

CSEC 32022 - Advanced Computer Communication and Networking

Lab 02

Table of Contents

Part 1: Building a network using a switch.....	5
2. Add a Generic Switch (Switch1)	5
3. Add a Generic PC (PC1)	5
4. Connect FastEthernet0 of PC1 to FastEthernet0/1 of Switch1	6
5. Add 2 other PCs and connect them to Switch1	6
6. PC1 IP configuration.....	7
7. IP configuration of PC2 and PC3	8
8. IP configuration of the PC1	10
9. Type ping 192.168.1.2 in PC1.....	11
10. Tests the network connectivity between all three PCs.	12
Part 2: Building a network using routers and switches.....	14
1. Add another switch (Switch2) and connect 3 PCs (PC4, PC5, and PC6).....	14
2. Configure IP addresses of PC4, PC5 and PC6 and test connectivity	15
3. Add a Generic router	18
4. Connect Router1 to Switch1 and Switch2.....	18
5. Configure Router IP address on FastEthernet0/0	19
6. Select 'On'.	19
7. Configure Router IP address on FastEthernet0/0	20
9. Can you ping from PC1 to 192.168.1.254?	21
10. Can you ping from PC1 to PC4? If you cannot ping, what is the reason?	22
11. Correct the above problem so that you can ping from PC1 to PC4.	23
Part 3: Configure static routing	24
1. Add Router2 and connect to Router1 using a Fiber connection.....	24
2. Add Switch3 and connect to Router2	25
3. Add a PC (PC7) to Switch3 and configure IP address.	27
4. Ping from PC7 to 192.168.3.254	28
5. Ping from PC7 to PC1. What is the message received?	28
6. What is the reason for the above message	29
7. Discuss how to correct the above problem.	29
8. Static routing configuration on Router1	30
10. Static routing configuration on Router2	30
11. Ping from PC7 to all other PCs	31

Table of Figures

Figure 1 : Switch 1	5
Figure 2 : Switch1 and PC1	5
Figure 3 : PC1 connected to Switch1	6
Figure 4 : PC1, PC2, PC3 connected to Switch1	6
Figure 5 : PC1 IP configuration	7
Figure 6 : IP configuration of PC3	8
Figure 7 : IP configuration of PC2	9
Figure 8 : IP configuration of the PC1	10
Figure 9 : Type ping 192.168.1.2 in PC1	11
Figure 10 : Ping from PC1 to PC2 and PC3	12
Figure 11 : Ping from PC2 to PC1 and PC3	13
Figure 12 : Ping from PC3 to PC1 and PC2	13
Figure 13 : PC4, PC5, PC6 are connected to Switch2	14
Figure 14 : PC4 IP Configuration.....	15
Figure 15 : PC5 IP Configuration.....	15
Figure 16 : PC6 IP Configuration.....	16
Figure 17 : Ping from PC4 to PC5 and PC6	16
Figure 18 : Ping from PC5 to PC4 and PC6	17
Figure 19 : Ping from PC6 to PC4 and PC5	17
Figure 20 : Router1.....	18
Figure 21 : Switch1 and Switch2 are connected to Router1	18
Figure 22 : Configure Router IP address on FastEthernet0/0	19
Figure 23 : Gave no shutdown to the port	19
Figure 24 : Gave no shutdown to the port	20
Figure 25 : Gave no shutdown to the port	20
Figure 26 : Gave no shutdown to the port	21
Figure 27 : ping from PC1 to 192.168.1.254	21
Figure 28 : Results of ping from PC1 to PC4.....	22
Figure 29 : Setting up gateway addresses of PC1 and PC4.....	23
Figure 30 : Result of ping PC1 to PC4	23
Figure 31 : Adding Router2 and Connected to Router1	24
Figure 32 : Set IP addresses and bring interfaces "Up"	24
Figure 33 : Set IP addresses and bring interfaces "Up"	25
Figure 34 : After interfaces are up	25
Figure 35 : Add Switch3 and connect to Router2.....	25
Figure 36 : Gave no shutdown to interface	26
Figure 37 : After interface in up	26
Figure 38 : PC7 configuration	27
Figure 39 : All interfaces are up except for fiber connection	27
Figure 40 : Ping from PC7 to 192.168.3.254	28
Figure 41 : Result of Ping from PC7 to PC1	28

Figure 42 : Static routing configuration on Router1.....	30
Figure 43 : Static routing configuration on Router2.....	30

Part 1: Building a network using a switch.

2. Add a Generic Switch (Switch1)



Figure 1 : Switch 1

3. Add a Generic PC (PC1)



Figure 2 : Switch1 and PC1

4. Connect FastEthernet0 of PC1 to FastEthernet0/1 of Switch1

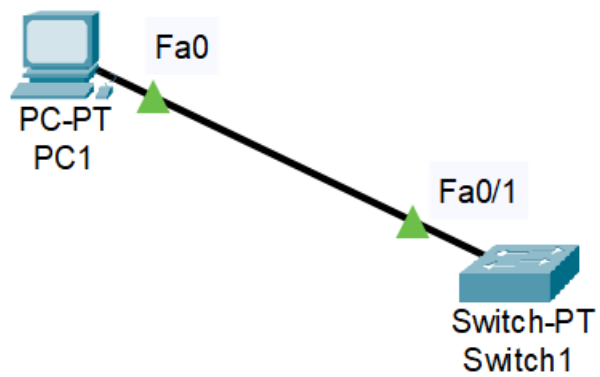


Figure 3 : PC1 connected to Switch1

5. Add 2 other PCs and connect them to Switch1

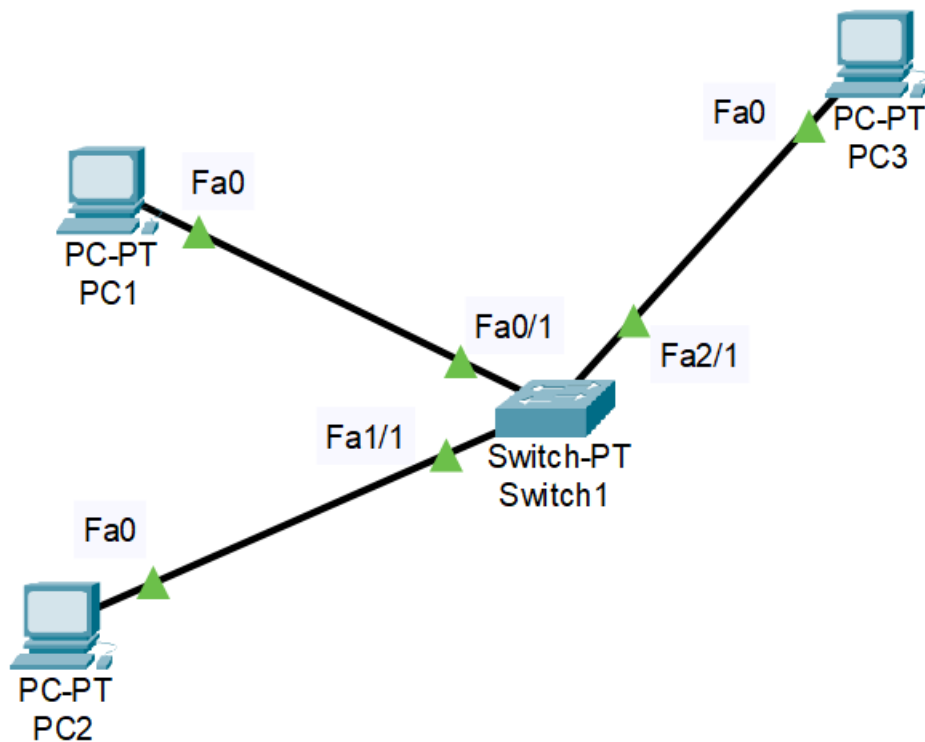


Figure 4 : PC1, PC2, PC3 connected to Switch1

6. PC1 IP configuration

The screenshot shows a window titled "PC1" with tabs for Physical, Config, Desktop, Programming, and Attributes. The "Config" tab is active, and the "IP Configuration" section is highlighted. The interface is set to "FastEthernet0".

IP Configuration

Interface: FastEthernet0

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.1

Subnet Mask: 255.255.255.0

Default Gateway: 0.0.0.0

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::210:11FF:FE3C:D388

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top

Figure 5 : PC1 IP configuration

7. IP configuration of PC2 and PC3

The screenshot shows the 'PC3' configuration window with the 'Desktop' tab selected. The 'Interface' dropdown is set to 'FastEthernet0'. The 'IP Configuration' section is active, showing the following settings:

- IP Configuration:**
 - ☐ DHCP
 - ☒ Static
 - IPv4 Address: 192.168.1.3
 - Subnet Mask: 255.255.255.0
 - Default Gateway: 0.0.0.0
 - DNS Server: 0.0.0.0
- IPv6 Configuration:**
 - ☐ Automatic
 - ☒ Static
 - IPv6 Address: (empty) / (empty)
 - Link Local Address: FE80::201:43FF:FEFE:9188
 - Default Gateway: (empty)
 - DNS Server: (empty)
- 802.1X:**
 - ☐ Use 802.1X Security
 - Authentication: MD5
 - Username: (empty)
 - Password: (empty)

At the bottom left, there is a 'Top' button.

