

Department of Computer Engineering
TE Computer-B (2024-25 Sem I)
Computer Networks and Security
CNS Simulation Assignment 1: VLAN Configuration

[CO1-CO2, BT: L3 (Apply)] [Max Marks: 10]

Date of Assignment 11th July 2025

Last Date of Submission: 21st July 2025

Demonstrate of Virtual LAN (VLAN) using Packet Tracer

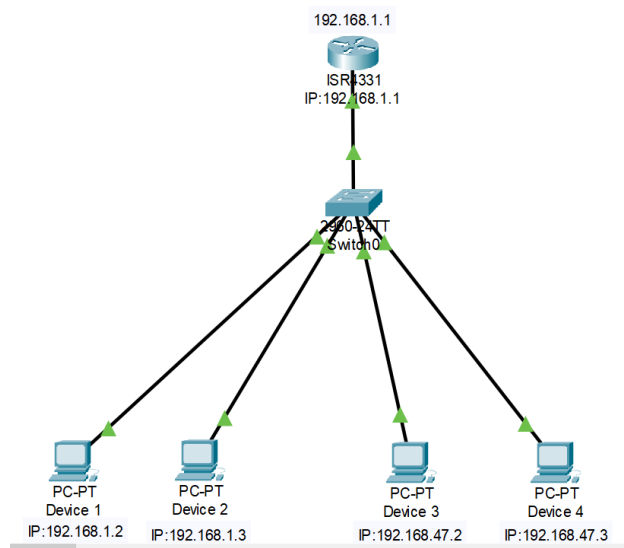
Objective: To configure and demonstrate Virtual LANs (VLANs) using Cisco Packet Tracer by creating two VLANs and testing inter-VLAN communication through a router.

IP Address Series: 192.168.1.1 to 192.168.1.254 for VLAN1 (Device 1 and 2)

192.168.47.1 to 192.168.47.254 for VLAN2 (Device 3 and 4)

Steps Involved:

1. **Network Topology:** 1 Router, 1 Switch, 4 PCs (2 in VLAN1, 2 in VLAN47), Cabling



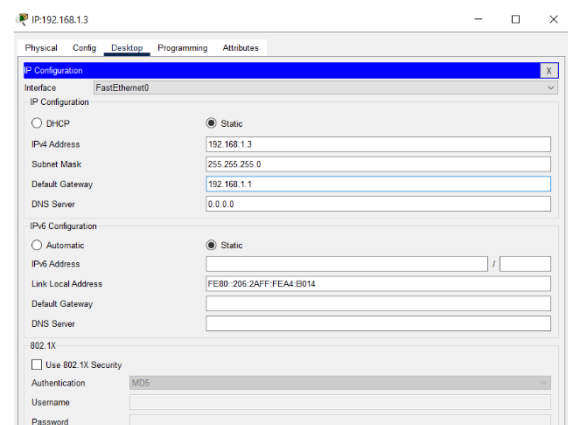
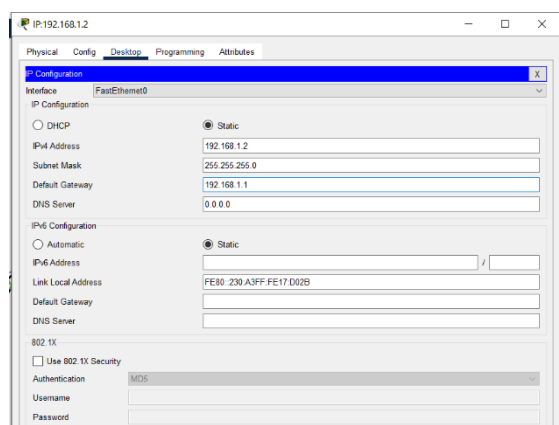
2. **IP Address Configuration of PCs:**

