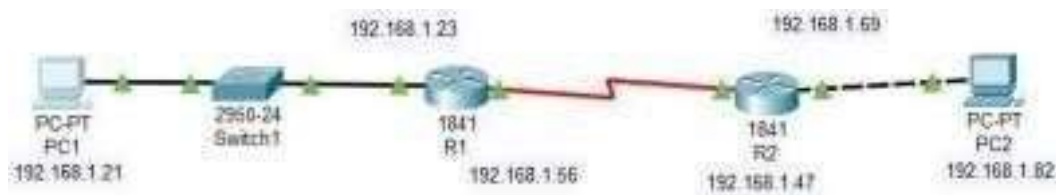


NAME	Anish Gade
UID	2021700022
EXPERIMENT NO.	10

Topology Diagram



Addressing Table

R1	Fa0/0	192.168.1.23	255.255.255.224	N/A
	S0/0/0	192.168.1.56	255.255.255.224	N/A
R2	Fa0/0	192.168.1.69	255.255.255.224	N/A
	S0/0/0	192.168.1.47	255.255.255.224	N/A
PC1	NIC	192.168.1.21	255.255.255.224	192.168.1.23
PC2	NIC	192.168.1.82	255.255.255.224	192.168.1.69

Learning Objectives

Upon completion of this lab, you will be able to:

- Subnet an address space given requirements.
- Assign appropriate addresses to interfaces and document.
- Configure and activate Serial and FastEthernet interfaces.
- Test and verify configurations.
- Reflect upon and document the network implementation.

Scenario

In this lab activity, you will design and apply an IP addressing scheme for the topology shown in the Topology Diagram. You will be given one address block that you must subnet to provide a logical addressing scheme for the network. The routers will then be ready for interface address configuration according to your IP

addressing scheme. When the configuration is complete, verify that the network is working properly.

Task 1: Subnet the Address Space.

Step 1: Examine the network requirements.

You have been given the 192.168.1.0/24 address space to use in your network design. The network consists of the following segments:

- The network connected to router R1 will require enough IP addresses to support 15 hosts.
- The network connected to router R2 will require enough IP addresses to support 30 hosts.
- The link between router R1 and router R2 will require IP addresses at each end of the link.

Step 2: Consider the following questions when creating your network design. How many subnets are needed for this network? 3 Subnets What is the subnet mask for this network in dotted decimal format?

