

DATA COMMUNICATION & NETWORKING LAB

CEL 222

Lab 4



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BSCS-4B

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Q1: Building and testing a Switch based Network.

Tasks:

1. Introduction (devices Connectivity, IP Assigning)
2. Connection Testing
3. Internet Sharing
4. Remote Desktop Connections
5. Use Hub, switch, Routers and perform the same experiment.

Introduction

Switch:

A network switch is a computer networking device that connects network segments. The term commonly refers to a network bridge that processes and routes data at the data link layer (layer 2) of the OSI model. Switches that additionally process data at the network layer (layer 3 and above) are often referred to as Layer 3 switches or multilayer switches

Hub:

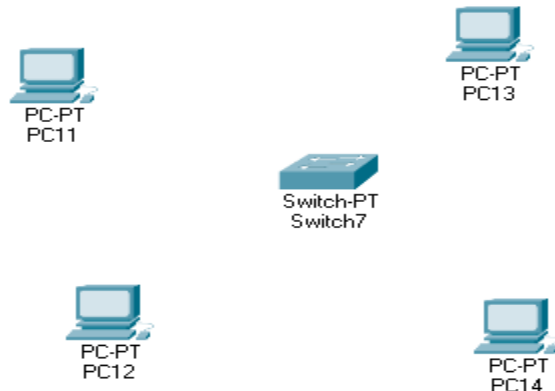
A network hub is a device that allows multiple computers to communicate with each other over a network. It has several Ethernet ports that are used to connect two or more network devices together. ... While switches send incoming data to a specific port, hubs broadcast all incoming data to all active ports.

Router:

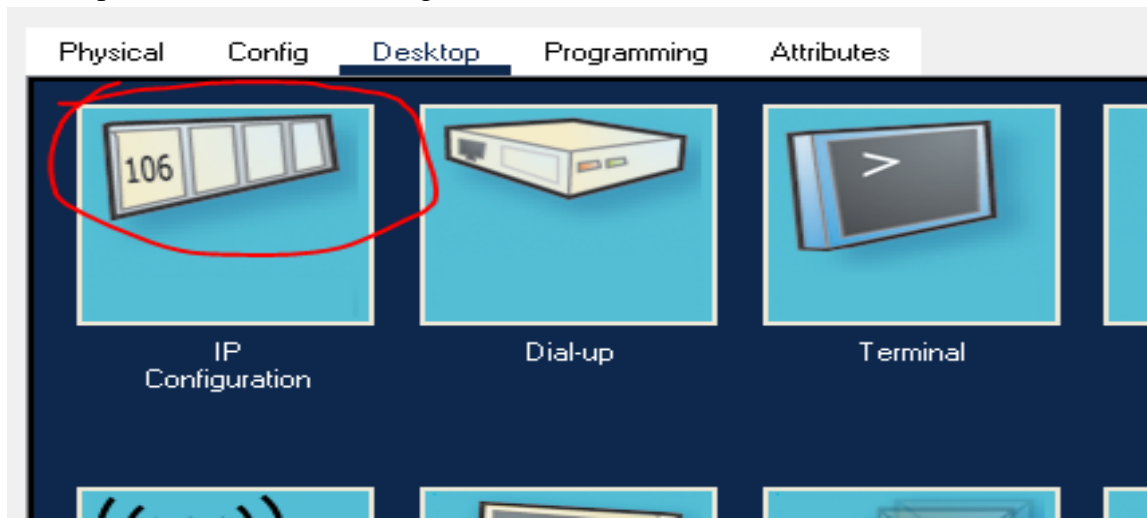
A router is an electronic device that interconnects two or more computer networks, and selectively interchanges packets of data between them. Each data packet contains address information that a router can use to determine if the source and destination are on the same network, or if the data packet must be transferred from one network to another. Where multiple routers are used in a large collection of interconnected networks, the routers exchange information about target system addresses, so that each router can build up a table showing the preferred paths between any two systems on the interconnected networks.

Devices Connectivity and IP Assigning.

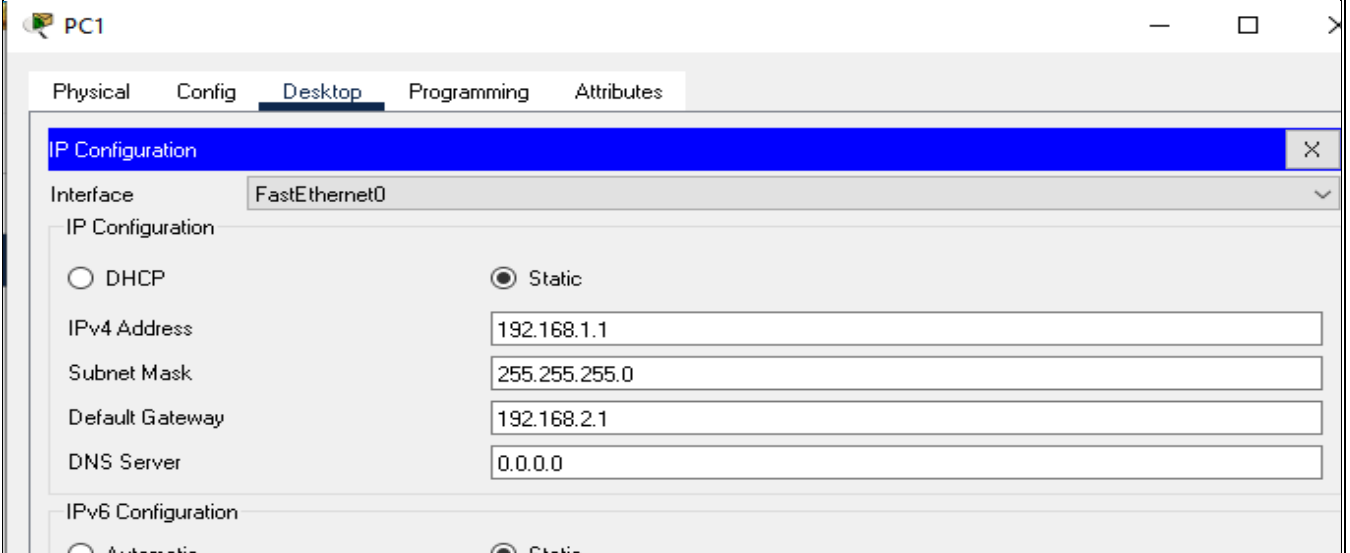
1. Open software packet tracer
2. Click End Devices icon (lower left corner) or press CTRL + ALT + V
3. Drag icon general (Personal Computer 4x) and drop to worksheets.
4. Drag a switch and drop to worksheets.