Figure 6 : IP configuration of PC3

The image shows a software window titled "PC2" with a standard Windows-style title bar (minimize, maximize, close buttons). Inside the window, there are four tabs: "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Config" tab is active, and within it, the "Desktop" sub-tab is selected. The main content area is titled "IP Configuration" with a blue header bar and a close button (X) on the right. Below the header, there is a dropdown menu for "Interface" set to "FastEthernet0". The configuration is divided into three sections: "IP Configuration", "IPv6 Configuration", and "802.1X". In the "IP Configuration" section, the "Static" radio button is selected, and the fields for IPv4 Address (192.168.1.2), Subnet Mask (255.255.255.0), Default Gateway (0.0.0.0), and DNS Server (0.0.0.0) are filled. In the "IPv6 Configuration" section, the "Static" radio button is also selected, and the fields for IPv6 Address (empty), Link Local Address (FE80::201:C7FF:FEB8:EABE), Default Gateway (empty), and DNS Server (empty) are shown. In the "802.1X" section, the "Use 802.1X Security" checkbox is unchecked, and the "Authentication" dropdown is set to "MD5". Below these fields are empty input boxes for "Username" and "Password". At the bottom left of the window, there is a "Top" button with a small square icon next to it.

PC2

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 0.0.0.0

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::201:C7FF:FEB8:EABE

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

Figure 7 : IP configuration of PC2

8. IP configuration of the PC1

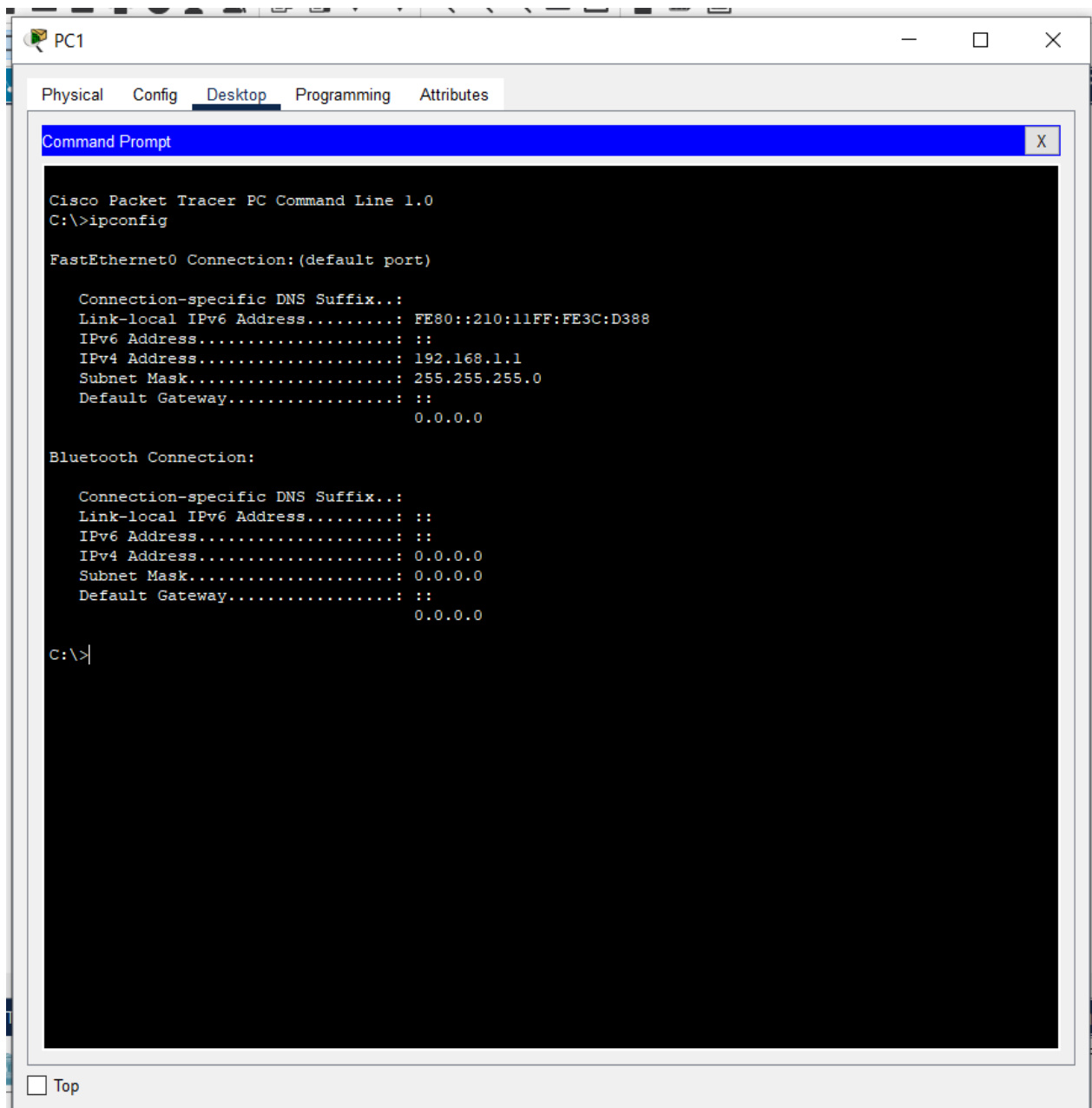


Figure 8 : IP configuration of the PC1

9. Type ping 192.168.1.2 in PC1

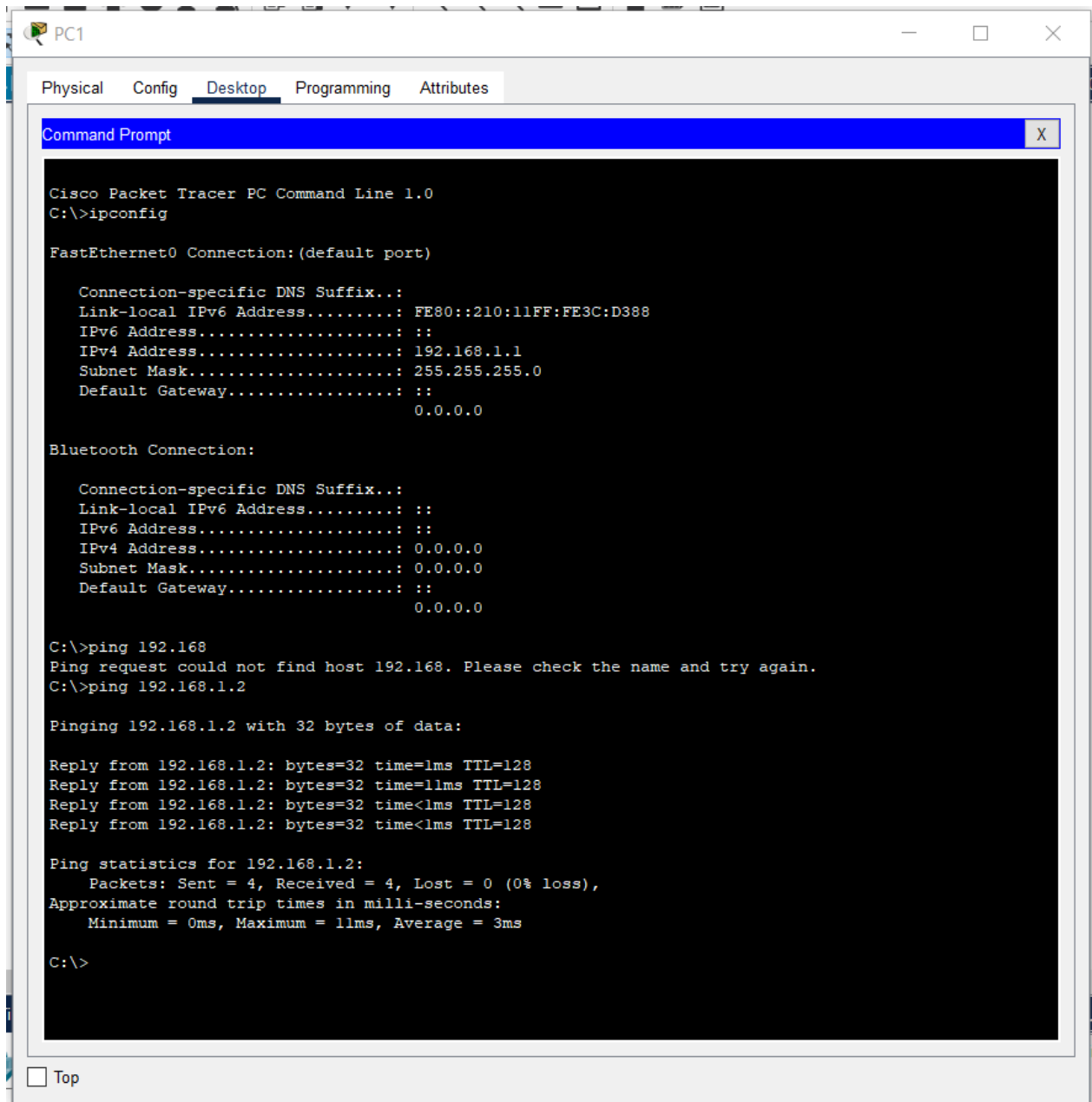


Figure 9 : Type ping 192.168.1.2 in PC1

Write down the first two lines you see.

Pinging 192.168.1.2 with 32 bytes of data:

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

Find answers to the following.

What is the use of ping command?

