CSEC 32022 - Advanced Computer Communication and Networking

Lab 02

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CS/2018/033

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

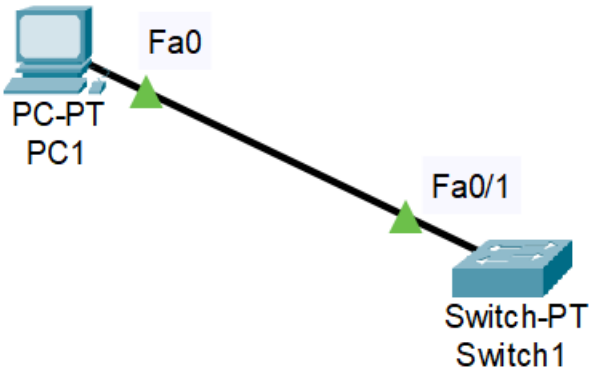


Figure 3 : PC1 connected to Switch1

5. Add 2 other PCs and connect them to Switch1

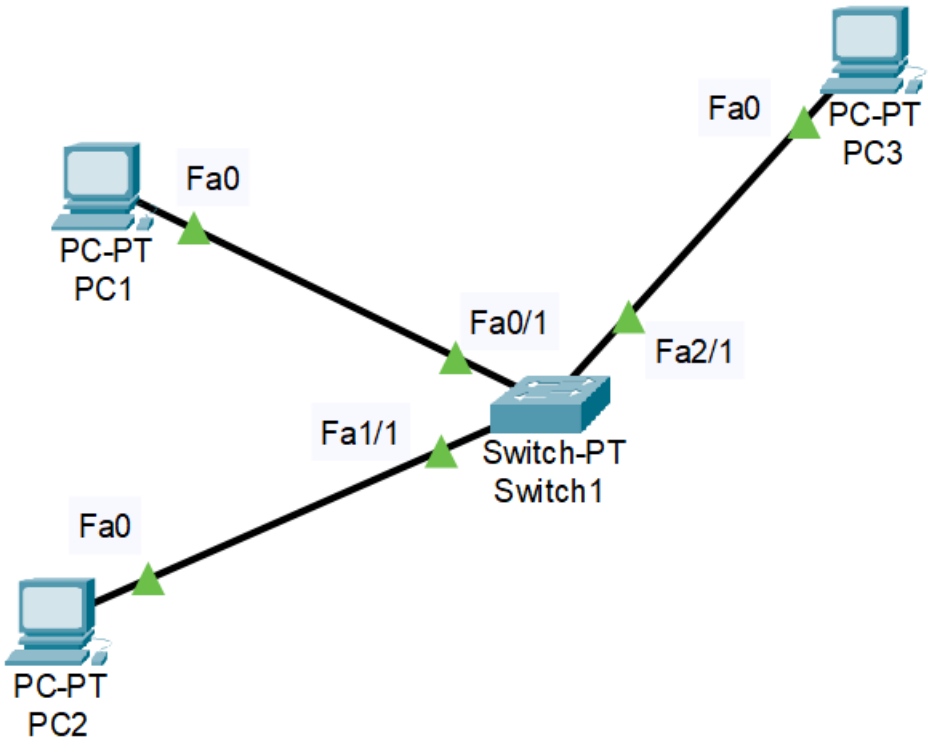


Figure 4 : PC1, PC2, PC3 connected to Switch1

6. PC1 IP configuration

