

AMITY UNIVERSITY UTTAR PRADESH



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY
AMITY UNIVERSITY UTTAR PRADESH**

EXPLORING THE NETWORKS (IT307)

LAB FILE

Submitted by

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5 CSE 12X

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EXPERIMENT-1

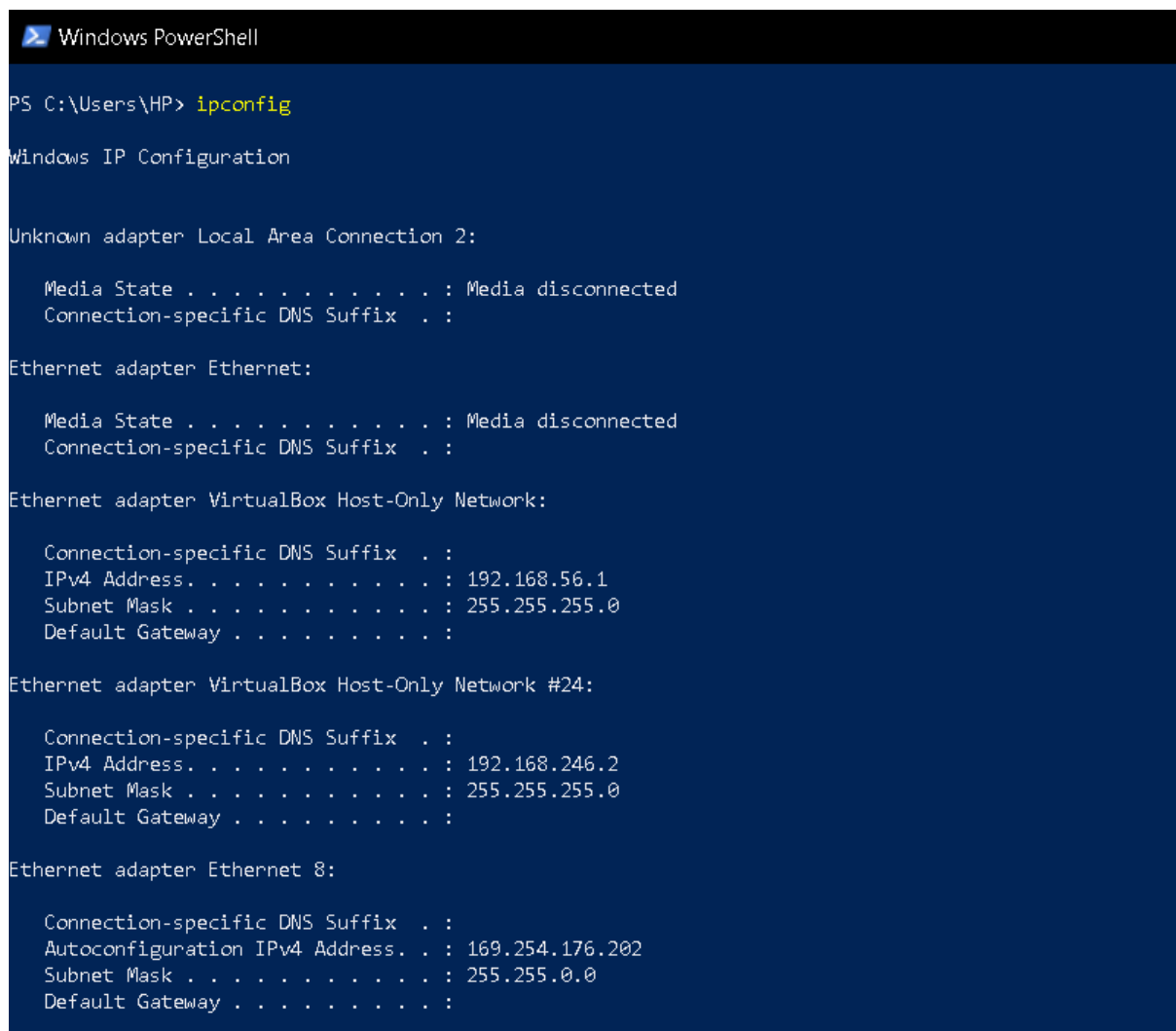
AIM: To explore the basic networking concepts & commands.

THEORY: Multiple computers can be connected in a network in several arrangements. These are called Network Topologies. These connections are made possible with the help of network devices called Hubs and Switches. The difference between a Hub and Switch is that a Hub is an unintelligent device, and it does not know where the intended recipient is located, therefore broadcasting any message it receives to all the connected terminals. However, switch, being an intelligent device, only sends the message to the intended recipient.

COMMANDS:

1. Ipconfig command

Internet Protocol Configuration is a windows command line utility that is used to manage the IP address assigned to the machine it is running in. It displays the computer's currently assigned IP, subnet mask and default gateway addresses.



```
Windows PowerShell

PS C:\Users\HP> ipconfig

Windows IP Configuration

Unknown adapter Local Area Connection 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Ethernet adapter VirtualBox Host-Only Network #24:

    Connection-specific DNS Suffix  . :
    IPv4 Address. . . . . : 192.168.246.2
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Ethernet adapter Ethernet 8:

    Connection-specific DNS Suffix  . :
    Autoconfiguration IPv4 Address. . : 169.254.176.202
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . :
```

2. Hostname Command

It is used to display the IP address of the remote machine/computer's hostname.



```
Windows PowerShell
PS C:\Users\HP> hostname
LAPTOP-RGDR8EK2
PS C:\Users\HP>
```

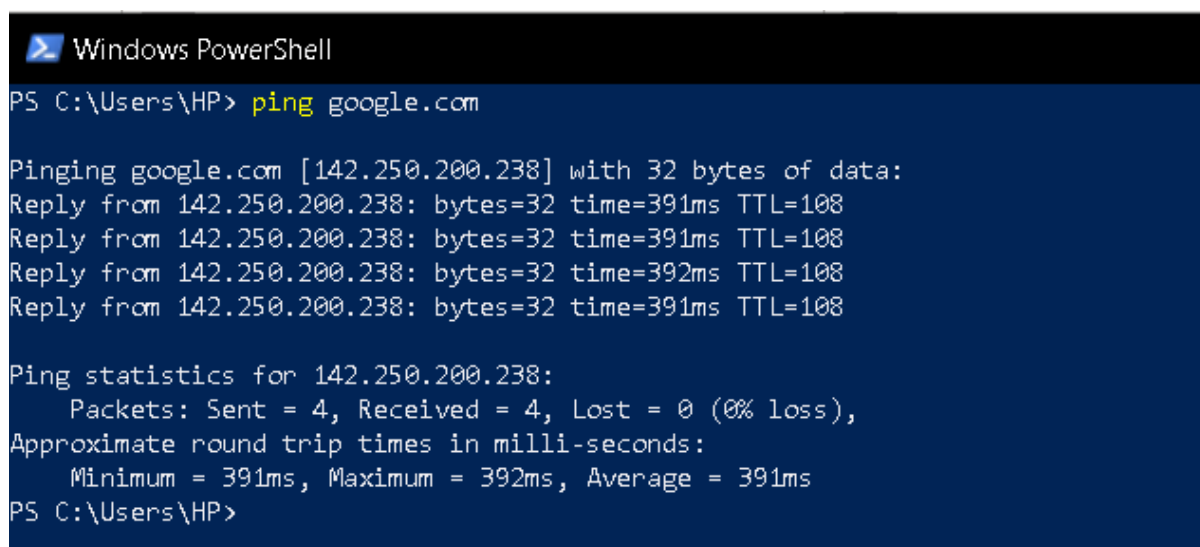
3. Ping ip-address command

Ping is a command-line utility that acts as a test to see if a networked device is reachable. The ping command sends a request over the network to a specific device. A successful ping results in a response from the computer that was pinged back to the originating computer.

Options:

A: -t: ping the specified host until stopped.

B: -a: resolve address to hostname.



```
Windows PowerShell
PS C:\Users\HP> ping google.com

Pinging google.com [142.250.200.238] with 32 bytes of data:
Reply from 142.250.200.238: bytes=32 time=391ms TTL=108
Reply from 142.250.200.238: bytes=32 time=391ms TTL=108
Reply from 142.250.200.238: bytes=32 time=392ms TTL=108
Reply from 142.250.200.238: bytes=32 time=391ms TTL=108

Ping statistics for 142.250.200.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 391ms, Maximum = 392ms, Average = 391ms
PS C:\Users\HP>
```

4. Tracert Ip-address command

The tracert command is a command that's used to show several details about the path that a packet takes from the computer or device you're on to whatever destination you specify.

```

PS C:\Users\HP> tracert google.com

Tracing route to google.com [142.250.200.238]
over a maximum of 30 hops:

  1    4 ms     1 ms     1 ms    192.168.1.1
  2    8 ms     20 ms    7 ms    10.10.0.1
  3    4 ms     4 ms     3 ms    10.100.100.1
  4    5 ms     3 ms     8 ms    103.119.240.1.static-chennai.powertel.in [103.119.240.1]
  5   16 ms    14 ms    16 ms    103.197.136.5.static-mizoram.powertel.in [103.197.136.5]
  6   51 ms    50 ms    64 ms    103.120.29.73.static-delhi.powertel.in [103.120.29.73]
  7   51 ms    78 ms    53 ms    103.120.29.72.static-delhi.powertel.in [103.120.29.72]
  8  203 ms   136 ms   179 ms    72.14.209.113
  9   55 ms    52 ms    52 ms    74.125.242.155
 10  166 ms   103 ms   134 ms   209.85.247.227
 11  171 ms   157 ms   164 ms   209.85.255.131
 12  238 ms   239 ms   259 ms   216.239.58.230
 13  298 ms   299 ms   317 ms   142.250.231.200
 14  301 ms   325 ms   302 ms   142.251.67.141
 15  413 ms   345 ms   439 ms   142.251.69.8
 16  552 ms   748 ms   565 ms   142.251.69.11
 17  453 ms   387 ms   454 ms   64.233.175.242
 18  394 ms   412 ms   384 ms   108.170.252.225
 19  388 ms   397 ms   403 ms   209.85.243.243
 20  390 ms   390 ms   393 ms   mrs08s18-in-f14.1e100.net [142.250.200.238]

Trace complete.

```

5. Pathping ip-address command

The pathping command is a command-line network utility command that combines the functionality of ping with that of tracert. It is used to locate spots that have network latency and network loss.

```

Windows PowerShell
PS C:\Users\HP> pathping google.com

Tracing route to google.com [142.251.37.238]
over a maximum of 30 hops:
  0  LAPTOP-RGDR8EK2.hgu_lan [192.168.1.34]
  1  192.168.1.1
  2  10.10.0.1
  3  10.100.100.1
  4  103.119.240.1.static-chennai.powertel.in [103.119.240.1]
  5  103.197.136.5.static-mizoram.powertel.in [103.197.136.5]
  6  103.120.29.73.static-delhi.powertel.in [103.120.29.73]
  7  103.120.29.72.static-delhi.powertel.in [103.120.29.72]
  8  72.14.209.113
  9  108.170.253.121
 10  74.125.251.157
 11  209.85.255.131
 12  209.85.255.220
 13  72.14.239.196
 14  142.251.67.133
 15  142.251.69.8
 16  142.251.69.11
 17  64.233.175.242
 18  74.125.244.209
 19  142.251.78.85
 20  mrs09s16-in-f14.1e100.net [142.251.37.238]

Computing statistics for 500 seconds...

```

6. arp -a Command

This command allows us to display and modify the Address Resolution Protocol (ARP) cache. An ARP cache is a simple mapping of IP addresses to MAC addresses.

Options:

A: -a: Displays current ARP entries by Interrogating the current protocol data.

B: -g: Same as -a.

```
Windows PowerShell
PS C:\Users\HP> arp -a

Interface: 192.168.101.2 --- 0x4
    Internet Address      Physical Address      Type
    -----
    192.168.101.255      ff-ff-ff-ff-ff-ff    static
    224.0.0.22           01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    239.255.255.250      01-00-5e-7f-ff-fa    static

Interface: 192.168.246.2 --- 0x8
    Internet Address      Physical Address      Type
    -----
    192.168.246.255      ff-ff-ff-ff-ff-ff    static
    224.0.0.22           01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    239.255.255.250      01-00-5e-7f-ff-fa    static
```

7. netstat ip-address command

The netstat command generates displays that show network status and protocol statistics. It displays the status of TCP and UDP endpoints in table format, routing table information, and interface information. Netstat displays various types of network data depending on the command line option selected. These displays are the most useful for system administration.

```
PS C:\Users\HP> netstat 192.168.0.1

Active Connections

    Proto Local Address           Foreign Address         State
    -----
    TCP    127.0.0.1:49669          LAPTOP-RGDR8EK2:49670  ESTABLISHED
    TCP    127.0.0.1:49670          LAPTOP-RGDR8EK2:49669  ESTABLISHED
    TCP    192.168.1.34:49172      1:https                 TIME_WAIT
    TCP    192.168.1.34:49244      bom12s20-in-f14:https   TIME_WAIT
    TCP    192.168.1.34:49621      maa03s32-in-f7:https    TIME_WAIT
    TCP    192.168.1.34:49809      162.159.136.234:https   ESTABLISHED
```

8. ping -a ip-address command

```
PS C:\Users\HP> ping -a google.com

Pinging google.com [142.250.200.238] with 32 bytes of data:
Reply from 142.250.200.238: bytes=32 time=396ms TTL=108
Reply from 142.250.200.238: bytes=32 time=398ms TTL=108
Reply from 142.250.200.238: bytes=32 time=386ms TTL=108
Reply from 142.250.200.238: bytes=32 time=392ms TTL=108

Ping statistics for 142.250.200.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 386ms, Maximum = 398ms, Average = 393ms
PS C:\Users\HP>
```

9. ping -l size ip-address command

```
PS C:\Users\HP> ping -l size google.com

Pinging google.com [142.250.200.238] with 0 bytes of data:
Reply from 142.250.200.238: bytes=0 time=427ms TTL=108
Reply from 142.250.200.238: bytes=0 time=409ms TTL=108
Reply from 142.250.200.238: bytes=0 time=413ms TTL=108
Reply from 142.250.200.238: bytes=0 time=446ms TTL=108

Ping statistics for 142.250.200.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 409ms, Maximum = 446ms, Average = 423ms
PS C:\Users\HP>
```

RESULT: Explored the basic networking concepts & commands.

