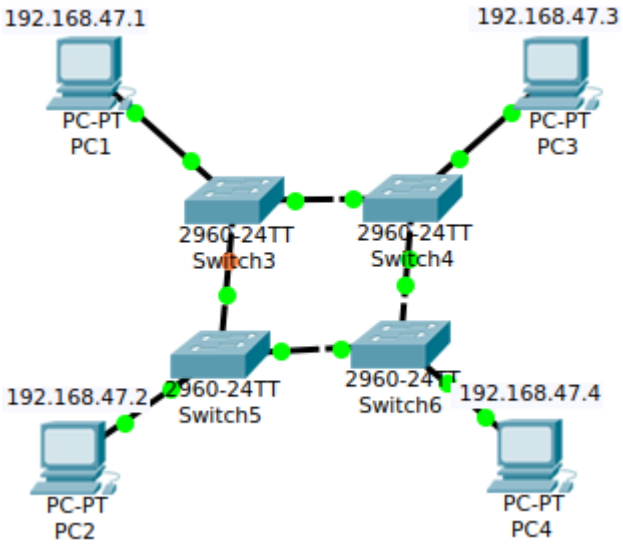
- Easy to install– Simple setup with one main cable connecting all devices
- Low cost-Uses less cable than star or mesh, so cheaper for small networks
- Requires less cable-Only one backbone cable is needed for all nodes.
- Good for small networks-Works well if there are fewer devices (up to 10–12)
- Easy to expand -You can add new devices easily without disturbing the existing network.

Disadvantages

- Difficult to troubleshoot-Hard to find the fault if the network goes down
- Cable failure affects all-If the main cable (backbone) breaks, the whole network stops working
- Limited cable length-Performance drops if the cable is too long or too many devices are added
- Slower with traffic-Data collisions can happen when many devices send data at once
- Low security-Data sent by one device can be seen by all, so it's not secure

Ring Topology

1.Network Topology

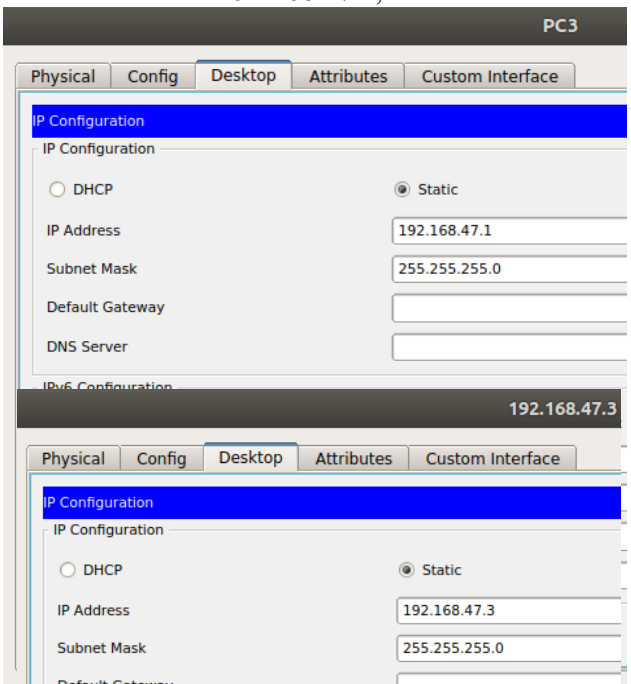


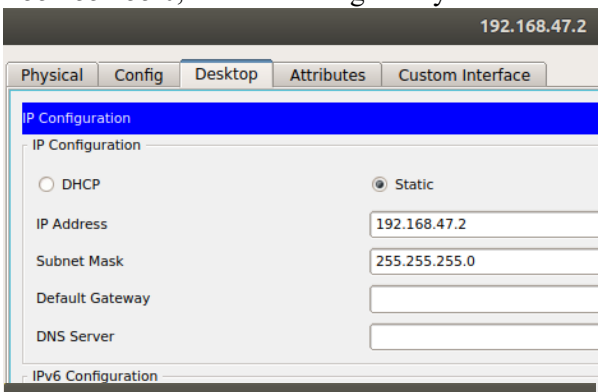
Design & Steps

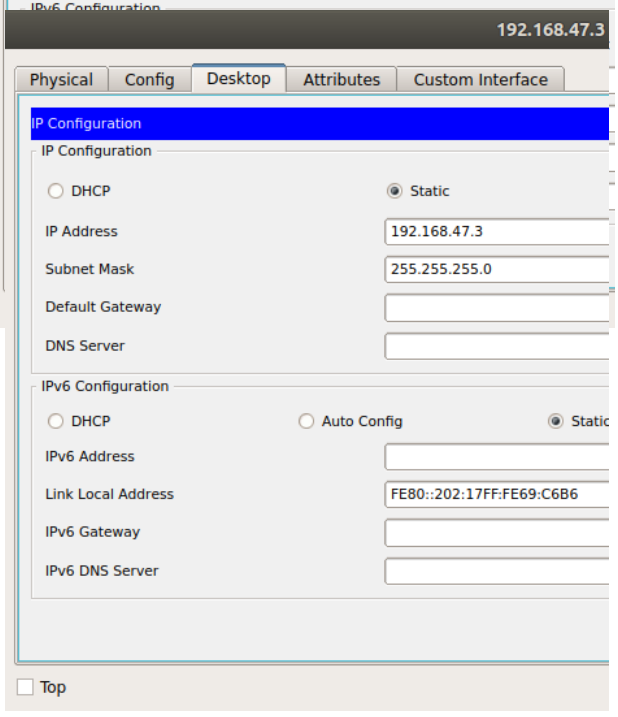
- Connect each PC to a switch
- Use multiple switches in a loop to simulate ring topology
- Assign proper IPs.

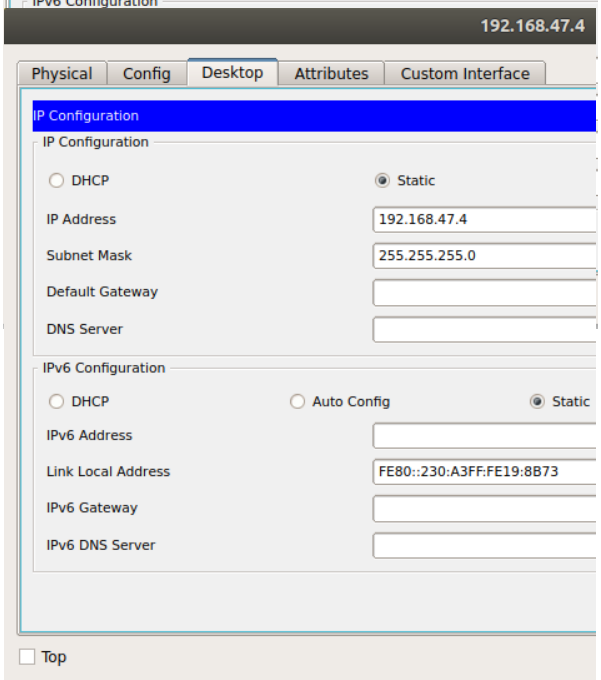
2.IP Address Configuration of PCs

To configure IP addresses in Cisco Packet Tracer, first drag and drop the required devices such as a PC and a router onto the workspace. For the PC, click on it, go to the "Desktop" tab, and open "IP Configuration". Enter a suitable IP address like 192.168.47.1, the subnet mask which usually autofill as 255.255.255.0, and a default gateway