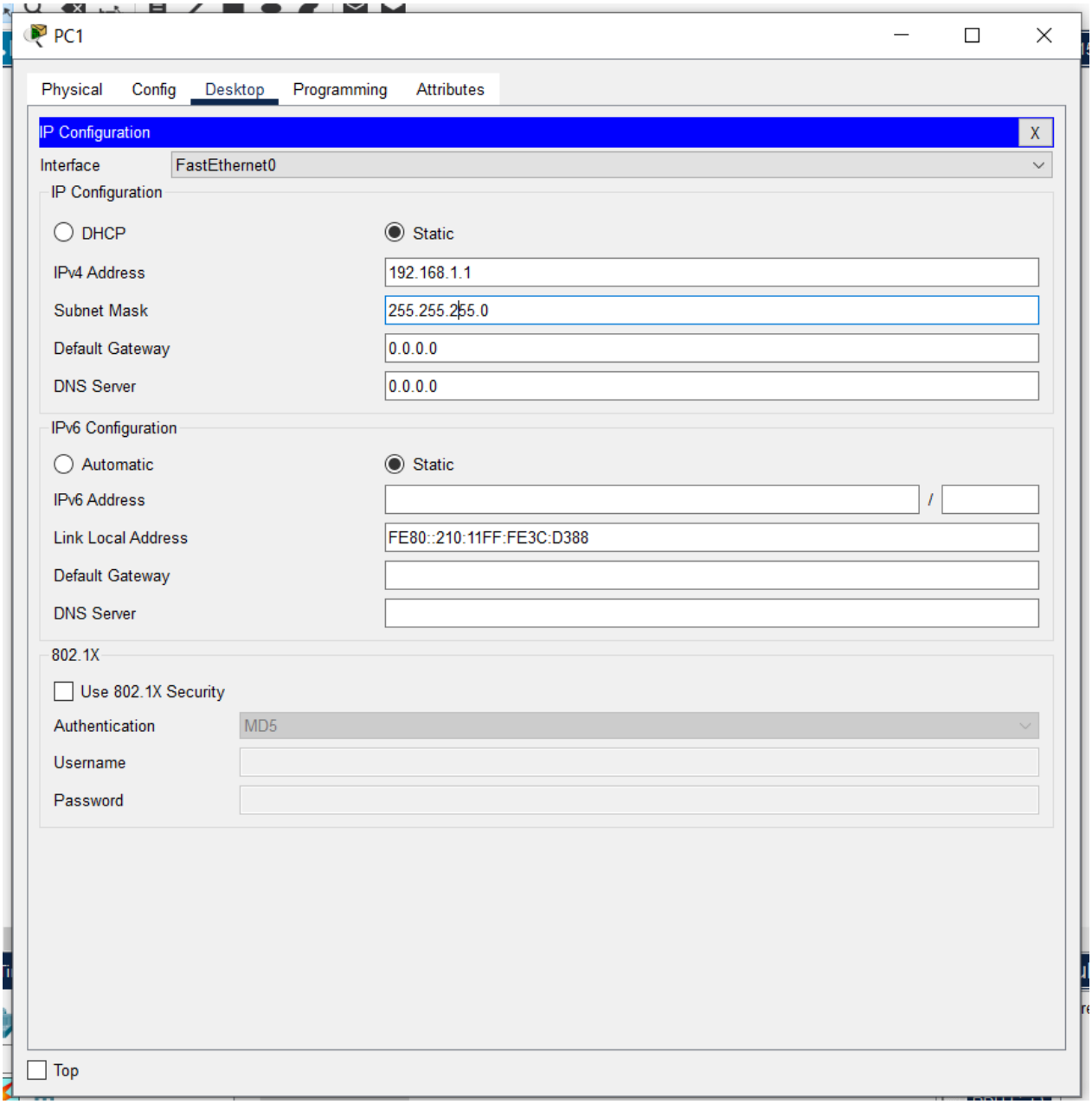


Figure 5 : PC1 IP configuration

7. IP configuration of PC2 and PC3

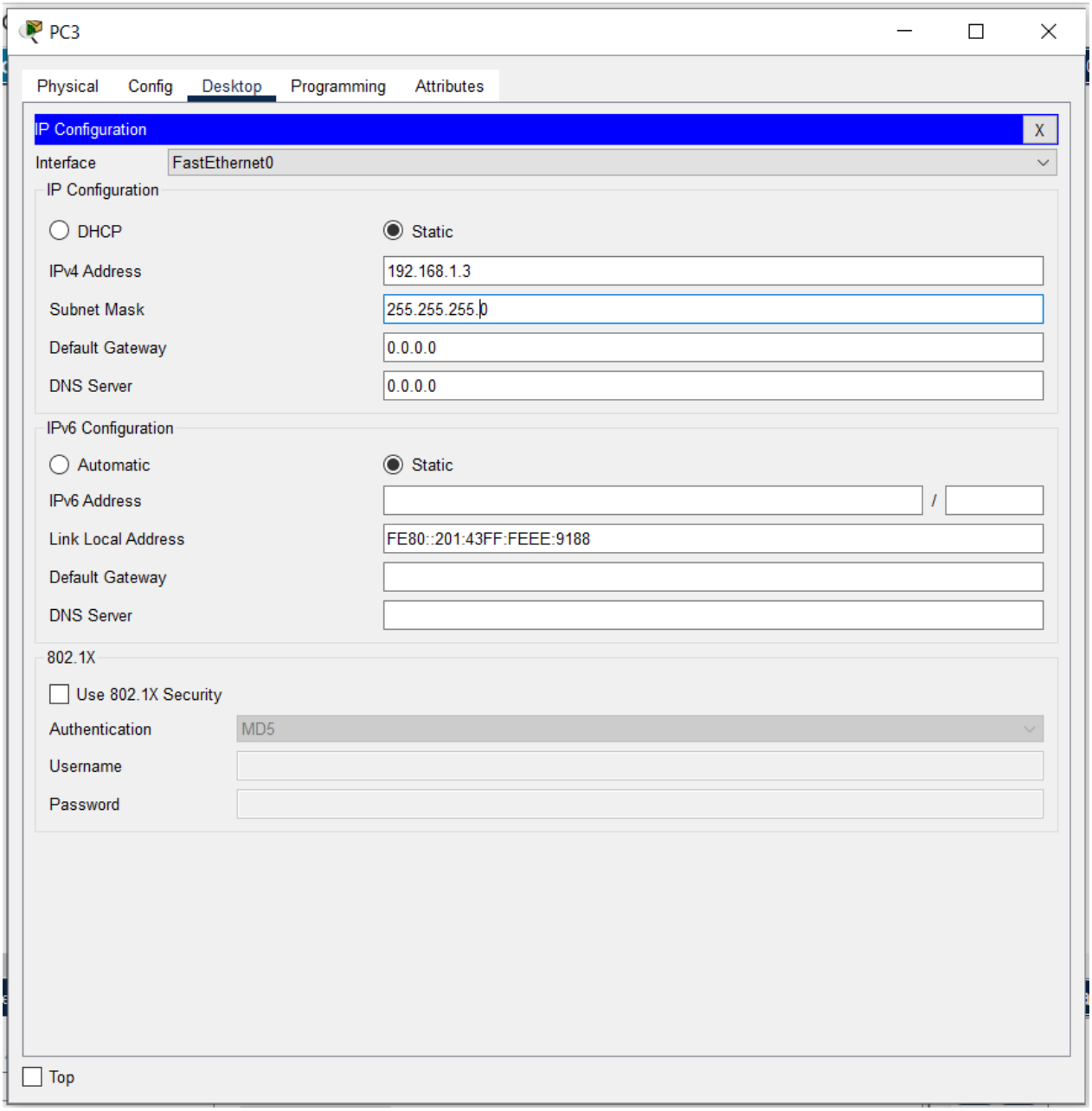


Figure 6 : IP configuration of PC3

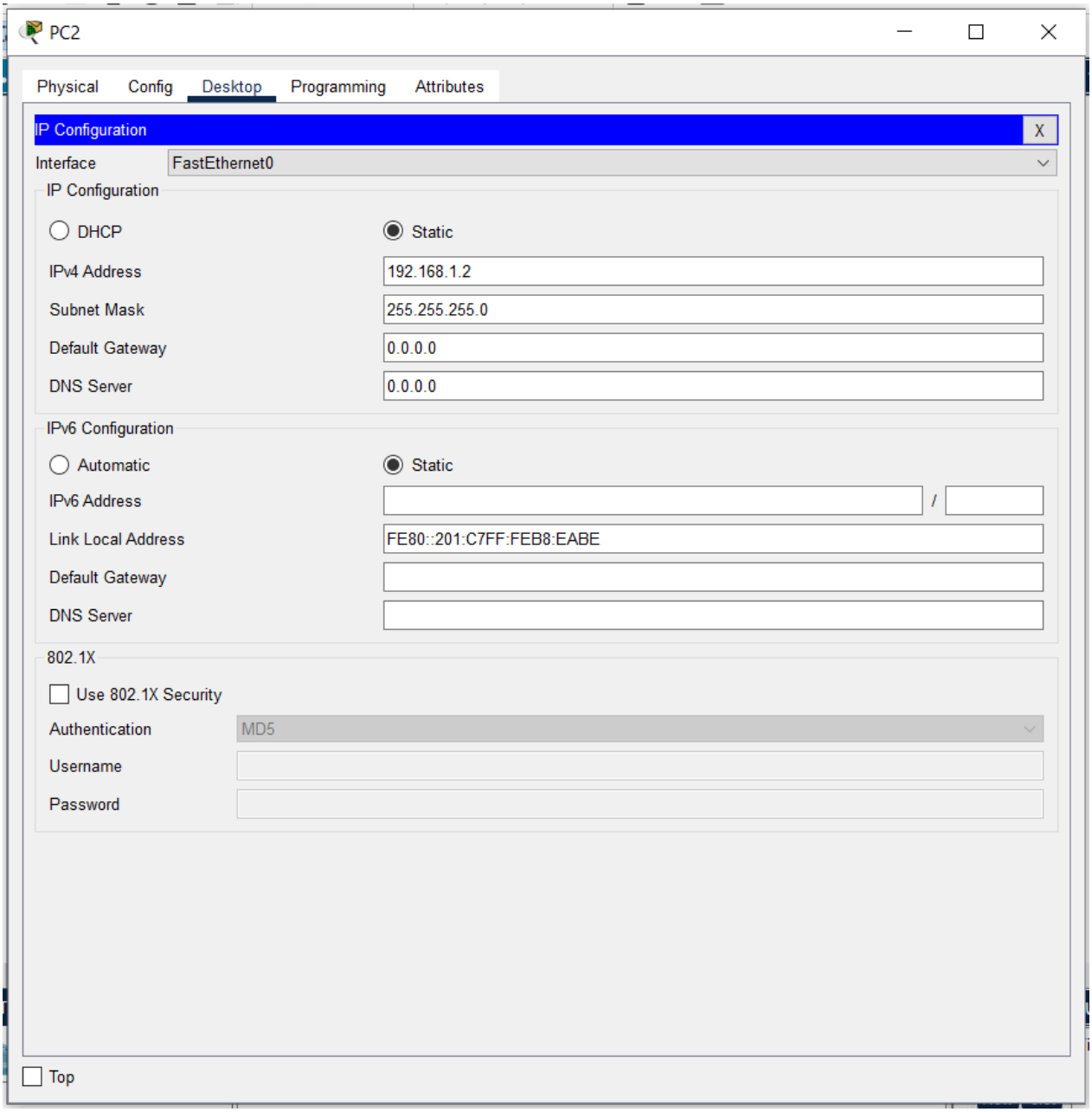


Figure 7 : IP configuration of PC2

8. IP configuration of the PC1

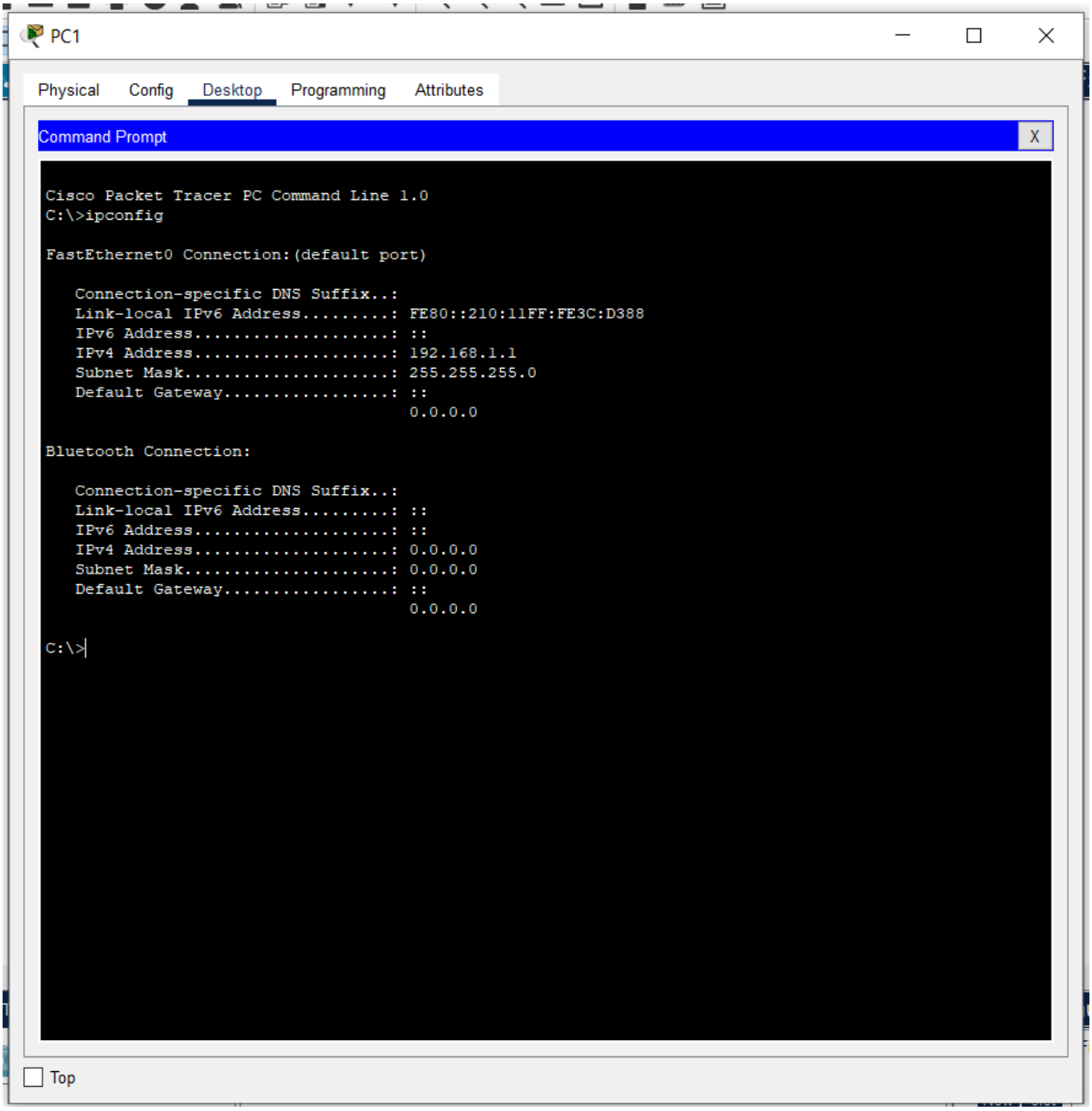


Figure 8 : IP configuration of the PC1

9. Type ping 192.168.1.2 in PC1

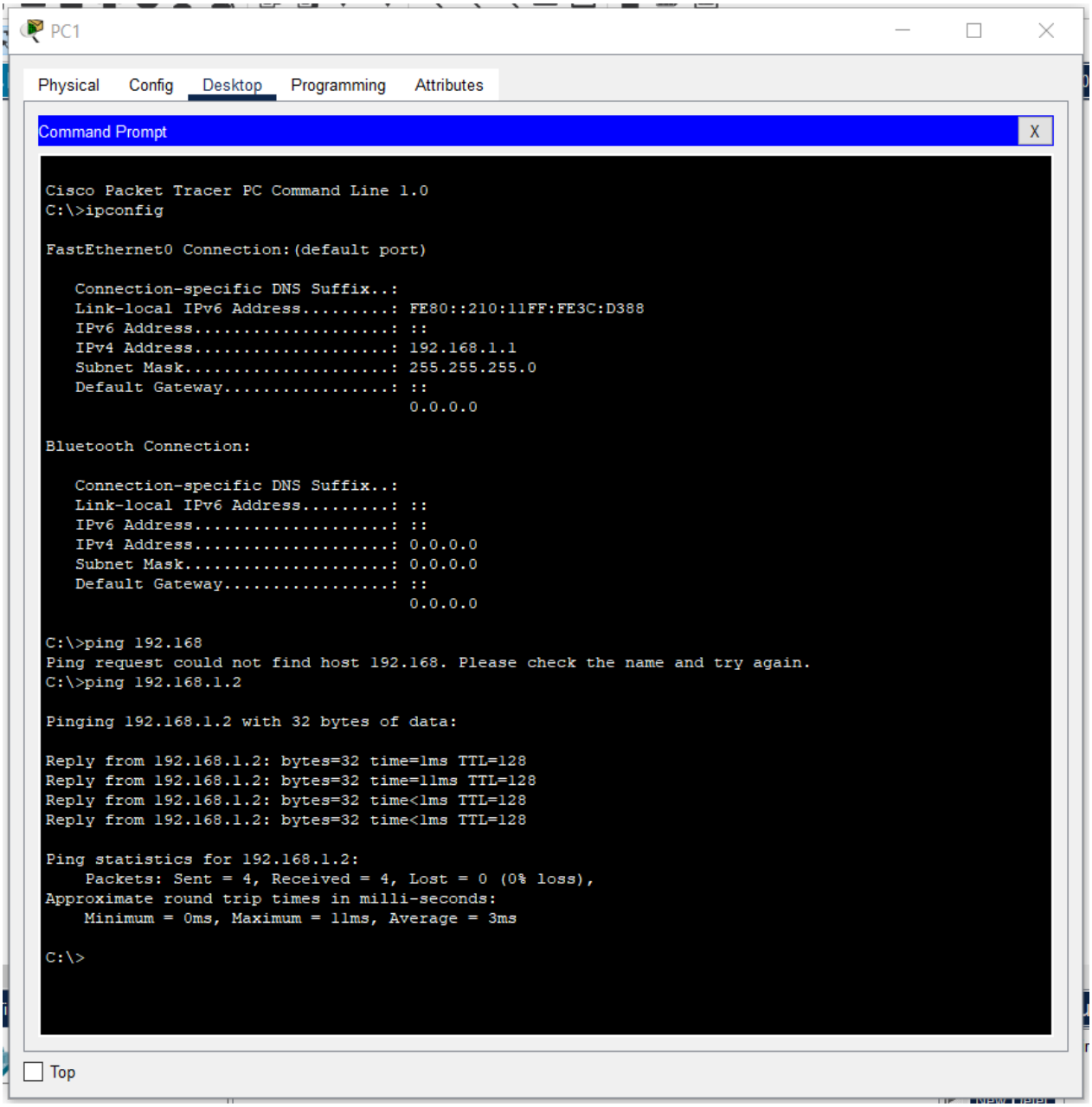