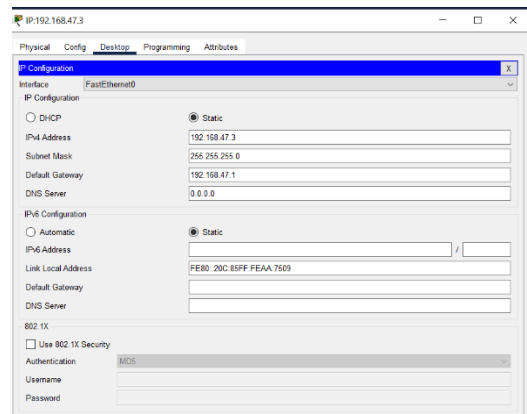
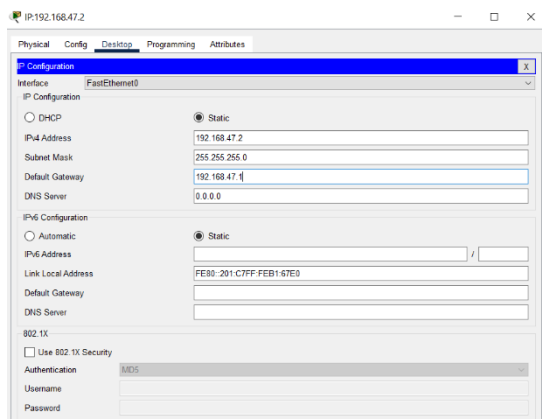
Device 1: IP – 192.168.1.2, Subnet Mask – 255.255.255.0, Gateway – 192.168.1.1

Device 2: IP – 192.168.1.3, Subnet Mask – 255.255.255.0, Gateway – 192.168.1.1

Device 3: IP – 192.168.47.2, Subnet Mask – 255.255.255.0, Gateway – 192.168.47.1

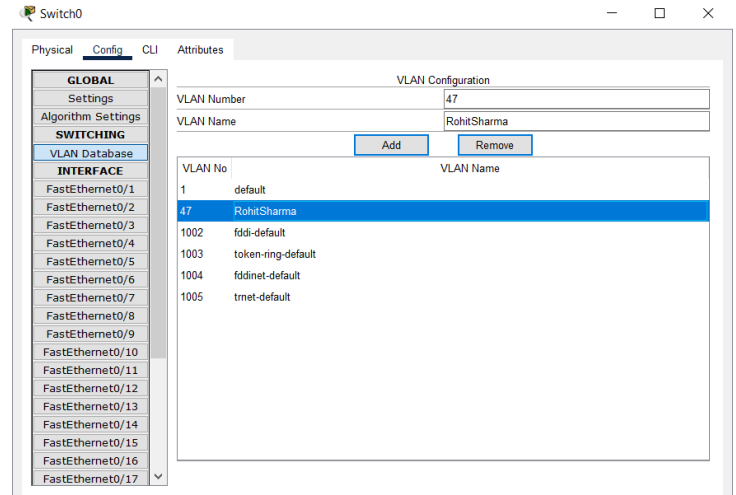
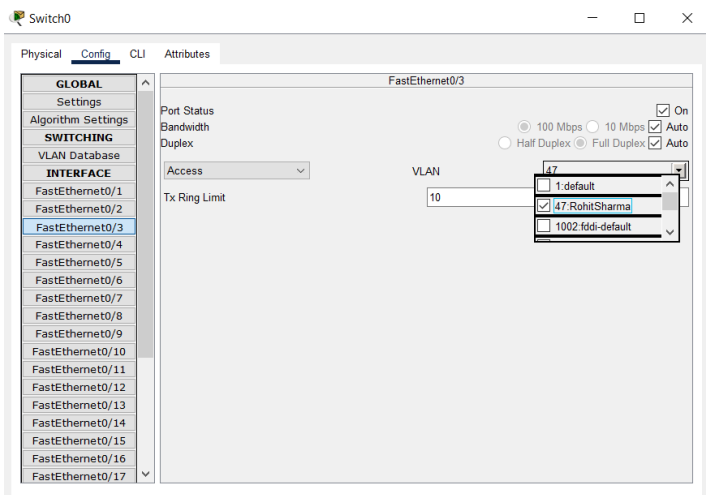
Device 4: IP – 192.168.47.3, Subnet Mask – 255.255.255.0, Gateway – 192.168.47.1





3. Configuration of VLAN Database at Switch:

- Go to Switch0 > Config > VLAN Database, enter VLAN Number 47, VLAN Name RohitSharma, and click Add.
- Select GigaEthernet0/3, set mode to Access, and assign it to VLAN 47: RohitSharma from the dropdown.



