

Date:04/06/2024

1.Binary to Decimal.

Binary To Decimal Conversion

128	64	32	16	8	4	2	1	Answers	Scratch Area
1	0	0	1	0	0	1	0	<u>146</u>	<u>128</u> <u>16</u> <u>32</u> <u>2</u> <u>16</u> <u>4</u> <u>2</u> <u>1</u>
0	1	1	1	0	1	1	1	<u>119</u>	<u>146</u>
1	1	1	1	1	1	1	1	_____	_____
1	1	0	0	0	1	0	1	_____	<u>119</u>
1	1	1	1	0	1	1	0	_____	_____
0	0	0	1	0	0	1	1	_____	_____
1	0	0	0	0	0	0	1	_____	_____
0	0	1	1	0	0	0	1	_____	_____
0	1	1	1	1	0	0	0	_____	_____
1	1	1	1	0	0	0	0	_____	_____
0	0	1	1	1	0	1	1	_____	_____
0	0	0	0	0	1	1	1	_____	_____
00011011									
10101010									

Solution:

1.10010010 ->146

2.01110111 ->119

3.11111111 ->255

4.11000101 ->197

5.11110110 ->246

6.00010011 ->19

7.10000001 ->129

8.00110001 ->49

9.01111000 ->120

10.11110000 ->240

11.00111011 ->59

12.00000111 ->7

13.00011011 ->27

14.10101010 ->170

Binary to decimal conversion.

128	64	32	16	8	4	2	1	Decimal
1	0	0	1	0	0	1	0	146
0	1	1	1	0	1	1	1	119
1	1	1	1	1	1	1	1	255
1	1	0	0	0	1	0	1	197
1	1	1	1	0	1	1	0	246
0	0	0	1	0	0	1	1	19
1	0	0	0	0	0	0	1	129
0	0	1	1	0	0	0	1	49
0	1	1	1	1	0	0	0	120
1	1	1	1	0	0	0	0	240
0	0	1	1	1	0	1	1	59
0	0	0	0	0	1	1	1	7
0	0	0	1	1	0	1	1	27
1	0	1	0	1	0	1	0	170.

2.Decimal to Binary.

Decimal To Binary Conversion

Use all 8 bits for each problem

128	64	32	16	8	4	2	1	=	255	Scratch Area
/	/	/	0	1	/	/	0	238	238	34
0	0	/	0	0	0	/	0	34	-128	-32
								123	110	2
								50	-64	-2
								255	46	0
								200	-32	
								10	14	
								138	-8	
								1	6	
								13	-4	
								250	2	
								107	-2	
								224	0	
								114		
								192		

Solution:

Decimal to Binary conversion.

Decimal	128	64	32	16	8	4	2	1
238	1	1	1	0	1	1	1	0
34	0	0	1	0	0	0	1	0
123	0	1	1	1	1	0	1	1
50	0	0	1	1	0	0	1	0
255	1	1	1	1	1	1	1	1
200	1	1	0	0	1	0	0	0
10	0	0	0	0	1	0	1	0
138	1	0	0	0	1	0	1	0
1	0	0	0	0	0	0	0	1
13	0	0	0	0	1	1	0	1
250	1	1	1	1	1	0	1	0
107	0	1	1	0	1	0	1	1
227	1	1	1	0	0	0	1	1
114	0	1	1	1	0	0	1	0
192	1	1	0	0	0	0	0	0

3.Address of classes identification.

Address Class Identification

Address	Class
10.250.1.1	<u>A</u>
150.10.15.0	<u>B</u>
192.14.2.0	_____
148.17.9.1	_____
193.42.1.1	_____
126.8.156.0	_____
220.200.23.1	_____
230.230.45.58	_____
177.100.18.4	_____
119.18.45.0	_____
249.240.80.78	_____

Solution:

A ->1-126

B ->128-191

C ->192-223

D ->224-239

E ->240-255

1. 10.250.1.1

- First Octet: 10

- Class A (1-126)

2. 150.10.15.0

- First Octet: 150

- Class B (128-191)

3. 192.14.2.0

- First Octet: 192

- Class C (192-223)
4. 148.17.9.1
- First Octet: 148
 - Class B (128-191)
5. 193.42.1.1
- First Octet: 193
 - Class C (192-223)
6. 126.8.156.0
- First Octet: 126
 - Class A (1-126)
7. 220.200.23.1
- First Octet: 220
 - Class C (192-223)
8. 230.230.45.58
- First Octet: 230
 - Class D (224-239, used for multicast)
9. 177.100.18.4
- First Octet: 177
 - Class B (128-191)
10. 119.18.45.0
- First Octet: 119
 - Class A (1-126)
11. 249.240.80.78
- First Octet: 249
 - Class E (240-255, used for experimental purposes)

4.Network and Host Position Circle.