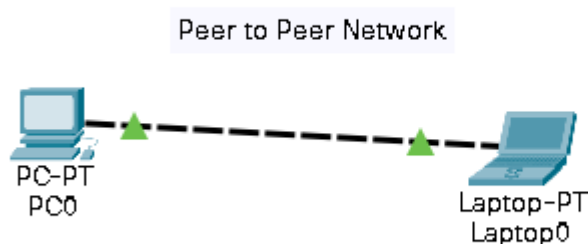
EXPERIMENT-2

AIM: To establish the various network topologies (Point-to-Point Topology, Star Topology, Ring Topology, Bus Topology, Hybrid Topology, Mesh Topology) using Hubs and Switches.

THEORY: Multiple computers can be connected in a network in several arrangements. These are called Network Topologies. These connections are made possible with the help of network devices called Hubs and Switches. The difference between a Hub and Switch is that a Hub is an unintelligent device, and it does not know where the intended recipient is located, therefore broadcasting any message it receives to all the connected terminals. However, switch, being an intelligent device, only sends the message to the intended recipient.

(1.) Peer to peer network

Peer to Peer topology is the simplest topology that connects two nodes directly together with a common link. The entire bandwidth of the common link is reserved for transmission between those two nodes. The point-to-point connections uses an actual length of wire or cable to connect the two ends, but other options, such as satellite links, or microwaves are also possible.



```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

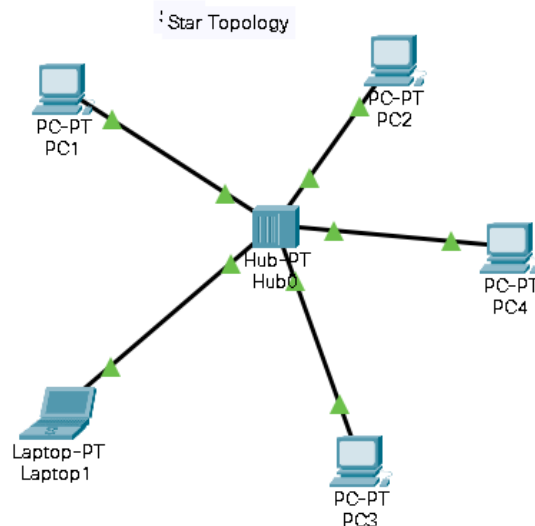
Pinging 192.168.1.2 with 32 bytes of data:

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=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
```


(2.) Star Topology

Star topology is a network topology where each individual piece of a network is attached to a central node (often called a hub or switch). The attachment of these network pieces to the central component is visually represented in a form similar to a star. Star topology is also known as a star network.



```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.5

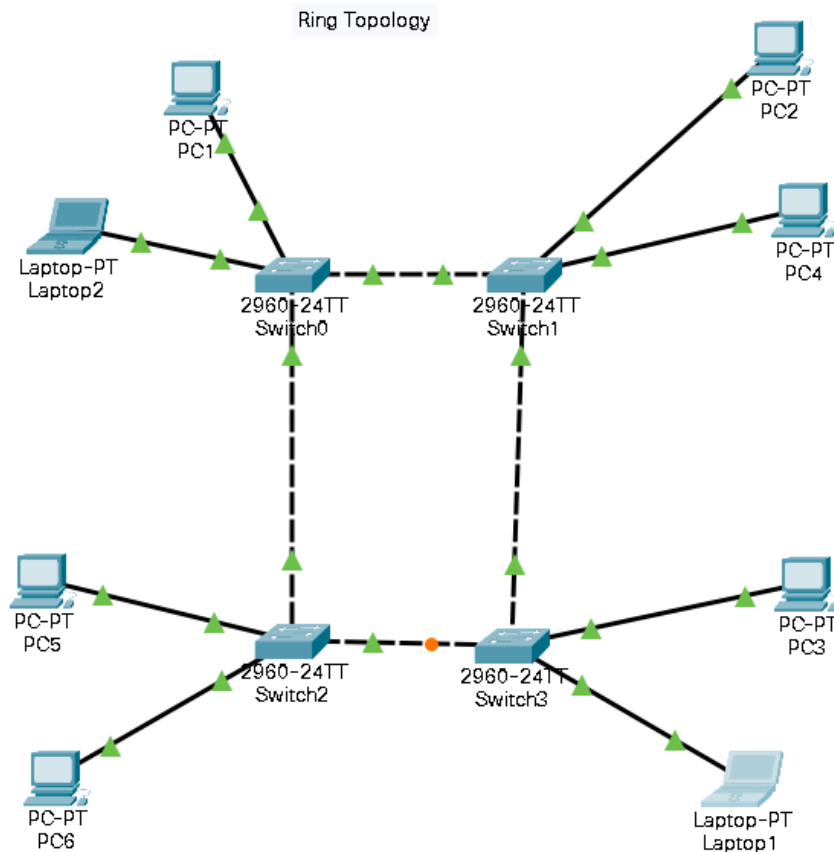
Pinging 192.168.1.5 with 32 bytes of data:

Reply from 192.168.1.5: bytes=32 time<1ms TTL=128
Reply from 192.168.1.5: bytes=32 time=1ms TTL=128
Reply from 192.168.1.5: bytes=32 time=1ms TTL=128
Reply from 192.168.1.5: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

(3.) Ring Topology

A ring topology is a network configuration where device connections create a circular data path. Each networked device is connected to two others, like points on a circle. Together, devices in a ring topology are referred to as a ring network. Others permit data to move in either direction, called bidirectional.



Packet Tracer PC Command Line 1.0

C:\>ping 192.168.1.5

Pinging 192.168.1.5 with 32 bytes of data:

Reply from 192.168.1.5: bytes=32 time<1ms TTL=128

Reply from 192.168.1.5: bytes=32 time=1ms TTL=128

Reply from 192.168.1.5: bytes=32 time=1ms TTL=128

Reply from 192.168.1.5: bytes=32 time=1ms TTL=128

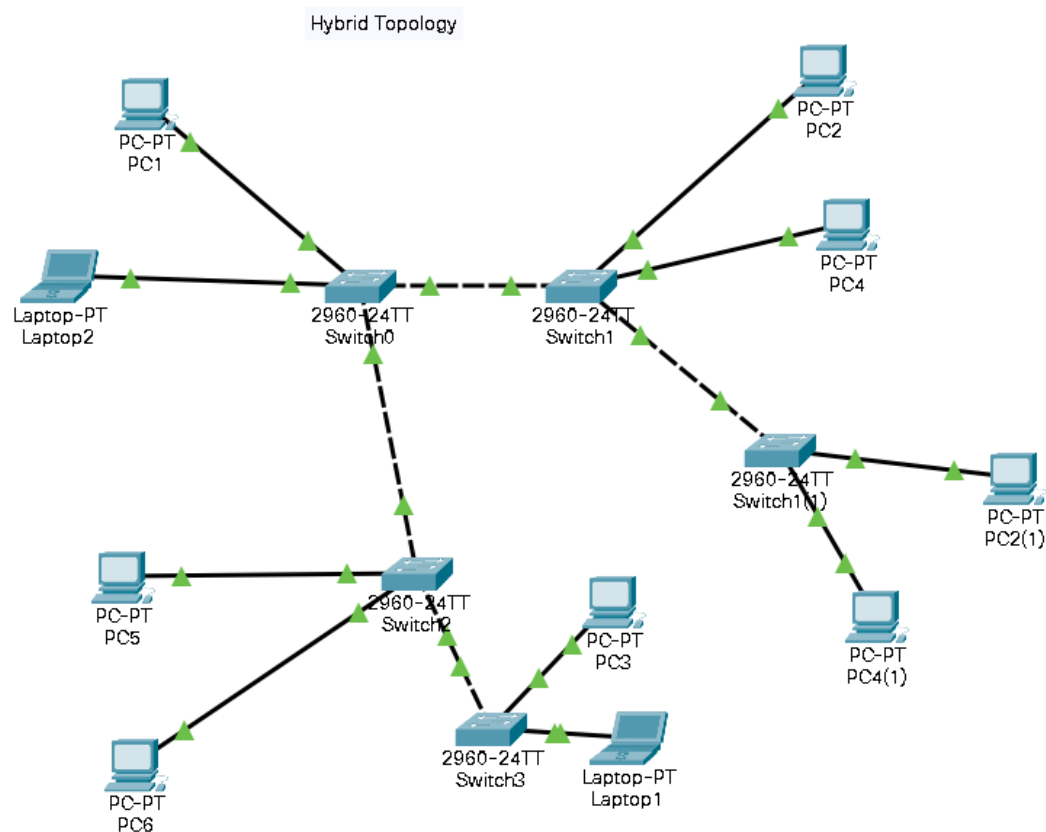
Ping statistics for 192.168.1.5:

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

Approximate round trip times in milli-seconds:

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

(4.) Hybrid Topology



Packet Tracer PC Command Line 1.0

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

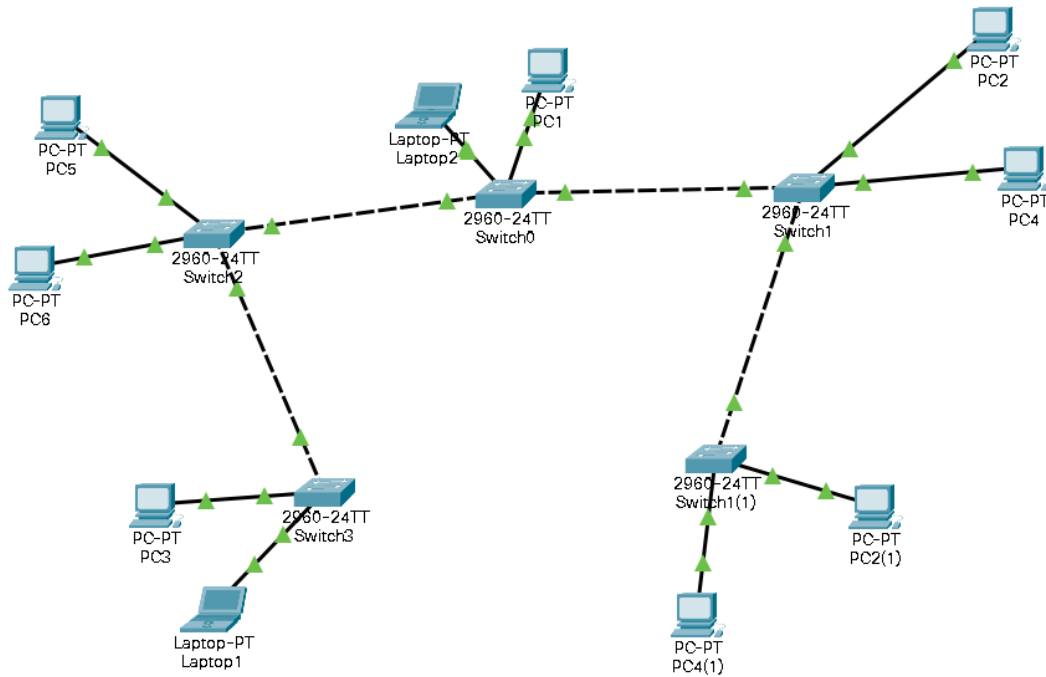
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
 Reply from 192.168.1.11: bytes=32 time=11ms TTL=128
 Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
 Reply from 192.168.1.11: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.11:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 0ms, Maximum = 11ms, Average = 2ms

(5.) Tree Topology

TREE TOPOLOGY



Packet Tracer PC Command Line 1.0

C:\>ping 192.168.1.16

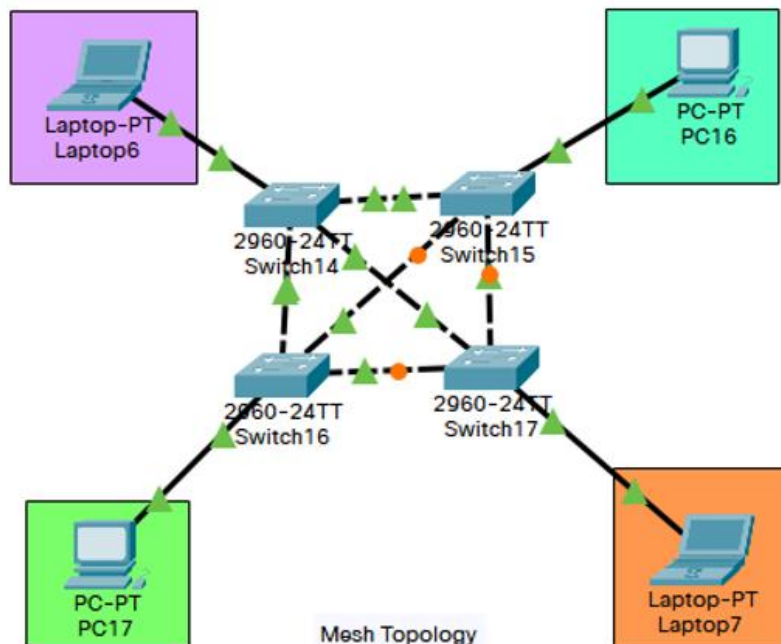
Pinging 192.168.1.16 with 32 bytes of data:

Reply from 192.168.1.16: bytes=32 time<1ms TTL=128
 Reply from 192.168.1.16: bytes=32 time<1ms TTL=128
 Reply from 192.168.1.16: bytes=32 time<1ms TTL=128
 Reply from 192.168.1.16: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.16:

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

(6.) Mesh Topology