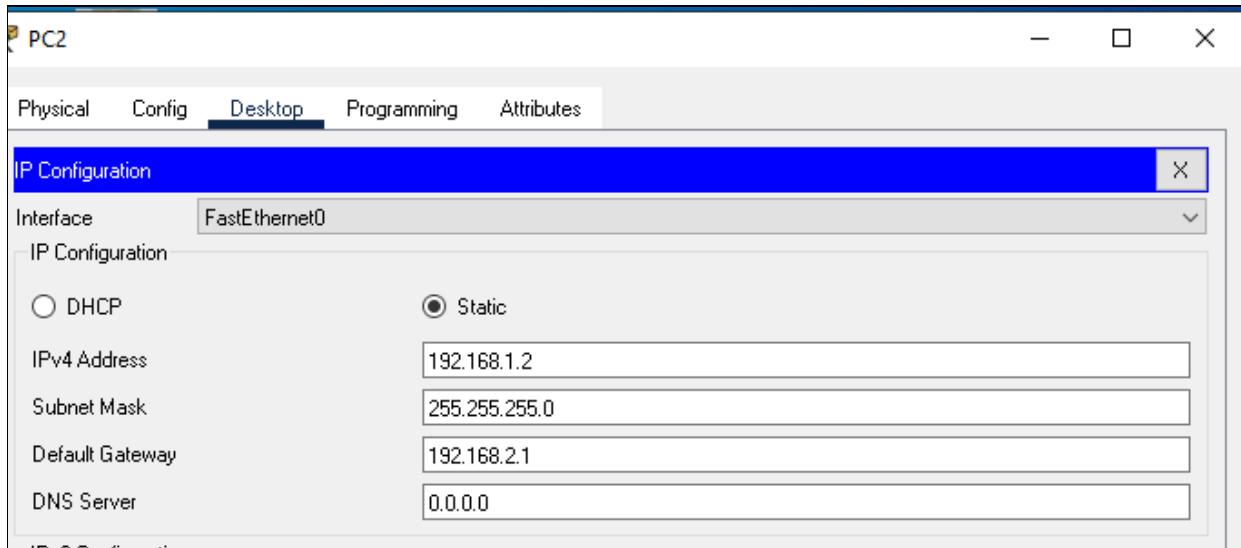
5. Double click PC1.
6. Desktop tab, then click IP Configuration.



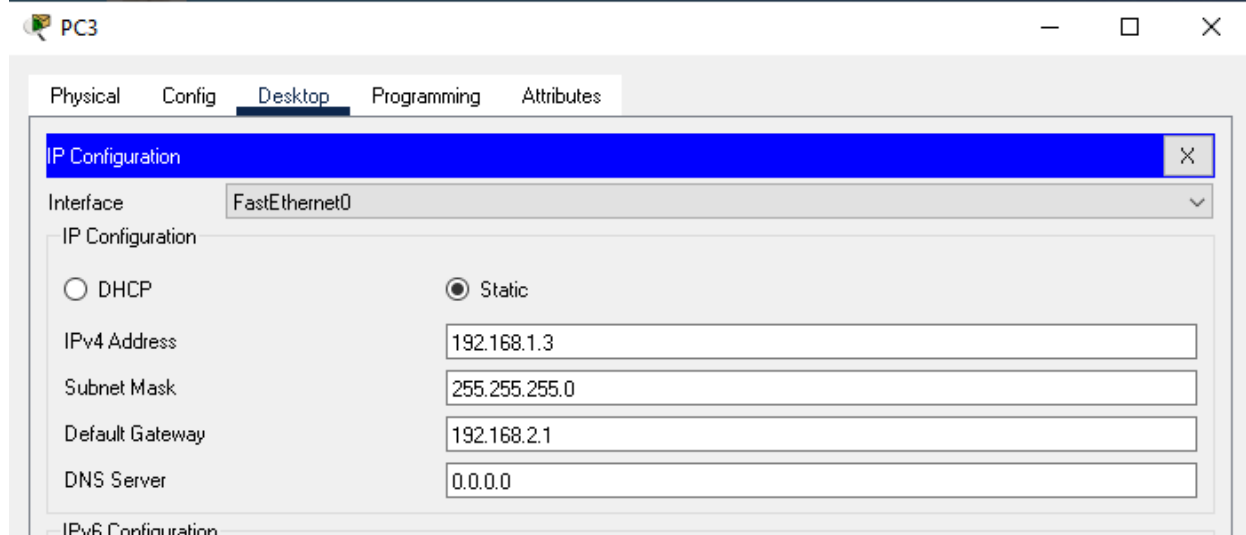
7. Set IP Address for Subnet Mask.
IP Address PC1 = 192.168.1.1
Subnet Mask = 255.255.255.0 (will automatically assign after inputting ip)
Default Gateway: 192.168.2.1