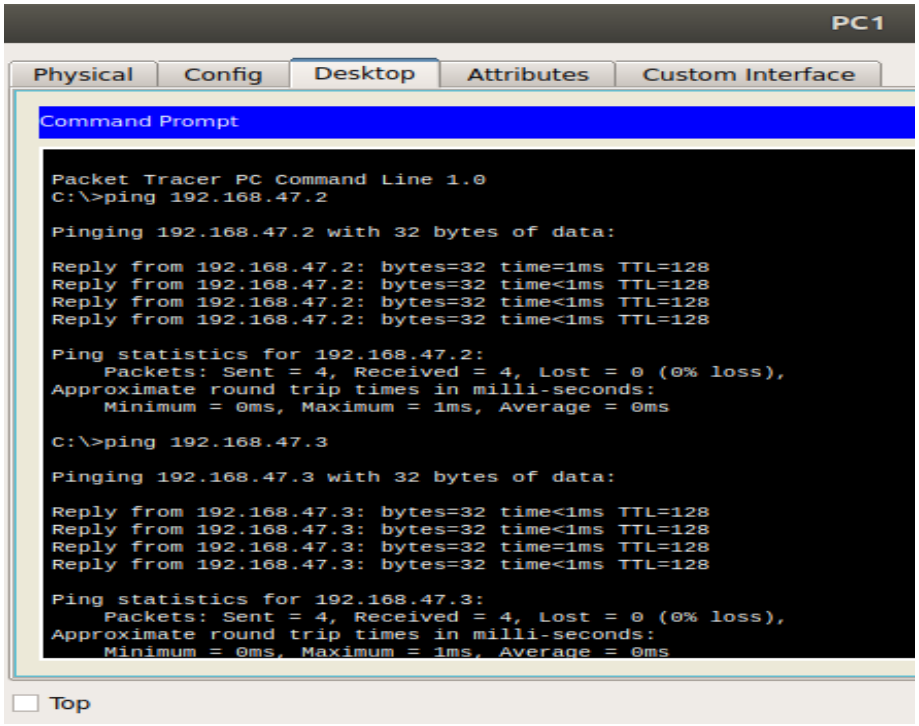








3. Ping Testing



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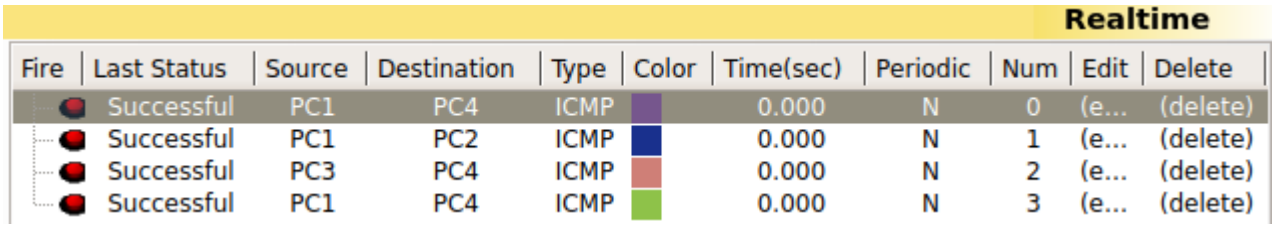
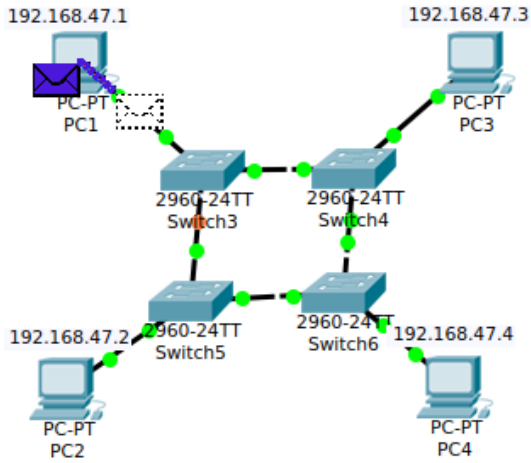
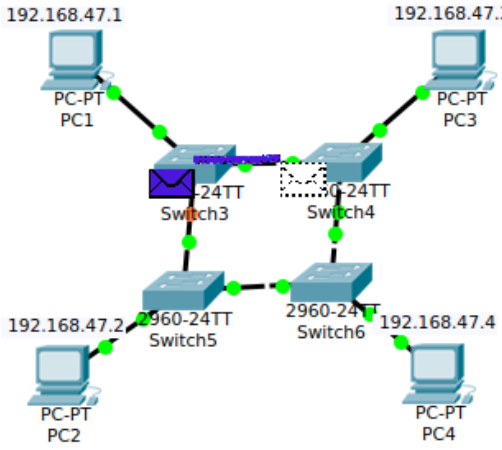
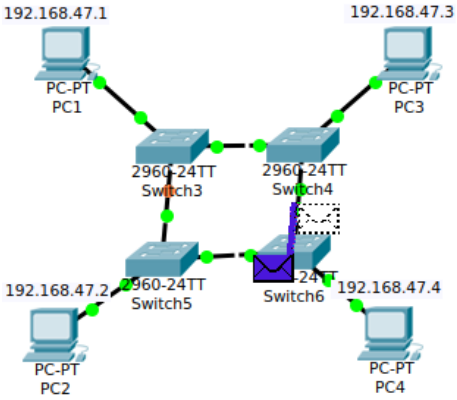
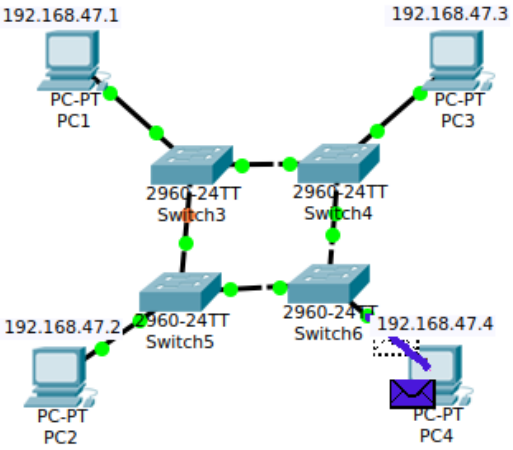
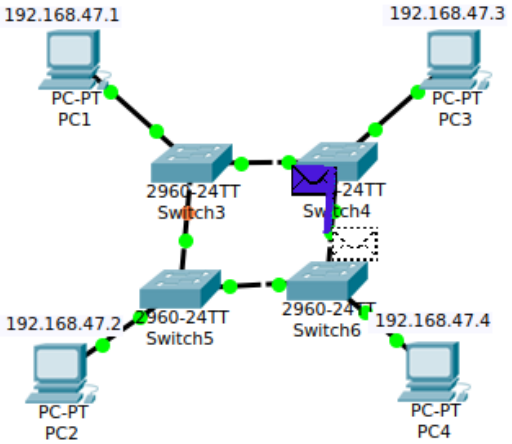