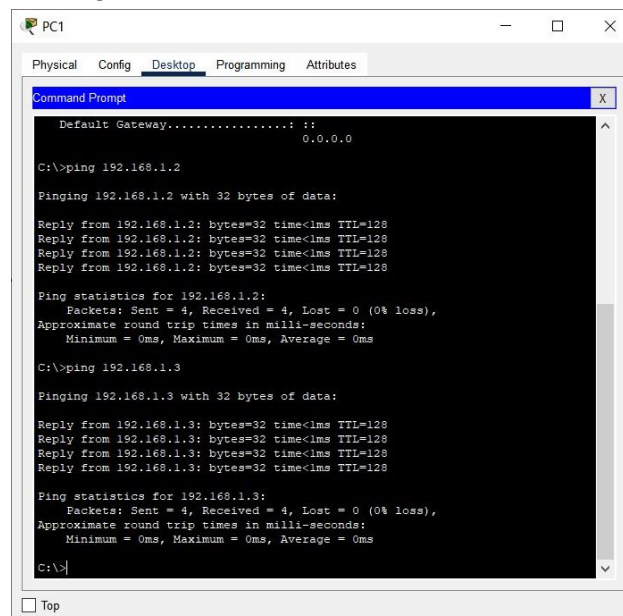
- Ping command is used to test the connectivity between to devices. Ping command act as a test to see if a network device in reachable.

What is the protocol used by ping?

- ICMP protocol

10. Tests the network connectivity between all three PCs.

Ping from PC1 to PC2 and PC3



```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
Default Gateway.....: 0.0.0.0

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 = 0ms, Average = 0ms

C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

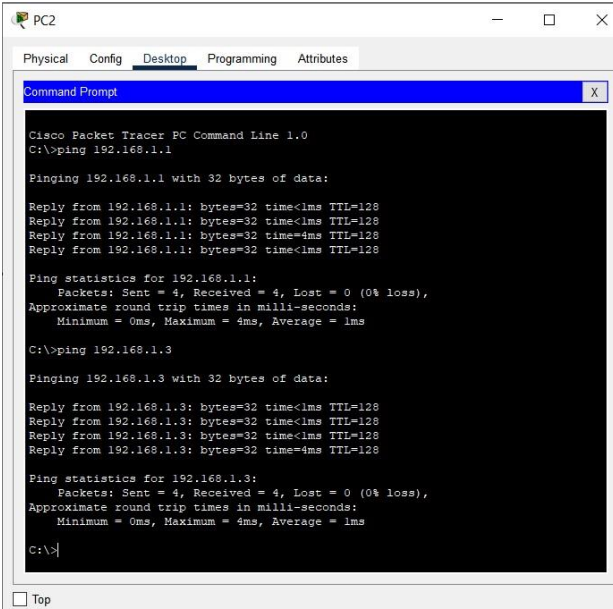
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

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 = 0ms, Average = 0ms

C:\>
```

Figure 10 : Ping from PC1 to PC2 and PC3

Ping from PC2 to PC1 and PC3



The screenshot shows a Cisco Packet Tracer PC Command Line window for PC2. The user has executed two ping commands. The first command is 'ping 192.168.1.1', which pings PC1. The output shows four successful replies with 32 bytes of data, a time of 1ms, and a TTL of 128. The statistics show 4 packets sent, 4 received, 0% loss, and an average round trip time of 1ms. The second command is 'ping 192.168.1.3', which pings PC3. The output also shows four successful replies with 32 bytes of data, a time of 1ms, and a TTL of 128. The statistics show 4 packets sent, 4 received, 0% loss, and an average round trip time of 1ms.

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=128
Reply from 192.168.1.1: bytes=32 time<1ms TTL=128
Reply from 192.168.1.1: bytes=32 time=4ms TTL=128
Reply from 192.168.1.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms

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=4ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

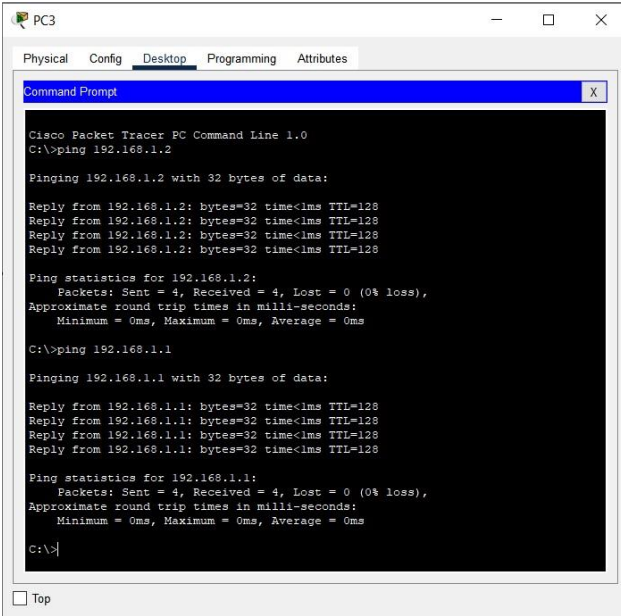
Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms

C:\>

```

Figure 11 : Ping from PC2 to PC1 and PC3

Ping from PC3 to PC1 and PC2



The screenshot shows a Cisco Packet Tracer PC Command Line window for PC3. The user has executed two ping commands. The first command is 'ping 192.168.1.2', which pings PC2. The output shows four successful replies with 32 bytes of data, a time of 1ms, and a TTL of 128. The statistics show 4 packets sent, 4 received, 0% loss, and an average round trip time of 0ms. The second command is 'ping 192.168.1.1', which pings PC1. The output also shows four successful replies with 32 bytes of data, a time of 1ms, and a TTL of 128. The statistics show 4 packets sent, 4 received, 0% loss, and an average round trip time of 0ms.

```

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

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<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 = 0ms, Average = 0ms