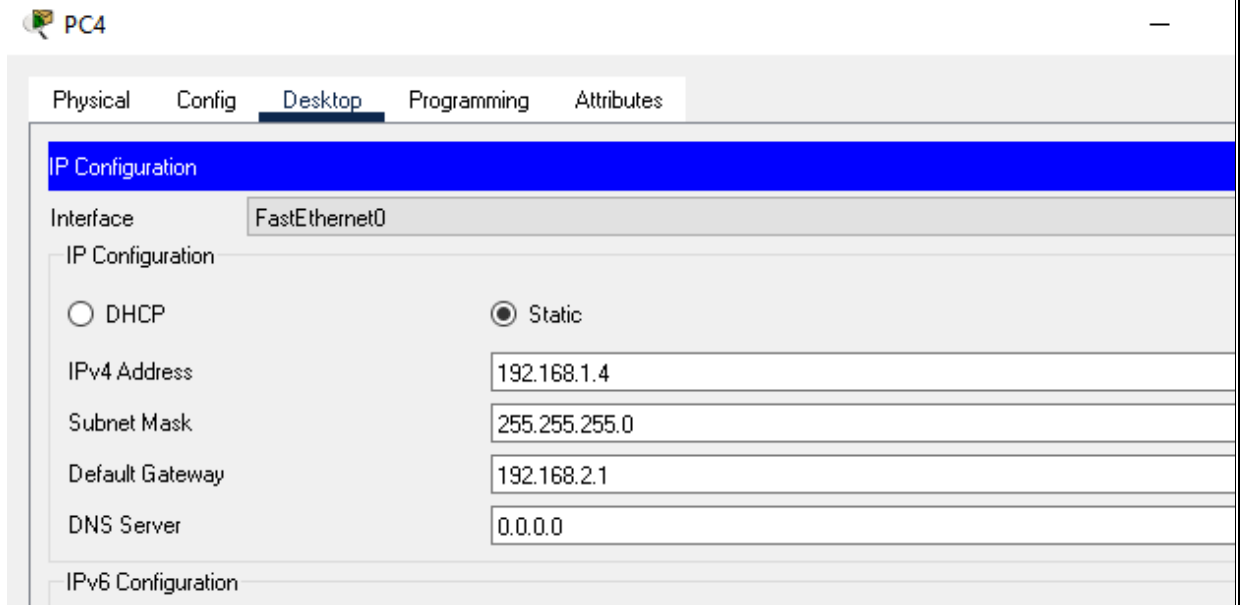
8. Close window PC1
9. Double click PC2.
10. Desktop tab, then click IP Configuration
11. IP Address PC2 = 192.168.1.2
Subnet Mask = 255.255.255.0 (will automatically assign after inputting ip)
Default Gateway: 192.168.2.1



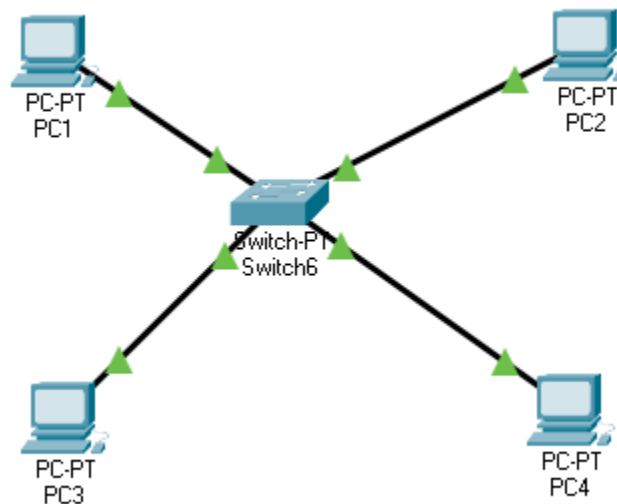
12. close window PC2
13. Double click PC3.
14. Desktop tab, then click IP Configuration
15. IP Address PC3 = 192.168.1.3
Subnet Mask = 255.255.255.0(will automatically assign after inputting ip)
Default Gateway: 192.168.2.1



16. close window PC3
17. Double click PC4.
18. Desktop tab, then click IP Configuration
19. IP Address PC4 = 192.168.1.4
Subnet Mask = 255.255.255.0(will automatically assign after inputting ip)
Default Gateway: 192.168.2.1



20. Close window PC4
21. Now Click Connections icon or press CTRL + ALT + 0 , then click Automatically Choose Connection Type.
22. Connect Each PC to the switch



Connection Testing

For PC1

23. Click PC1
24. Desktop tab, then click Command Prompt
25. Enter ping 192.169.1.2

```
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<1ms TTL=128
```