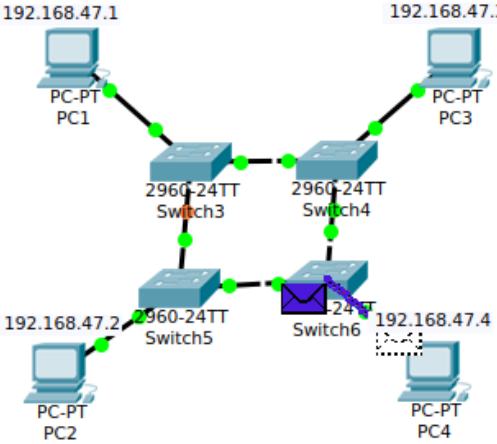


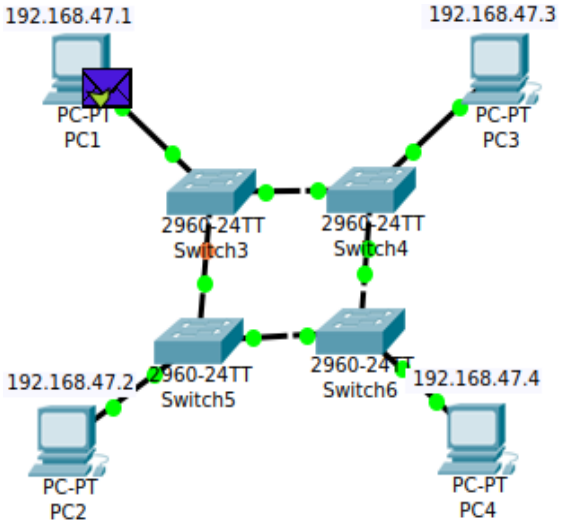


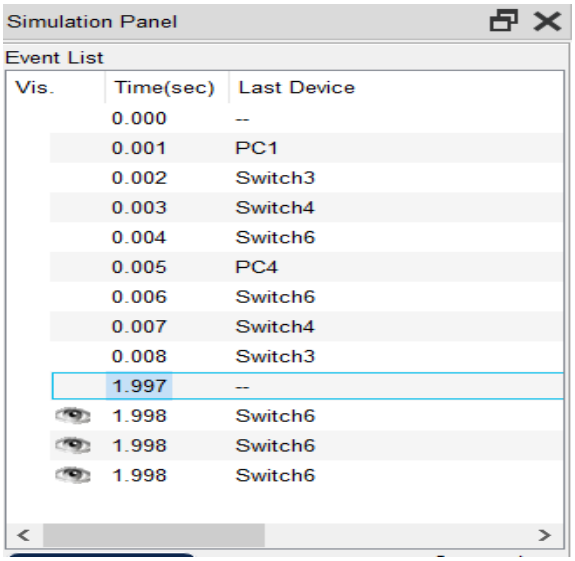












5.Advantages and Disadvantages of Ring Topology

Advantages

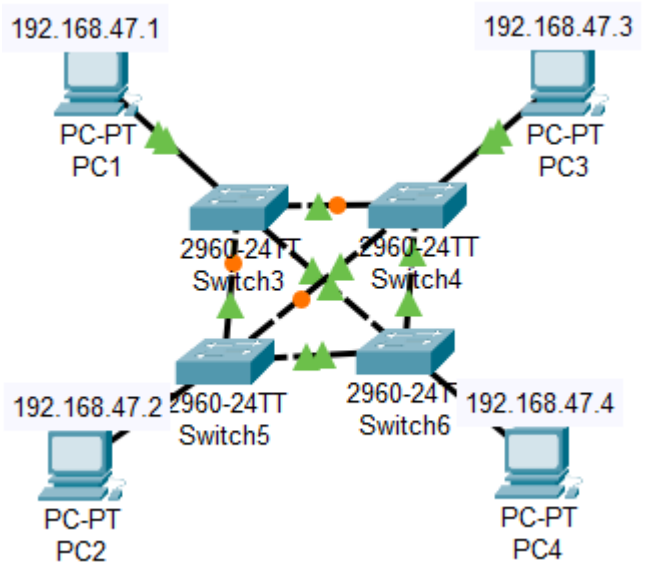
- Easy to manage – Data flows in one direction, so it's easier to trace problems
- No data collisions – Only one device sends data at a time using a token, so no clashes occur
- Equal access for all devices – Every device gets a chance to send data, no priority issues
- Better than bus for traffic – Performs better than bus topology when many users are active
- Predictable data flow – Fixed path helps in smooth data transfer without random paths

Disadvantages

- One failure breaks the network – If any one device or cable fails, the entire network may stop working
- Difficult to troubleshoot – Finding the exact problem can be tricky in a ring.
- Slower if many devices – More devices = more delay as data passes through each one.
- Hard to add/remove devices – The network must be temporarily stopped to make changes.
- Expensive hardware – Needs special devices like token ring switches (if token-based)