Figure 9 : Type ping 192.168.1.2 in PC1

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

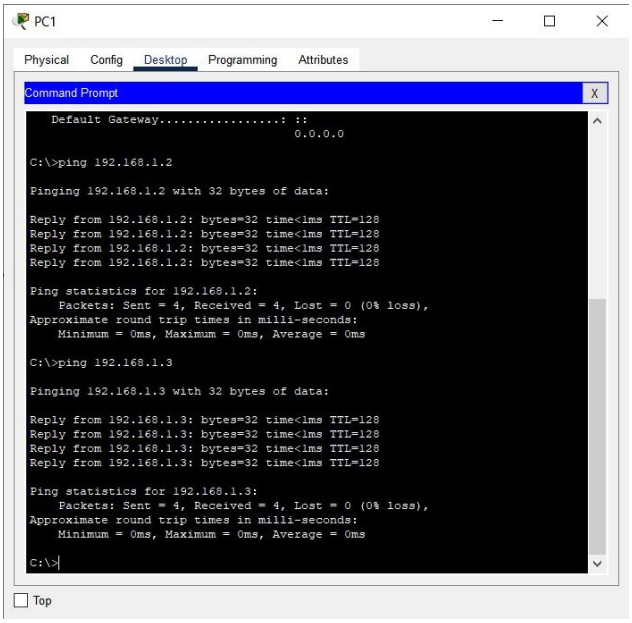


Figure 10 : Ping from PC1 to PC2 and PC3

Ping from PC2 to PC1 and PC3

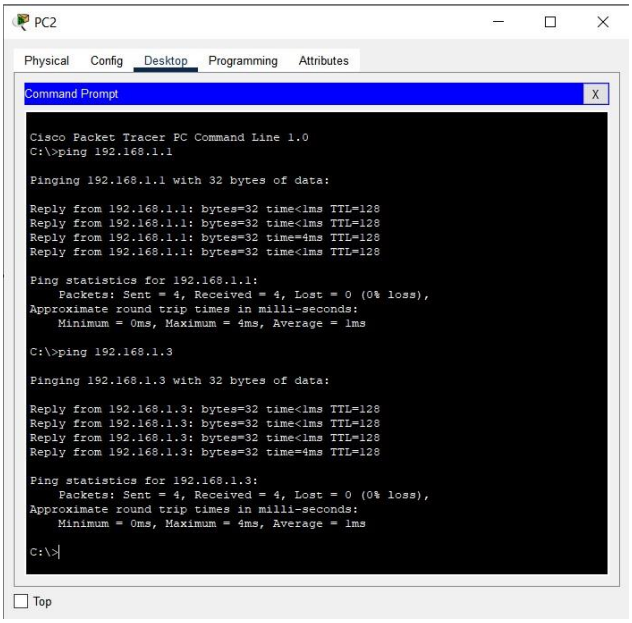


Figure 11 : Ping from PC2 to PC1 and PC3

Ping from PC3 to PC1 and PC2

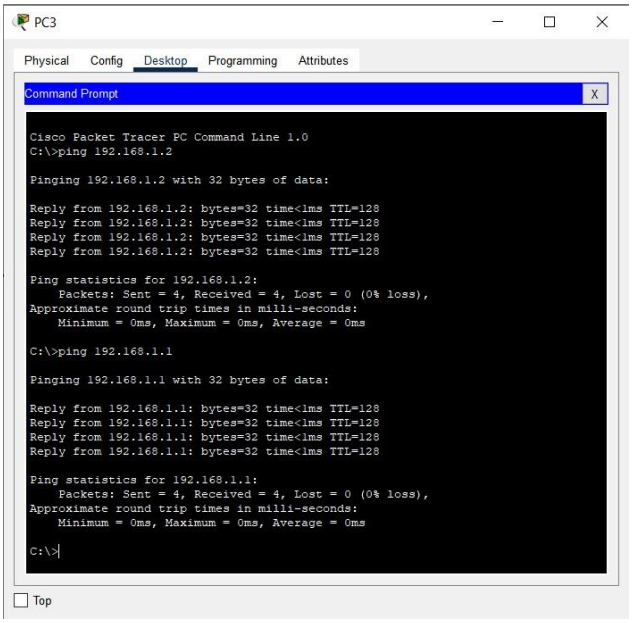


Figure 12 : Ping from PC3 to PC1 and PC2

Part 2: Building a network using routers and switches.