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

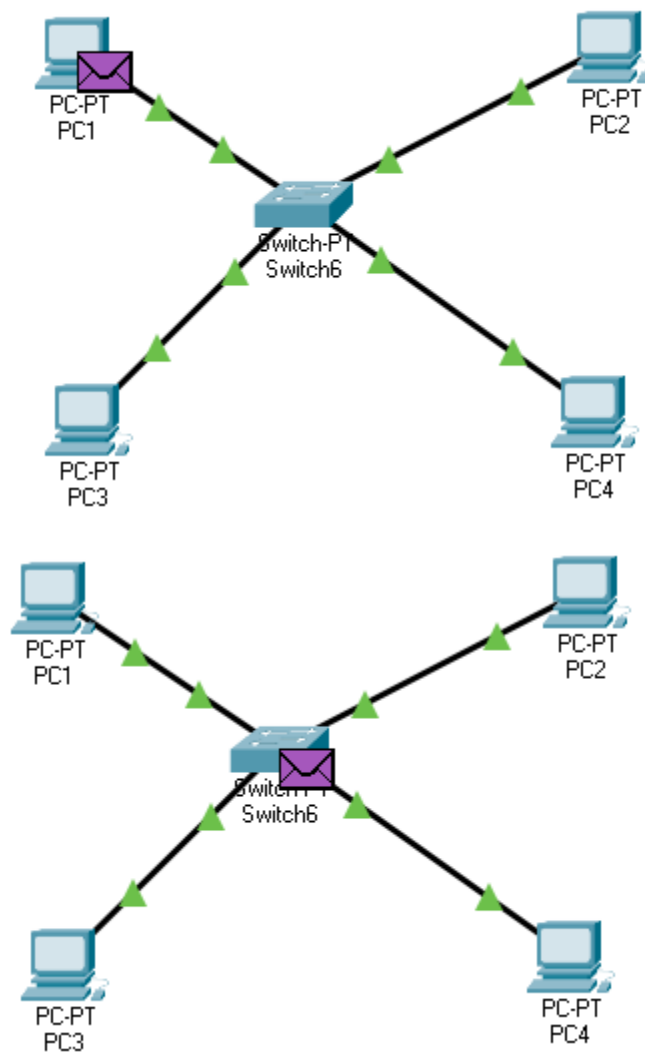
```
Ping statistics for 192.168.1.2:
```