Mesh Topology

1.Network Topology

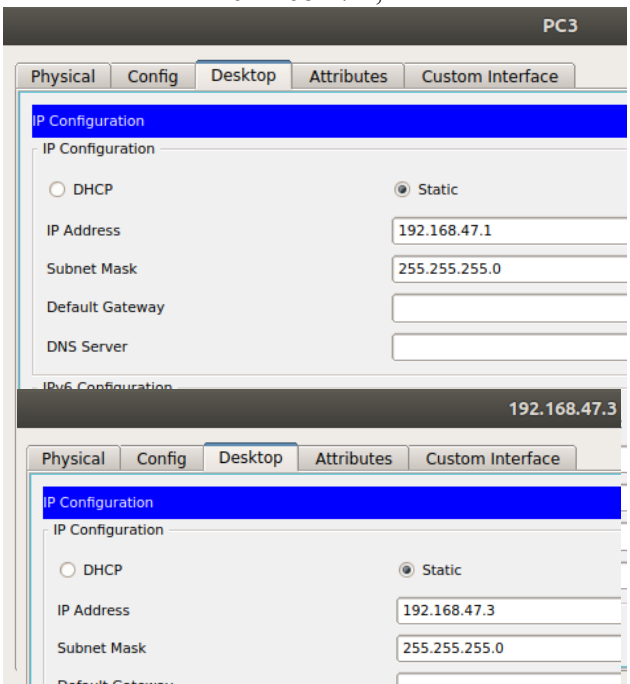


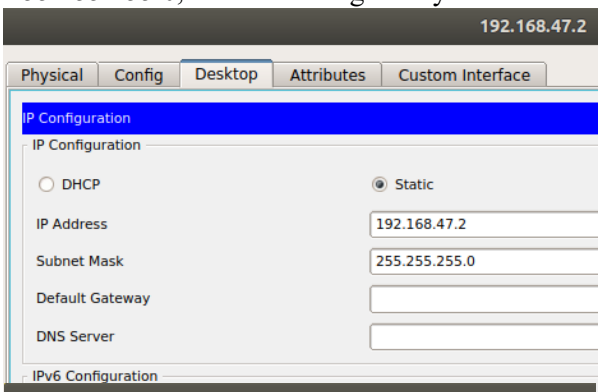
Design & Steps

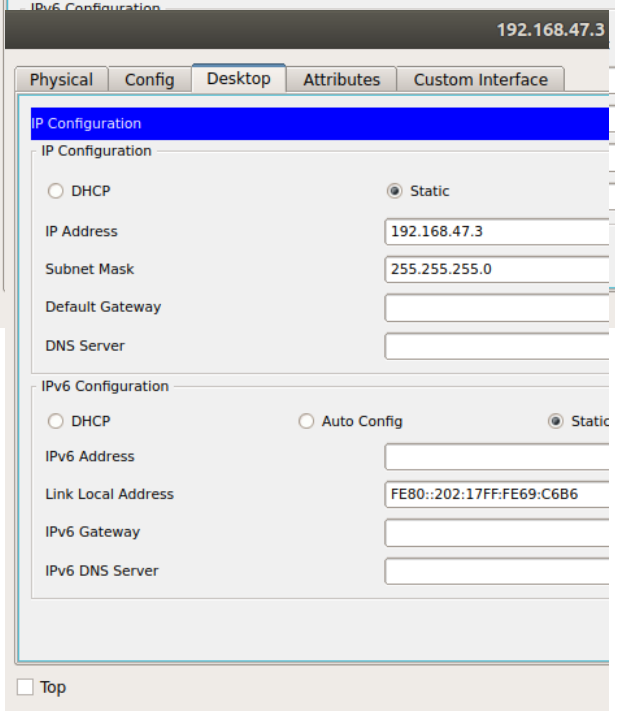
- Connect each PC to every other PC via individual switches.
- Use crossover cables between switches if needed.
- Assign proper IPs.

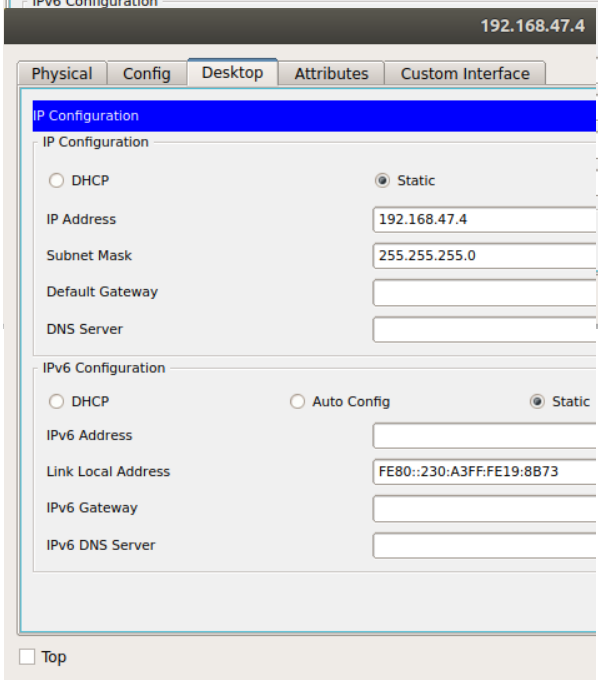
2.IP Address Configuration of PCs

To configure IP addresses in Cisco Packet Tracer, first drag and drop the required devices such as a PC and a router onto the workspace. For the PC, click on it, go to the "Desktop" tab, and open "IP Configuration". Enter a suitable IP address like 192.168.47.1, the subnet mask which usually autofill as 255.255.255.0, and a default gateway