```

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3

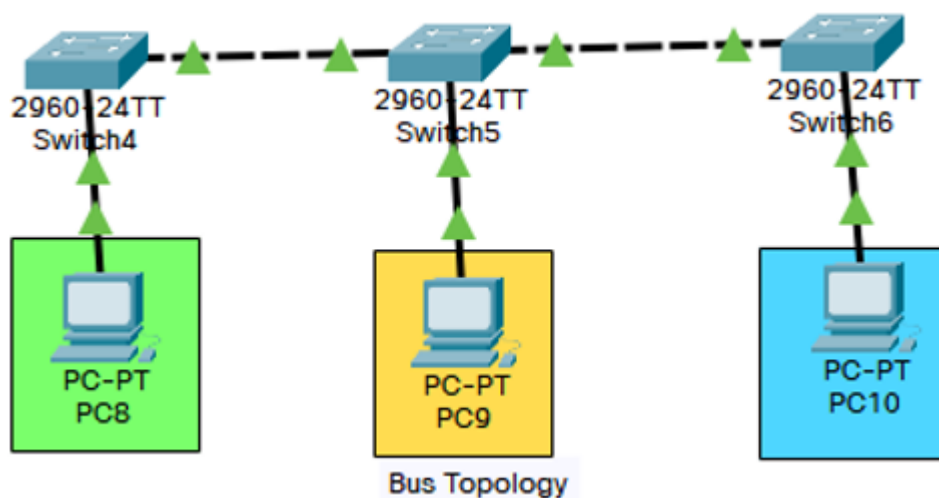
Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=10ms 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 = 10ms Average = 3ms

```

(7.) Bus Topology



```
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=10ms 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 = 10ms, Average = 3ms
```

RESULT: The topologies were made and their results were analyzed.

EXPERIMENT-3

AIM: To configure a switch appropriately with required properties.

THEORY: The properties of a switch can be configured using CLI, short for Command Line Interface. There are several modes in the CLI and each mode is used to modify certain specific attributes of the switch. The modes of execution and their uses are listed in the table as under.

S.No.	Mode	Command Prompt	Use
1.	User Execution Mode	>	Allows access to only a limited number of basic monitoring commands
2.	Privileged Execution Mode	#	To enter this mode, from user-exec mode, type enable. Allows us to change the current configuration of the switch.
3.	Global Configuration Mode	(config)#	To enter this mode, configure terminal or conf t must be typed. Used to access configuration options on the device.
4.	Line Configuration Mode	(config-line)#	To configure console, SSH, Telnet or AUX Configuration access. They help us manage the lines of mode the switch. To enter this mode type line console 0.
5.	Interface Configuration Mode	(config-if)#	Used to configure a switchport or router interface.

COMMANDS:-

STAR TOPOLOGY

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#no ip domain-lookup

Switch(config)#interface fa0/1

```
Switch(config-if)#shutdown
```

```
Switch(config-if)#
```

```
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
```

```
Switch(config-if)#interface fa0/1
```

```
Switch(config-if)#no shutdown
```

```
Switch(config-if)#
```

```
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
```

```
Switch(config-if)#end
```

```
Switch#
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

```
Switch#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Switch(config)#enable secret class
```

```
Switch(config)#line con 0
```

```
Switch(config-line)#password 12345
```

```
Switch(config-line)#login
```

```
Switch(config-line)#end
```

```
Switch#
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

```
Switch#show running-config
```

```
Building configuration...
```

```
Current configuration : 1172 bytes
```

```
!
```

```
version 15.0
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

```
no service password-encryption
```

```
!
```

```
hostname Switch
```

```
!
```

```
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
```

```
!
```

```
!
```

```
!
```

```
no ip domain-lookup
```

```
!
```

```
!
```

```
!
```

```
spanning-tree mode pvst
```

```
spanning-tree extend system-id
```

```
!
```

```
interface FastEthernet0/1
```



```
!  
interface FastEthernet0/2  
!  
interface FastEthernet0/3  
!  
interface FastEthernet0/4  
!  
interface FastEthernet0/5  
!  
interface FastEthernet0/6  
!  
interface FastEthernet0/7  
!  
interface FastEthernet0/8  
!  
interface FastEthernet0/9  
!  
interface FastEthernet0/10  
!  
interface FastEthernet0/11  
!  
interface FastEthernet0/12  
!  
interface FastEthernet0/13  
!  
interface FastEthernet0/14  
!  
interface FastEthernet0/15  
!  
interface FastEthernet0/16  
!  
interface FastEthernet0/17  
!  
interface FastEthernet0/18  
!  
interface FastEthernet0/19  
!  
interface FastEthernet0/20  
!  
interface FastEthernet0/21  
!  
interface FastEthernet0/22  
!  
interface FastEthernet0/23  
!  
interface FastEthernet0/24  
!  
interface GigabitEthernet0/1  
!  
interface GigabitEthernet0/2  
!  
interface Vlan1  
no ip address
```

shutdown

!
!
!
!

line con 0

password 12345

login

!

line vty 0 4

login

line vty 5 15

login

!

!

!

!

end

Switch#

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#host Host1

Host1(config)#interface vlan1

Host1(config-if)#ip address 192.168.1.2 255.255.255.0

Host1(config-if)#no shut

Host1(config-if)#

%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Host1(config-if)#end

Host1#

%SYS-5-CONFIG_I: Configured from console by console

Host1#copy run start

Destination filename [startup-config]?

Building configuration...

[OK]

Host1#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Host1(config)#line vty 0 15

Host1(config-line)#password 12345

Host1(config-line)#login

Host1(config-line)#banner motd #Hello!!#

Host1(config)#end

Host1#

%SYS-5-CONFIG_I: Configured from console by console

Host1#copy run start

Destination filename [startup-config]?

Building configuration...

[OK]

RING TOPOLOGY

Switch-1

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#no ip domain-lookup

Switch(config)#interface fa0/1

Switch(config-if)#shutdown

Switch(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

Switch(config-if)#interface fa0/1

Switch(config-if)#no shutdown

Switch(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch(config-if)#end

Switch#

%SYS-5-CONFIG_I: Configured from console by console

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#enable secret class

Switch(config)#line con 0

Switch(config-line)#password 12345

Switch(config-line)#login

Switch(config-line)#end

Switch#

%SYS-5-CONFIG_I: Configured from console by console

Switch#show running-config

Building configuration...

Current configuration : 1172 bytes

!

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

!

hostname Switch

```
!  
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1  
!  
!  
!  
no ip domain-lookup  
!  
!  
!  
spanning-tree mode pvst  
spanning-tree extend system-id  
!  
interface FastEthernet0/1  
!  
interface FastEthernet0/2  
!  
interface FastEthernet0/3  
!  
interface FastEthernet0/4  
!  
interface FastEthernet0/5  
!  
interface FastEthernet0/6  
!  
interface FastEthernet0/7  
!  
interface FastEthernet0/8  
!  
interface FastEthernet0/9  
!  
interface FastEthernet0/10  
!  
interface FastEthernet0/11  
!  
interface FastEthernet0/12  
!  
interface FastEthernet0/13  
!  
interface FastEthernet0/14  
!  
interface FastEthernet0/15  
!  
interface FastEthernet0/16  
!  
interface FastEthernet0/17  
!  
interface FastEthernet0/18  
!  
interface FastEthernet0/19  
!  
interface FastEthernet0/20  
!  
interface FastEthernet0/21
```

```

!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
shutdown
!
!
!
!
line con 0
password 12345
login
!
line vty 0 4
login
line vty 5 15
login
!
!
!
!
end

```

```

Switch#
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#host Host2
Host2(config)#interface vlan1
Host2(config-if)#ip address 192.168.1.3 255.255.255.0
Host2(config-if)#no shut

```

```

Host2(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

```

```

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

```

```

Host2(config-if)#line vty 0 15
Host2(config-line)#password 12345
Host2(config-line)#login
Host2(config-line)#banner motd #Heyy!!#
Host2(config)#end
Host2#
%SYS-5-CONFIG_I: Configured from console by console

```

```
Host2#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
Host2#
```

Switch-2

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#interface fa0/1
Switch(config-if)#shutdown

Switch(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

Switch(config-if)#interface fa0/1
Switch(config-if)#no shutdown

Switch(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#enable secret class
Switch(config)#line con 0
Switch(config-line)#password 12345
Switch(config-line)#login
Switch(config-line)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show running-config
Building configuration...

Current configuration : 1172 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
```

```
no service password-encryption
!
hostname Switch
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
no ip domain-lookup
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
```

```

interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
shutdown
!
!
!
!
line con 0
password 12345
login
!
line vty 0 4
login
line vty 5 15
login
!
!
!
!
end

```

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#host Host3

Host3(config)#interface vlan1

Host3(config-if)#ip address 192.168.1.4 255.255.255.0

Host3(config-if)#no shut

Host3(config-if)#

%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Host3(config-if)#end

Host3#

%SYS-5-CONFIG_I: Configured from console by console

Host3#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Host3(config)#line vty 0 15

Host3(config-line)#password 12345

Host3(config-line)#login

Host3(config-line)#banner motd #Hello World!!#

Host3(config)#end

Host3#

%SYS-5-CONFIG_I: Configured from console by console

Host3#copy run start

Destination filename [startup-config]?

Building configuration...

[OK]

Host3#

SWITCH 3

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#no ip domain-lookup

Switch(config)#interface fa0/1

Switch(config-if)#shutdown

Switch(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

Switch(config-if)#interface fa0/1

Switch(config-if)#no shutdown

Switch(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch(config-if)#enable secret class

Switch(config)#line con 0

Switch(config-line)#password 12345

Switch(config-line)#login

Switch(config-line)#end

Switch#

%SYS-5-CONFIG_I: Configured from console by console

Switch#show running-config

Building configuration...

Current configuration : 1172 bytes

!

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

```
no service password-encryption
!
hostname Switch
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
no ip domain-lookup
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
```

```

interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
shutdown
!
!
!
!
line con 0
password 12345
login
!
line vty 0 4
login
line vty 5 15
login
!
!
!
!
end
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#host Host4
Host4(config)#interface vlan1
Host4(config-if)#ip address 192.168.1.5 255.255.255.0
Host4(config-if)#no shut

Host4(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Host4(config-if)#line vty 0 15
Host4(config-line)#password 12345
Host4(config-line)#login
Host4(config-line)#banner motd #Hey everyone!#
Host4(config)#end
Host4#
%SYS-5-CONFIG_I: Configured from console by console

```

```
Host4#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
Host4#
```

Switch-4

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#interface fa0/1
Switch(config-if)#shutdown
```

```
Switch(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
```

```
Switch(config-if)#interface fa0/1
Switch(config-if)#no shutdown
```

```
Switch(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
```

```
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

```
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#enable secret class
Switch(config)#line con 0
Switch(config-line)#password 12345
Switch(config-line)#login
Switch(config-line)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

```
Switch#show running-config
Building configuration...
```

```
Current configuration : 1172 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
```

```
hostname Switch
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
no ip domain-lookup
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
```

```

interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
shutdown
!
!
!
!
line con 0
password 12345
login
!
line vty 0 4
login
line vty 5 15
login
!
!
!
!
end

```

```

Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#host Host5
Host5(config)#interface vlan1
Host5(config-if)#ip address 192.168.1.6 255.255.255.0
Host5(config-if)#no shut

```

```

Host5(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

```

```

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

```

```

Host5(config-if)#end
Host5#
%SYS-5-CONFIG_I: Configured from console by console