Network & Host Identification

177.100.18.4

119.18.45.0

209.240.80.78

199.155.77.56

117.89.56.45

215.45.45.0

192.200.15.0

95.0.21.90

33.0.0.0

158.98.80.0

217.21.56.0

10.250.1.1

Solution:

Network Host Identification.

A → 1 - 127
 B → 128 - 191
 C → 192 - 223
 D → 224 - 239

A → N H H H
 B → N N H H
 C → N N N H

IP Address	Network	Host.
177.100.18.4	177.100	18.4
119.18.45.0	119	18.45.0
209.240.80.78	209.240.80	78
199.155.77.56	199.155	77.56
117.89.56.45	117	89.56.45
215.45.45.0	215.45.45	0
192.200.15.0	192.200.15	0
95.0.21.90	95	0.21.90
33.0.0.0	33	0.0.0
158.98.80.0	158.98	8.0
217.21.56.0	217.21.56	0
10.250.1.1	10	250.1.1

Date:05/06/2024

1.Network Address.

Network Addresses

Using the IP address and subnet mask shown write out the network address:

188.10.18.2
255.255.0.0

188 . 10 . 0 . 0

10.10.48.80
255.255.255.0

10 . 10 . 48 . 0

192.149.24.191
255.255.255.0

150.203.23.19
255.255.0.0

10.10.10.10
255.0.0.0

186.13.23.110
255.255.255.0

223.69.230.250
255.255.0.0

200.120.135.15
255.255.255.0

Solution:

Network Addresses

1. 188.10.18.2 / 255.255.0.0

- IP Address: 188.10.18.2
- Subnet Mask: 255.255.0.0
- Network Address: 188.10.0.0**

2. 10.10.48.80 / 255.255.255.0

- IP Address: 10.10.48.80
- Subnet Mask: 255.255.255.0
- Network Address: 10.10.48.0**

3. 192.149.24.191 / 255.255.255.0

- IP Address: 192.149.24.191
- Subnet Mask: 255.255.255.0
- **Network Address: 192.149.24.0**

4. 150.203.23.19 / 255.255.0.0

- IP Address: 150.203.23.19
- Subnet Mask: 255.255.0.0
- **Network Address: 150.203.0.0**

5. 10.10.10.10 / 255.0.0.0

- IP Address: 10.10.10.10
- Subnet Mask: 255.0.0.0
- **Network Address: 10.0.0.0**

6. 186.13.23.110 / 255.255.255.0

- IP Address: 186.13.23.110
- Subnet Mask: 255.255.255.0
- **Network Address: 186.13.23.0**

7. 223.69.230.250 / 255.255.0.0

- IP Address: 223.69.230.250
- Subnet Mask: 255.255.0.0
- **Network Address: 223.69.0.0**

8. 200.120.135.15 / 255.255.255.0

- IP Address: 200.120.135.15
- Subnet Mask: 255.255.255.0
- **Network Address: 200.120.135.0**

Network Address.

IP Address and Subnet Mask	Network Address
188.10.18.2 255.255.0.0	188.10.0.0
10.10.48.80 255.255.255.0	10.10.48.0
192.149.24.191 255.255.255.0	192.149.24.0
150.203.23.19 255.255.0.0	150.203.0.0
10.10.10.10 255.0.0.0	10.0.0.0
186.13.23.110 255.255.255.0	186.13.23.0
223.69.230.250 255.255.0.0	223.69.0.0
200.120.135.15 255.255.255.0	200.120.135.0

2.Host Address.

Host Addresses

Using the IP address and subnet mask shown write out the host address:

188.10.18.2	<u>0 . 0 . 18 . 2</u>
255.255.0.0	
10.10.48.80	<u>0 . 0 . 0 . 80</u>
255.255.255.0	
222.49.49.11	
255.255.255.0	
128.23.230.19	
255.255.0.0	
10.10.10.10	
255.0.0.0	
200.113.123.11	
255.255.255.0	
223.169.23.20	
255.255.0.0	

Solution:

Host Address.