C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=128
Reply from 192.168.1.1: bytes=32 time<1ms TTL=128
Reply from 192.168.1.1: bytes=32 time<1ms TTL=128
Reply from 192.168.1.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

```

Figure 12 : Ping from PC3 to PC1 and PC2

Part 2: Building a network using routers and switches.

1. Add another switch (Switch2) and connect 3 PCs (PC4, PC5, and PC6)

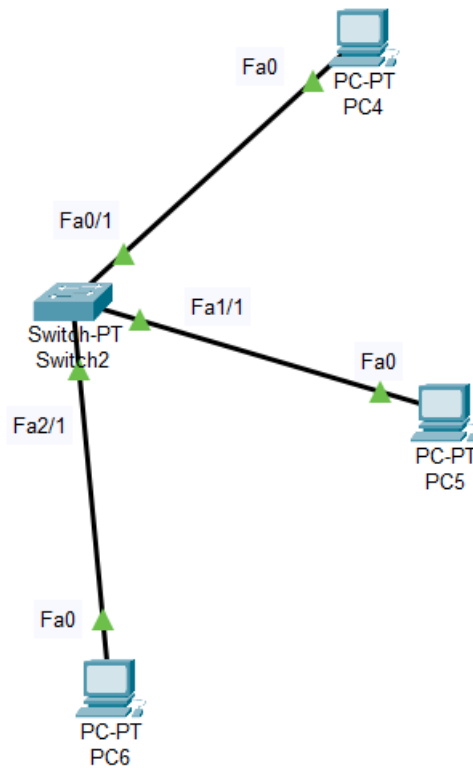
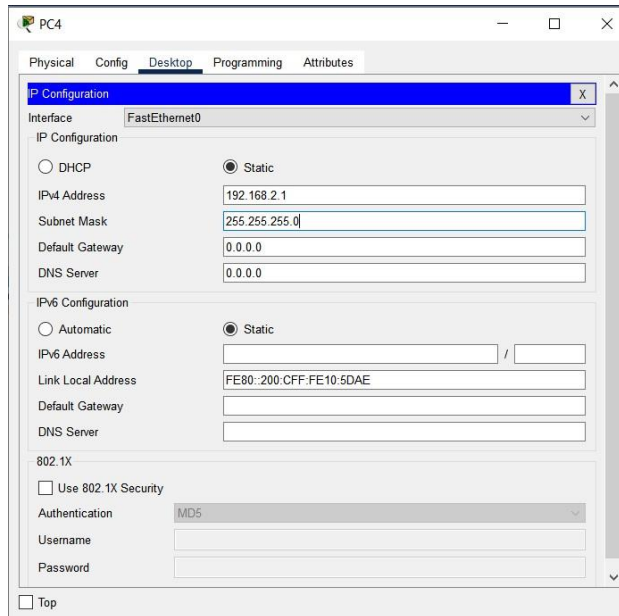


Figure 13 : PC4, PC5, PC6 are connected to Switch2

2. Configure IP addresses of PC4, PC5 and PC6 and test connectivity

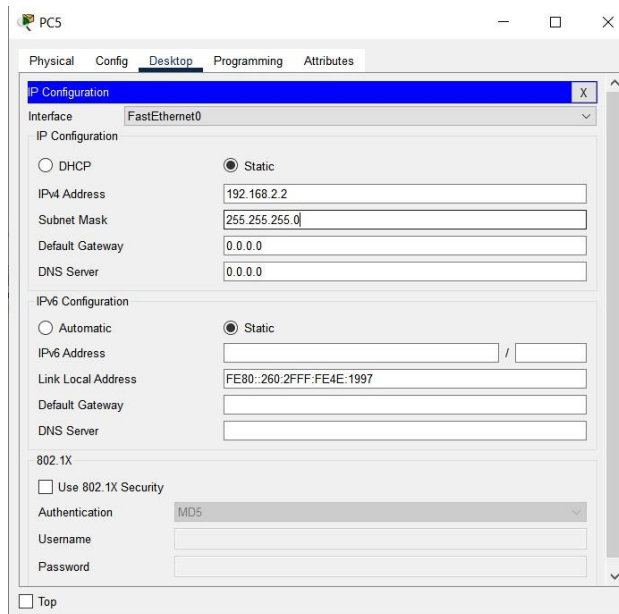
PC4 IP Configuration



The screenshot shows the 'PC4' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing the 'FastEthernet0' interface. The 'IP Configuration' radio button is selected, and the 'Static' option is chosen. The IPv4 Address is set to 192.168.2.1, Subnet Mask to 255.255.255.0, Default Gateway to 0.0.0.0, and DNS Server to 0.0.0.0. The IPv6 Configuration section is also visible, with the 'Static' option selected. The IPv6 Address is empty, Link Local Address is FE80::200:CFF:FE10:5DAE, Default Gateway is empty, and DNS Server is empty. The 802.1X section is collapsed, showing 'Use 802.1X Security' unchecked, Authentication set to MD5, and Username and Password fields empty.

Figure 14 : PC4 IP Configuration

PC5 IP Configuration



The screenshot shows the 'PC5' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing the 'FastEthernet0' interface. The 'IP Configuration' radio button is selected, and the 'Static' option is chosen. The IPv4 Address is set to 192.168.2.2, Subnet Mask to 255.255.255.0, Default Gateway to 0.0.0.0, and DNS Server to 0.0.0.0. The IPv6 Configuration section is also visible, with the 'Static' option selected. The IPv6 Address is empty, Link Local Address is FE80::260:2FFF:FE4E:1997, Default Gateway is empty, and DNS Server is empty. The 802.1X section is collapsed, showing 'Use 802.1X Security' unchecked, Authentication set to MD5, and Username and Password fields empty.

Figure 15 : PC5 IP Configuration

PC6 IP Configuration

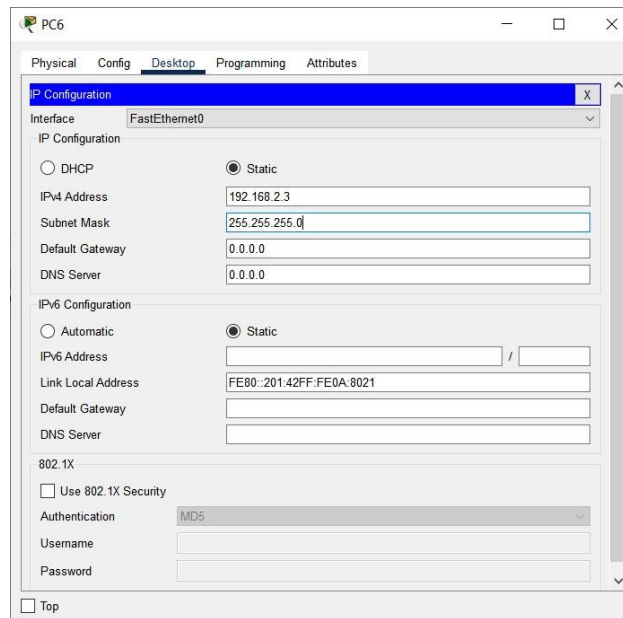


Figure 16 : PC6 IP Configuration

Ping from PC4 to PC5 and PC6

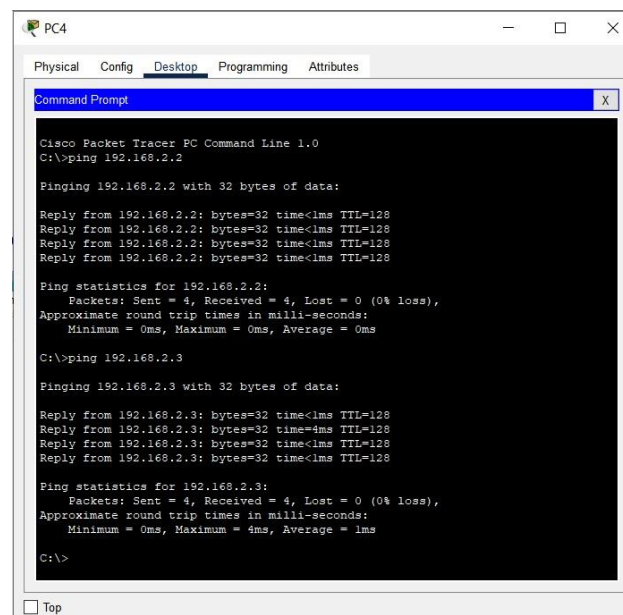
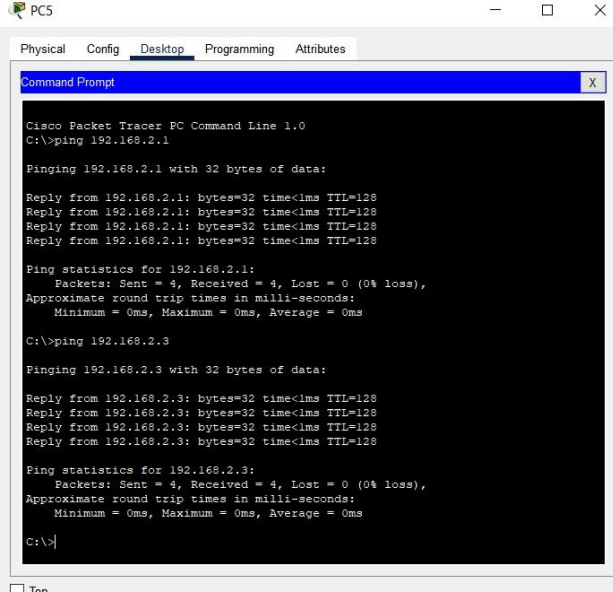


Figure 17 : Ping from PC4 to PC5 and PC6

Ping from PC5 to PC4 and PC6



```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time<1ms TTL=128
Reply from 192.168.2.1: bytes=32 time<1ms TTL=128
Reply from 192.168.2.1: bytes=32 time<1ms TTL=128
Reply from 192.168.2.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128

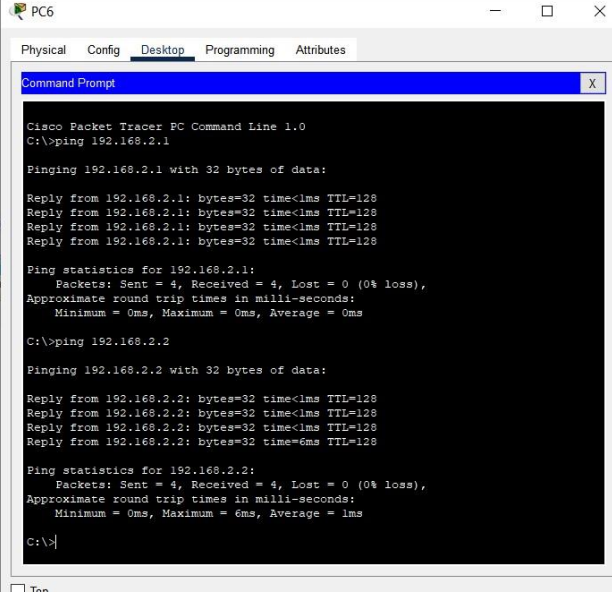
Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

```

Figure 18 : Ping from PC5 to PC4 and PC6

Ping from PC6 to PC4 and PC5



```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time<1ms TTL=128
Reply from 192.168.2.1: bytes=32 time<1ms TTL=128
Reply from 192.168.2.1: bytes=32 time<1ms TTL=128
Reply from 192.168.2.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time=6ms TTL=128