```

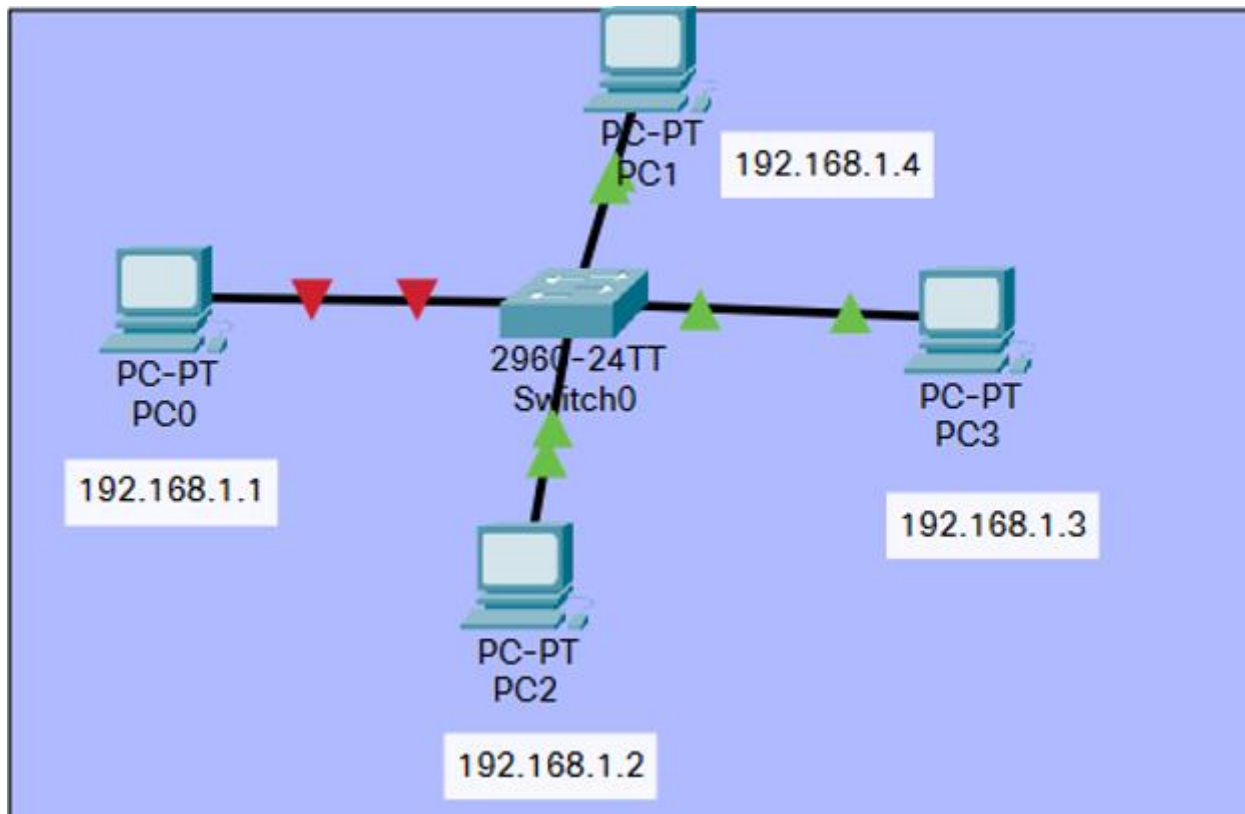
```

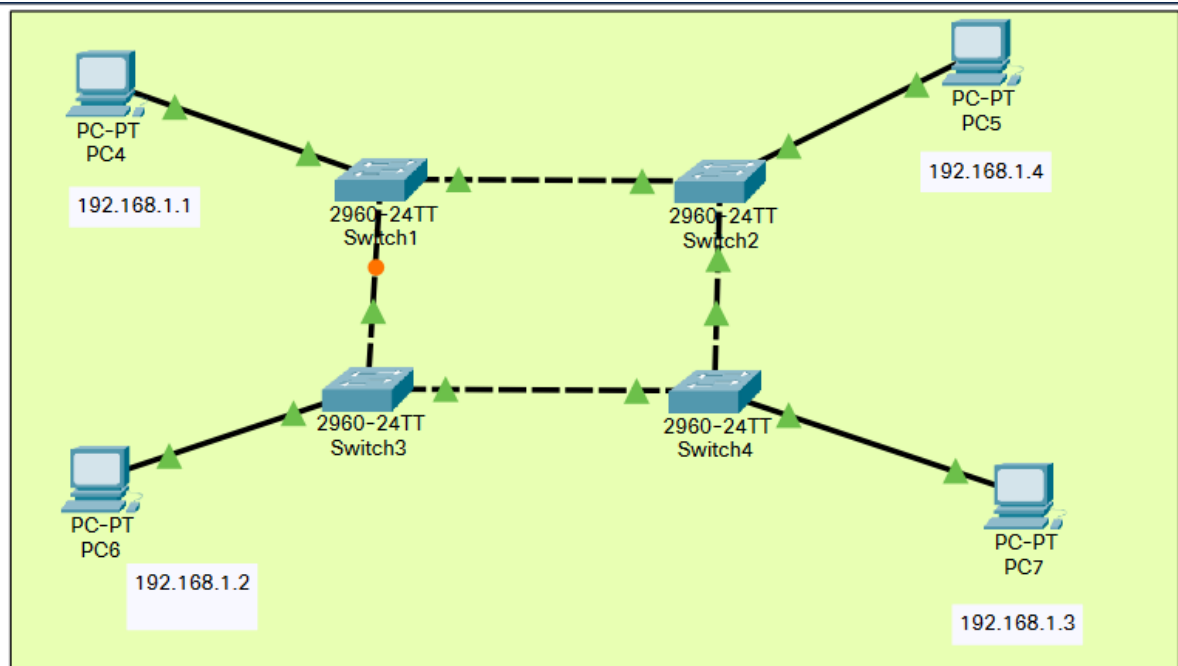
Host5#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Host5(config)#line vty 0 15

```

```
Host5(config-line)#password 12345
Host5(config-line)#login
Host5(config-line)#banner motd #Hello World!!#
Host5(config)#end
Host5#
%SYS-5-CONFIG_I: Configured from console by console
```

```
Host5#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
```





RESULT: The switch was successfully configured.

EXPERIMENT-4

AIM: To configure VLAN appropriately by creating network topology for a university having 5 departments: CSE, ECE, ME, CE, EEE each having 3 computers. There should be no communication between the departments.

THEORY: A VLAN is a set of end stations and the switch ports that connect them. You can have different reasons for the logical division, such as department or project membership. The only physical requirement is that the end station and the port to which it is connected both belong to the same VLAN. The properties of a VLAN can be configured using CLI, short for Command Line Interface.

COMMANDS:-

For Switch 0

```
Switch>en
Switch#conf t
!Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 60
Switch(config-vlan)#name CSE1
Switch(config-vlan)#exit
Switch(config)#vlan 70
Switch(config-vlan)#name ECE1
Switch(config-vlan)#exit
Switch(config)#vlan 80
Switch(config-vlan)#name IT1
Switch(config-vlan)#exit
Switch(config)#vlan 90
Switch(config-vlan)#name ME1
Switch(config-vlan)#exit
Switch(config)#vlan 100
Switch(config-vlan)#name EEE1
Switch(config-vlan)#exit
Switch(config)#interface fa0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 60
Switch(config-if)#exit
Switch(config)#interface fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 60
Switch(config-if)#exit
Switch(config)#interface fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 60
Switch(config-if)#exit
Switch(config)#exit
Switch(config)#interface fa0/6
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 70
Switch(config-if)#exit
```

```

Switch(config)#interface fa0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 70
Switch(config-if)#exit
Switch(config)#interface fa0/7
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 70
Switch(config-if)#exit
Switch(config)#interface fa0/9
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 80
Switch(config-if)#exit
Switch(config)#interface fa0/10
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 80
Switch(config-if)#exit
Switch(config)#interface fa0/8
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 80
Switch(config-if)#exit
Switch(config)#interface fa0/11
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 90
Switch(config-if)#exit
Switch(config)#interface fa0/13
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 90
Switch(config-if)#exit
Switch(config)#interface fa0/12
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 90
Switch(config-if)#exit
Switch(config)#interface fa0/14
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 100
Switch(config-if)#exit
Switch(config)#interface fa0/15
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 100
Switch(config-if)#exit
Switch(config)#interface fa0/16
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 100
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

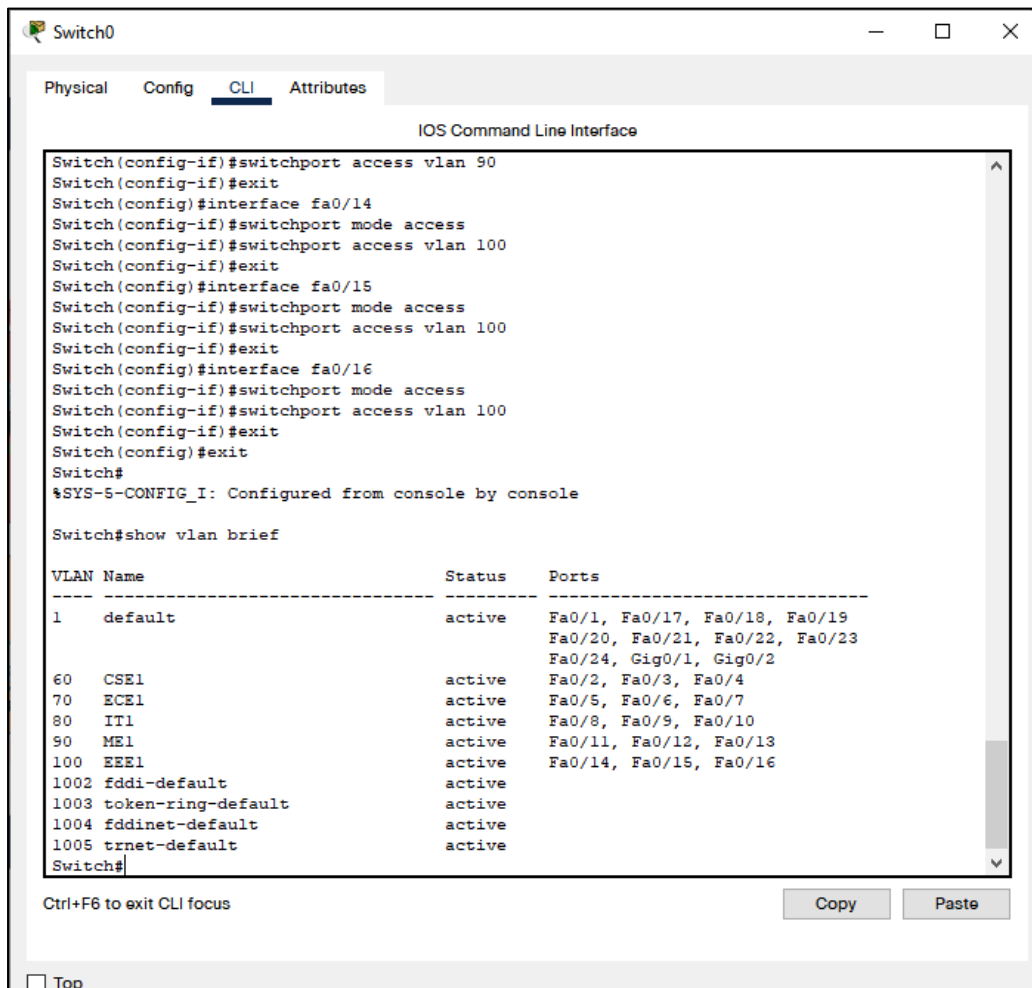
```

```
Switch#show vlan brief
```

```
VLAN Name Status Ports
```

```
-----
1 default active Fa0/1, Fa0/17, Fa0/18, Fa0/19
```

Fa0/20, Fa0/21, Fa0/22, Fa0/23
 Fa0/24, Gig0/1, Gig0/2
 60 CSE1 active Fa0/2, Fa0/3, Fa0/4
 70 ECE1 active Fa0/5, Fa0/6, Fa0/7
 80 IT1 active Fa0/8, Fa0/9, Fa0/10
 90 ME1 active Fa0/11, Fa0/12, Fa0/13
 100 EEE1 active Fa0/14, Fa0/15, Fa0/16
 1002 fddi-default active
 1003 token-ring-default active
 1004 fddinet-default active
 1005 trnet-default active
 Switch#



For Switch 1

Switch>en
 Switch#conf t
 Enter configuration commands, one per line. End with CNTL/Z.
 Switch(config)#vlan 10
 Switch(config-vlan)#name CSE
 Switch(config-vlan)#exit
 Switch(config)#vlan 20
 Switch(config-vlan)#name ECE
 Switch(config-vlan)#exit
 Switch(config)#vlan 30

```
Switch(config-vlan)#name IT
Switch(config-vlan)#exit
Switch(config)#vlan 40
Switch(config-vlan)#name ME
Switch(config-vlan)#exit
Switch(config)#vlan 50
Switch(config-vlan)#name EEE
Switch(config-vlan)#exit
Switch(config)#interface fa0/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface fa0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface fa0/6
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#interface fa0/7
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#interface fa0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#interface fa0/10
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
Switch(config)#interface fa0/8
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
Switch(config)#interface fa0/9
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
Switch(config)#interface fa0/11
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 40
Switch(config-if)#exit
Switch(config)#interface fa0/13
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 40
Switch(config-if)#exit
Switch(config)#interface fa0/12
```

```

Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 40
Switch(config-if)#exit
Switch(config)#interface fa0/16
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 50
Switch(config-if)#exit
Switch(config)#interface fa0/14
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 50
Switch(config-if)#exit
Switch(config)#interface fa0/15
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 50
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