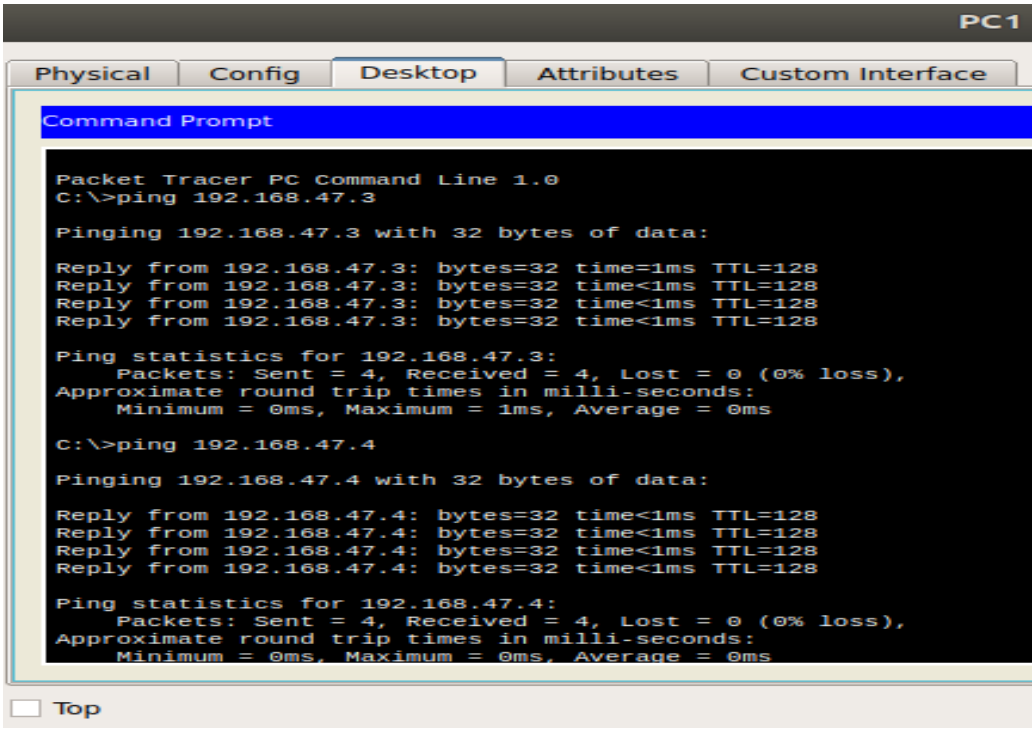






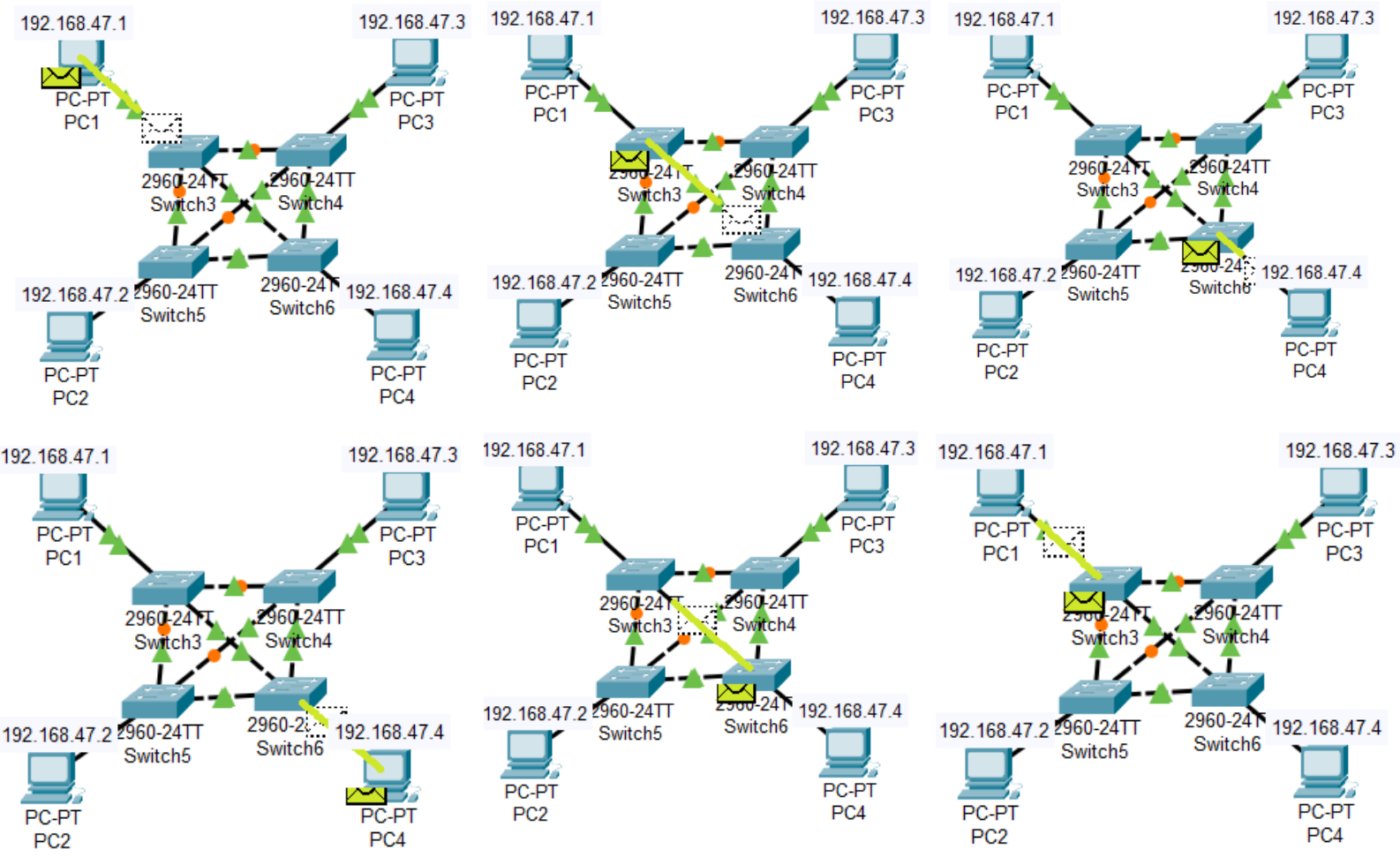


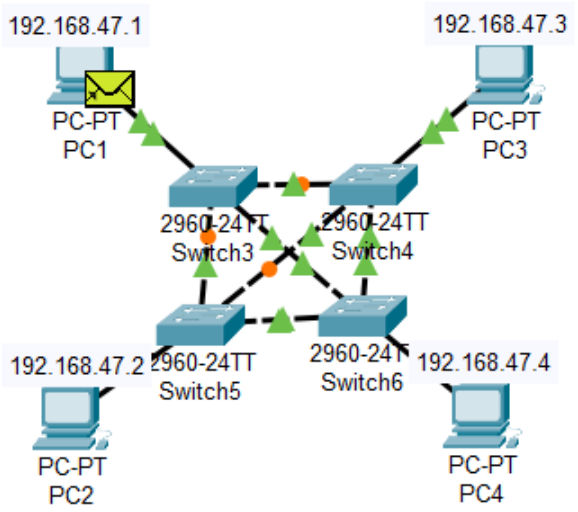
3. Ping Testing

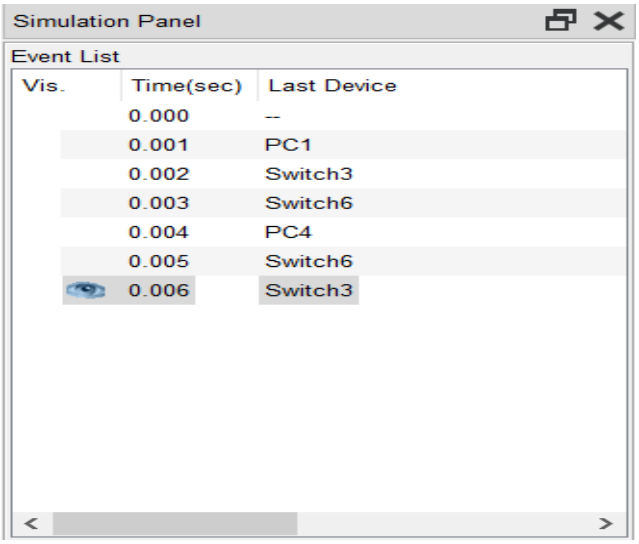


4. Real Mode Simulation and Event Simulation

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC4	PC1	ICMP		0.000	N	0	(edit)	(delete)
	Successful	PC1	PC3	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC3	PC2	ICMP		0.000	N	2	(edit)	(delete)







5.Advantages and Disadvantages of Mesh Topology

Advantages

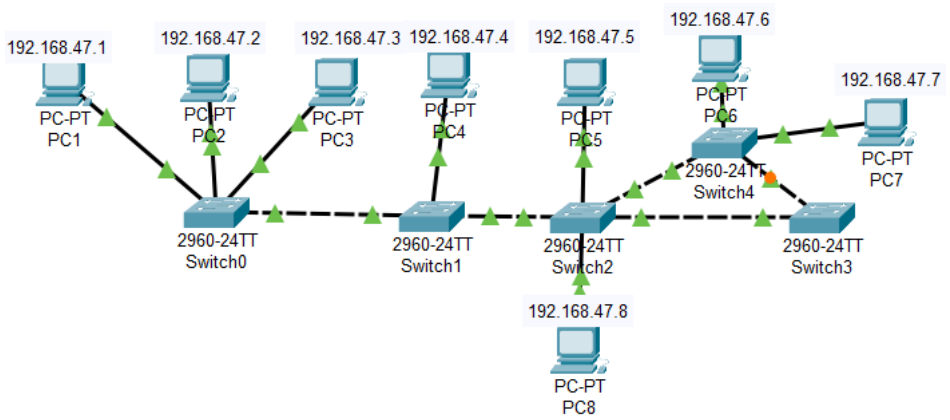
- Highly reliable – Failure of one cable or device doesn't affect the entire network.
- No data traffic issues – Dedicated links for each device mean no congestion or collision.
- Easy to detect faults – Faulty connections can be easily identified and fixed.
- Secure communication – Direct links make data transfer more private and secure.
- Supports high traffic – Multiple devices can communicate at the same time.

Disadvantages

- Very expensive – Needs a lot of cables and ports, increasing cost.
- Difficult to install – Complex wiring and setup due to many connections.
- Hard to manage – Managing and maintaining so many links is tough.
- Wastes cable – Not all links are used all the time, leading to cable wastage.
- Scalability issues – Adding new devices increases complexity and wiring.