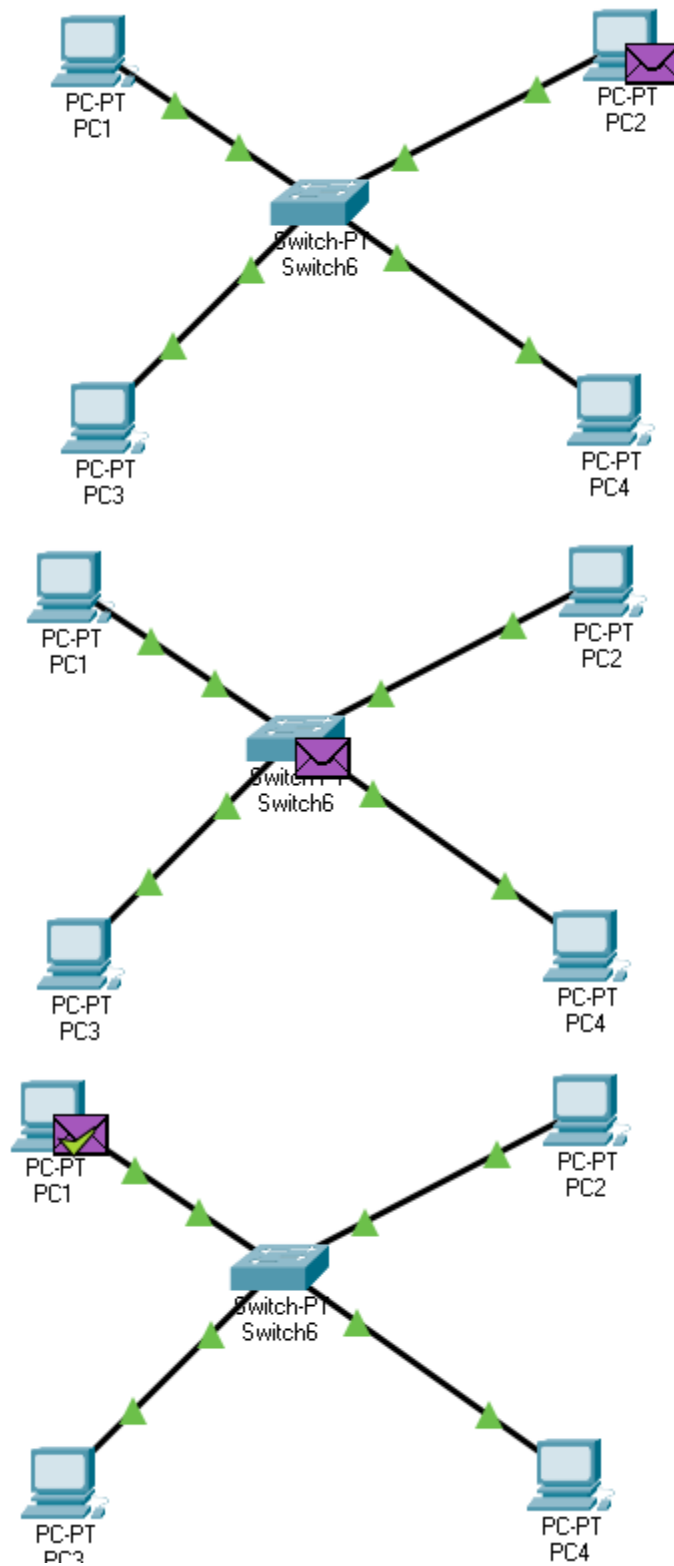
```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

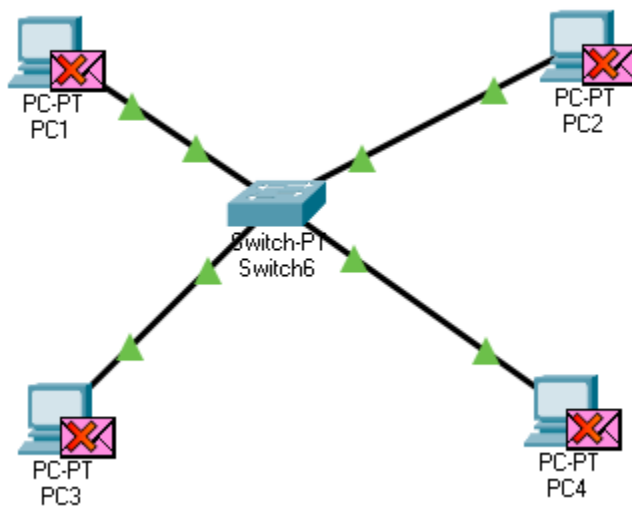
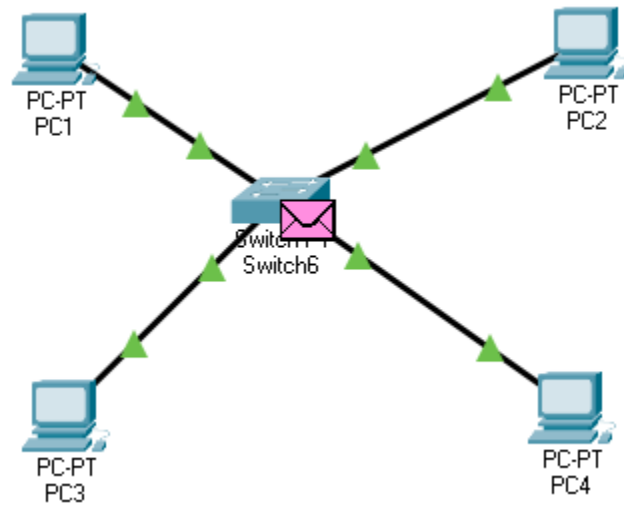
```
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
C:\>
```

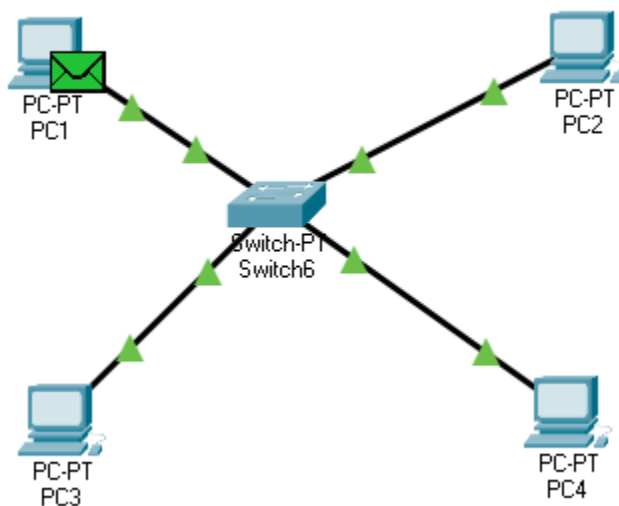




26. **STP is being followed Before sending another Packet**



27. Now Next Packet (Message will be sent)



28. Now The previous steps will be repeated to stimulate the packets.

For PC2

29. Click PC2
30. Desktop tab, then click Command Prompt
31. Enter ping 192.169.1.3

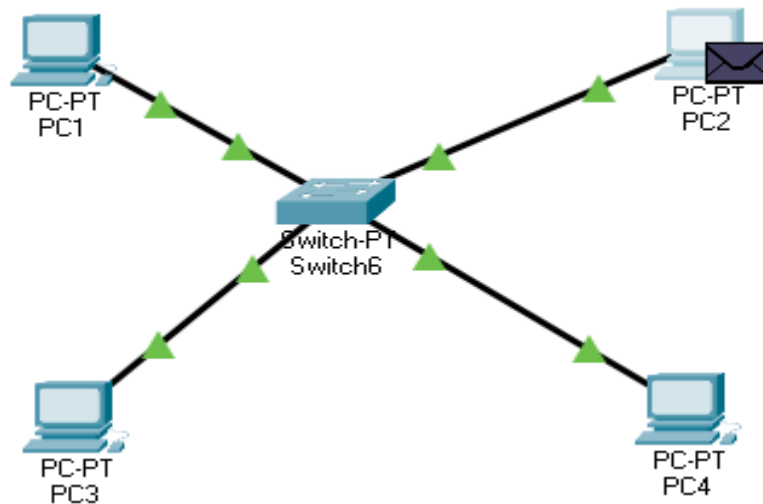
```
C:\>ping 192.168.1.3

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:\>
```



32. Similar Steps from PC1 will be Repeated here to show the simulation.
33. Enter ping 192.168.1.4

```
C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time=4ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128

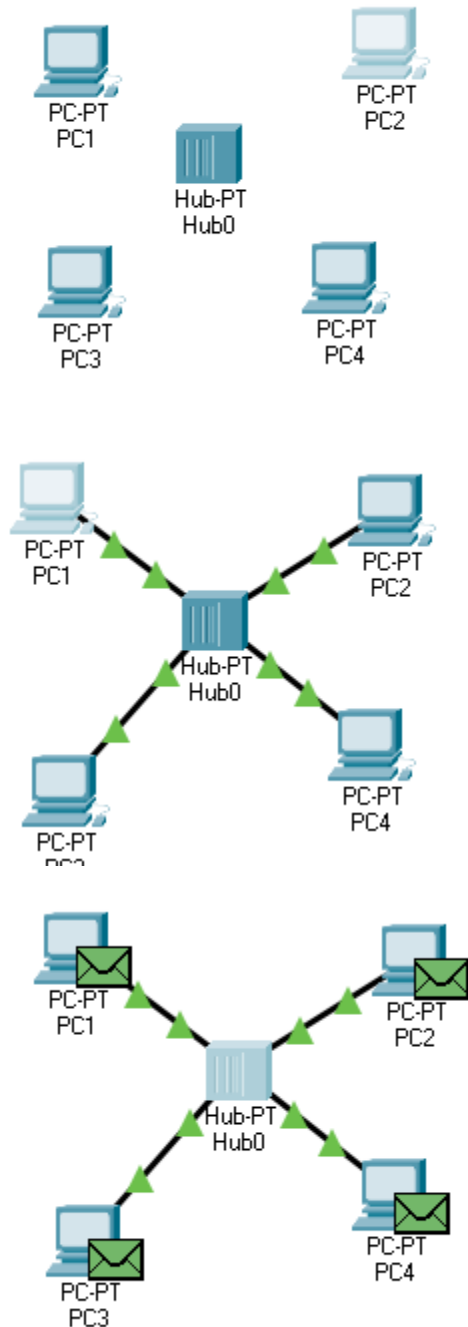
Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms

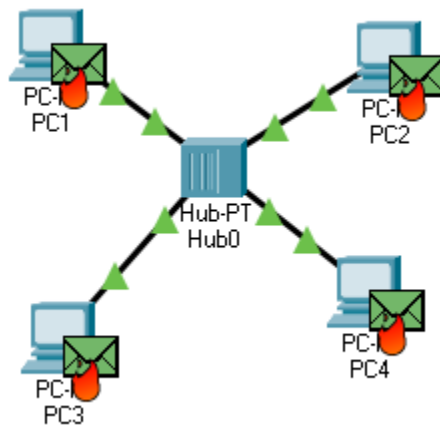
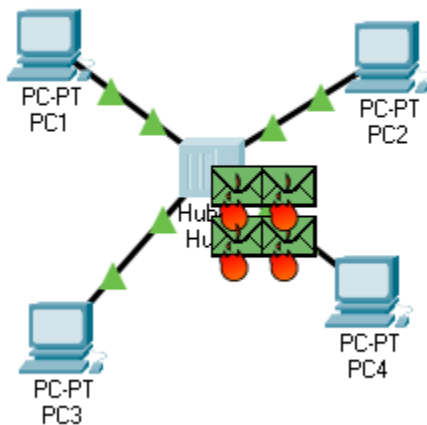
C:\>
```

34. Similar Steps from PC1 will be Repeated here to show the simulation.
35. All the pings were Successful hence connections are Tested and verified successfully.

Using Hub

**Repeat above steps from Step 1 to Step 2 with the exception of switch
Instead use Hub Instead of Switch.**





Connection Testing:

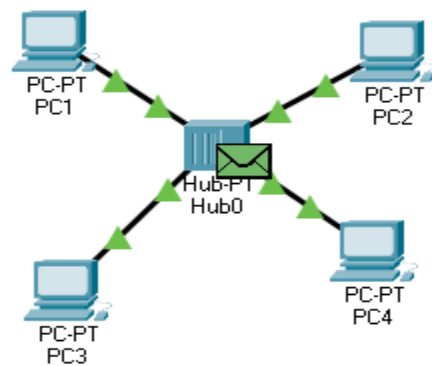
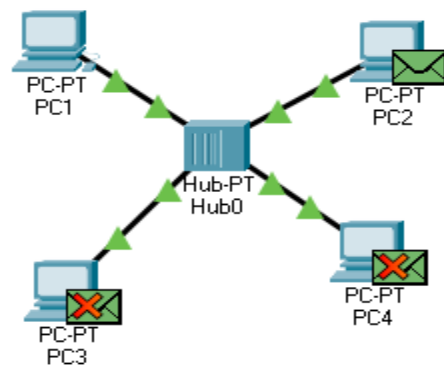
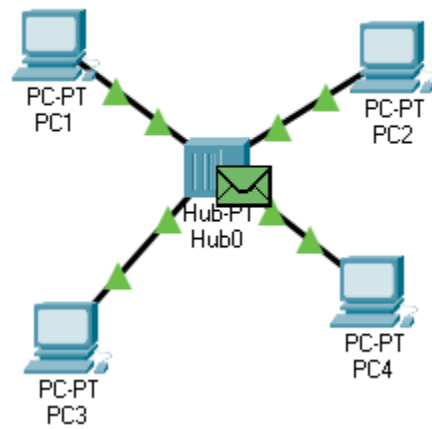
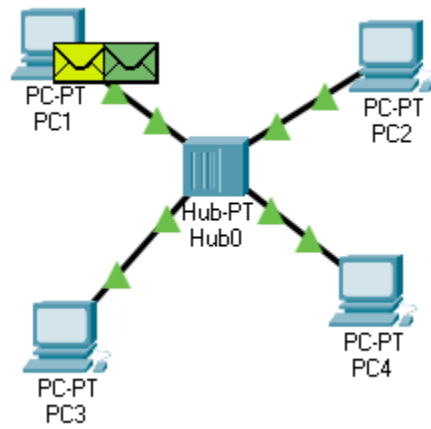
1. Click PC1
2. Desktop tab, then click Command Prompt
3. Enter ping 192.169.1.2
4. Press Enter

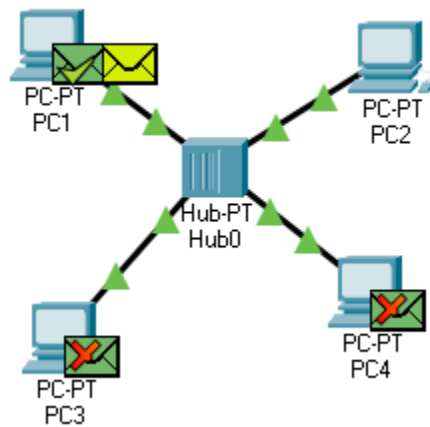
```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=5ms TTL=128
Reply from 192.168.1.2: bytes=32 time=26ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms 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 = 26ms, Average = 8ms