4. Configuration of router

- Go to **Router CLI**, enter: enable → configure terminal
- Create sub interface for VLAN 1: interface GigabitEthernet0/0.1 → encapsulation dot1Q 1 → ip address 192.168.1.1 255.255.255.0 → exit
- Create sub interface for VLAN 47: interface GigabitEthernet0/0.47 → encapsulation dot1Q 47 → ip address 192.168.47.1 255.255.255.0 → exit
- Activate main interface: interface GigabitEthernet0/0 → no shutdown → exit

```
IP:192.168.1.1
Physical Config CLI Attributes
Exiting...
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/2
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#interface GigabitEthernet0/0/0.1
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.1, changed state to up
encapsulation dot1Q 1
Router(config-subif)#encapsulation dot1Q 1
Router(config-subif)#ip address 192.168.1.1 255.255.255.0
% 192.168.1.0 overlaps with GigabitEthernet0/0/0
Router(config-subif)#exit
Router(config)#interface GigabitEthernet0/0/0.1
Router(config-subif)#encapsulation dot1Q 1
Router(config-subif)#ip address 192.168.1.1 255.255.255.0
% 192.168.1.0 overlaps with GigabitEthernet0/0/0
Router(config-subif)#interface GigabitEthernet0/0/0
Router(config-if)#no ip address
Router(config-if)#exit
% Invalid input detected at '^' marker.
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0.1
Router(config-subif)#encapsulation dot1Q 1
Router(config-subif)#ip address 192.168.1.1 255.255.255.0
Router(config-subif)#exit
Router(config)#interface GigabitEthernet0/0/0.47
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.47, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.47, changed state to up
encapsulation dot1Q 47
Router(config-subif)#ip address 192.168.47.1 255.255.255.0
% 192.168.47.0 overlaps with GigabitEthernet0/0/1
Router(config-subif)#interface GigabitEthernet0/0/1
Router(config-if)#no ip address
Router(config-if)#exit
% Invalid input detected at '^' marker.
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0.47
Router(config-subif)#encapsulation dot1Q 47
```

```
IP:192.168.1.1
Physical Config CLI Attributes
Router(config)#interface GigabitEthernet0/0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/2
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#interface GigabitEthernet0/0/0.1
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.1, changed state to up
encapsulation dot1Q 1
Router(config-subif)#encapsulation dot1Q 1
Router(config-subif)#ip address 192.168.1.1 255.255.255.0
% 192.168.1.0 overlaps with GigabitEthernet0/0/0
Router(config-subif)#exit
Router(config)#interface GigabitEthernet0/0/0.1
Router(config-subif)#encapsulation dot1Q 1
Router(config-subif)#ip address 192.168.1.1 255.255.255.0
% 192.168.1.0 overlaps with GigabitEthernet0/0/0
Router(config-subif)#interface GigabitEthernet0/0/0
Router(config-if)#no ip address
Router(config-if)#exit
% Invalid input detected at '^' marker.
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0.1
Router(config-subif)#encapsulation dot1Q 1
Router(config-subif)#ip address 192.168.1.1 255.255.255.0
Router(config-subif)#exit
Router(config)#interface GigabitEthernet0/0/0.47
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.47, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.47, changed state to up
encapsulation dot1Q 47
Router(config-subif)#ip address 192.168.47.1 255.255.255.0
% 192.168.47.0 overlaps with GigabitEthernet0/0/1
Router(config-subif)#interface GigabitEthernet0/0/1
Router(config-if)#no ip address
Router(config-if)#exit
% Invalid input detected at '^' marker.
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0.47
Router(config-subif)#encapsulation dot1Q 47
Router(config-subif)#ip address 192.168.47.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
```

5.Ping Testing:

- On PC1, open Command Prompt and ping PC2 (same VLAN): ping 192.168.1.3 — Successful reply received.
- On PC1, ping the Router sub interface for VLAN 47: ping 192.168.47.1 — Successful, confirming router reachability.
- On PC2, ping PC1 (same VLAN): ping 192.168.1.2 — Successful reply.
- On PC2, ping PC3 and PC4 (different VLAN): ping 192.168.47.3 and ping 192.168.47.2 — Both successful, confirming inter-VLAN routing.

```
Device 2
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=5ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 5ms, Average = 1ms

C:\>ping 192.168.47.3

Pinging 192.168.47.3 with 32 bytes of data:

Reply from 192.168.47.3: bytes=32 time<1ms TTL=127
Reply from 192.168.47.3: bytes=32 time<1ms TTL=127
Reply from 192.168.47.3: bytes=32 time<1ms TTL=127
Reply from 192.168.47.3: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.47.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.47.2

Pinging 192.168.47.2 with 32 bytes of data:

Reply from 192.168.47.2: bytes=32 time<1ms TTL=127
Reply from 192.168.47.2: bytes=32 time<1ms TTL=127
Reply from 192.168.47.2: bytes=32 time<1ms TTL=127
Reply from 192.168.47.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.47.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

```
Device 1
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

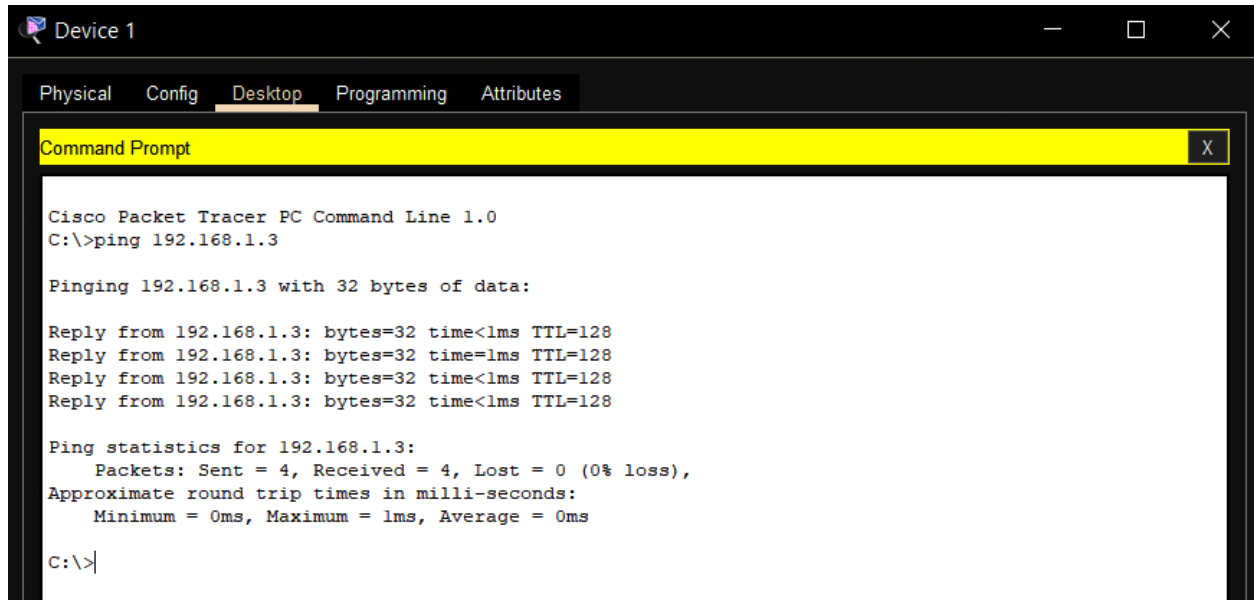
C:\>ping 192.168.47.1

Pinging 192.168.47.1 with 32 bytes of data:

Reply from 192.168.47.1: bytes=32 time<1ms TTL=255
Reply from 192.168.47.1: bytes=32 time<1ms TTL=255
Reply from 192.168.47.1: bytes=32 time<1ms TTL=255
Reply from 192.168.47.1: bytes=32 time<1ms TTL=255