IP Address and Subnet Mask	Host Address
188. 10. 18. 2 255. 255. 0. 0	0. 0. 18. 2
10. 10. 48. 80 255. 255. 255. 0	0. 0. 0. 80
222. 49. 49. 11 255. 255. 255. 0	0. 0. 0. 11
128. 23. 230. 19 255. 255. 0. 0	0. 0. 230. 19
10. 10. 10. 10 255. 0. 0. 0	0. 10. 10. 10
200. 113. 123. 11 255. 255. 255. 0	0. 0. 0. 11
223. 169. 23. 20 255. 255. 0. 0	0. 0. 23. 20

3.Default Subnet Masks:

Default Subnet Masks

Write the correct default subnet mask for each of the following addresses:

177.100.18.4

255 . 255 . 0 . 0

119.18.45.0

255 . 0 . 0 . 0

191.249.234.191

223.23.223.109

10.10.250.1

126.123.23.1

223.69.230.250

192.12.35.105

77.251.200.51

189.210.50.1

88.45.65.35

128.212.250.254

Solution:

1. 177.100.18.4

- Class B

- Default Subnet Mask: 255.255.0.0

2. 119.18.45.0

- Class A

- Default Subnet Mask: 255.0.0.0

3. 191.249.234.191

- Class B

- Default Subnet Mask: 255.255.0.0

4. 223.23.223.109

- Class C

- Default Subnet Mask: 255.255.255.0

5. 10.10.250.1

- Class A

- Default Subnet Mask: 255.0.0.0

6. 126.123.23.1

- Class A

- Default Subnet Mask: 255.0.0.0

7. 223.69.230.250

- Class C

- Default Subnet Mask: 255.255.255.0

8. 192.12.35.105

- Class C

- Default Subnet Mask: 255.255.255.0

9. 77.251.200.51

- Class A

- Default Subnet Mask: 255.0.0.0

10. 189.210.50.1

- Class B

- Default Subnet Mask: 255.255.0.0

11. 88.45.65.35

- Class A

- Default Subnet Mask: 255.0.0.0

12. 128.212.250.254

- Class B

- Default Subnet Mask: 255.255.0.0

Default Subnet Masks

A → 1 - 127	A → 250.0.0.0
B → 128 - 191	B → 255.255.0.0
C → 192 - 223	C → 255.255.255.0
D → 224 - 239	

IP Address	Default subnet Mask	Class
177.100.18.4	255.255.0.0	Class B
119.18.45.0	255.0.0.0	Class A
191.249.234.191	255.255.0.0	Class B
223.23.223.109	255.255.255.0	Class C
10.10.250.1	255.0.0.0	Class A
126.123.23.1	255.0.0.0	Class A
223.69.230.250	255.255.255.0	Class C
192.12.35.105	255.255.255.0	Class C
77.251.200.51	255.0.0.0	Class A
189.210.50.1	255.255.0.0	Class B
88.45.65.35	255.0.0.0	Class A
128.212.250.254	255.255.0.0	Class B

4.Broadcast.

Using this ip address and subnet mask find broadcast address

188.10.18.2

255.255.0.0

10.10.48.80

255.255.255.0

192.149.24.191

255.255.255.0

150.203.23.19

255.255.0.0

10.10.10.10

255.0.0.0

186.13.23.110

255.255.255.0

223.69.230.250

255.255.0.0

200.120.135.15

255.255.255.0

Solution:

Broadcast Address:

Broadcast Address

Ip address and Subnet Mask	Broadcast Address
18.10.18.2 255.255.0.0	188.10.255.255
10.10.48.80 255.255.255.0	10.10.48.255
192.149.24.191 255.255.255.0	192.149.24.255
150.203.23.19 255.255.0.0	150.203.255.255
10.10.10.10 255.0.0.0	10.255.255.255
186.13.23.110 255.255.255.0	186.13.23.255
223.69.230.250 255.255.0.0	223.69.255.255
200.120.135.15 255.255.255.0	200.120.135.255

Custom Subnet Masks

Problem 4

Number of needed subnets **6**

Number of needed usable hosts **30**

Network Address **195.85.8.0**

Address class _____

Default subnet mask _____

Custom subnet mask _____

Total number of subnets _____

Total number of host addresses _____

Number of usable addresses _____

Number of bits borrowed _____

Show your work for **Problem 5** in the space below.