```

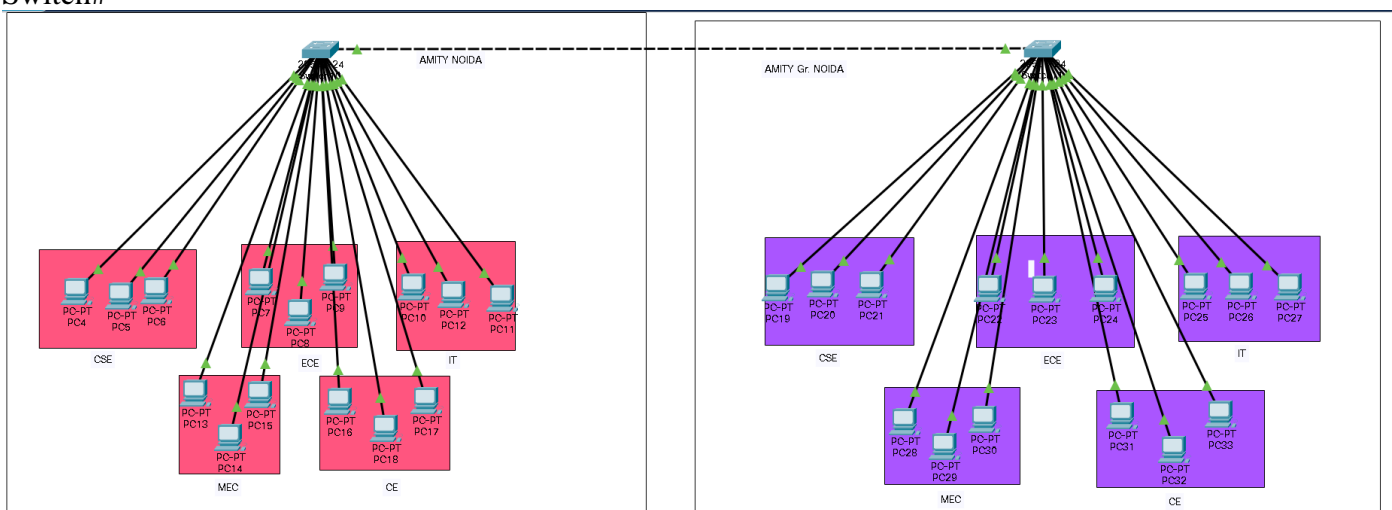
```
Switch#show vlan brief
```

VLAN Name Status Ports

```

-----
1 default active Fa0/2, Fa0/17, Fa0/18, Fa0/19
Fa0/20, Fa0/21, Fa0/22, Fa0/23
Fa0/24, Gig0/1, Gig0/2
10 CSE active Fa0/1, Fa0/3, Fa0/4
20 ECE active Fa0/5, Fa0/6, Fa0/7
30 IT active Fa0/8, Fa0/9, Fa0/10
40 ME active Fa0/11, Fa0/12, Fa0/13
50 EEE active Fa0/14, Fa0/15, Fa0/16
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
Switch#

```



```
Switch1
Physical Config CLI Attributes
IOS Command Line Interface

Switch(config-if)#switchport access vlan 40
Switch(config-if)#exit
Switch(config)#interface fa0/16
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 50
Switch(config-if)#exit
Switch(config)#interface fa0/14
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 50
Switch(config-if)#exit
Switch(config)#interface fa0/15
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 50
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan brief

VLAN Name                Status    Ports
-----
1    default                active    Fa0/2, Fa0/17, Fa0/18, Fa0/19
                                           Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                           Fa0/24, Gig0/1, Gig0/2
10   CSE                    active    Fa0/1, Fa0/3, Fa0/4
20   ECE                    active    Fa0/5, Fa0/6, Fa0/7
30   IT                     active    Fa0/8, Fa0/9, Fa0/10
40   ME                     active    Fa0/11, Fa0/12, Fa0/13
50   EEE                    active    Fa0/14, Fa0/15, Fa0/16
1002 fddi-default          active
1003 token-ring-default    active
1004 fddinet-default        active
1005 trnet-default          active
Switch#

Ctrl+F6 to exit CLI focus      Copy Paste
```

RESULT: The VLAN was successfully configured.

EXPERIMENT-5

AIM: To configure router appropriately with required properties.

THEORY: Routers guide and direct network data, using packets that contain various kinds of data-such as files, communications, and simple transmissions like web interactions. The data packets have several layers, or sections, one of which carries identifying information such as sender, data type, size, and most importantly, the destination IP (Internet protocol) address. The router reads this layer, prioritizes the data, and chooses the best route to use for each transmission.

COMMANDS:-

```
Router>en
```

```
Router#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Router(config)#hostname MyRouter
```

```
MyRouter(config)#interface g0/0
```

```
MyRouter(config-if)#no shutdown
```

```
MyRouter(config-if)#
```

```
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
```

```
MyRouter(config-if)#ip address 192.168.1.1 255.255.255.0
```

```
MyRouter(config-if)#no shut
```

```
MyRouter(config-if)#interface g0/1
```

```
MyRouter(config-if)#ip address 192.168.2.1 255.255.255.0
```

```
MyRouter(config-if)#no shut
```

```
MyRouter(config-if)#
```

```
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
```

```
MyRouter(config-if)#exit
```

```
MyRouter(config)#exit
```

```
MyRouter#
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

```
MyRouter#show ip interface brief
```

```
Interface IP-Address OK? Method Status Protocol
```

```
GigabitEthernet0/0 192.168.1.1 YES manual up up
```

```
GigabitEthernet0/1 192.168.2.1 YES manual up up
```

```
Vlan1 unassigned YES unset administratively down down
```

```
MyRouter>en
```

```
MyRouter#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
MyRouter(config)#interface loopback 0
```

```
MyRouter(config-if)#
```

```
%LINK-5-CHANGED: Interface Loopback0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
```

```
MyRouter(config-if)#ip address 100.0.0.1 255.255.255.0
```

```
MyRouter(config-if)#interface loopback1
```

```
MyRouter(config-if)#
```

```
%LINK-5-CHANGED: Interface Loopback1, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up
```

```
MyRouter(config-if)#ip address 101.0.0.1 255.255.255.0
```

```
MyRouter(config-if)#end
```

```
MyRouter#
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

```
MyRouter#show ip interface brief
```

```
Interface IP-Address OK? Method Status Protocol
```

```
GigabitEthernet0/0 192.168.1.1 YES manual up up
```

```
GigabitEthernet0/1 192.168.2.1 YES manual up up
```

```
Loopback0 100.0.0.1 YES manual up up
```

```
Loopback1 101.0.0.1 YES manual up up
```

```
Vlan1 unassigned YES unset administratively down down
```

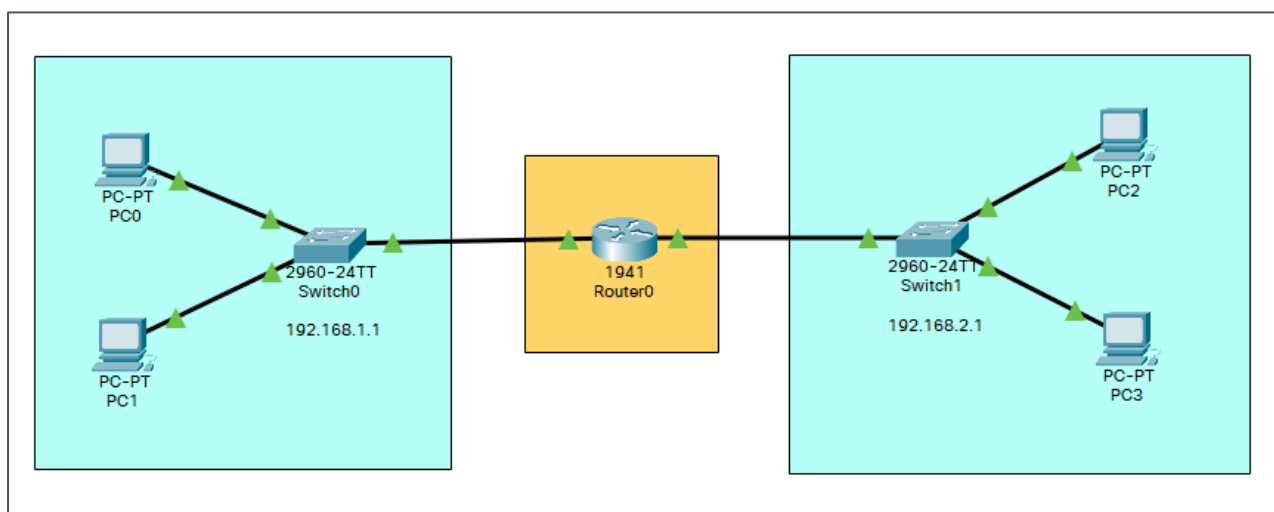
```
MyRouter#copy run start
```

```
Destination filename [startup-config]?
```

```
Building configuration...
```

```
[OK]
```

```
MyRouter#
```




```
MyRouter>en
MyRouter#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MyRouter(config)#interface loopback 0

MyRouter(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

MyRouter(config-if)#ip address 100.0.0.1 255.255.255.0
MyRouter(config-if)#interface loopback 1

MyRouter(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

MyRouter(config-if)#ip address 101.0.0.1 255.255.255.0
MyRouter(config-if)#end
MyRouter#
%SYS-5-CONFIG_I: Configured from console by console

MyRouter#show ip interface brief
Interface                IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0       192.168.1.1     YES manual up          up
GigabitEthernet0/1       192.168.2.1     YES manual up          up
Loopback0                 100.0.0.1       YES manual up          up
Loopback1                 101.0.0.1       YES manual up          up
Vlan1                     unassigned      YES unset  administratively down down
MyRouter#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
MyRouter#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

RESULT: The router was successfully configured.

EXPERIMENT-6

AIM: To configure VLAN on router appropriately by creating network topology for a university having 4 departments each having 2 computers.

THEORY: A VLAN is a set of end stations and the switch ports that connect them. You can have different reasons for the logical division, such as department or project membership. The only physical requirement is that the end station and the port to which it is connected both belong to the same VLAN. The properties of a VLAN can be configured using CLI, short for Command Line Interface.

COMMANDS:-

SWITCH 1

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name Dept1
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name Dept2
Switch(config-vlan)#exit
Switch(config)#interface fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface fa0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#interface fa0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
```

SWITCH 2

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 30
Switch(config-vlan)#name Dept3
```

```
Switch(config-vlan)#exit
Switch(config)#vlan 40
Switch(config-vlan)#name Dept4
Switch(config-vlan)#exit
Switch(config)#interface fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
Switch(config)#interface fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
Switch(config)#interface fa0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 40
Switch(config-if)#exit
Switch(config)#interface fa0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 40
Switch(config-if)#exit
Switch(config)#
```

ROUTER

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface g0/0/0
Router(config-if)#no ip address
Router(config-if)#no shut
```

```
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
```

```
Router(config-if)#interface g0/0/0.10
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.10, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.10, changed state to up
```

```
Router(config-subif)#encapsulation dot1q 10
Router(config-subif)#ip address 10.0.0.1 255.0.0.0
Router(config-subif)#interface g0/0/0.20
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.20, changed state to up
```

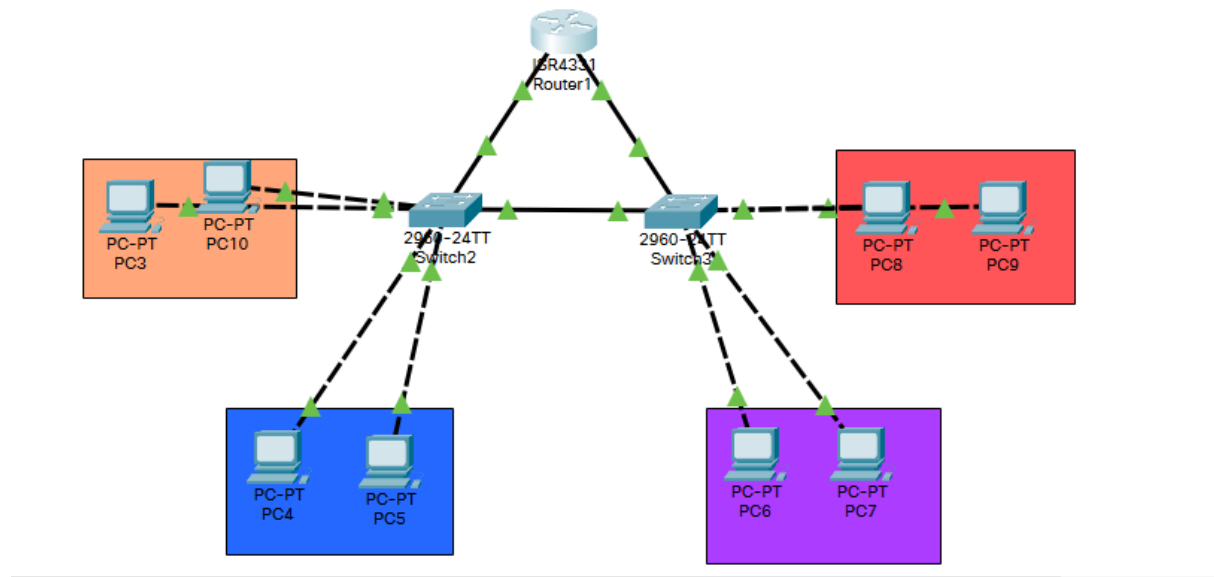
```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.20, changed state to up
```

```
Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip address 20.0.0.1 255.0.0.0
Router(config-subif)#exit
```

```
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