Hybrid Topology

1.Network Topology

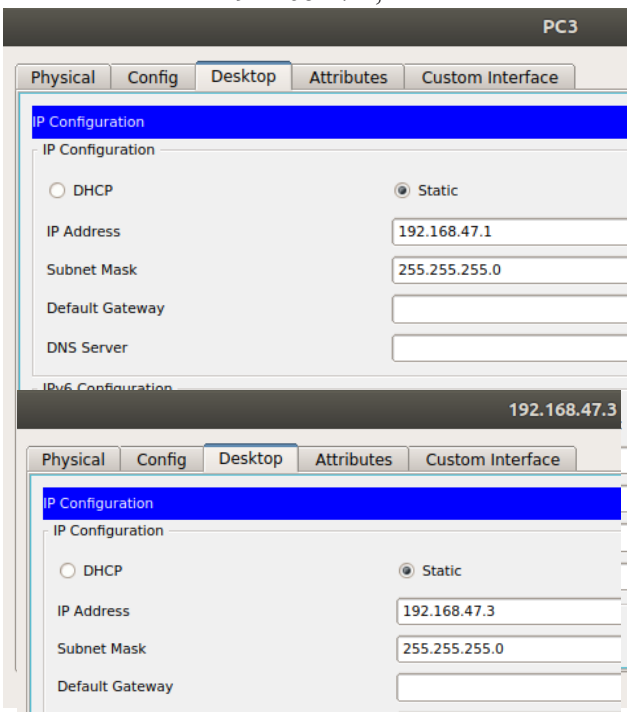


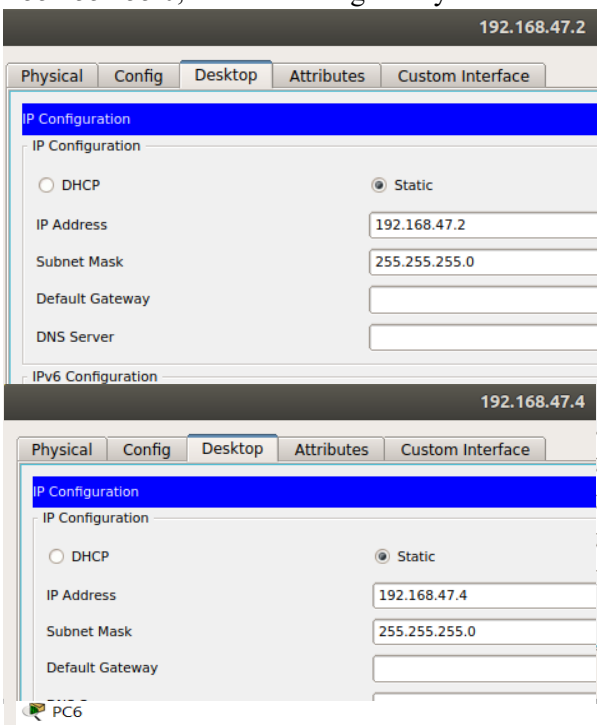
Design & Steps

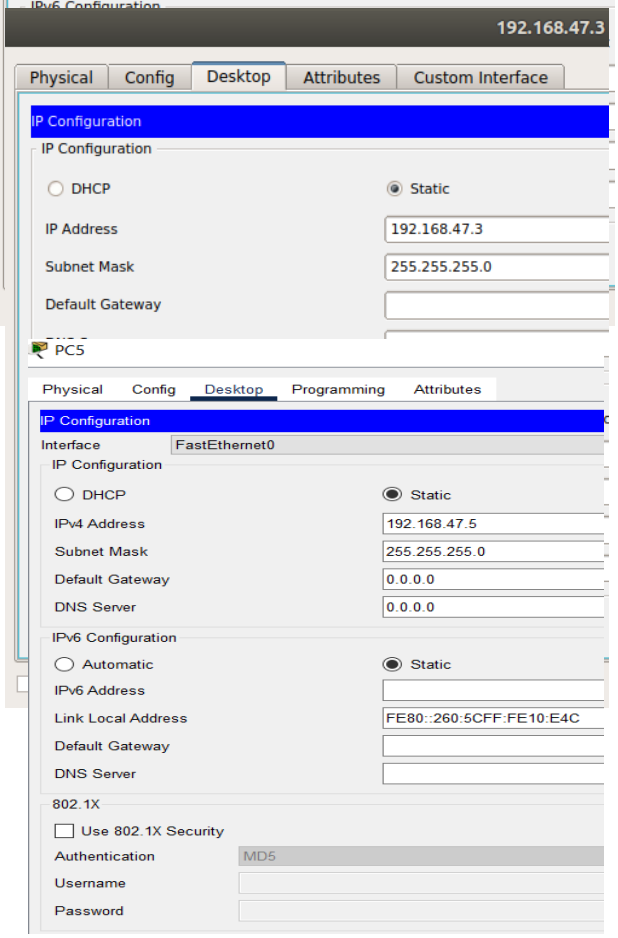
- Combine star and ring (or any two) using switches and hubs
- Assign proper IPs.

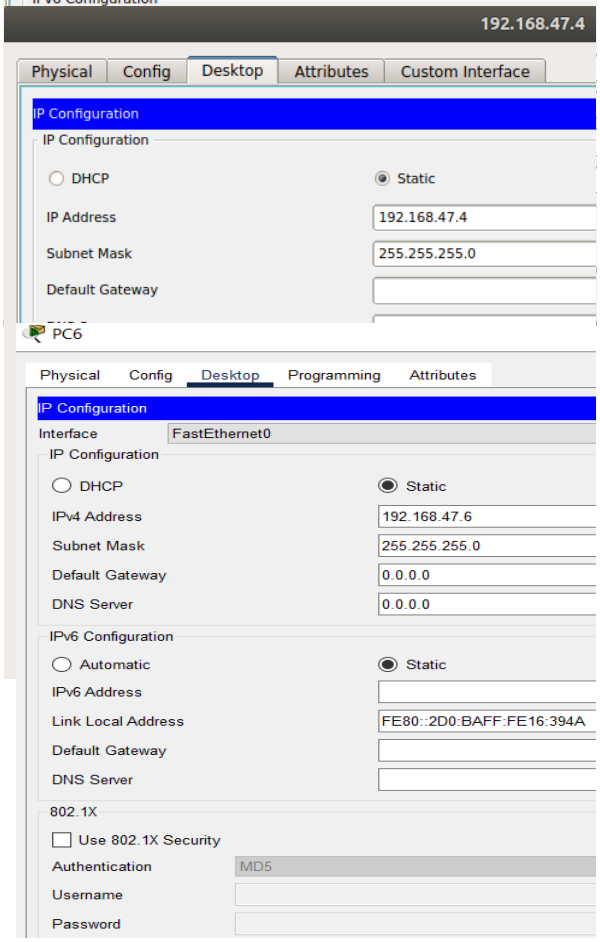
2.IP Address Configuration of PCs

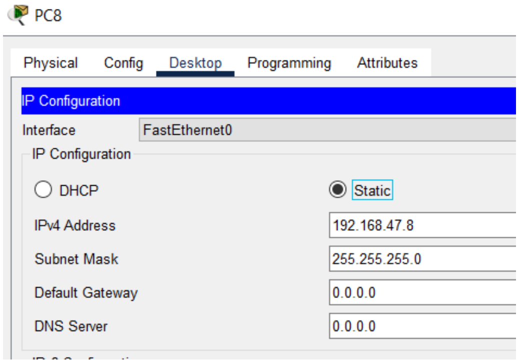
To configure IP addresses in Cisco Packet Tracer, first drag and drop the required devices such as a PC and a router onto the workspace. For the PC, click on it, go to the "Desktop" tab, and open "IP Configuration". Enter a suitable IP address like 192.168.47.1, the subnet mask which usually autofill as 255.255.255.0, and a default gateway