Solution:

Address class:C

Default subnet mask: 255.255.255.0

Custom subnet mask: 255.255.255.224

Total number of subnets: 8

Total number of host addresses: 32

Number of usable addresses: 30

Number of bits borrowed: 3

Explanation:

1. Address Class:

Network address:195.85.8.0.

Range of 192-223, it is a Class C address.

Address class: C

2. Default Subnet Mask:

For a Class C address, the default subnet mask is 255.255.255.0.

Default subnet mask: 255.255.255.0

3. Custom Subnet Mask:

$(2^3 = 8)$ (since 3 bits are enough to create 8 subnets, which is more than 6).

$(2^5 - 2 = 30)$ (since 5 bits provide 32 addresses, but 2 are reserved for network and broadcast addresses, leaving 30 usable addresses).

Class C address has 24 network bits and we borrow 3 bits for subnetting, the subnet mask will be:

$$24 + 3 = 27 \text{ bits}$$

Custom subnet mask: 255.255.255.224

4. The Total Number of Subnets:

3 borrowed bits, $(2^3 = 8)$ subnets.

Total number of subnets: 8

5. The Total Number of Host Addresses per Subnet:

5 remaining host bits, $(2^5 = 32)$ addresses per subnet.

Total number of host addresses: 32

6. The Number of Usable Addresses per Subnet:

The number of usable addresses is $(2^5 - 2 = 30)$.

Number of usable addresses: 30

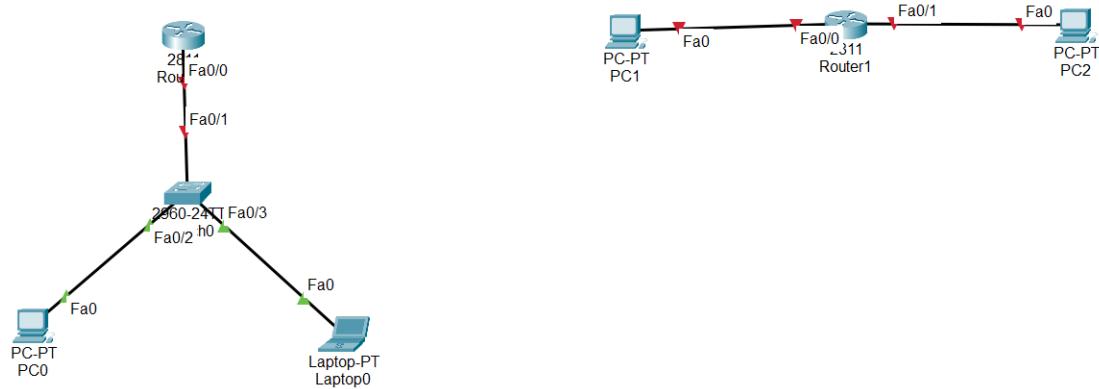
7. Number of Bits Borrowed:

Borrowed 3 bits from the host portion to create subnets.