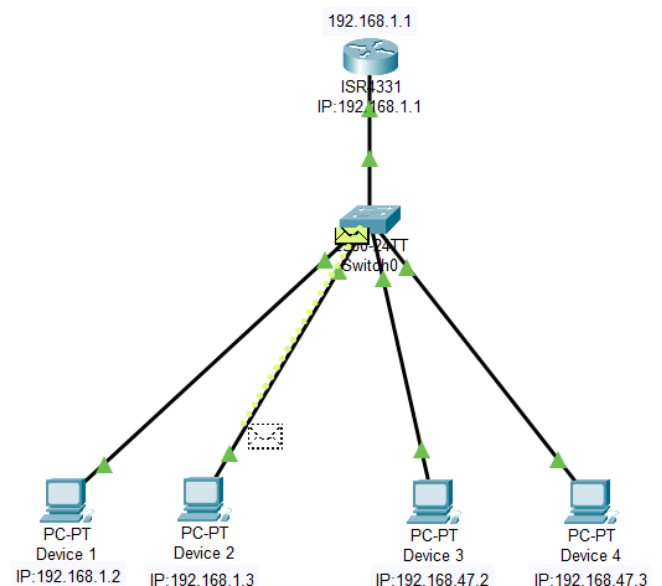
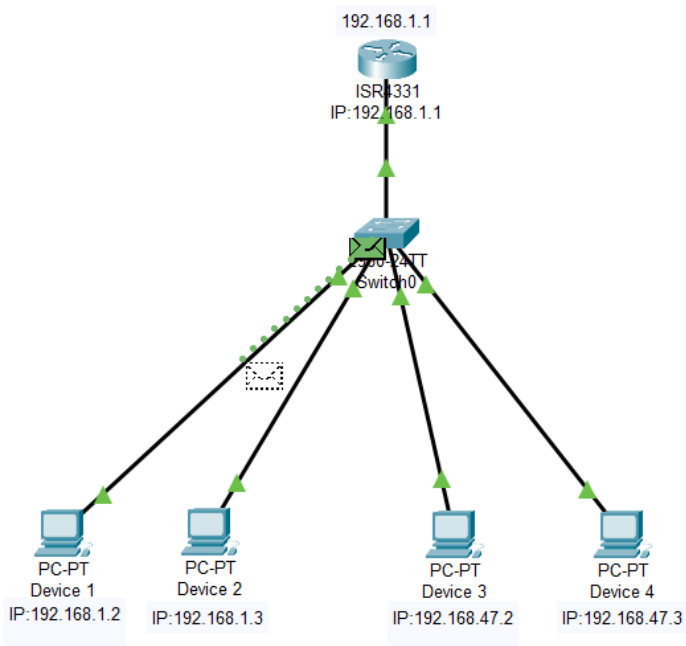
Ping statistics for 192.168.47.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