255.255.255.224 What is the

subnet mask for the network in slash format? /27

How many usable hosts are there per subnet? 30

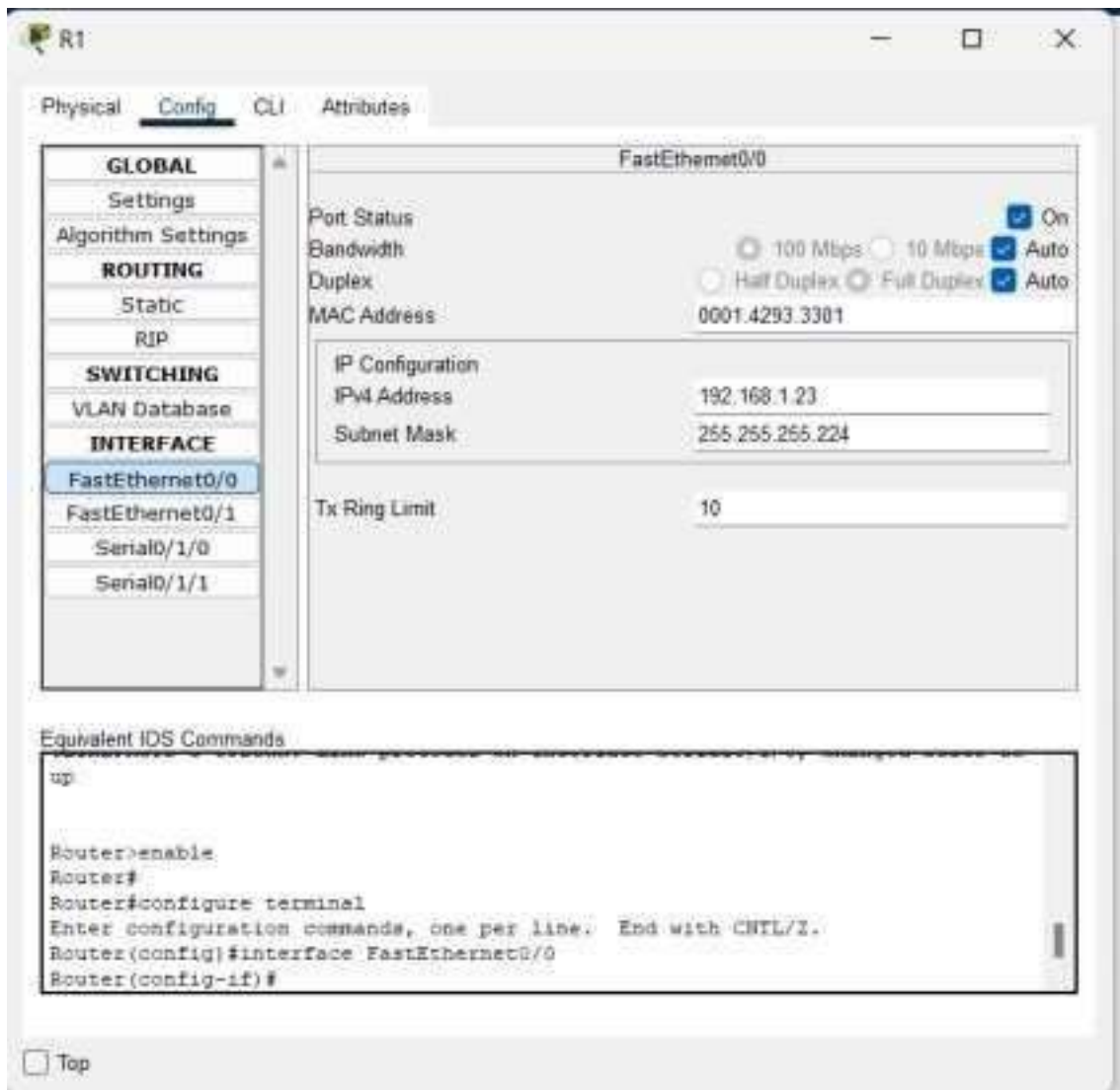
Step 3: Assign subnetwork addresses to the Topology Diagram.

1. Assign subnet 1 to the network attached to R1. - **192.168.1.0/27**
2. Assign subnet 2 to the link between R1 and R2. - **192.168.1.32/27**
3. Assign subnet 3 to the network attached to R2. - **192.168.1.64/27**

Task 2: Determine Interface Addresses.

Step 1: Assign appropriate addresses to the device interfaces.

1. Assign the first valid host address in subnet 1 to the LAN interface on R1.



2. Assign the last valid host address in subnet 1 to PC1.

PC1

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.21

Subnet Mask 255.255.255.224

Default Gateway 192.168.1.23

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::202:17FF:FE35:8097

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

3. Assign the first valid host address in subnet 2 to the WAN interface on R1.

R1

Physical Config CLI Attributes

GLOBAL

- Settings
- Algorithm Settings

ROUTING

- Static
- RIP

SWITCHING

- VLAN Database

INTERFACE

- FastEthernet0/0
- FastEthernet0/1
- Serial0/1/0**
- Serial0/1/1

Serial0/1/0

Port Status ☒ On

Duplex ☐ Full Duplex

Clock Rate 2000000

IP Configuration

IPv4 Address 192.168.1.56

Subnet Mask 255.255.255.224

Tx Ring Limit 10

Equivalent IOS Commands

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CTRL/Z..
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
```

☐ Top

4. Assign the last valid host address in subnet 2 to the WAN interface on R2.

R2

Physical Config CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/1/0

Serial0/1/1

Serial0/1/0

Port Status ☒ On

Duplex ☐ Full Duplex

Clock Rate 2000000

IP Configuration

IPv4 Address 192.168.1.47

Subnet Mask 255.255.255.224

Tx Ring Limit 10

Equivalent IOS Commands