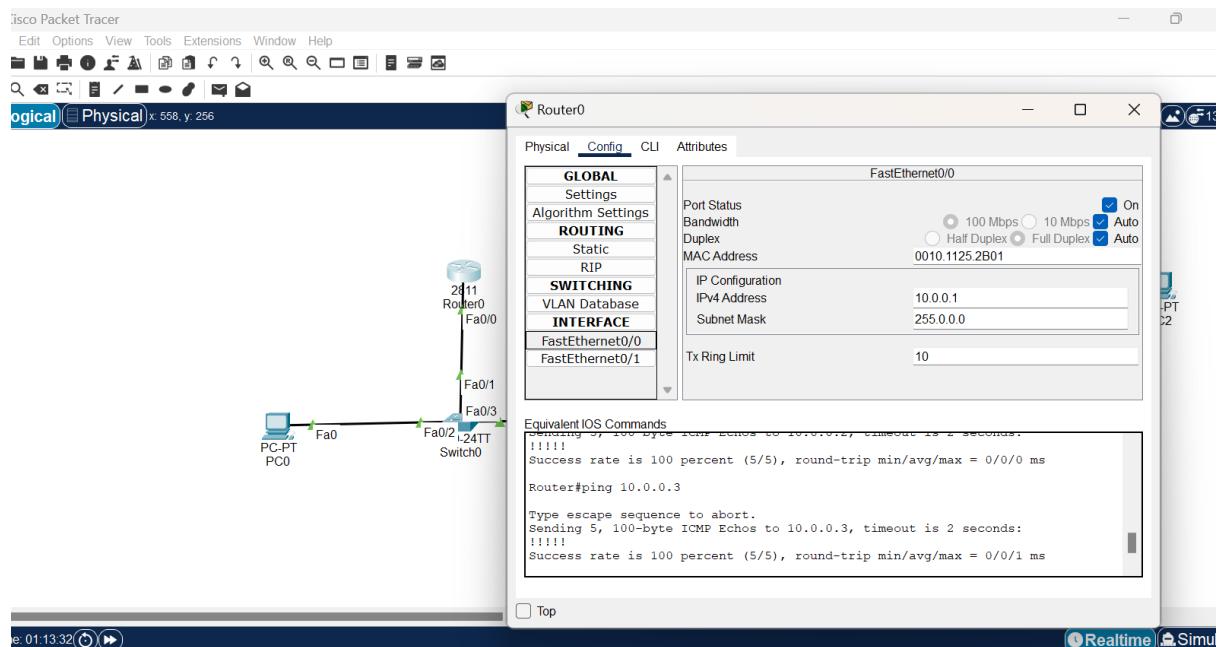
Number of bits borrowed: 3

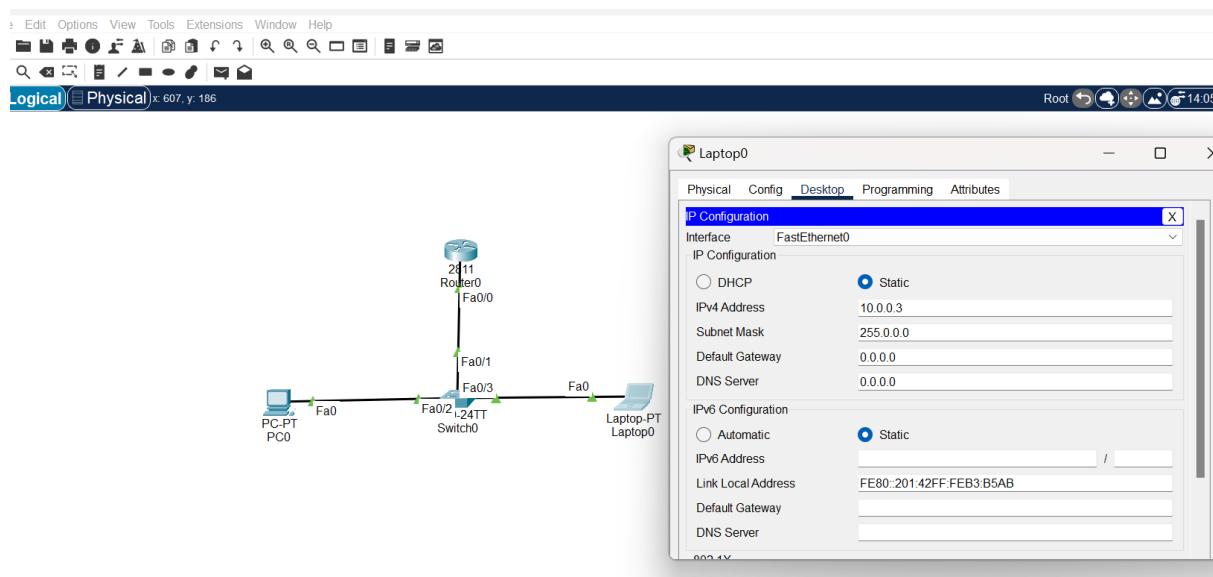
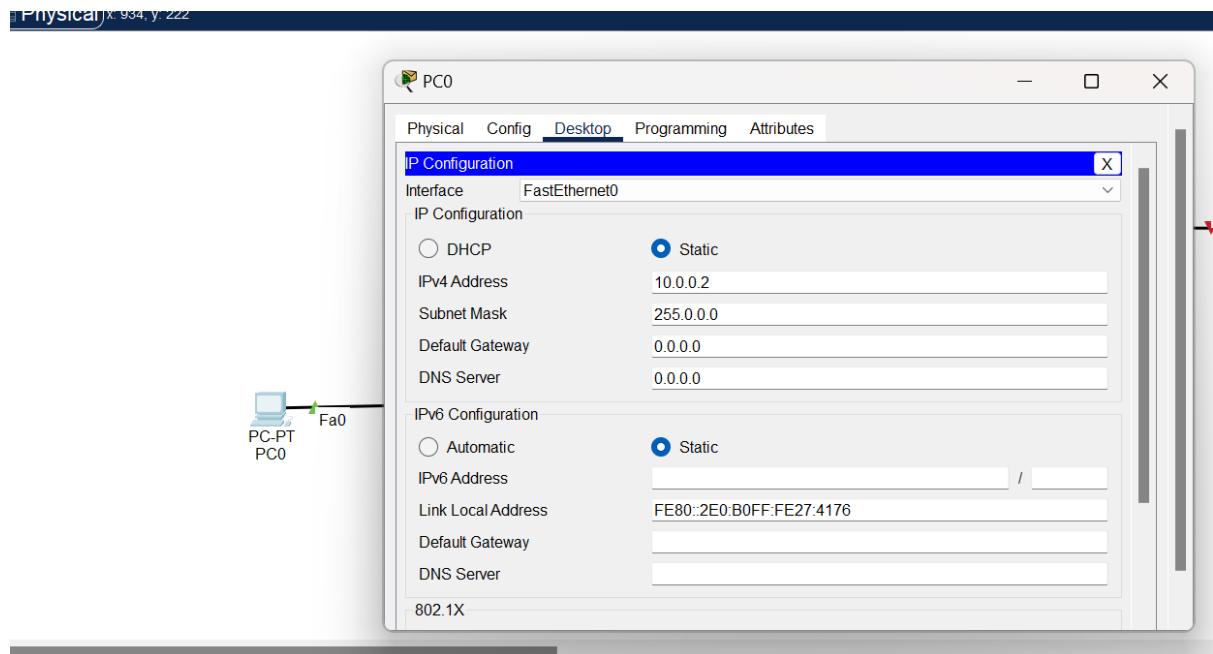
Date:06/06/2024