```
Router#sh ip interface brief
```

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0/0	unassigned	YES	unset	up	up
GigabitEthernet0/0/0.10	10.0.0.1	YES	manual	up	up
GigabitEthernet0/0/0.20	20.0.0.1	YES	manual	up	up
GigabitEthernet0/0/1	unassigned	YES	unset	administratively down	down
Vlan1	unassigned	YES	unset	administratively down	down



Device Name: Router0					
Device Model: ISR4321					
Hostname: Router					
Port	Link	VLAN	IP Address	IPv6 Address	MAC Address
GigabitEthernet0/0/0	Up	--	<not set>	<not set>	00E0.A3E3.C601
GigabitEthernet0/0/0.10	Up	--	10.0.0.1/8	<not set>	00E0.A3E3.C601
GigabitEthernet0/0/0.20	Up	--	20.0.0.1/8	<not set>	00E0.A3E3.C601
GigabitEthernet0/0/1	Down	--	<not set>	<not set>	00E0.A3E3.C602
Vlan1	Down	1	<not set>	<not set>	0010.11A0.5636
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > Router0					

RESULT: Configured VLAN on router appropriately by creating network topology for a university having 4 departments each having 2 computers.

EXPERIMENT-7

AIM: To configure router as a DHCP server.

THEORY: Dynamic Host Configuration Protocol (DHCP) is an application layer protocol used to distribute various network configuration parameters to devices on a TCP/IP network. IP addresses, subnet masks, default gateways, DNS servers, etc. DHCP employs a client-server architecture; a DHCP client is configured to request network parameters from a DHCP server on the network. A DHCP server is configured with a pool of available IP addresses and assigns one of them to the DHCP client.

COMMANDS:-

For Router0

```
Router>en
```

```
Router#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Router(config)#hostname Router
```

```
Router(config)#interface GigabitEthernet0/0/0
```

```
Router(config-if)#ip add 192.168.1.1 255.255.255.0
```

```
Router(config-if)#no shut
```

```
Router(config-if)#
```

```
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
```

```
Router(config-if)#exit
```

```
Router(config)#ip DHCP pool abc
```

```
Router(dhcp-config)#default-router 192.168.1.1
```

```
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
```

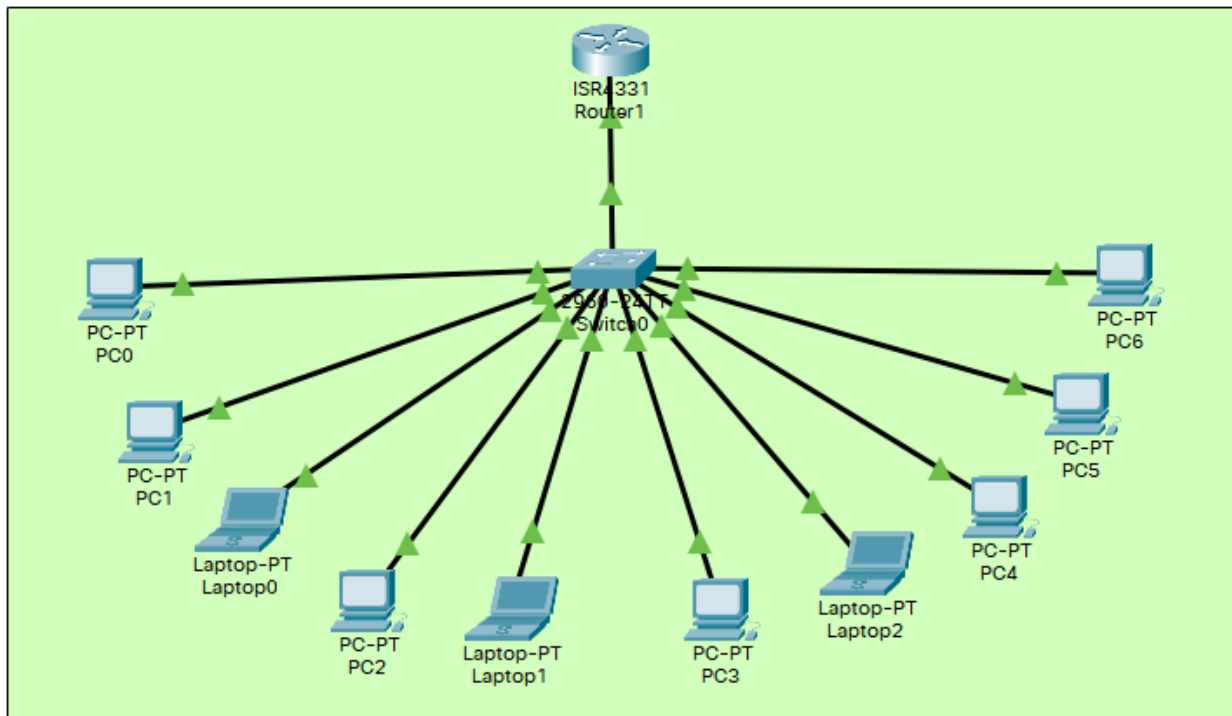
```
Router(dhcp-config)#exit
```

```
Router(config)#do wr
```

```
Building configuration...
```

```
[OK]
```

```
Router(config-if)%%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 192.168.1.1.
```



PC1

Physical Config **Desktop** Programming Attributes

IP Configuration [X]

Interface: FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address: 192.168.1.3

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: [] / []

Link Local Address: FE80::260:47FF:FE89:6C4B

Default Gateway: []

DNS Server: []

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username: []

Password: []

☐ Top

RESULT: Configured router as a DHCP server.

EXPERIMENT-8

AIM: To create a network consisting of switches and routers, to implement and configure IPv6 Addresses.

THEORY:

An IPv6 address is made of 128 bits divided into eight 16-bits blocks. Each block is then converted into 4-digit Hexadecimal numbers separated by colon symbols. Even after converting into Hexadecimal format, IPv6 address remains long. IPv6 provides some rules to shorten the address.

For Router0

```
Router>en
```

```
Router#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Router(config)#interface gigabitethernet 0/0/0
```

```
Router(config-if)#ipv6 address 2001:db8:acad:1::1/64
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

```
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up  
exit
```

```
Router(config)#exit
```

```
Router#
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

```
Router#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Router(config)#interface gigabitethernet 0/0/1
```

```
Router(config-if)#ipv6 address 2001:db8:acad:2::1/64
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

```
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up
```

```
Router(config-if)#exit
```

```
Router(config)#interface serial 0/1/0
```

```
Router(config-if)#ipv6 address 2001:db8:acad:3::1/64
```

```
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
```

```
Router(config-if)#exit
```

```
Router(config)#interface gigabitethernet 0/0/0
```

```
Router(config-if)#ipv6 address fe80::1:1 link-local
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
```

```
Router(config)#exit
```

Router#
%SYS-5-CONFIG_I: Configured from console by console

```
Router#show ipv6 interface brief
GigabitEthernet0/0/0 [up/up]
FE80::1:1
2001:DB8:ACAD:1::1
GigabitEthernet0/0/1 [up/up]
FE80::20C:85FF:FE63:D902
2001:DB8:ACAD:2::1
GigabitEthernet0/0/2 [administratively down/down]
unassigned
Serial0/1/0 [down/down]
FE80::20C:85FF:FE63:D901
2001:DB8:ACAD:3::1
Serial0/1/1 [administratively down/down]
unassigned
Vlan1 [administratively down/down]
unassigned
```

```
Router#show ipv6 interface brief
GigabitEthernet0/0/0      [up/up]
    FE80::1:1
    2001:DB8:ACAD:1::1
GigabitEthernet0/0/1      [up/up]
    FE80::20C:85FF:FE63:D902
    2001:DB8:ACAD:2::1
GigabitEthernet0/0/2      [administratively down/down]
    unassigned
Serial0/1/0               [down/down]
    FE80::20C:85FF:FE63:D901
    2001:DB8:ACAD:3::1
Serial0/1/1               [administratively down/down]
    unassigned
Vlan1                     [administratively down/down]
    unassigned
```

For Router1

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gigabitethernet 0/0/0
Router(config-if)#ipv6 address 2001:db8:acad:4::1/64
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
Router(config-if)#interface gigabitethernet 0/0/1
Router(config-if)#ipv6 address 2001:db8:acad:5::1/64
```



```

Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

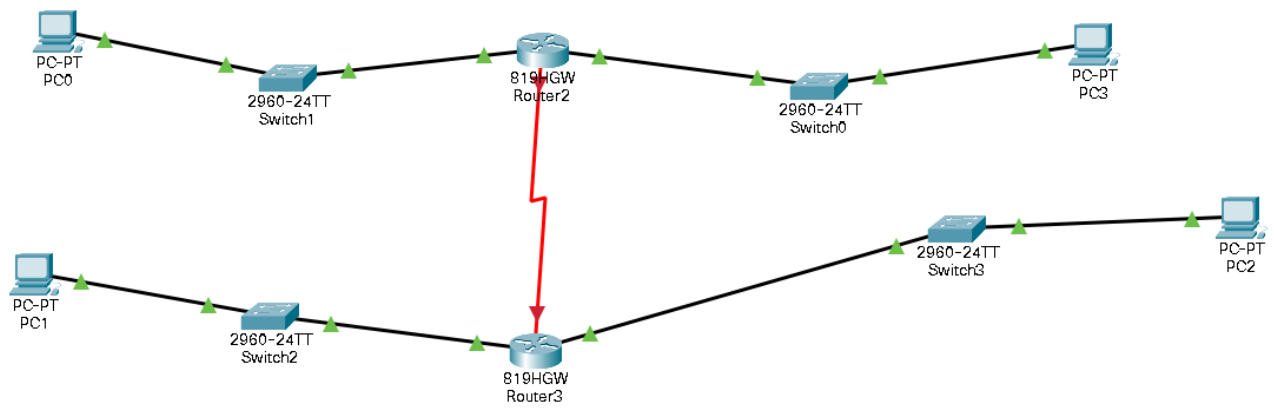
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up
Router(config-if)#interface serial 0/1/0
Router(config-if)#ipv6 address 2001:db8:acad:6::1/64
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#show ipv6 interface brief
GigabitEthernet0/0/0 [up/up]
FE80::2D0:FFFF:FE38:4601
2001:DB8:ACAD:4::1
GigabitEthernet0/0/1 [up/up]
FE80::2D0:FFFF:FE38:4602
2001:DB8:ACAD:5::1
GigabitEthernet0/0/2 [administratively down/down]
unassigned
Serial0/1/0 [up/up]
FE80::2D0:FFFF:FE38:4601
2001:DB8:ACAD:6::1
Serial0/1/1 [administratively down/down]
unassigned
Vlan1 [administratively down/down]
unassigned
Router#

```

```

Router#show ipv6 interface brief
GigabitEthernet0/0/0      [up/up]
    FE80::2D0:FFFF:FE38:4601
    2001:DB8:ACAD:4::1
GigabitEthernet0/0/1      [up/up]
    FE80::2D0:FFFF:FE38:4602
    2001:DB8:ACAD:5::1
GigabitEthernet0/0/2      [administratively down/down]
    unassigned
Serial0/1/0                [up/up]
    FE80::2D0:FFFF:FE38:4601
    2001:DB8:ACAD:6::1
Serial0/1/1                [administratively down/down]
    unassigned
Vlan1                      [administratively down/down]
    unassigned

```



RESULT: Created a network consisting of switches and routers, to implement and configure IPv6 Addresses.

EXPERIMENT-9

AIM: To configure servers appropriately with required properties.

THEORY: A server is a computer or system that provides resources, data, services, or programs to other computers, known as clients, over a network. In theory, whenever computers share resources with client machines they are considered servers.

Dynamic Host Configuration Protocol (DHCP) is a network management protocol used to automate the process of configuring devices on IP networks, thus allowing them to use network services such as DNS, NTP, and any communication protocol based on UDP or TCP.

DNS is a host name to IP address translation service. DNS is a distributed database implemented in a hierarchy of name servers. It is an application layer protocol for message exchange between clients and servers.

COMMANDS:-

For Router

```
Router>en
```

```
Router#conf t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#interface fa0/0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

```
Router(config-if)#ip address 192.168.1.1 255.255.255.0
```

```
Router(config-if)#no shut
```

```
Router(config-if)#
```

```

Device Name: Router0
Device Model: Router-PT
Hostname: Router

Port          Link    IP Address      IPv6 Address      MAC Address
FastEthernet0/0 Up      192.168.1.1/24  <not set>         00E0.F777.8083
FastEthernet1/0 Down    <not set>        <not set>         0060.478A.B427
Serial2/0      Down    <not set>        <not set>         <not set>
Serial3/0      Down    <not set>        <not set>         <not set>
FastEthernet4/0 Down    <not set>        <not set>         0005.5E55.D424
FastEthernet5/0 Down    <not set>        <not set>         00D0.D31E.968B

Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > Router0

```

For PC0

PC0

Physical Config **Desktop** Programming Attributes

IP Configuration [X]

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.2

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

DNS Server: 192.168.1.5

For PC1

PC1

Physical Config **Desktop** Programming Attributes

IP Configuration [X]