```
up

Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CRTL/Z.
Router(config)#interface Serial0/1/0
Router(config-if)#
```

☐ Top

5. Assign the first valid host address in subnet 3 to the LAN interface of R2.

R2

Physical **Config** CU Attributes

GLOBAL

- Settings
- Algorithm Settings

ROUTING

- Static
- RIP

SWITCHING

- VLAN Database

INTERFACE

- FastEthernet0/0**
- FastEthernet0/1
- Serial0/1/0
- Serial0/1/1

FastEthernet0/0

Port Status: ☒ On

Bandwidth: ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address: 0090.0CD2.4201

IP Configuration

IPv4 Address: 192.168.1.69

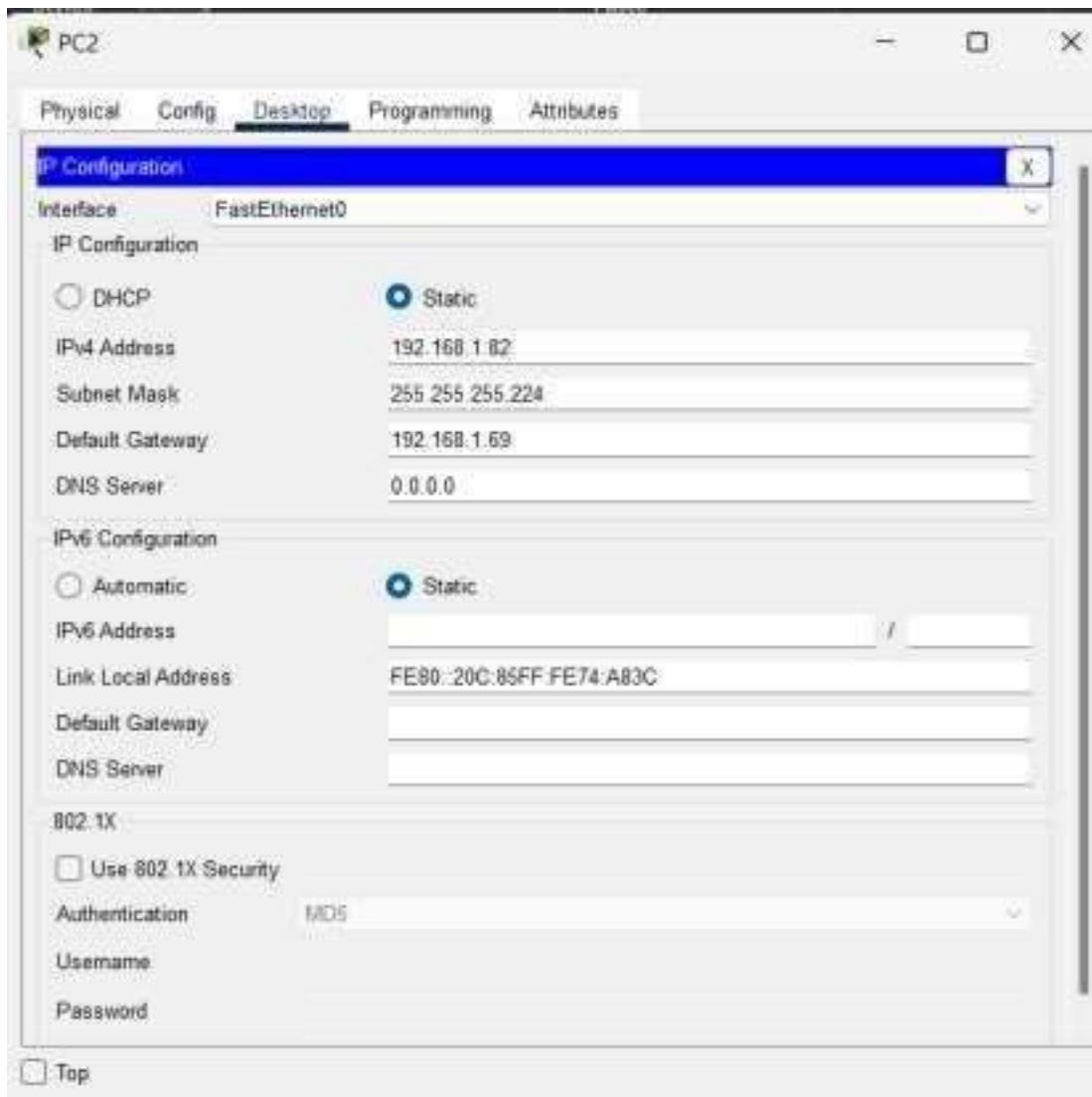
Subnet Mask: 255.255.255.224

Tx Ring Limit: 10

Equivalent IOS Commands:

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
```

6. Assign the last valid host address in subnet 3 to PC2.



Step 2: Document the addresses to be used in the table provide under the Topology Diagram.