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

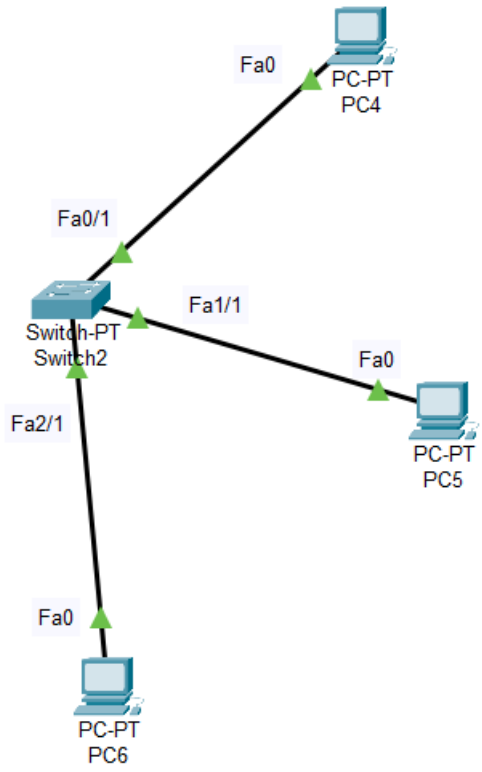


Figure 13 : PC4, PC5, PC6 are connected to Switch2

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

PC4 IP Configuration

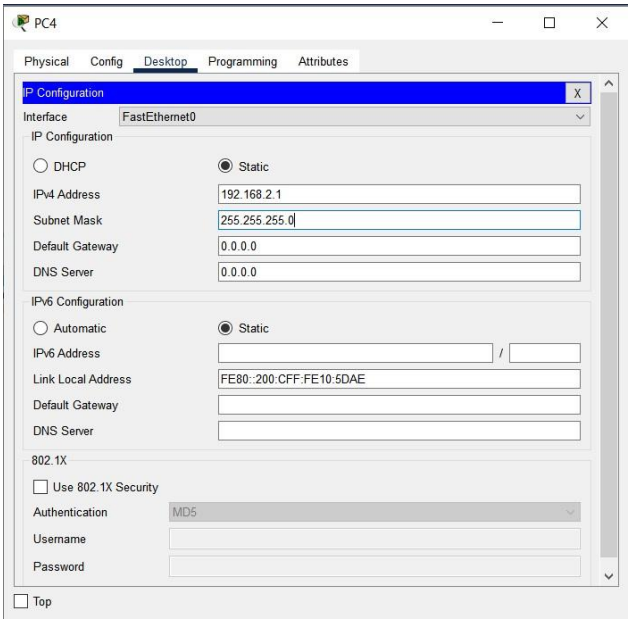


Figure 14 : PC4 IP Configuration

PC5 IP Configuration

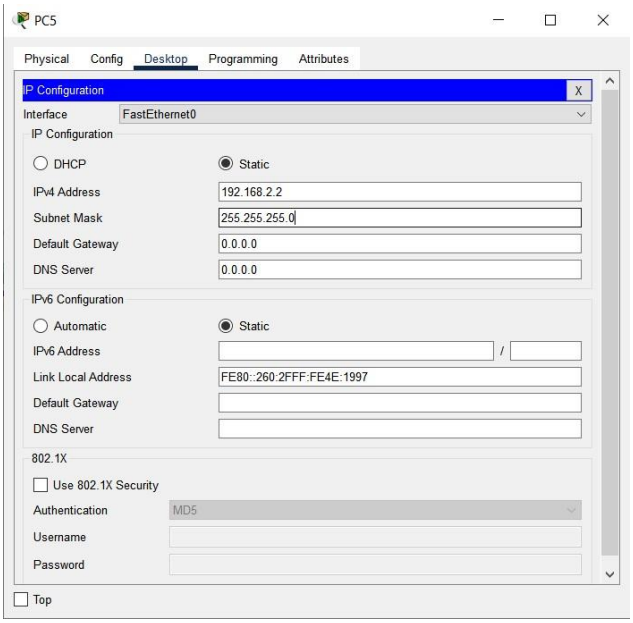


Figure 15 : PC5 IP Configuration

PC6 IP Configuration

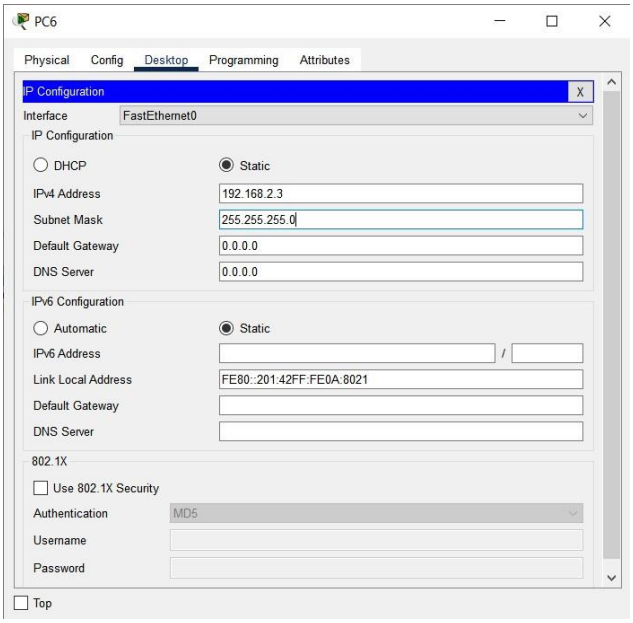


Figure 16 : PC6 IP Configuration

Ping from PC4 to PC5 and PC6

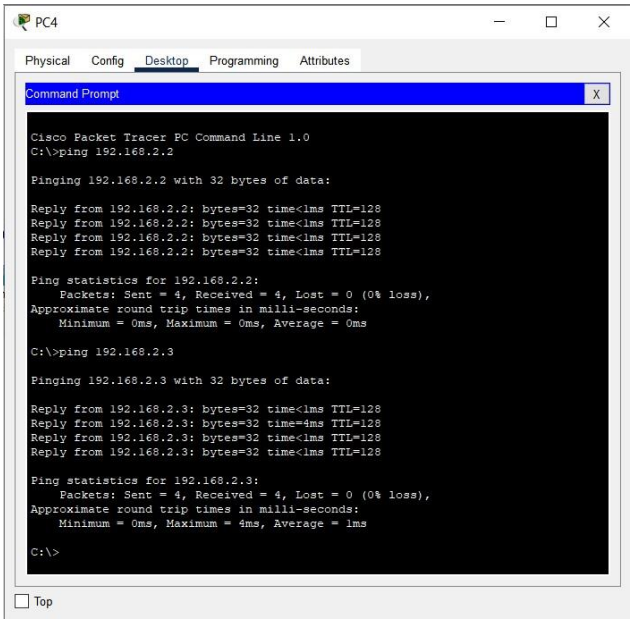


Figure 17 : Ping from PC4 to PC5 and PC6

Ping from PC5 to PC4 and PC6

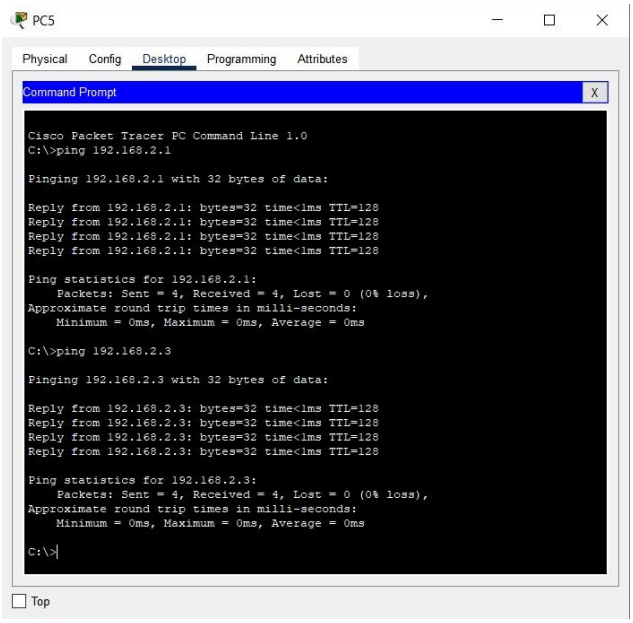


Figure 18 : Ping from PC5 to PC4 and PC6

Ping from PC6 to PC4 and PC5

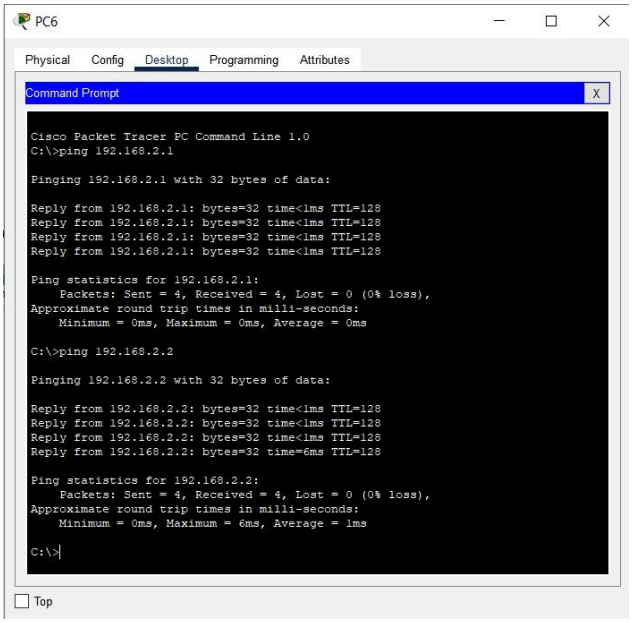


Figure 19 : Ping from PC6 to PC4 and PC5

3. Add a Generic router

Figure 20 : Router1

4. Connect Router1 to Switch1 and Switch2

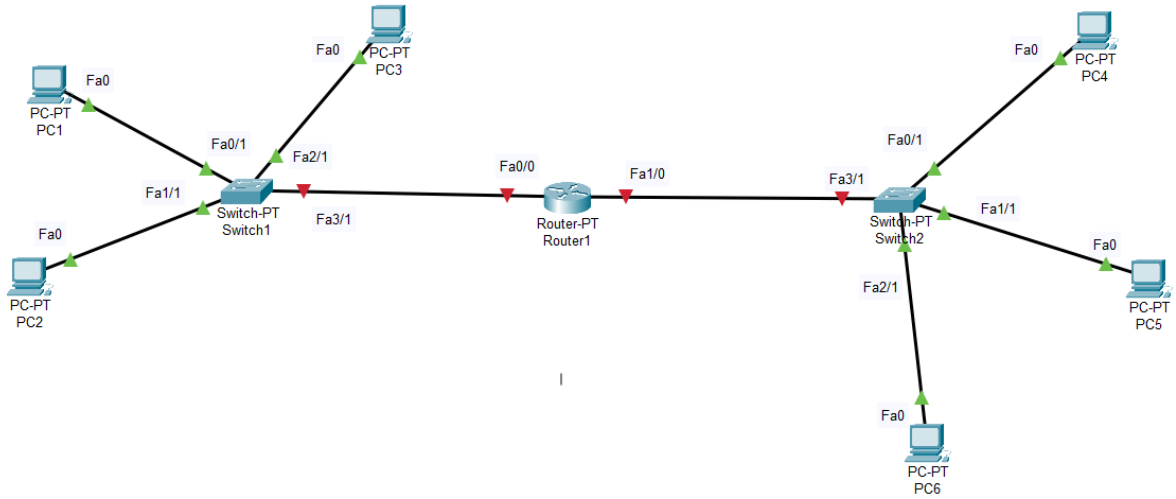


Figure 21 : Switch1 and Switch2 are connected to Router1.