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.3

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

DNS Server: 192.168.1.5

For Server0 : DHCP

DHCP

Physical Config **Services** Desktop Programming Attributes

IP Configuration X

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.4

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

DNS Server: 192.168.1.5

DHCP

Physical Config **Services** Desktop Programming Attributes

SERVICES ^

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DHCP

Interface: FastEthernet0 Service: ☒ On ☐ Off

Pool Name: serverPool

Default Gateway: 192.168.1.1

DNS Server: 192.168.1.5

Start IP Address: 192 168 1 0

Subnet Mask: 255 255 255 0

Maximum Number of Users: 256

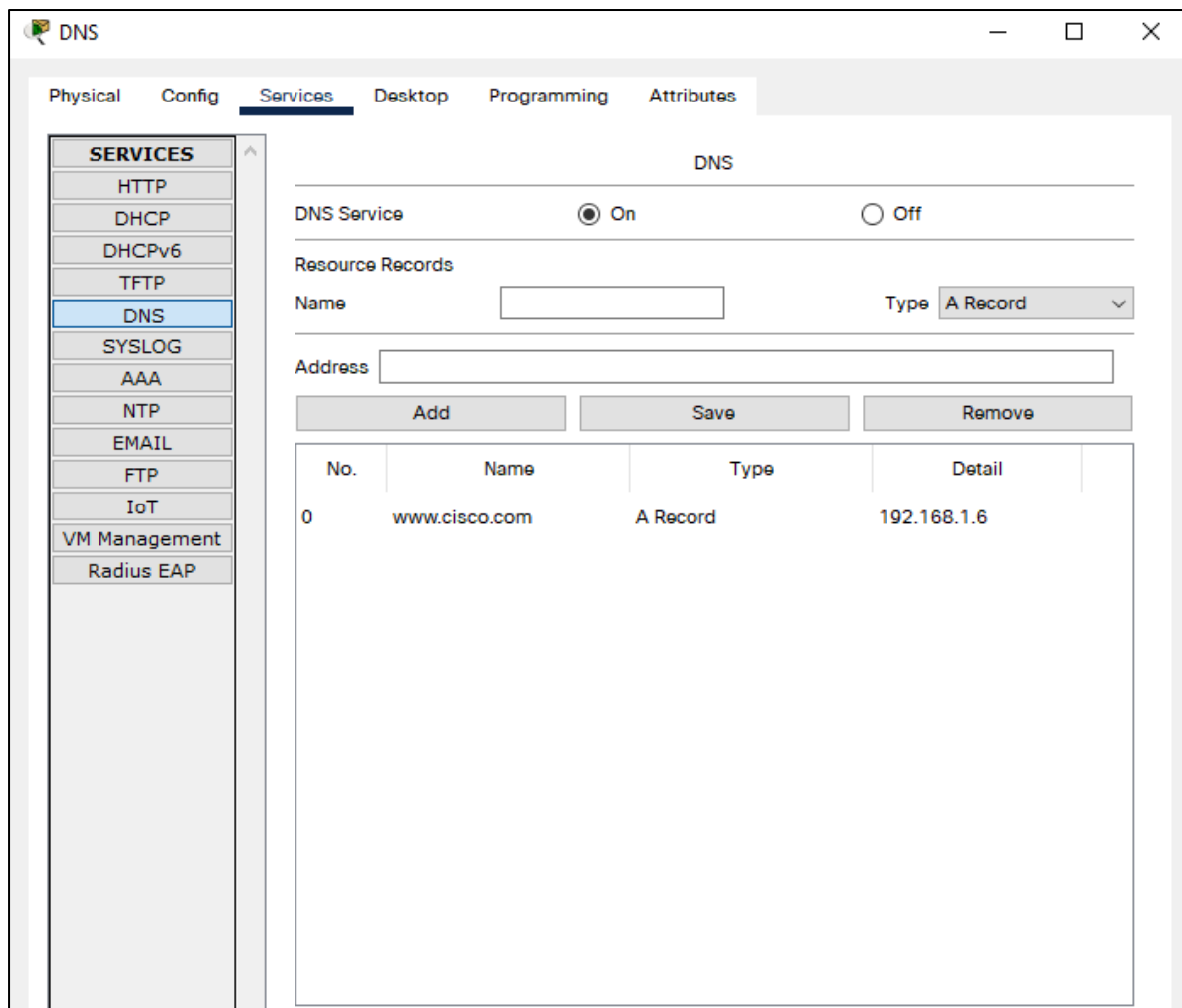
TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

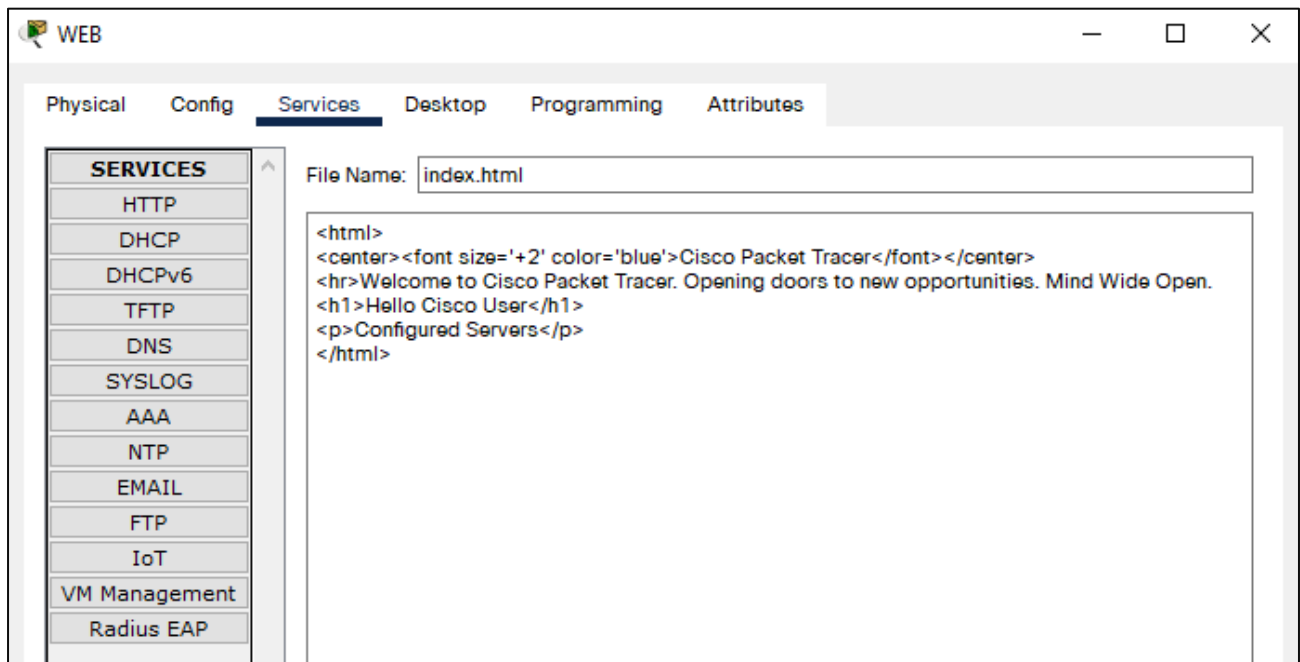
Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	192.168...	192.168...	192.168...	255.255...	256	0.0.0.0	0.0.0.0

For Server1 : DNS



For Server2 : WEB



WEB

Physical Config Services **Desktop** Programming Attributes

IP Configuration X

IP Configuration

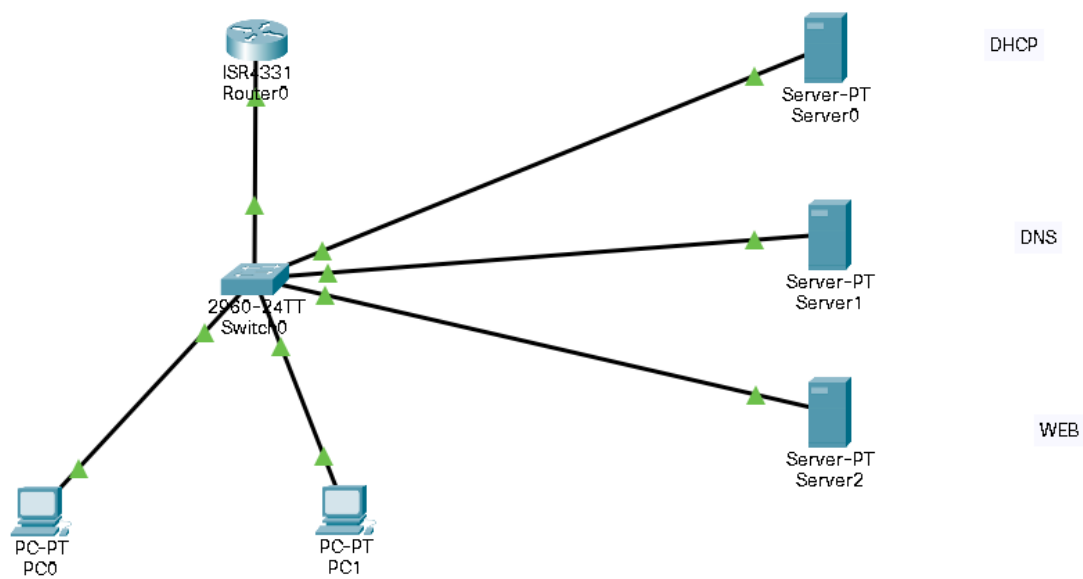
☐ DHCP ☒ Static

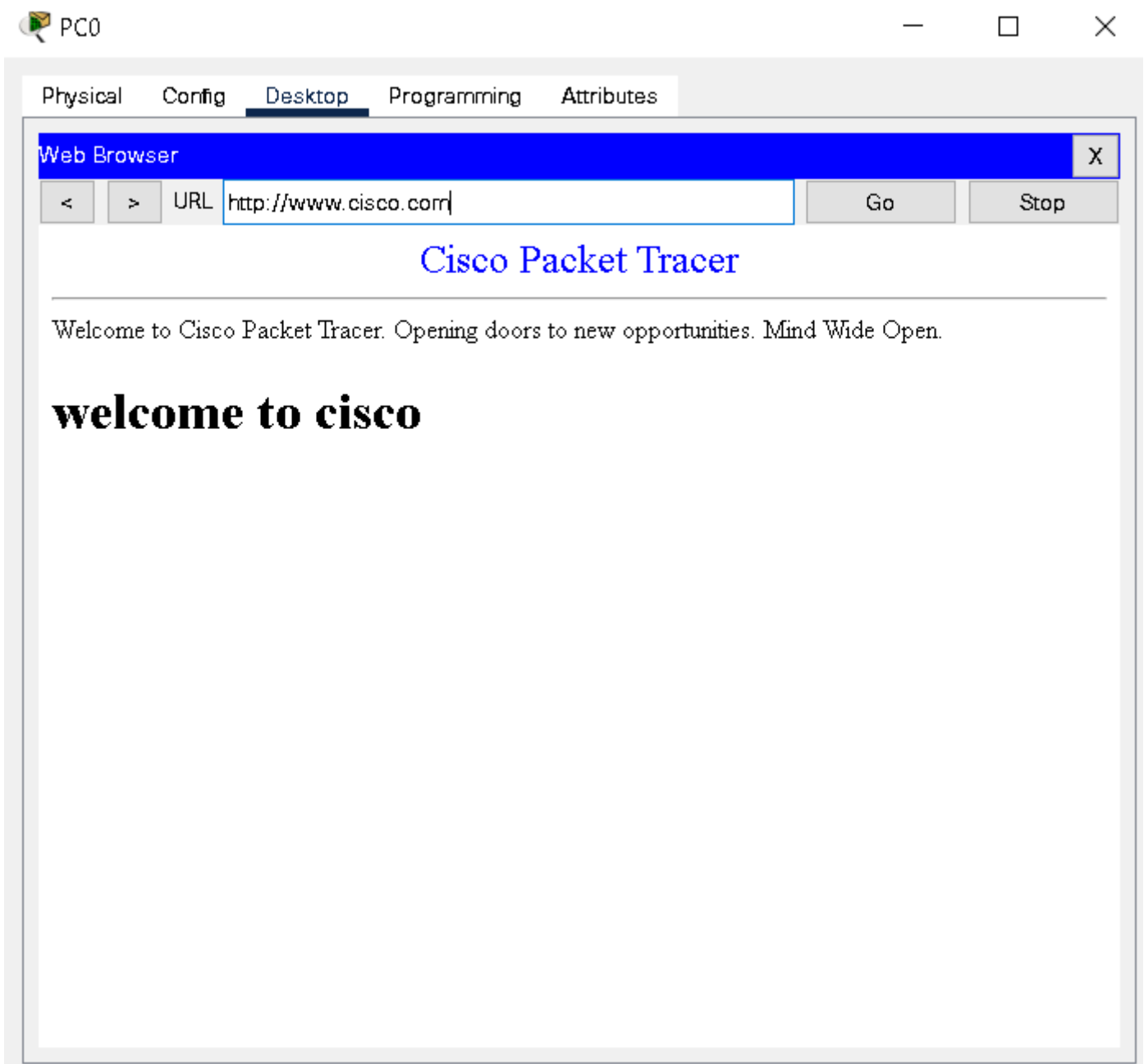
IPv4 Address 192.168.1.6

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 192.168.1.5





RESULT: Configured servers appropriately with required properties.

EXPERIMENT-10

AIM: To configure routers with static routing using IP route command.

THEORY: Static routing is a form of routing that occurs when a router uses a manually configured routing entry than information from dynamic routing traffic. Unlike dynamic routing, static routes are fixed and do not change if the network is changed or reconfigured. Static routing and dynamic routing are not mutually exclusive. Both dynamic routing and static routing are usually used on a router to maximize routing efficiency and to provide backups if dynamic routing information fails to be exchanged.

Command	Purpose
configure terminal	Enters global configuration mode.
interface gigabitethernet slot/port	Enters the configuration mode for a Gigabit Ethernet interface on the router. GigabitEthernet(GE) LAN Interfaces are 0/0 to 0/7 for Cisco C841M-8X ISR and 0/0 to 0/3 for Cisco C841M-4X ISR.
ip address ip-address mask	Sets the IP address and subnet mask for the specified GE interface.
no shutdown	Enables the GE interface, changing its state from administratively down to administratively up.
exit	Exits configuration mode for the GE interface and returns to global configuration mode.
enable	This command is used to enter the privileged EXEC mode and configure it
show ip interface brief	The show ip interface brief command can be used to view a summary of the router interfaces. This command displays the IP address, interface status, and additional information.
interface loopback	A loopback interface is a virtual interface on a Cisco router that remains up (active) after you issue the no shutdown command until you disable it with the shutdown command. Unlike sub interfaces, loopback interfaces are independent of the state of any physical interface.