Task 3: Configure the Serial and FastEthernet Addresses.

Step 1: Configure the router interfaces.

Configure the interfaces on the R1 and R2 routers with the IP addresses from your network design. Please note, to complete the activity in Packet Tracer you will be using the Config Tab. When you have finished, be sure to save the running configuration to the NVRAM of the router.

R1

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/1/0

Serial0/1/1

Static Routes

Network192.168.1.64

Mask255.255.255.224

Next Hop192.168.1.42

Add

Network Address

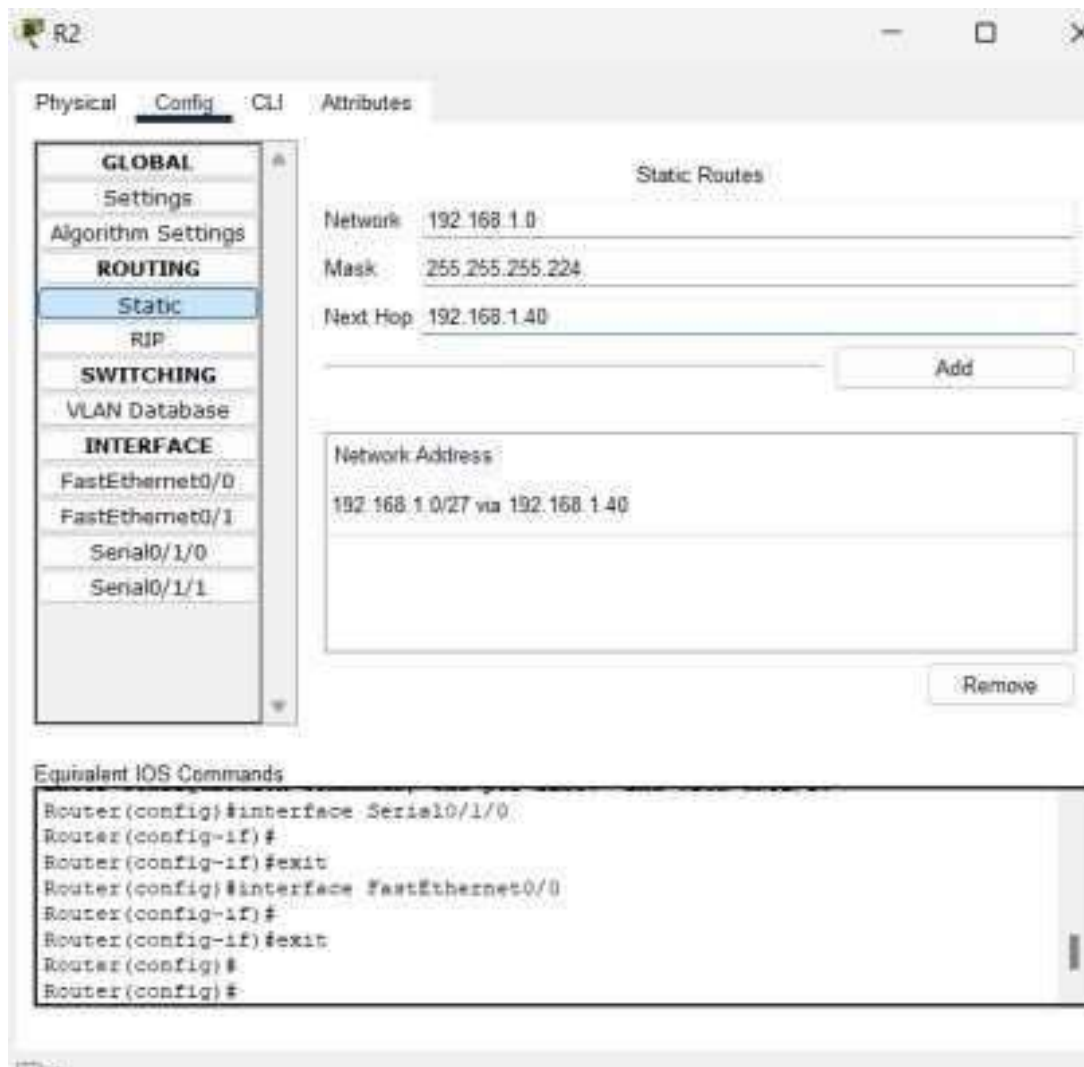
192.168.1.64/27 via 192.168.1.42

Remove

Equivalent IOS Commands

```
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
```

☐ Top



Step 2: Configure the PC interfaces.