5. Configure Router IP address on FastEthernet0/0

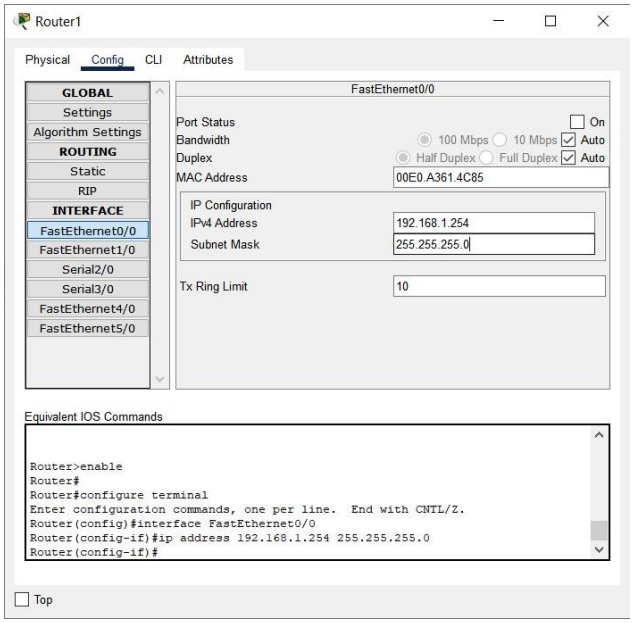


Figure 22 : Configure Router IP address on FastEthernet0/0

6. Select 'On'.

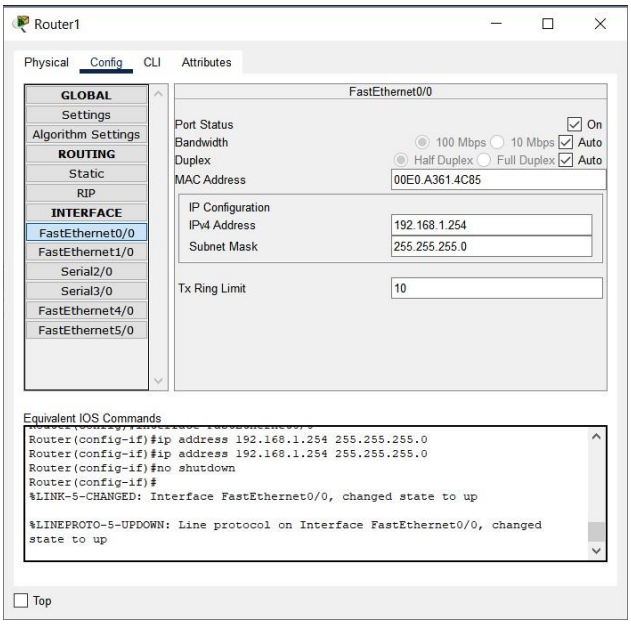


Figure 23 : Gave no shutdown to the port

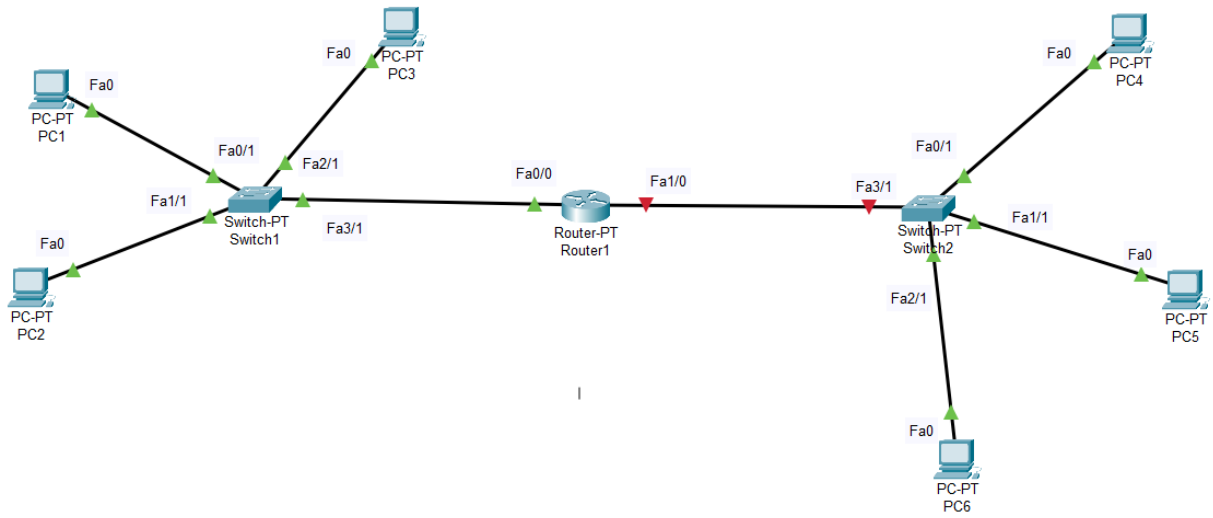


Figure 24 : Gave no shutdown to the port

7. Configure Router IP address on FastEthernet0/0

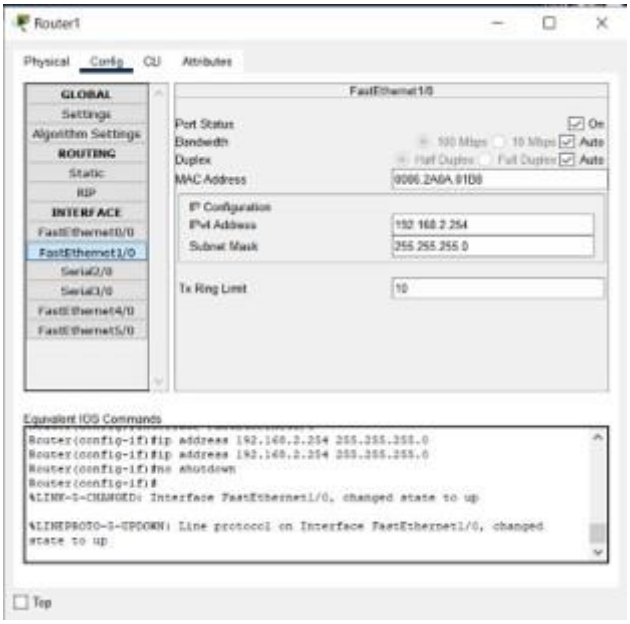


Figure 25 : Gave no shutdown to the port

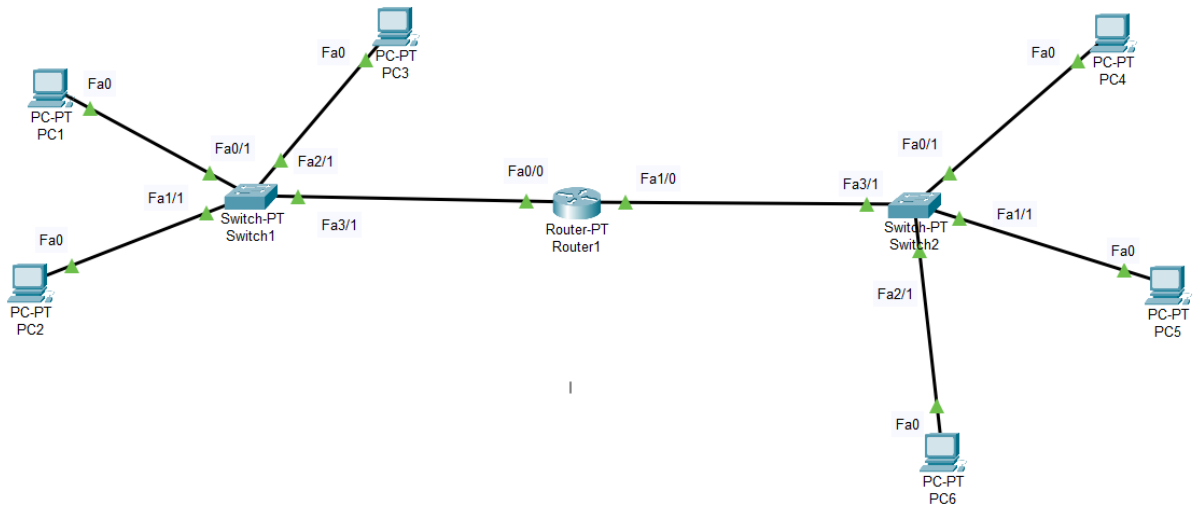


Figure 26 : Gave no shutdown to the port

9. Can you ping from PC1 to 192.168.1.254?
   - Yes, we can ping PC1 to 192.168.1.254 of the router.