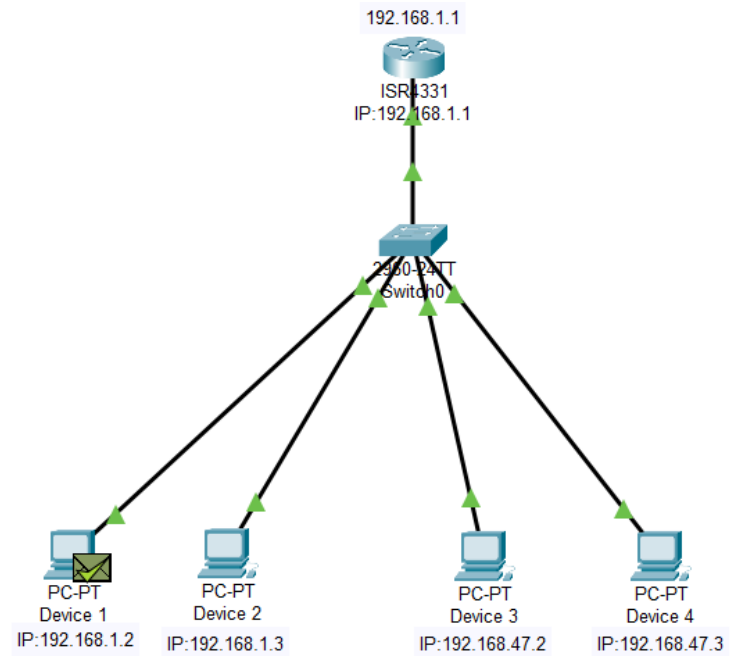
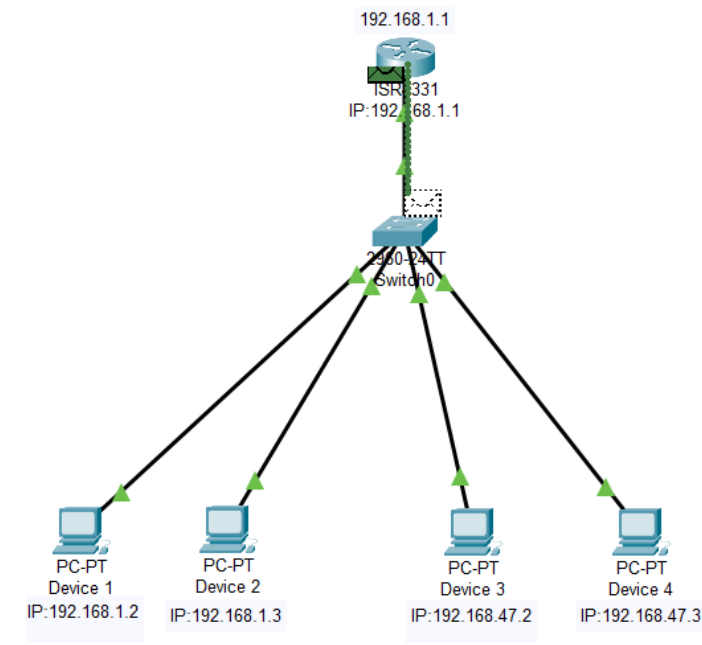
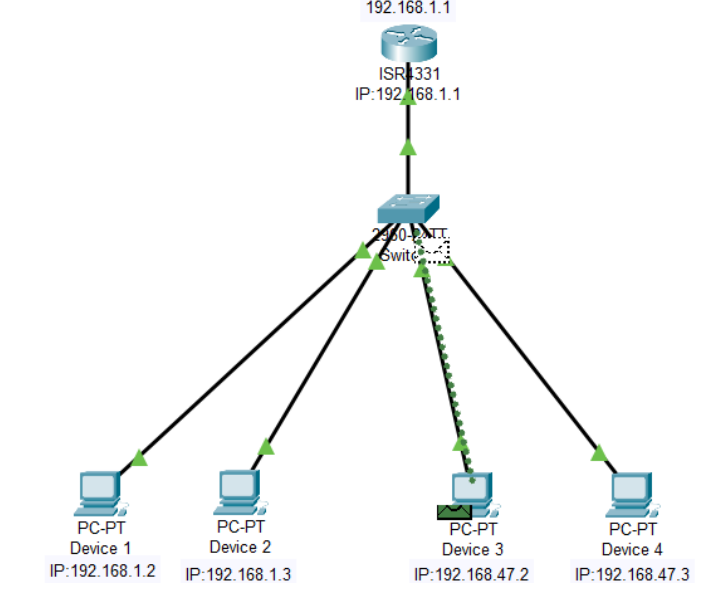
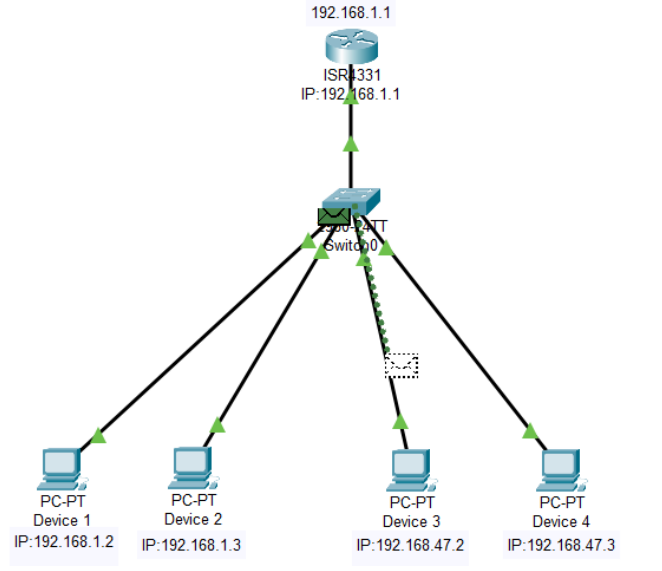
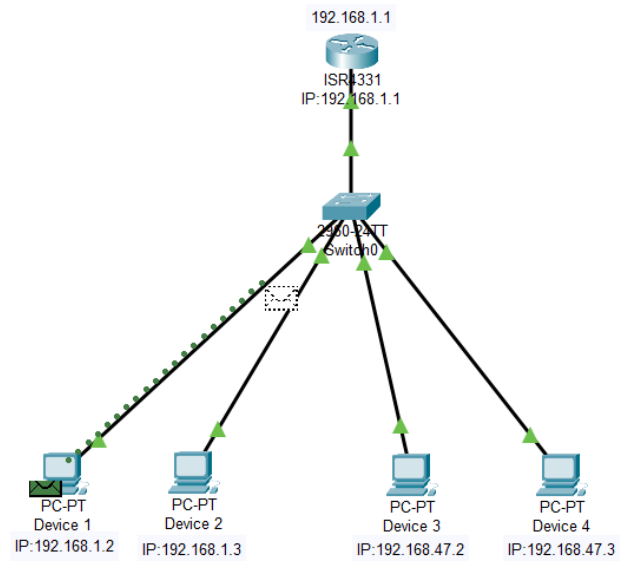
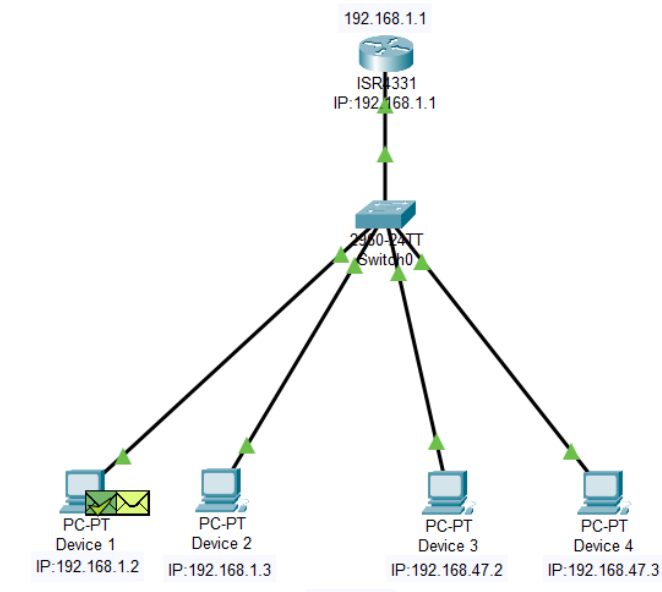
C:\>
```



6. Real Mode Simulation and Event Simulation:

- At the bottom-right, click Simulation Mode.
- Now click the “Add Simple PDU” (envelope icon) from the bottom-left toolbar.
- Click on Device 1 (192.168.1.2), then click on Device 2 (192.168.1.3).
- This drops a simulated ping (ICMP packet) between the two devices.
- After a few steps, the simulation should complete and show packet delivery. Message changes to: Last Status: Successful | Source: Device 1 | Destination: Device 2 | Type: ICMP
- At the bottom-right, click the Simulation tab.
- Click the Add Simple PDU tool (envelope icon in the bottom-left toolset).
- First, click on Device 1 (192.168.1.2), then click on Device 2 (192.168.1.3) to create a simulated ping.
- Press the Capture/Forward button to step through the packet's path.
- Green dots/arrows will appear showing the packet flow from source to destination.
- We will see events updating live in the Event List Panel (right side).





Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	Device 1	Device 2	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Device 1	Device 3	ICMP		0.000	N	1	(edit)	(delete)
	Successful	Device 1	Device 4	ICMP		0.000	N	2	(edit)	(delete)