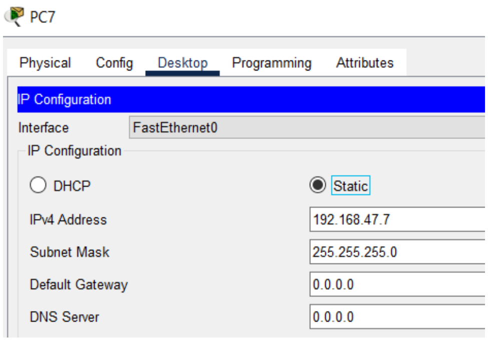




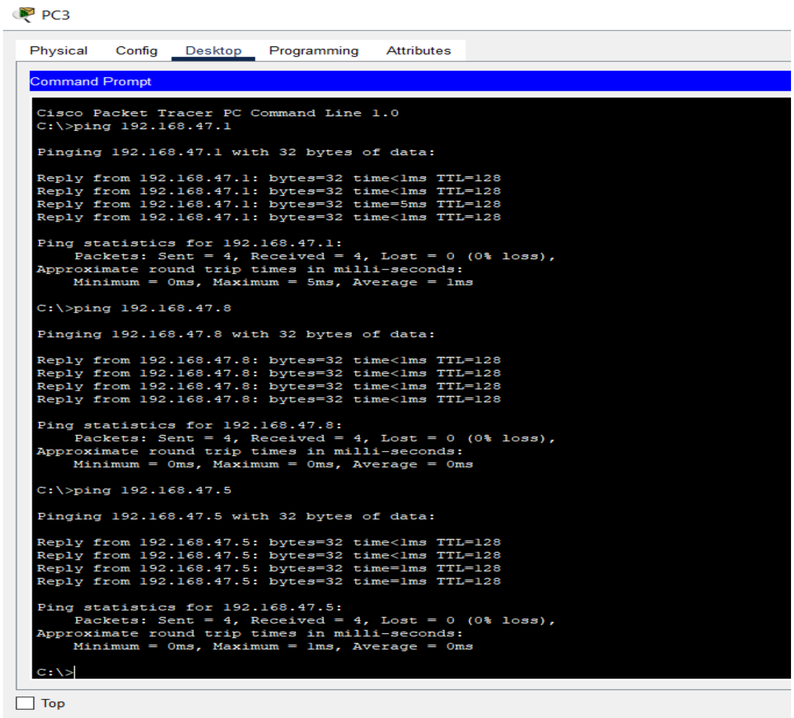








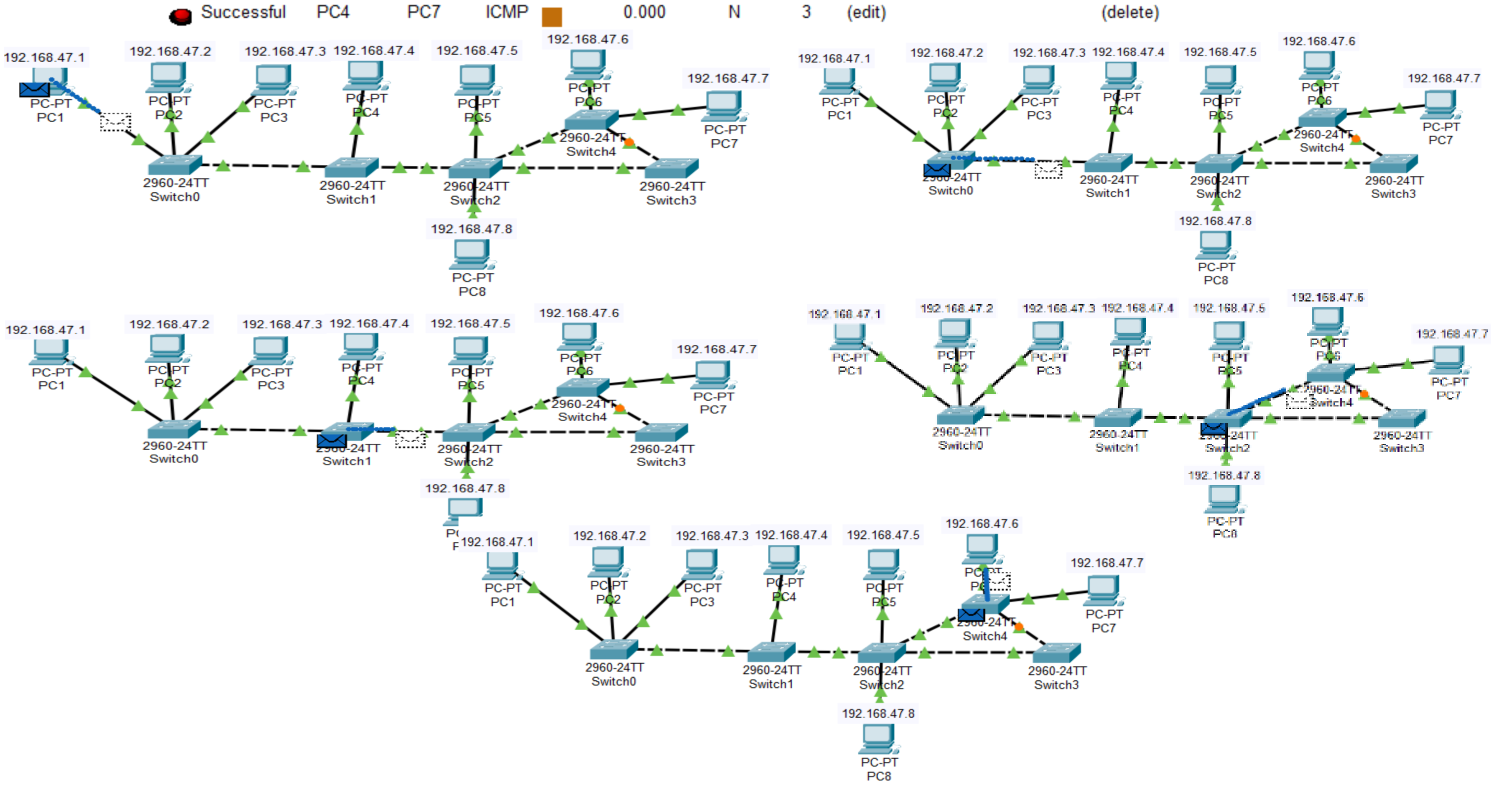
3. Ping Testing

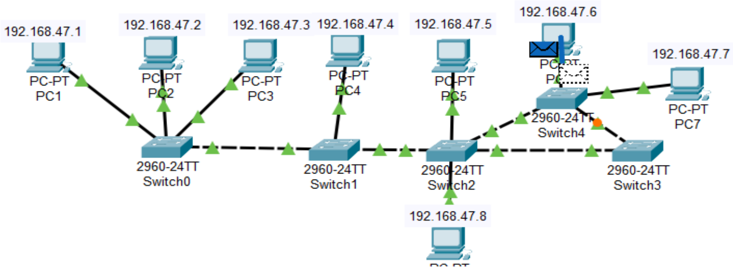


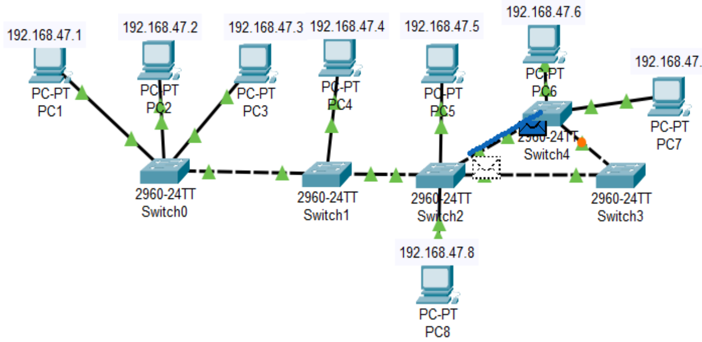

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.47.1

Pinging 192.168.47.1 with 32 bytes of data:

Reply from 192.168.47.1: bytes=32 time<1ms TTL=128
Reply from 192.168.47.1: bytes=32 time<1ms TTL=128
Reply from 192.168.47.1: bytes=32 time=5ms TTL=128
Reply from 192.168.47.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.47.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 5ms, Average = 1ms

C:\>ping 192.168.47.8

Pinging 192.168.47.8 with 32 bytes of data:

Reply from 192.168.47.8: bytes=32 time<1ms TTL=128
Reply from 192.168.47.8: bytes=32 time<1ms TTL=128
Reply from 192.168.47.8: bytes=32 time<1ms TTL=128
Reply from 192.168.47.8: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.47.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.47.5

Pinging 192.168.47.5 with 32 bytes of data:

Reply from 192.168.47.5: bytes=32 time<1ms TTL=128
Reply from 192.168.47.5: bytes=32 time<1ms TTL=128
Reply from 192.168.47.5: bytes=32 time=1ms TTL=128
Reply from 192.168.47.5: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.47.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

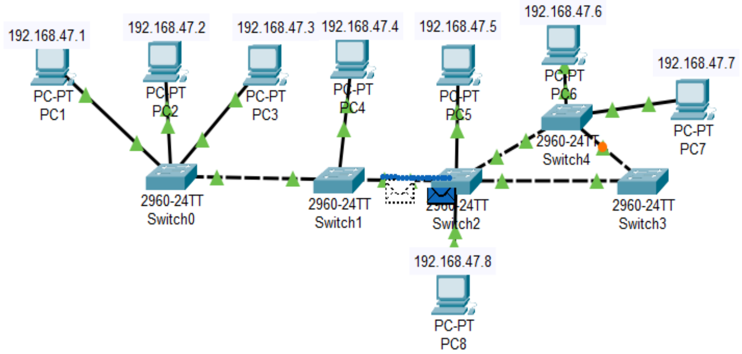
4. Real Mode Simulation and Event Simulation

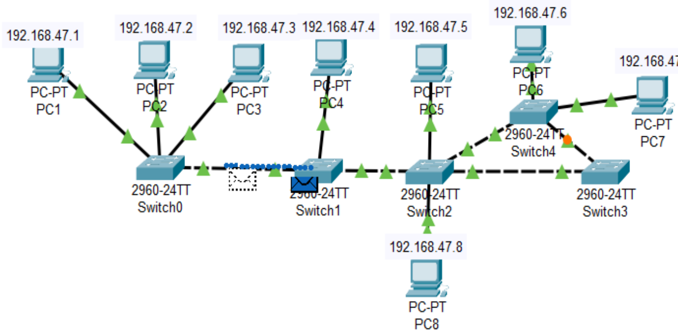
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
●	Successful	PC3	PC8	ICMP	■	0.000	N	1	(edit)	(delete)
●	Successful	PC6	PC3	ICMP	■	0.000	N	2	(edit)	(delete)
●	Successful	PC4	PC7	ICMP	■	0.000	N	3	(edit)	(delete)

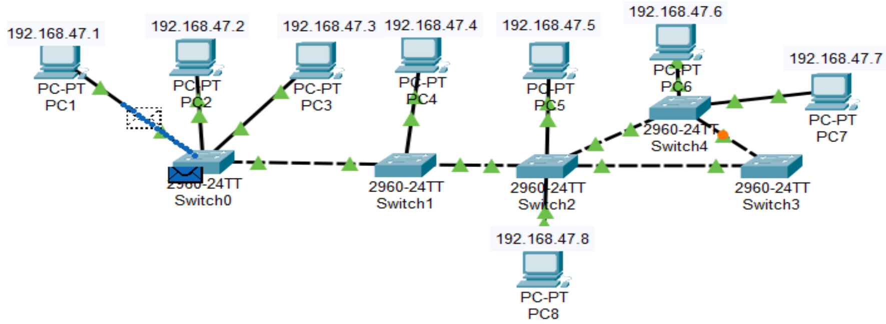


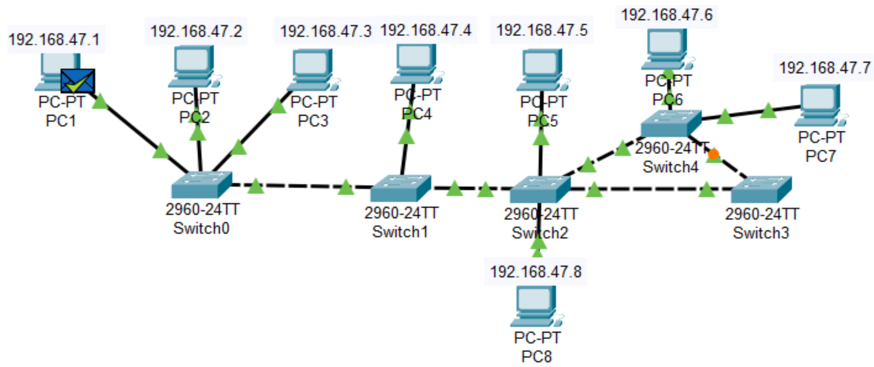


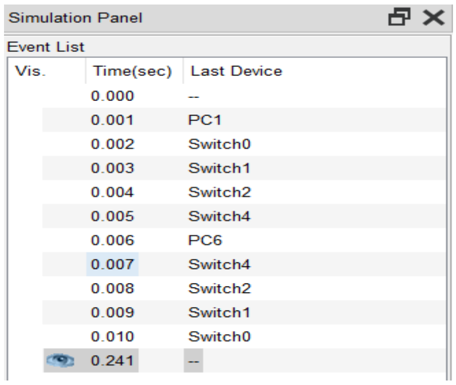











Simulation Panel

Event List

Vis.	Time(sec)	Last Device
	0.000	--
	0.001	PC1
	0.002	Switch0
	0.003	Switch1
	0.004	Switch2
	0.005	Switch4
	0.006	PC6
	0.007	Switch4
	0.008	Switch2
	0.009	Switch1
	0.010	Switch0
	0.241	--

5.Advantages and Disadvantages of Hybrid Topology

Advantages

- Flexible design – Combines two or more topologies based on needs.
- Scalable – Easy to add new devices or networks without disturbing existing setup
- Reliable – If one part fails, others can continue working.
- Efficient performance – Uses the best features of multiple topologies.
- Customizable – Can be designed as per specific network requirements.

Disadvantages

- Complex setup – Difficult to design and implement due to mixed structures.
- High cost – Expensive to install and maintain due to advanced hardware.
- Difficult to manage – Managing a mix of different topologies needs skilled professionals.
- Troubleshooting is hard – Finding issues may take time in a large hybrid system.
- More cabling – May require more cables and network devices than simpler topologies.