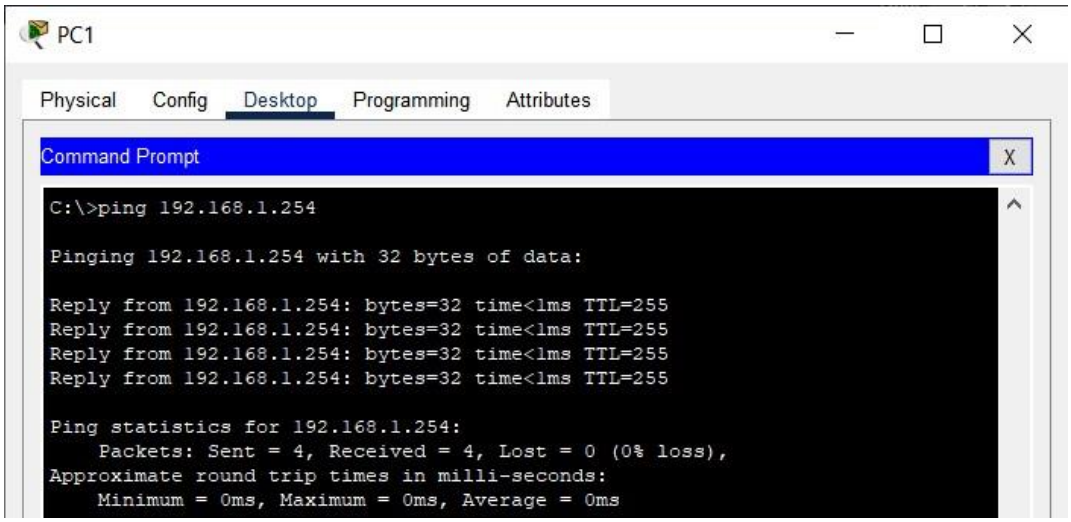


Figure 27 : ping from PC1 to 192.168.1.254

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

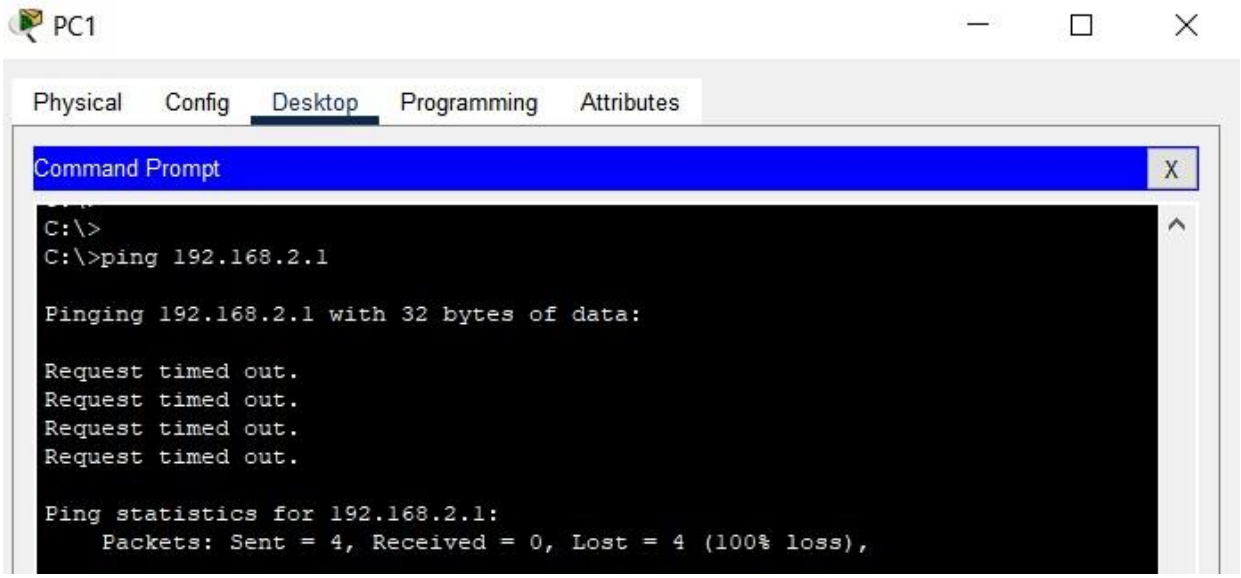


Figure 28 : Results of ping from PC1 to PC4

- 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.

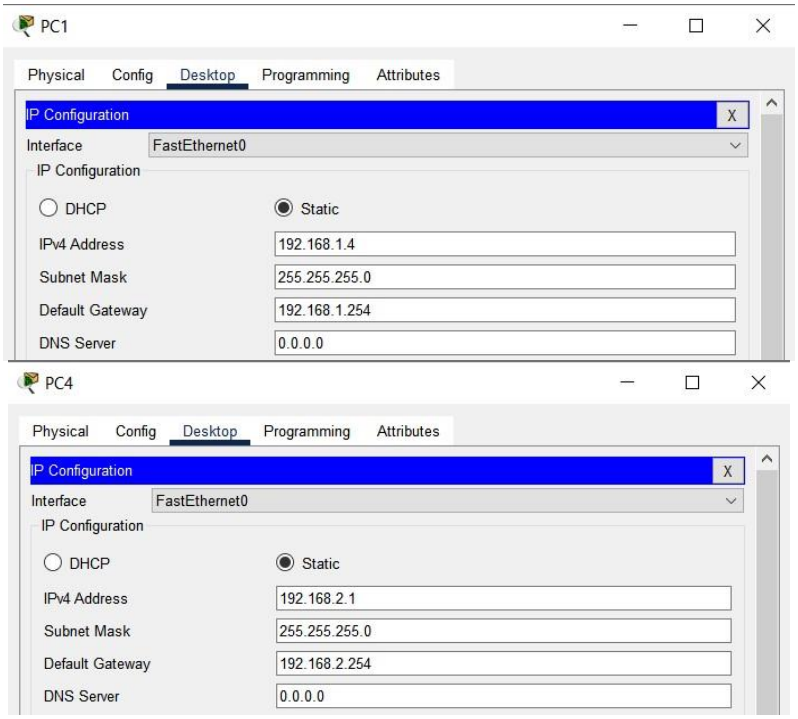


Figure 29 : Setting up gateway addresses of PC1 and PC4

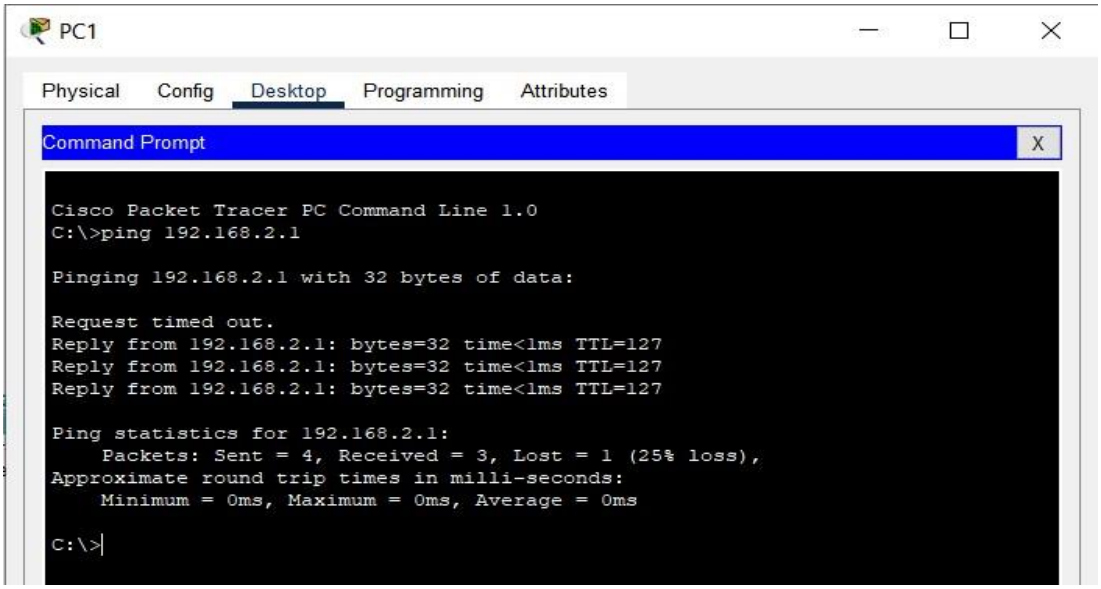


Figure 30 : Result of ping PC1 to PC4

Part 3: Configure static routing.

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

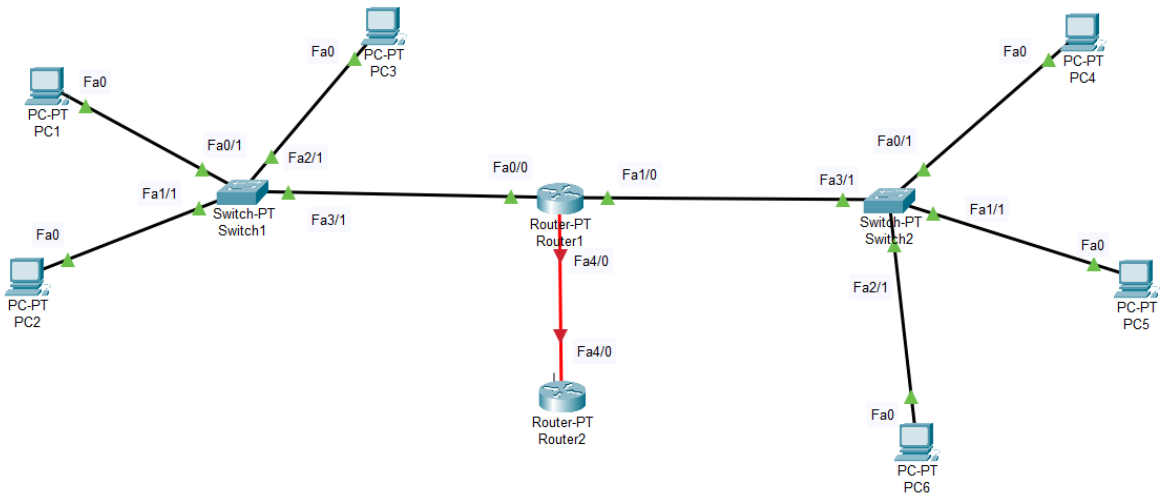


Figure 31 : Adding Router2 and Connected to Router1

Set IP addresses and bring interfaces “Up”.