```



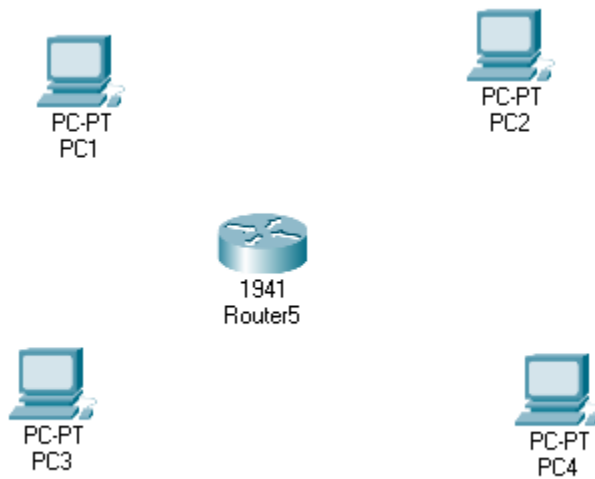


Similarly Perform Pings and simulations for Other PCS.

Pings Were Successful So the connection of PCS with Router Was Successfully Tested

Using Router

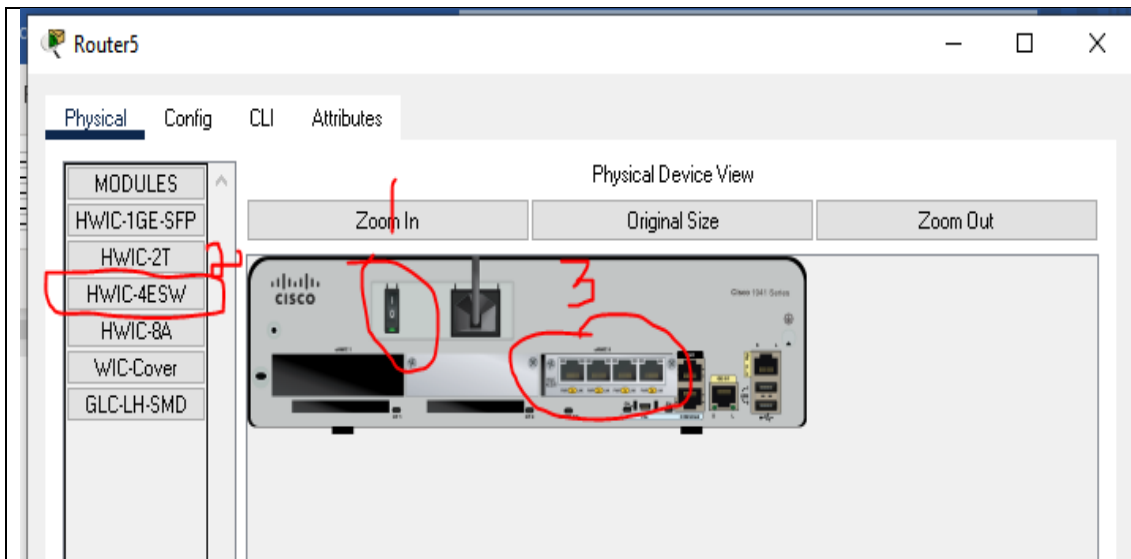
Repeat above steps from Step 1 to Step 2 except for switch Instead use Router Instead of Switch.



Click Router

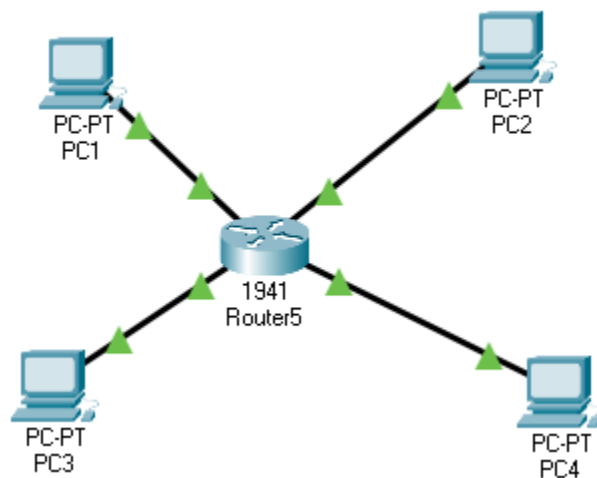
Turn it off by clicking the button.

Then Drag the HWIC-4ESW Port(as highlighted 2 in below pic)
at the empty position(as highlighted 3 in below pic)



Close Router

Select Copper Straight Through Cable and Attach all the 4 pcs(Fast Ethernet). with the router(Fast Ethernet).



Connection Testing.

For PC1.

Click PC1

Desktop tab, then click Command Prompt

Enter ping 192.168.1.2

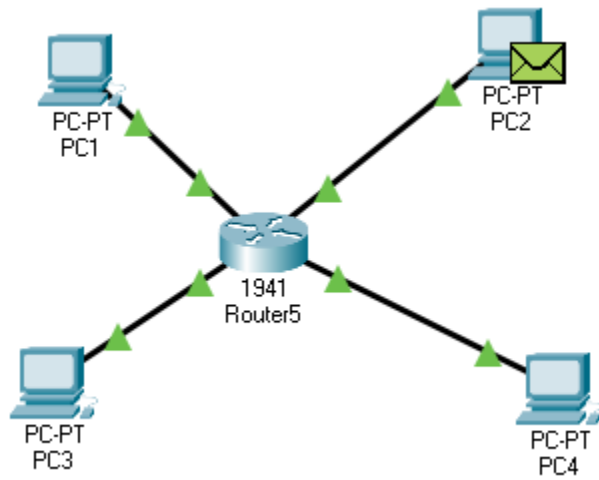
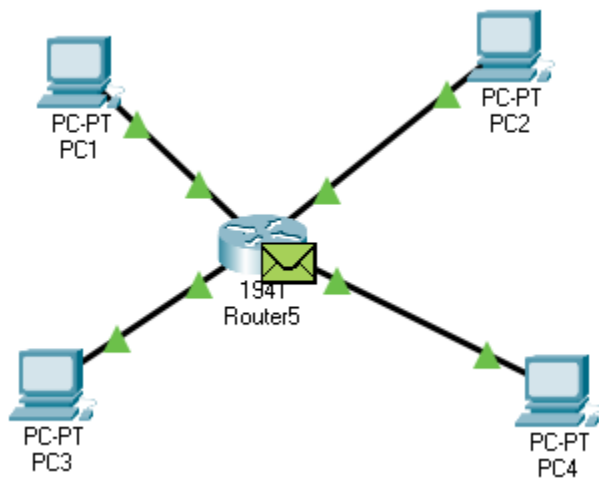
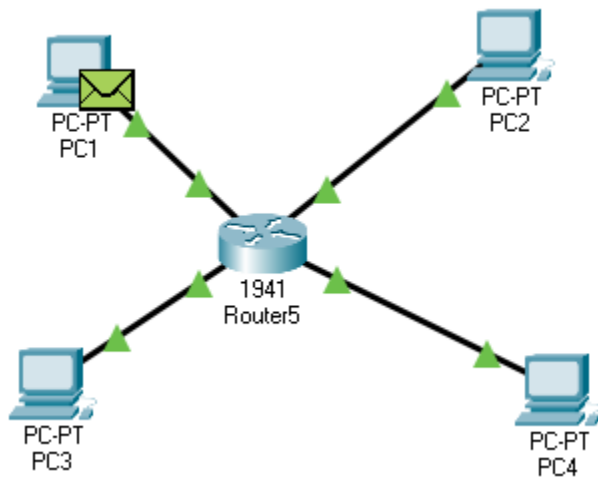
```