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 1ms

C:\>

```

Figure 19 : Ping from PC6 to PC4 and PC5

3. Add a Generic router



Figure 20 : Router1

4. Connect Router1 to Switch1 and Switch2

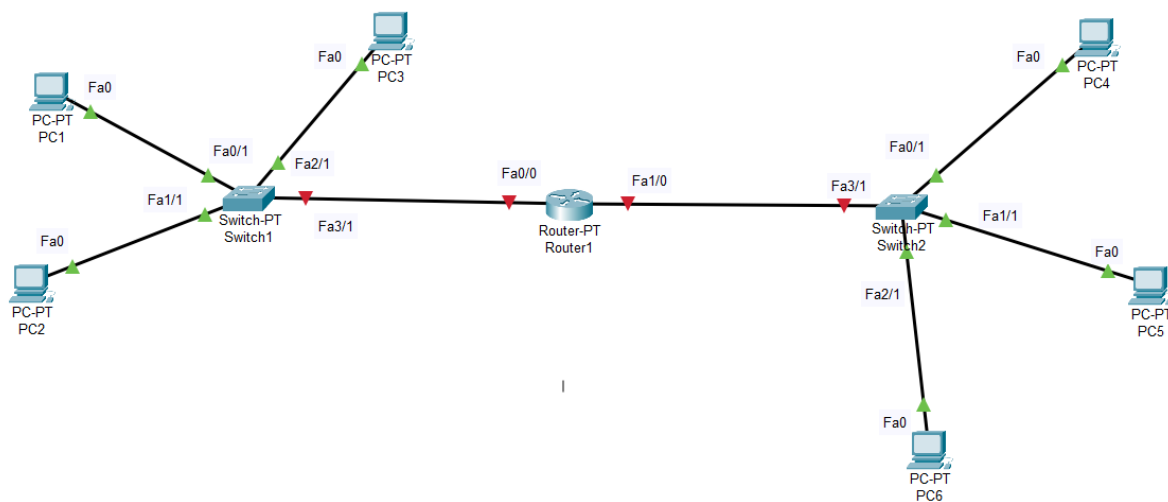


Figure 21 : Switch1 and Switch2 are connected to Router1.

5. Configure Router IP address on FastEthernet0/0

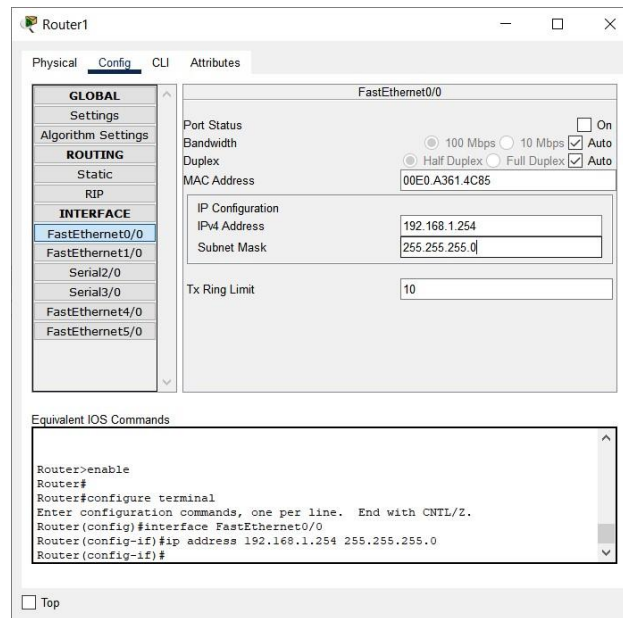


Figure 22 : Configure Router IP address on FastEthernet0/0

6. Select 'On'.

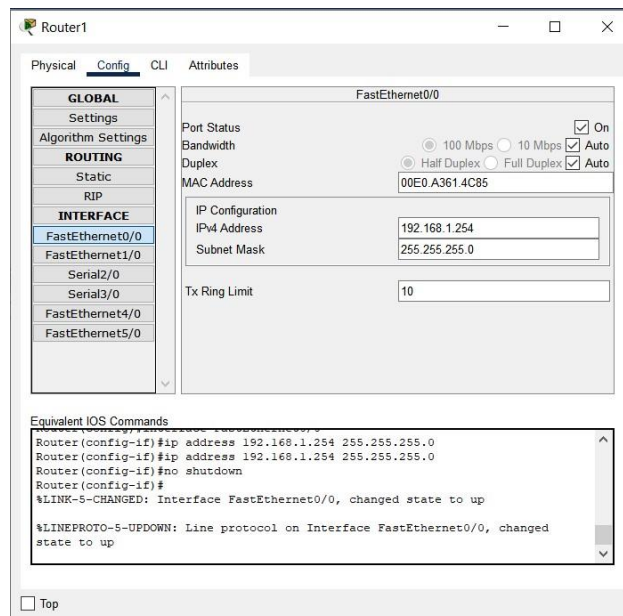


Figure 23 : Gave no shutdown to the port

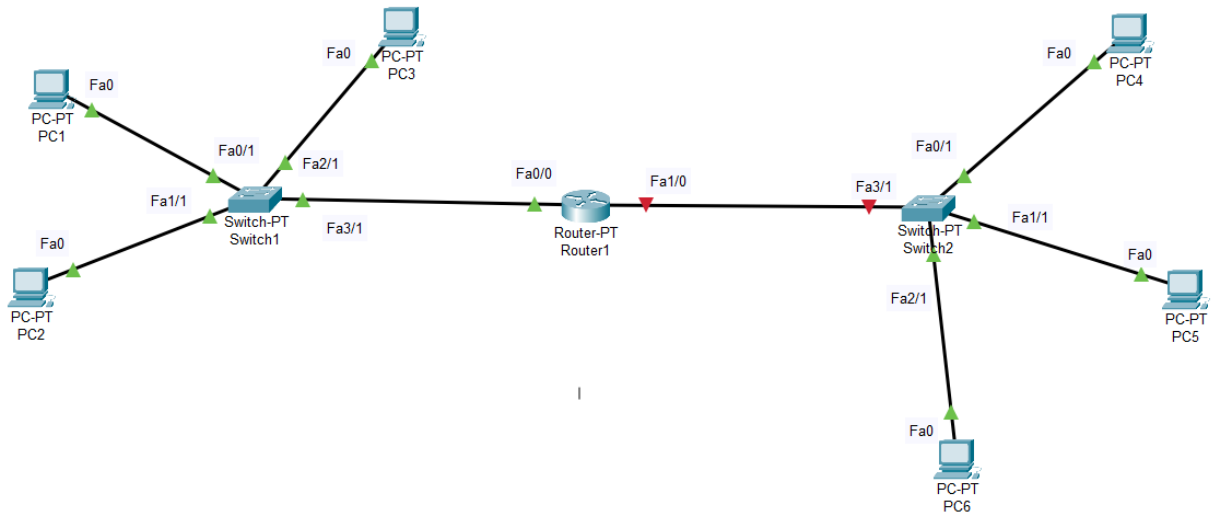


Figure 24 : Gave no shutdown to the port

7. Configure Router IP address on FastEthernet0/0

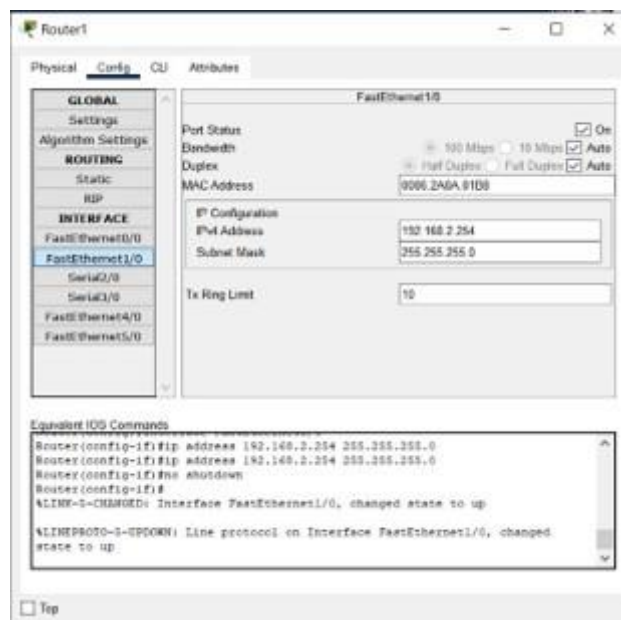


Figure 25 : Gave no shutdown to the port

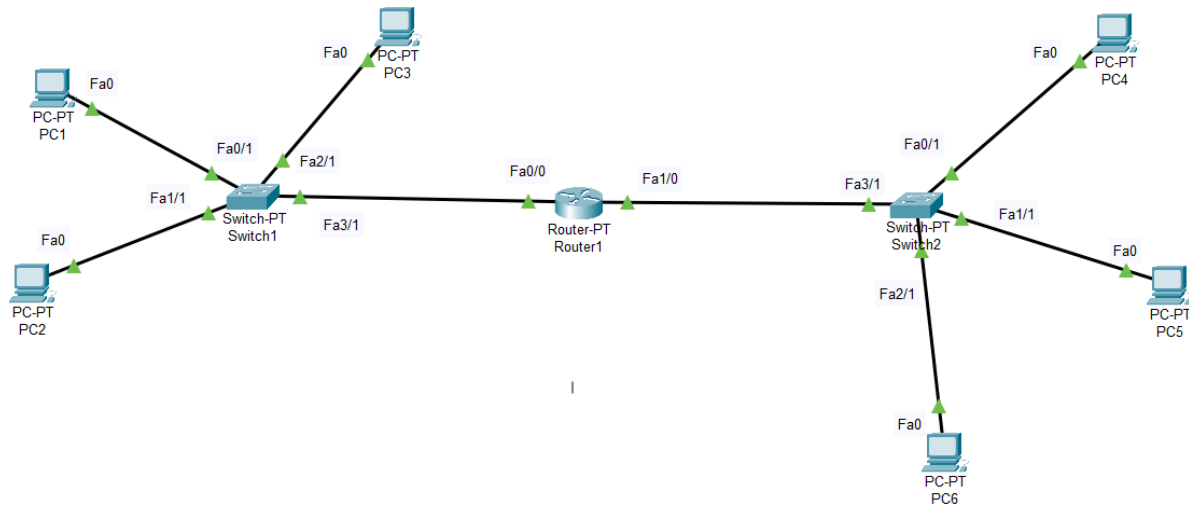


Figure 26 : Gave no shutdown to the port

9. Can you ping from PC1 to 192.168.1.254?

- Yes, we can ping PC1 to 192.168.1.254 of the router.

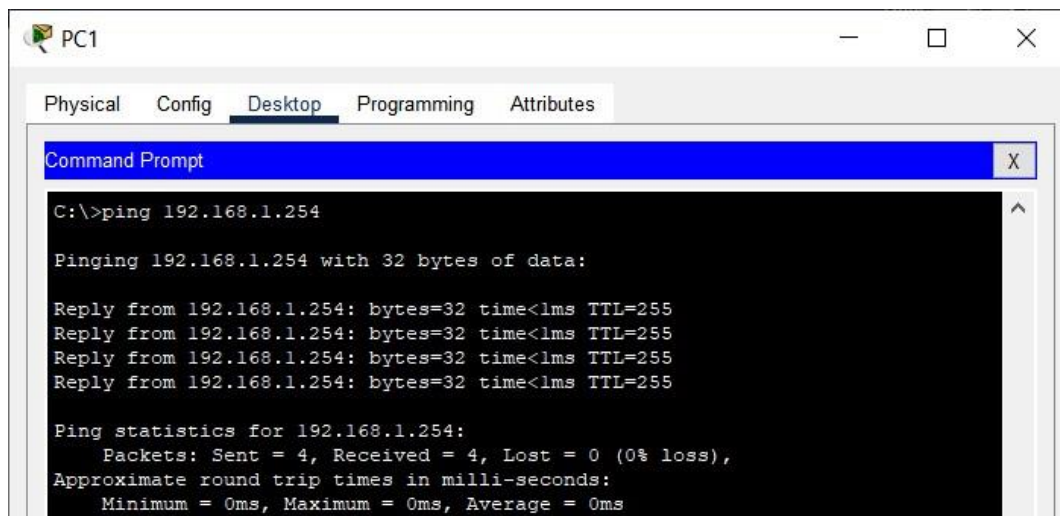


Figure 27 : ping from PC1 to 192.168.1.254

10. Can you ping from PC1 to PC4? If you cannot ping, what is the reason?

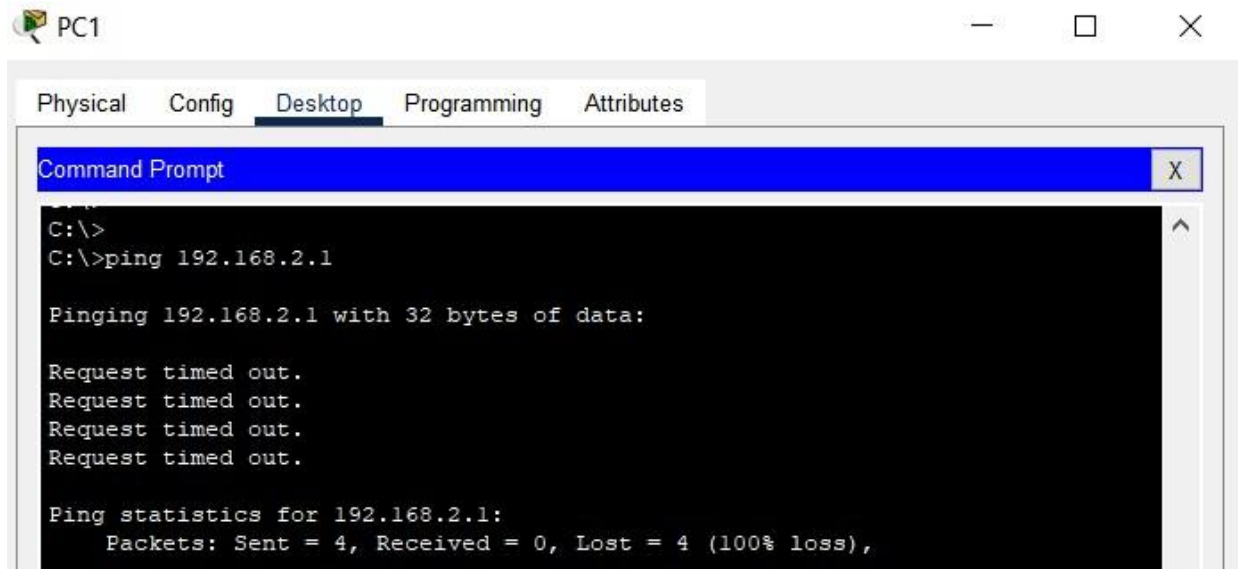


Figure 28 : Results of ping from PC1 to PC4

- No, we cannot ping from PC1 to PC4. Because we didn't configure the default gateway addresses on the PCs. As PC1 and PC4 are in separate networks, without a configured default gateway they won't know how to reach devices outside their own local network.

11. Correct the above problem so that you can ping from PC1 to PC4.