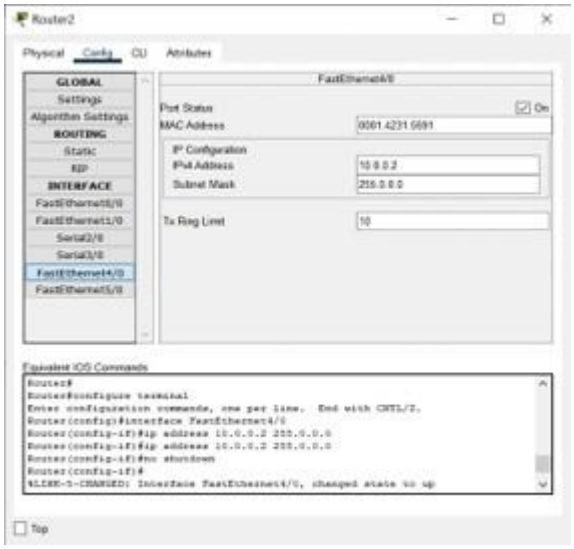


Figure 32 : Set IP addresses and bring interfaces “Up”

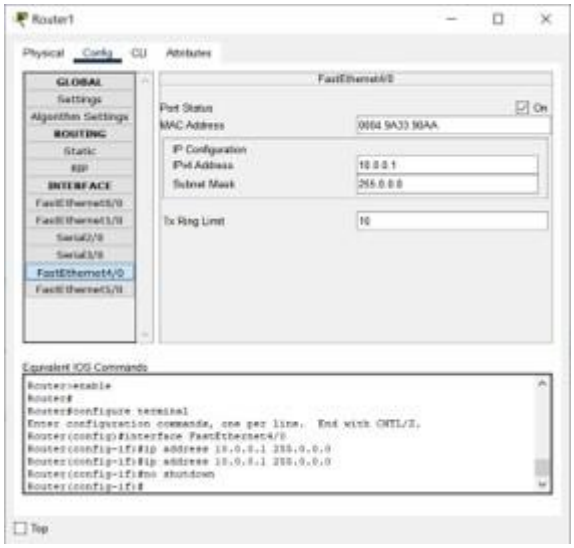


Figure 33 : Set IP addresses and bring interfaces "Up"

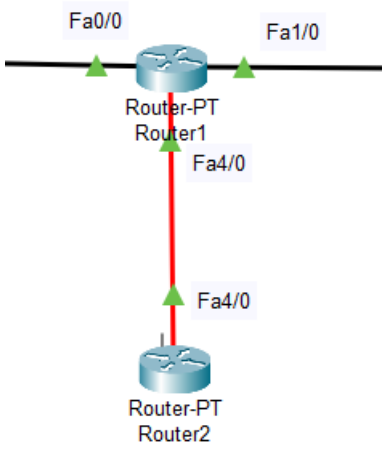


Figure 34 : After interfaces are up

2. Add Switch3 and connect to Router2

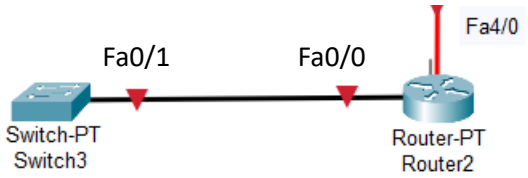


Figure 35 : Add Switch3 and connect to Router2

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

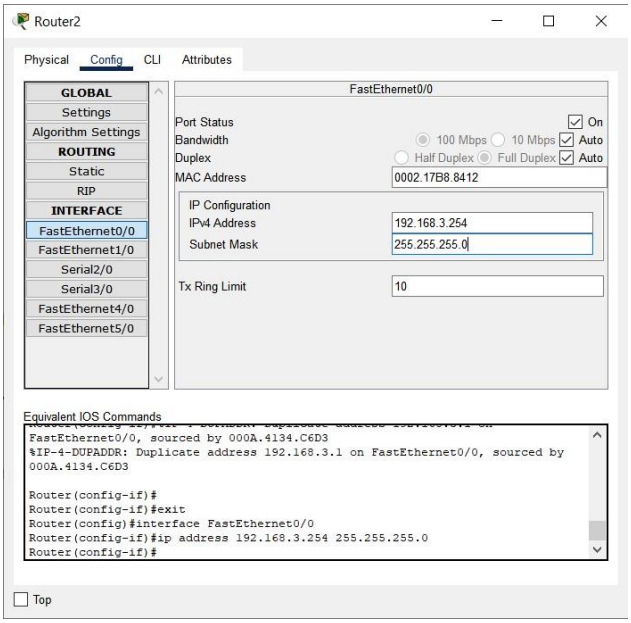


Figure 36 : Gave no shutdown to interface

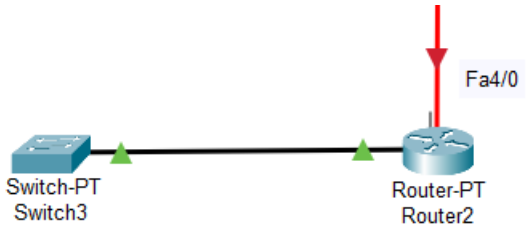


Figure 37 : After interface in up

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.