COMMANDS:-

For Router 0

Router>en

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#interface se 0/1/0

Router(config-if)#no shutdown

```
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#ip address 10.0.0.2 255.255.255.0
Router(config-if)#interface gig 0/0/0
Router(config-if)#no shutdown
```

```
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
```

```
Router(config-if)#ip address 192.168.10.1 255.255.255.0
Router(config)#ip route 192.168.11.0 255.255.255.0 10.0.0.3
Router(config)#ip route 192.168.12.0 255.255.255.0 10.0.0.3
Router(config)#ip route 11.0.0.0 255.0.0.0 10.0.0.3
```

For Router 1

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface se 0/1/0
Router(config-if)#no shutdown
```

```
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
```

```
Router(config-if)#ip address
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed s
Router(config-if)#ip address 10.0.0.3 255.255.255.0
Router(config-if)#interface gig 0/0/0
Router(config-if)#no shutdown
```

```
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
```

```
Router(config-if)#ip address 192.168.11.1 255.255.255.0
Router(config-if)#interface se 0/1/1
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#ip address 11.0.0.2 255.255.255.0
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up
Router(config)#ip route 192.168.10.0 255.255.255.0 10.0.0.2
Router(config)#ip route 192.168.12.0 255.255.255.0 11.0.0.3
Router(config)#end
Router#
```

For Router 2

```
Router>en
```

```
Router#conf t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#interface se 0/1/0
```

```
Router(config-if)#ip address 11.0.0.3 255.255.255.0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

```
Router(config-if)#
```

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up

```
Router(config-if)#interface gig 0/0/0
```

```
Router(config-if)#ip address 192.168.12.1 255.255.255.0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

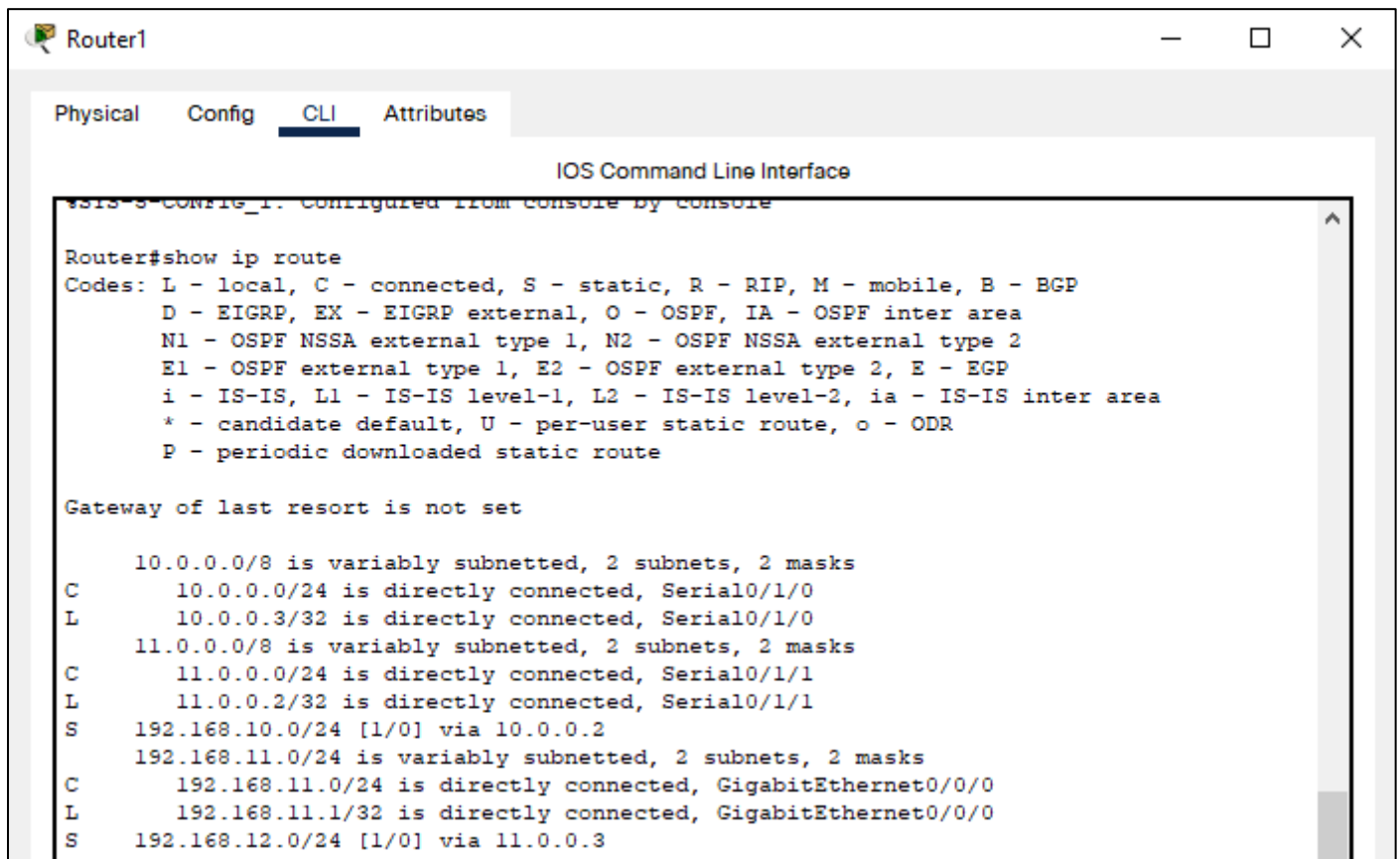
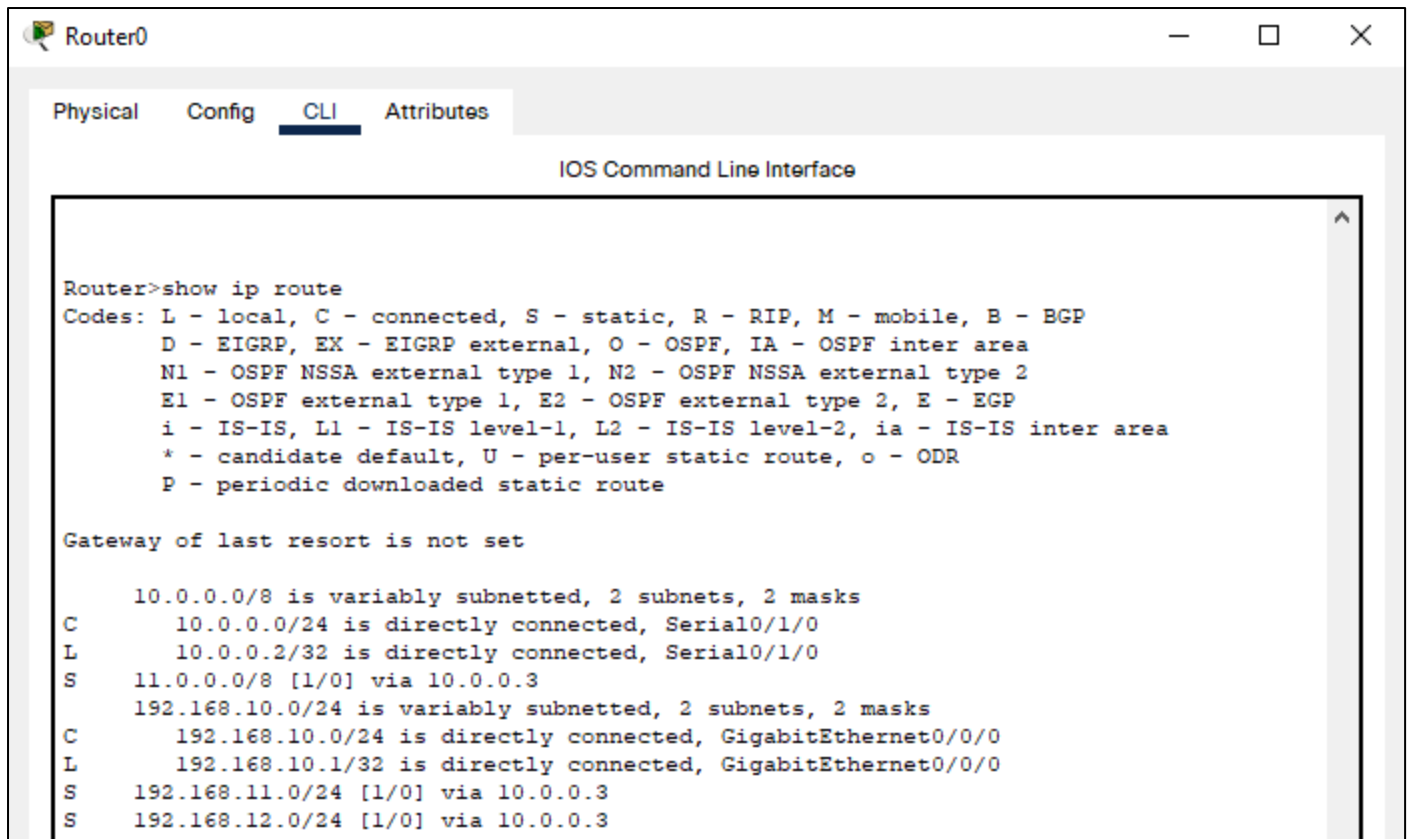
```
Router(config-if)#exit
```

```
Router(config)#ip route 192.168.11.0 255.255.255.0 11.0.0.2
```

```
Router(config)#ip route 192.168.10.0 255.255.255.0 11.0.0.2
```

```
Router(config)#ip route 10.0.0.0 255.0.0.0 11.0.0.2
```

```
Router(config)#end
```

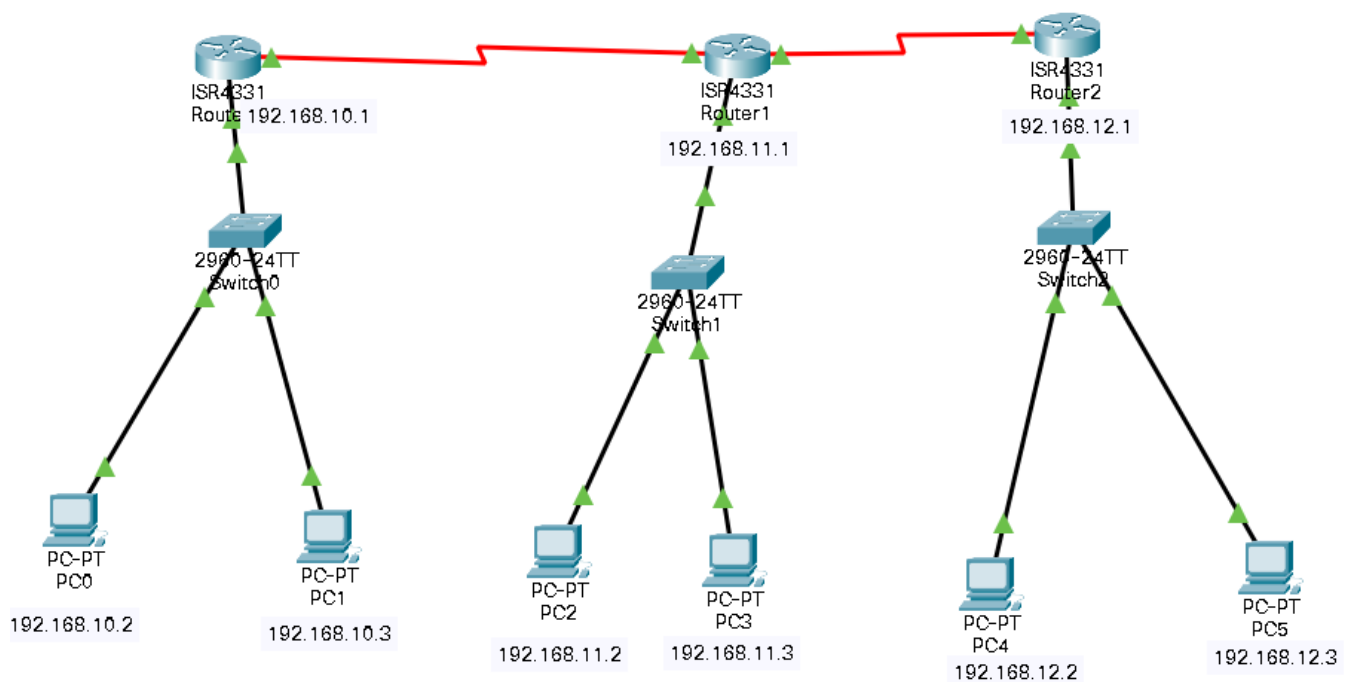


```
Router2
Physical Config CLI Attributes
IOS Command Line Interface
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

S    10.0.0.0/8 [1/0] via 11.0.0.2
    11.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    11.0.0.0/24 is directly connected, Serial0/1/0
L    11.0.0.3/32 is directly connected, Serial0/1/0
S    192.168.10.0/24 [1/0] via 11.0.0.2
S    192.168.11.0/24 [1/0] via 11.0.0.2
    192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.12.0/24 is directly connected, GigabitEthernet0/0/0
L    192.168.12.1/32 is directly connected, GigabitEthernet0/0/0
```



RESULT: Configured routers with static routing using IP route command.