Configure the Ethernet interfaces of PC1 and PC2 with the IP addresses and default gateways from your network design.

PC1

Physical

Config

Desktop

Programming

Attributes

IP Configuration

Interface

FastEthernet0

IP Configuration

☐ DHCP

☒ Static

IPv4 Address

192.168.1.21

Subnet Mask

255.255.255.224

Default Gateway

192.168.1.23

DNS Server

0.0.0.0

IPv6 Configuration

☐ Automatic

☒ Static

IPv6 Address

Link Local Address

FE80::202:17FF:FE35:8097

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication

MOS

Username

Password

Top

The screenshot shows a window titled "PC2" with tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, displaying the "IP Configuration" window for the "FastEthernet0" interface. The configuration is as follows:

IP Configuration	
Interface: FastEthernet0	
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address:	192.168.1.82
Subnet Mask:	255.255.255.224
Default Gateway:	192.168.1.69
DNS Server:	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address:	
Link Local Address:	FE80::20C:85FF:FE74:AB3C
Default Gateway:	
DNS Server:	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication:	MD5
Username:	
Password:	

At the bottom left of the configuration window is a "Top" button.

Task 4: Verify the Configurations.

Answer the following questions to verify that the network is operating as expected. From the host attached to R1, is it possible to ping the default gateway? **Yes**

```
PC1
Physical  Config  Desktop  Programming  Attributes
Command Prompt

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.23

Pinging 192.168.1.23 with 32 bytes of data:

Reply from 192.168.1.23: bytes=32 time<1ms TTL=255
Reply from 192.168.1.23: bytes=32 time<1ms TTL=255
Reply from 192.168.1.23: bytes=32 time<1ms TTL=255
Reply from 192.168.1.23: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.23:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.1.82

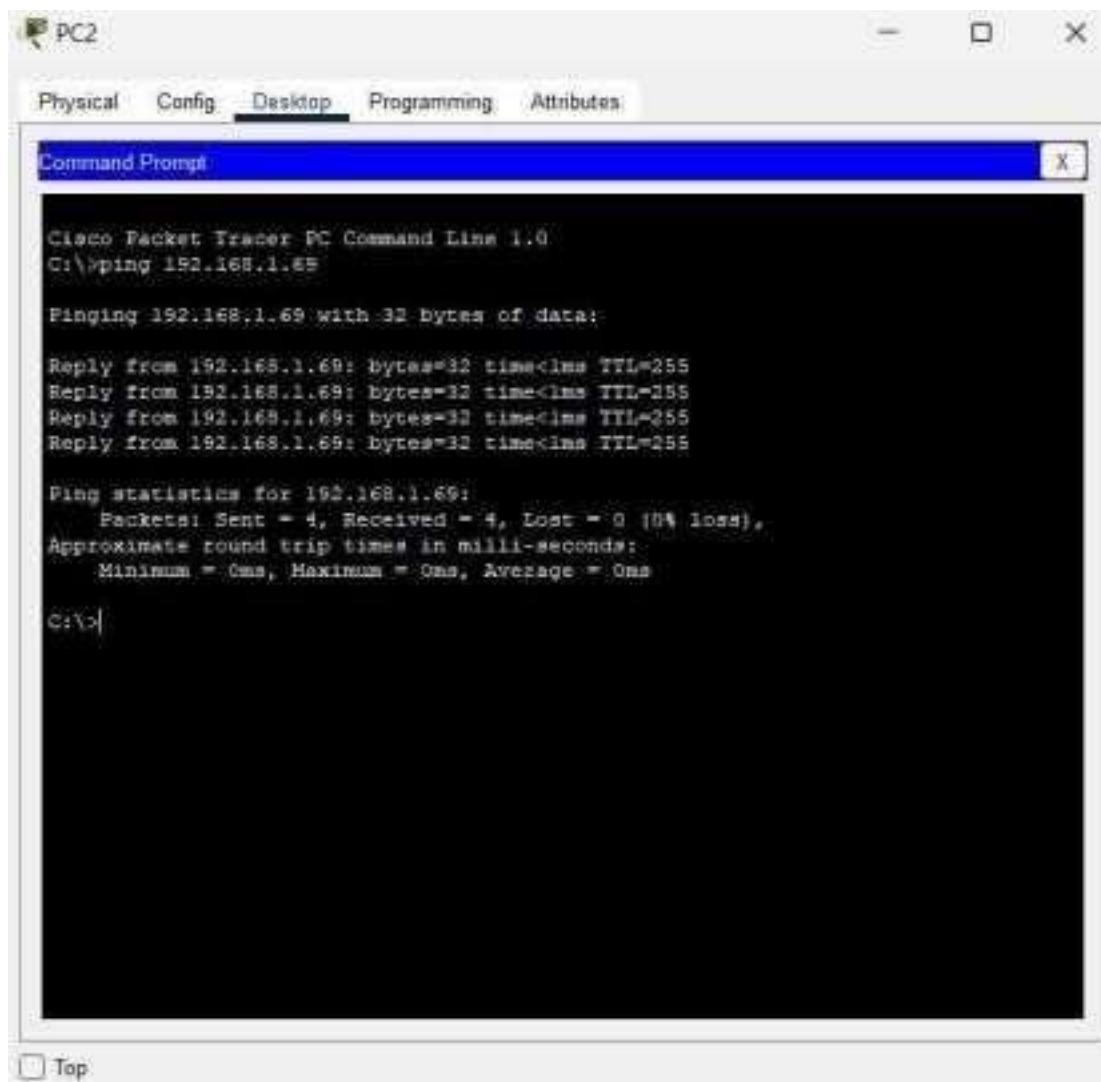
Pinging 192.168.1.82 with 32 bytes of data:

Request timed out.
Reply from 192.168.1.82: bytes=32 time=10ms TTL=126
Reply from 192.168.1.82: bytes=32 time=15ms TTL=126
Reply from 192.168.1.82: bytes=32 time=10ms TTL=126

Ping statistics for 192.168.1.82:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 15ms, Average = 11ms

C:\>ping 192.168.1.82
```

From the host attached to R2, is it possible to ping the default gateway? **Yes**