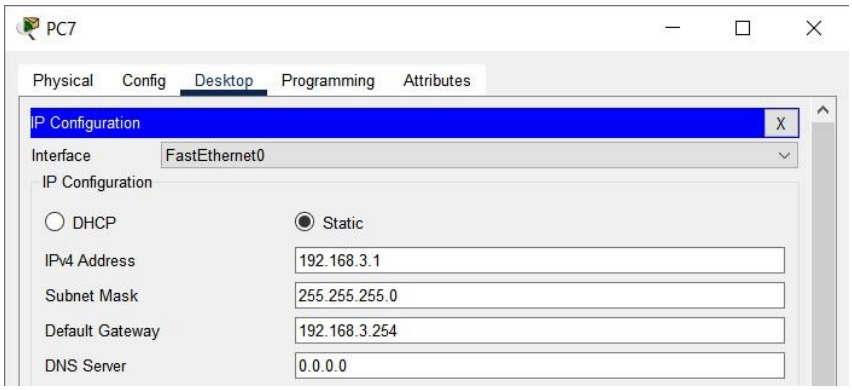


Figure 38 : PC7 configuration

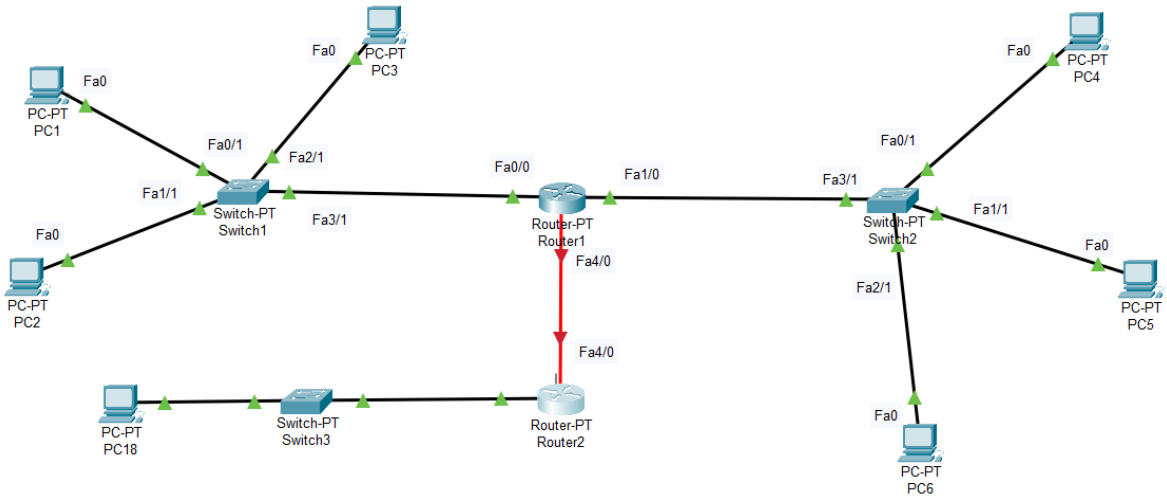


Figure 39 : All interfaces are up except for fiber connection

4. Ping from PC7 to 192.168.3.254

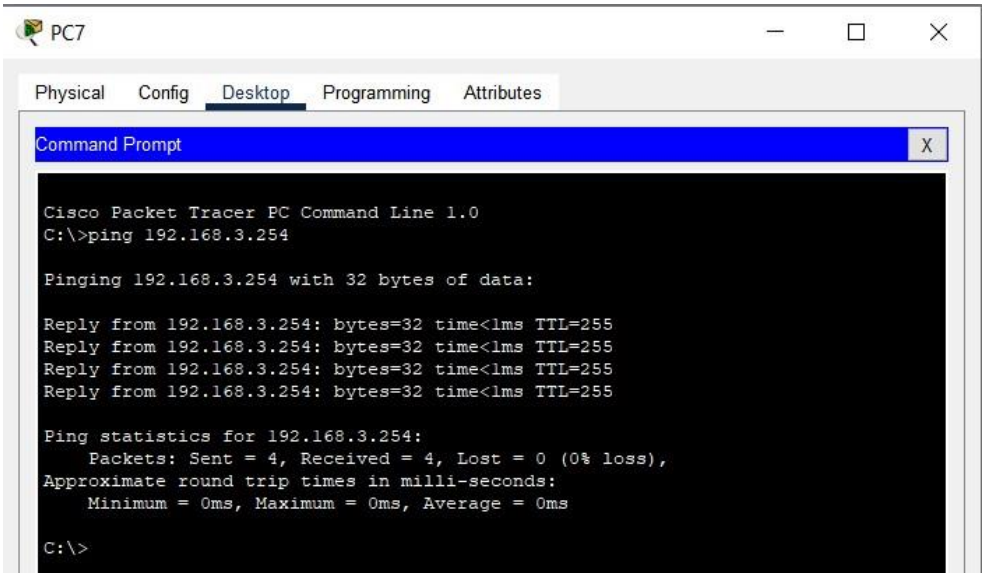


Figure 40 : Ping from PC7 to 192.168.3.254

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

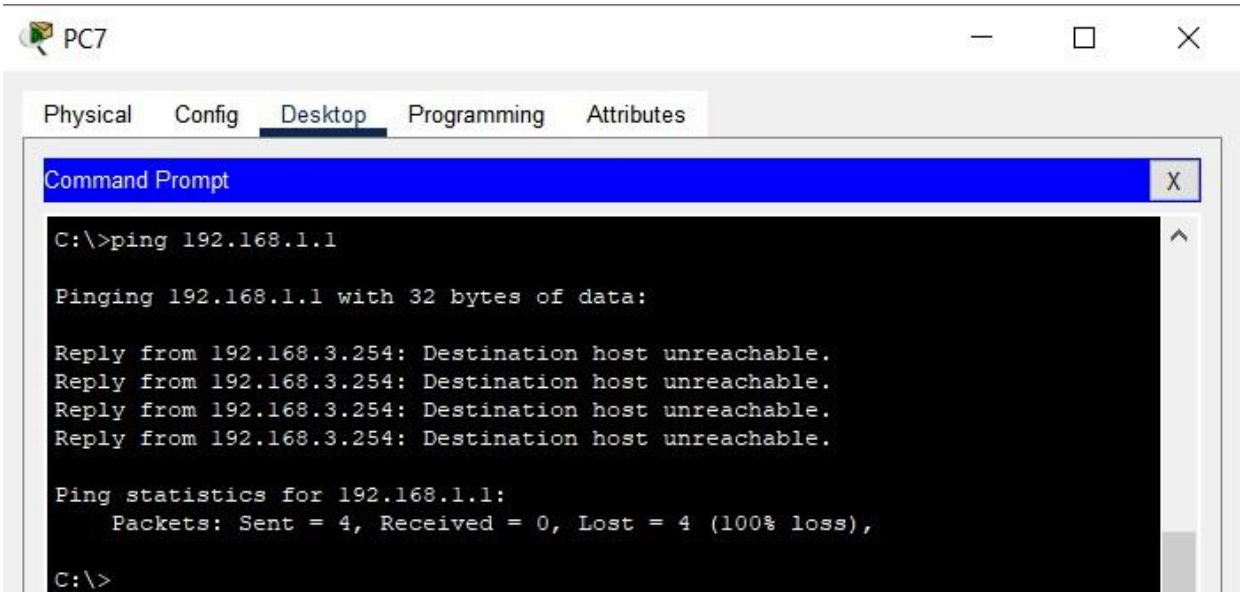
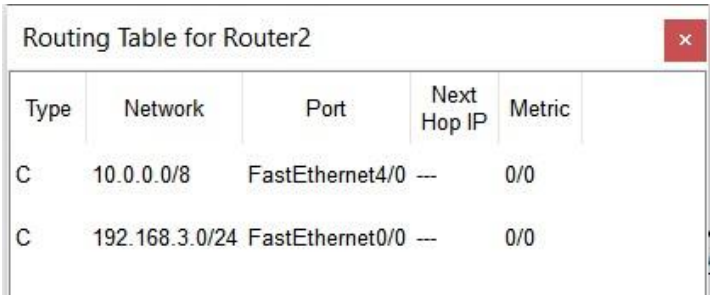


Figure 41 : Result of Ping from PC7 to PC1

Reply from 192.168.3.254: Destination host unreachable.

6. What is the reason for the above message

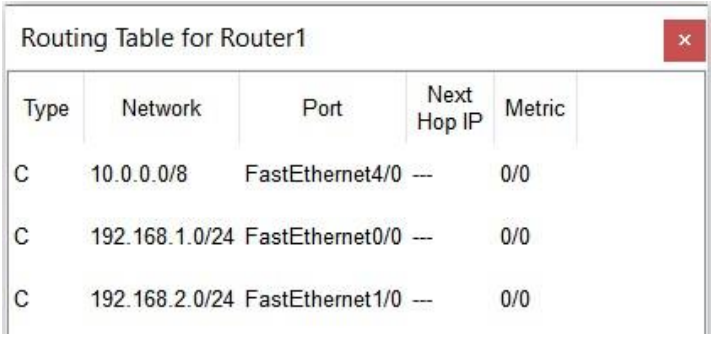
- It is because PC7 packets can only travel up to Router2. Router2 knows about Router1, but it doesn't know what is beyond Router1 because routing table of Router2 doesn't have information about what is beyond Router1.



Routing Table for Router2

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.



Routing Table for 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

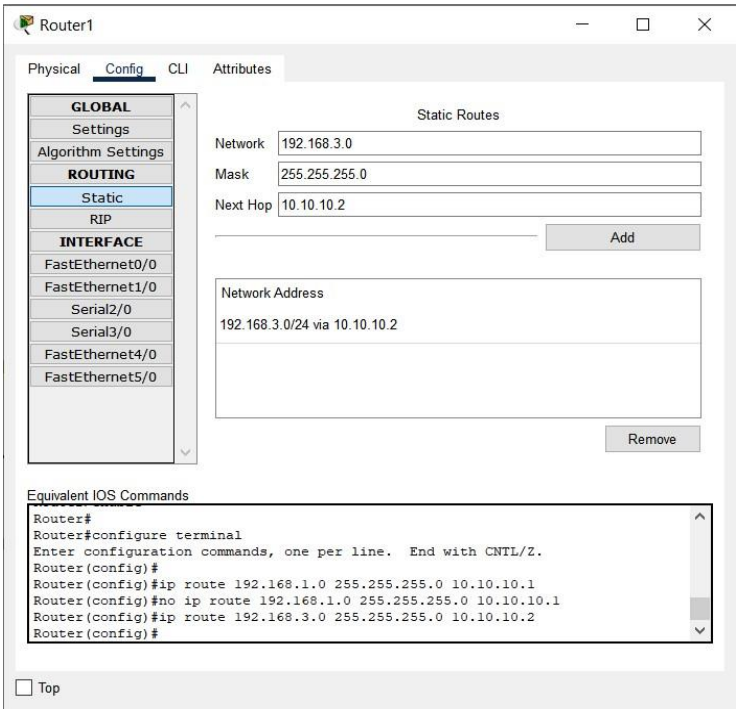


Figure 42 : Static routing configuration on Router1

10. Static routing configuration on Router2

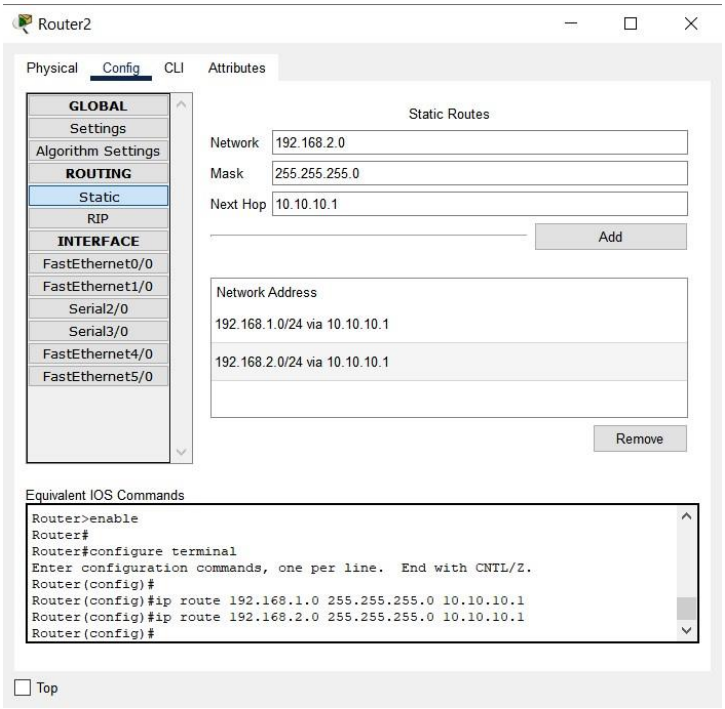


Figure 43 : Static routing configuration on Router2

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.