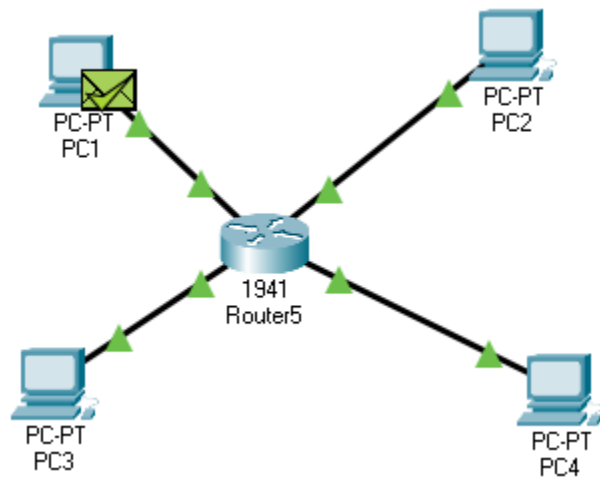
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

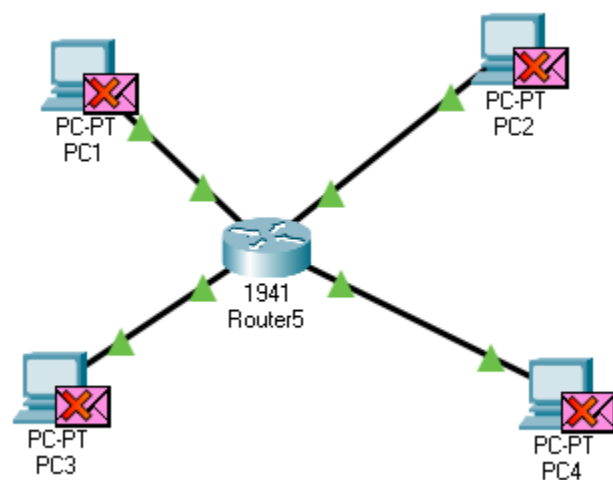
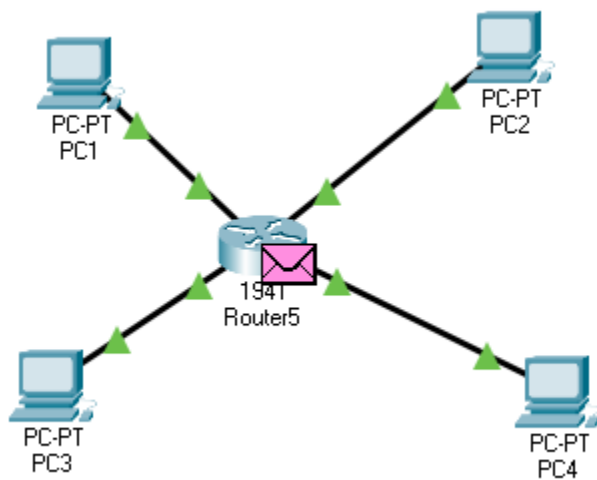
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128

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 = 1ms, Average = 0ms
  
```





STP is being followed Before sending another Packet



Similarly other Messages(packets) are sent.

Perform the Above steps with other PCS.

Pings Were Successful So the connection of PCS with Router Was Successfully Tested