From the router R1, is it possible to ping the Serial 0/0/0 interface of R2? Yes

```
R1
Physical Config CLI Attributes
IOS Command Line Interface

Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#no ip address
Router(config-if)#ip address 192.168.1.23 255.255.255.224
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#ip address 192.168.1.56 255.255.255.224
Router(config-if)#
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#ping 192.168.1.47

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.47, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 12/15/20 ms

Router#
```

Copy Paste

☐ Top

From the router R2, is it possible to ping the Serial 0/0/0 interface of R1? Yes

```
R2
Physical Config CLI Attributes
IOS Command Line Interface
Router(config-if)#ip address 192.168.1.70 255.255.255.224
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#ip address 192.168.1.47 255.255.255.224
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.69 255.255.255.224
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.69 255.255.255.224
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#ip address 192.168.1.47 255.255.255.224
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#ping 192.168.1.56
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.1.56, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 10/13/20 ms
Router#
```

The answer to the above questions should be **yes**. If any of the above pings failed, check your physical connections and configurations.

Task 5: Reflection

Are there any devices on the network that cannot ping each other?

No, all the devices on the network can ping each other. This can be verified by trying to ping PC1 in subnet 1 with PC2 in subnet 3 and PC2 in subnet 3 with PC1 in subnet 1.

What is missing from the network that is preventing communication between these devices?

Both the routers R1 and R2 are statically configured to route packets to the destination network. Therefore, there is communication between

the devices.

CONCLUSION

From this experiment, I learned about IP addressing, different forms of IPv4 addressing, router configuration, subnets, and subnet masks. I also learned to use Cisco Packet tracer software for visualizing and testing the network by successfully pinging computers on different networks and gateway routers using the ping comma