- Set the default gateway addresses of each computer same as the IP address of corresponding router interface.

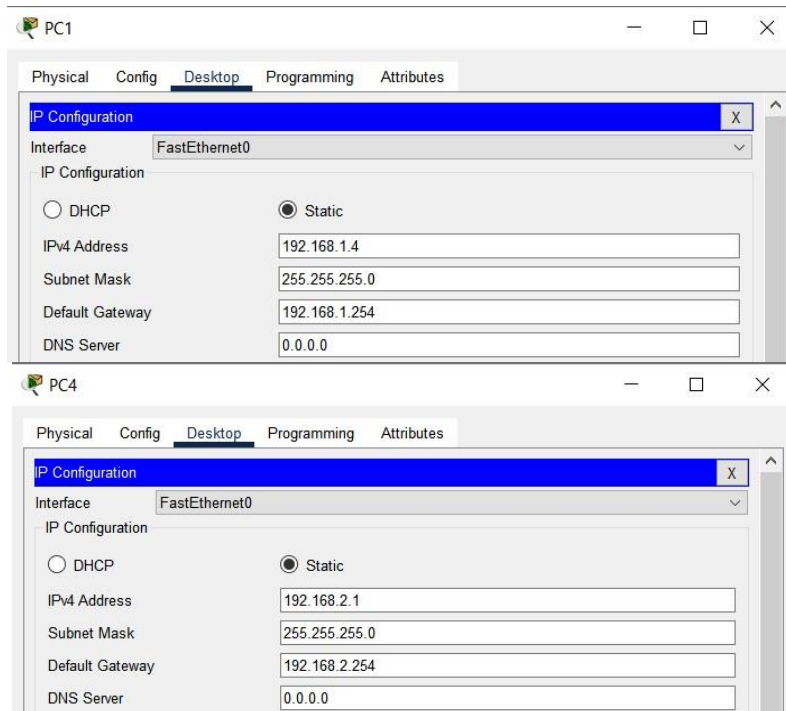


Figure 29 : Setting up gateway addresses of PC1 and PC4

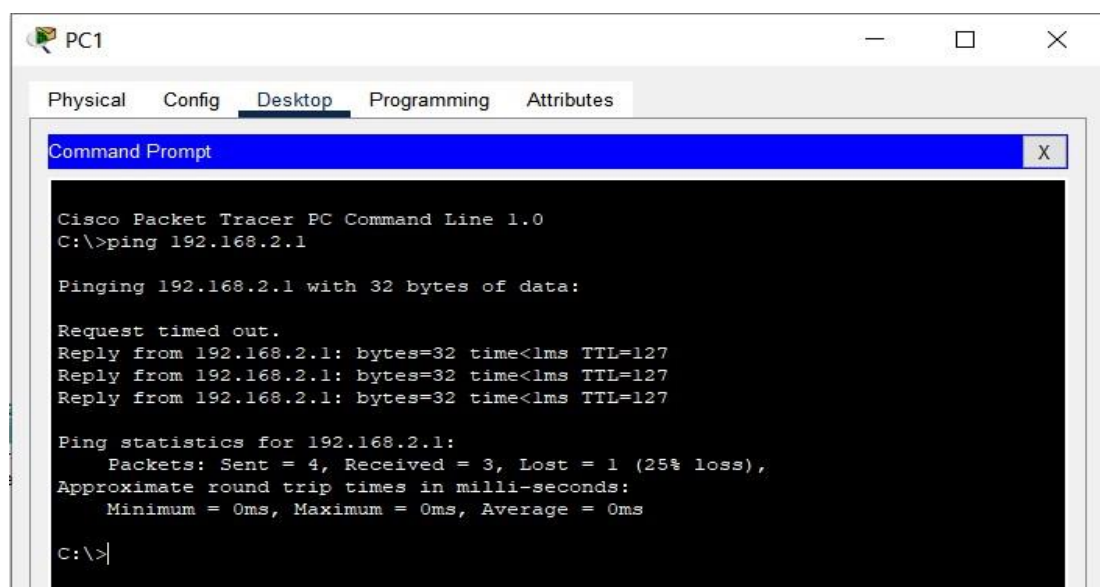


Figure 30 : Result of ping PC1 to PC4

Part 3: Configure static routing.

1. Add Router2 and connect to Router1 using a Fiber connection.

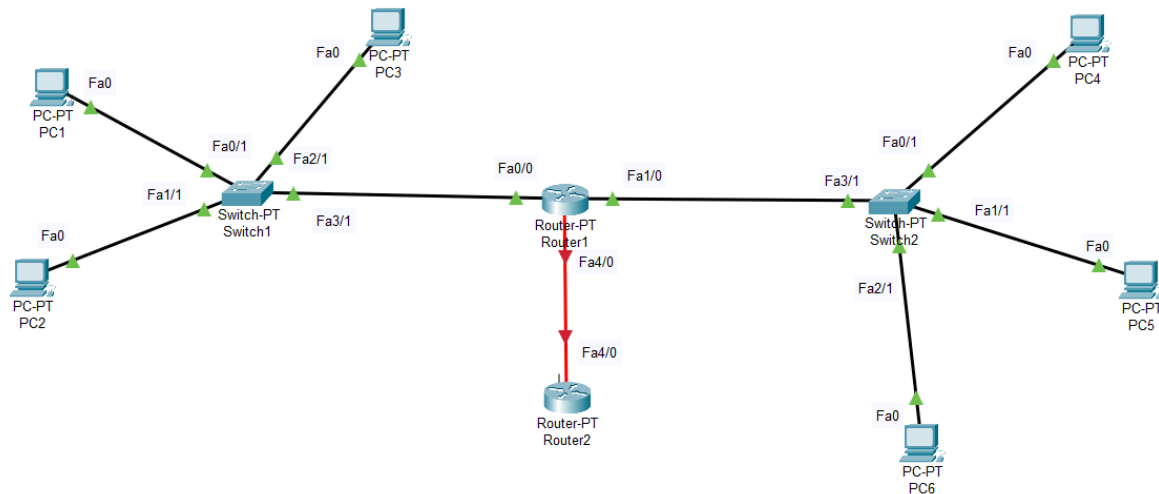


Figure 31 : Adding Router2 and Connected to Router1

Set IP addresses and bring interfaces “Up”.

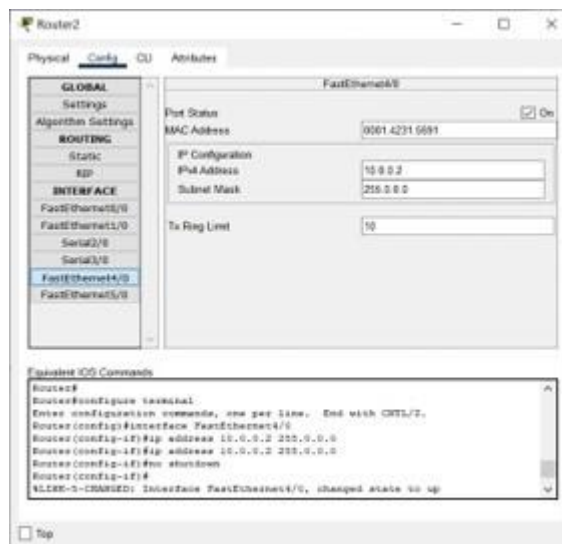


Figure 32 : Set IP addresses and bring interfaces “Up”

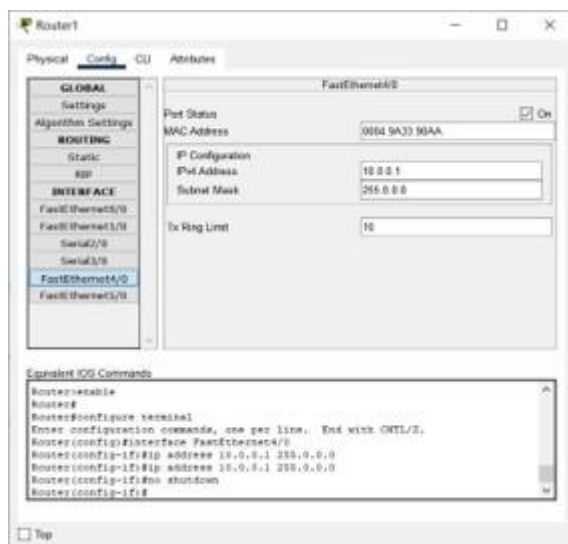


Figure 33 : Set IP addresses and bring interfaces "Up"

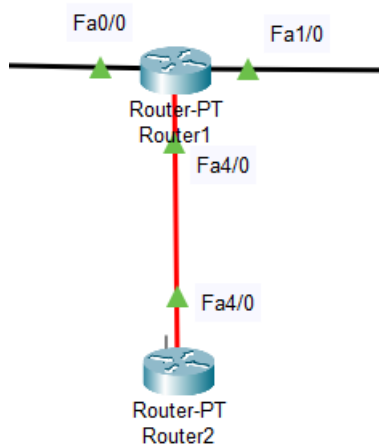


Figure 34 : After interfaces are up

2. Add Switch3 and connect to Router2

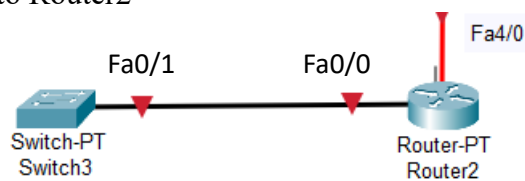


Figure 35 : Add Switch3 and connect to Router2

Set the IP address of the router interface and bring interfaces “Up”.

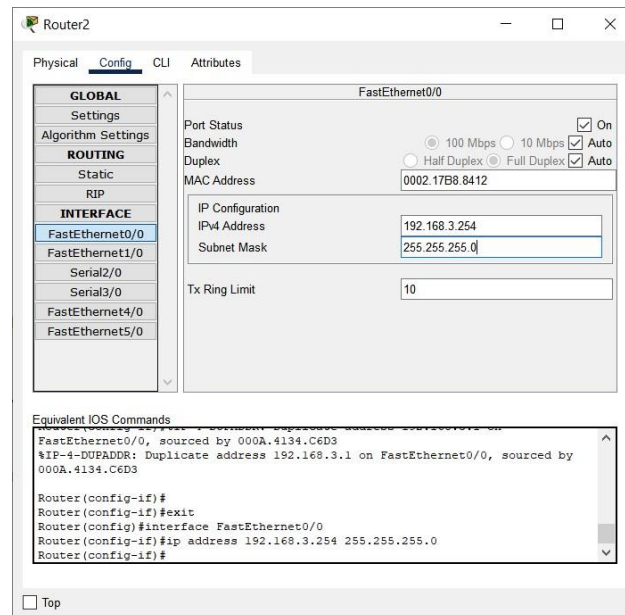


Figure 36 : Gave no shutdown to interface

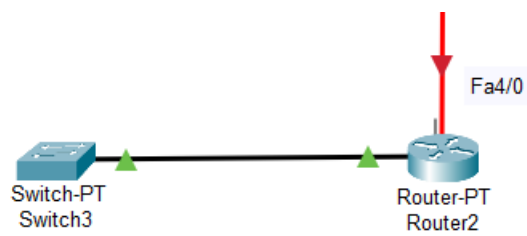


Figure 37 : After interface in up

3. Add a PC (PC7) to Switch3 and configure IP address.

- The default gateway address of PC7 is 192.168.3.254 because it is the corresponding interface IP address of Router2.

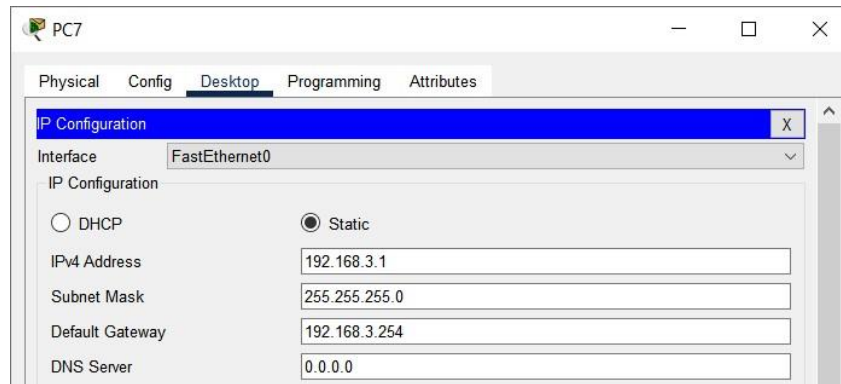


Figure 38 : PC7 configuration

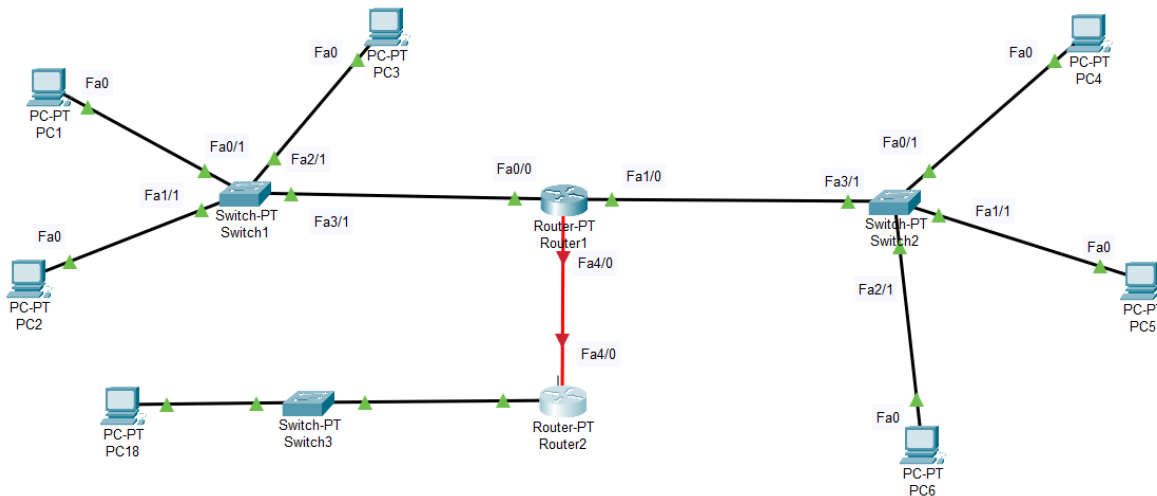
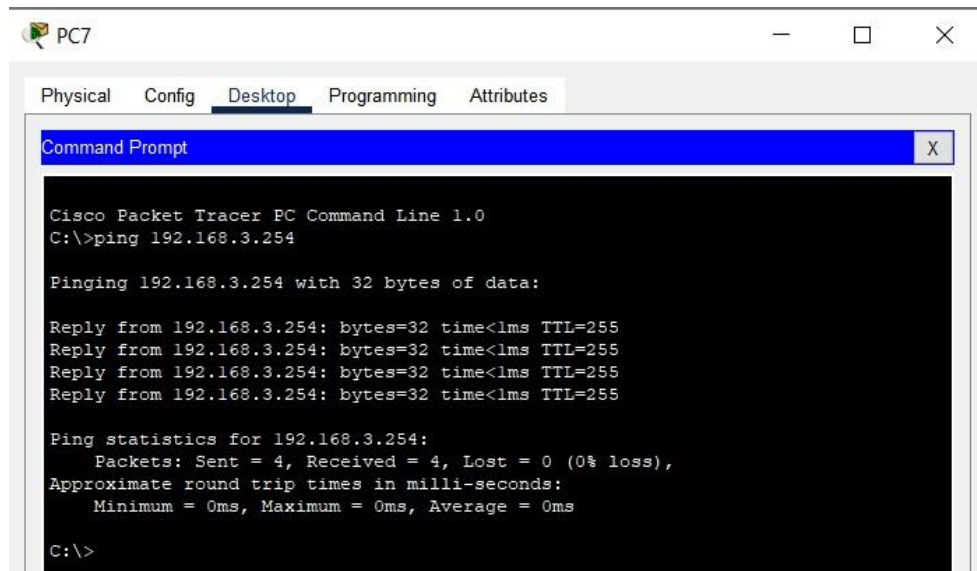


Figure 39 : All interfaces are up except for fiber connection

4. Ping from PC7 to 192.168.3.254



The screenshot shows a Cisco Packet Tracer window for PC7. The 'Desktop' tab is selected, and a 'Command Prompt' window is open. The command prompt shows the execution of the command 'ping 192.168.3.254'. The output indicates that the ping was successful, with four replies received from 192.168.3.254, each with 32 bytes of data, a time of less than 1ms, and a TTL of 255. The ping statistics show that 4 packets were sent, 4 were received, and 0 were lost (0% loss). The approximate round trip times in milliseconds are: Minimum = 0ms, Maximum = 0ms, Average = 0ms.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.3.254

Pinging 192.168.3.254 with 32 bytes of data:

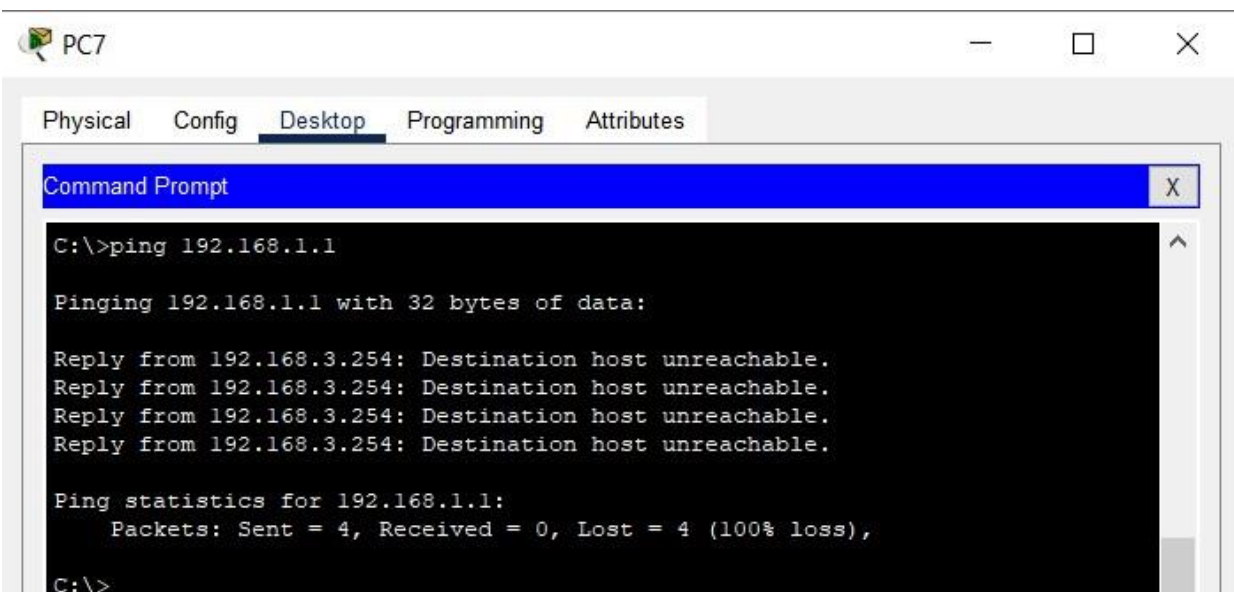
Reply from 192.168.3.254: bytes=32 time<1ms TTL=255
Reply from 192.168.3.254: bytes=32 time<1ms TTL=255
Reply from 192.168.3.254: bytes=32 time<1ms TTL=255
Reply from 192.168.3.254: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.3.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Figure 40 : Ping from PC7 to 192.168.3.254

5. Ping from PC7 to PC1. What is the message received?



The screenshot shows a Cisco Packet Tracer window for PC7. The 'Desktop' tab is selected, and a 'Command Prompt' window is open. The command prompt shows the execution of the command 'ping 192.168.1.1'. The output indicates that the ping failed, with four replies received from 192.168.3.254, each with the message 'Destination host unreachable'. The ping statistics show that 4 packets were sent, 0 were received, and 4 were lost (100% loss).

```
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.3.254: Destination host unreachable.
Reply from 192.168.3.254: Destination host unreachable.
Reply from 192.168.3.254: Destination host unreachable.
Reply from 192.168.3.254: Destination host unreachable.

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Figure 41 : Result of Ping from PC7 to PC1

Reply from 192.168.3.254: Destination host unreachable.

6. What is the reason for the above message

- It is because PC7 packets can only travel up to Router2. Router2 knows about Router1, but it doesn't know what is beyond Router1 because routing table of Router2 doesn't have information about what is beyond Router1.

Type	Network	Port	Next Hop IP	Metric
C	10.0.0.0/8	FastEthernet4/0	---	0/0
C	192.168.3.0/24	FastEthernet0/0	---	0/0

And it also applies to Router1.

Type	Network	Port	Next Hop IP	Metric
C	10.0.0.0/8	FastEthernet4/0	---	0/0
C	192.168.1.0/24	FastEthernet0/0	---	0/0
C	192.168.2.0/24	FastEthernet1/0	---	0/0

7. Discuss how to correct the above problem.

To configure routing in a router we can use,

Static Routing

- The network administrator manually configures the routes into the routing table of routers.

Dynamic routing

- Routers use dynamic routing protocols to exchange routing information with neighboring routers to determine and update routing information in routers.

For the above problem using Static routing is more effective.

8. Static routing configuration on Router1

The screenshot shows the configuration window for Router1. The 'Config' tab is active, and the 'Static' option under the 'ROUTING' section is selected. The 'Static Routes' section contains the following fields:

- Network: 192.168.3.0
- Mask: 255.255.255.0
- Next Hop: 10.10.10.2

An 'Add' button is located below these fields. Below the 'Add' button, the 'Network Address' section displays the configured route: 192.168.3.0/24 via 10.10.10.2. A 'Remove' button is located below this section. At the bottom, the 'Equivalent IOS Commands' section shows the following commands:

```
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.1.0 255.255.255.0 10.10.10.1
Router(config)#no ip route 192.168.1.0 255.255.255.0 10.10.10.1
Router(config)#ip route 192.168.3.0 255.255.255.0 10.10.10.2
Router(config)#
```

Figure 42 : Static routing configuration on Router1

10. Static routing configuration on Router2

The screenshot shows the configuration window for Router2. The 'Config' tab is active, and the 'Static' option under the 'ROUTING' section is selected. The 'Static Routes' section contains the following fields:

- Network: 192.168.2.0
- Mask: 255.255.255.0
- Next Hop: 10.10.10.1

An 'Add' button is located below these fields. Below the 'Add' button, the 'Network Address' section displays the configured routes: 192.168.1.0/24 via 10.10.10.1 and 192.168.2.0/24 via 10.10.10.1. A 'Remove' button is located below this section. At the bottom, the 'Equivalent IOS Commands' section shows the following commands:

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.1.0 255.255.255.0 10.10.10.1
Router(config)#ip route 192.168.2.0 255.255.255.0 10.10.10.1
Router(config)#
```

Figure 43 : Static routing configuration on Router2

11. Ping from PC7 to all other PCs

- Ping from PC7 not working. Because the router interface IP addresses between Router1 and Router2 are not identical with the next hop IP addresses on the routes of the routing tables. Either changing the next hop IP addresses or changing router interface IP addresses can solve the problem. For this problem I have changed router interface IP addresses between Router1 and Router2 into 10.10.10.1 and 10.10.10.2 respectively.