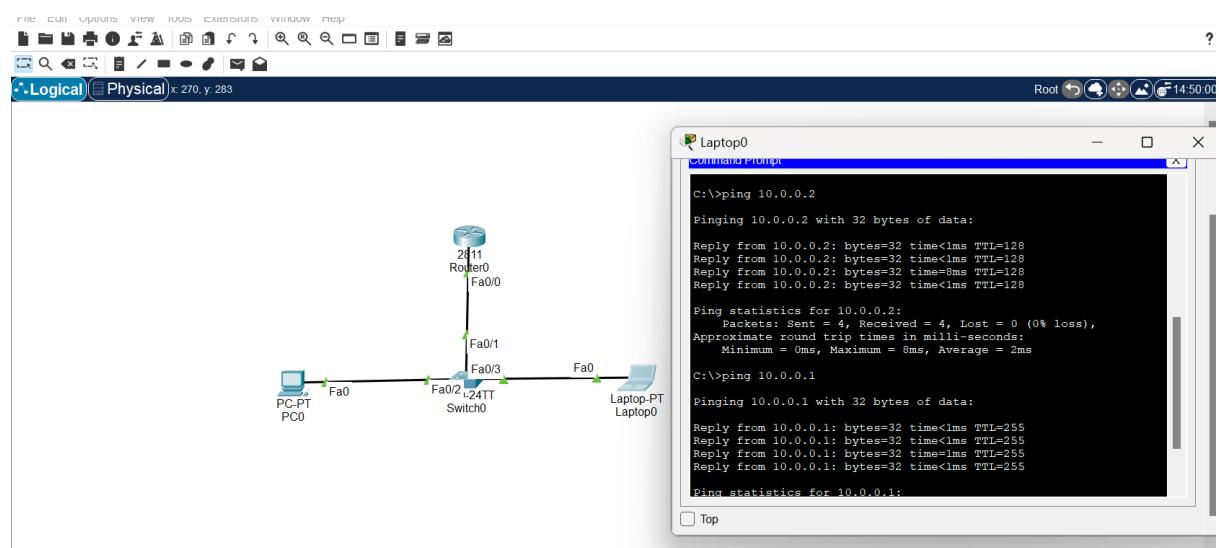
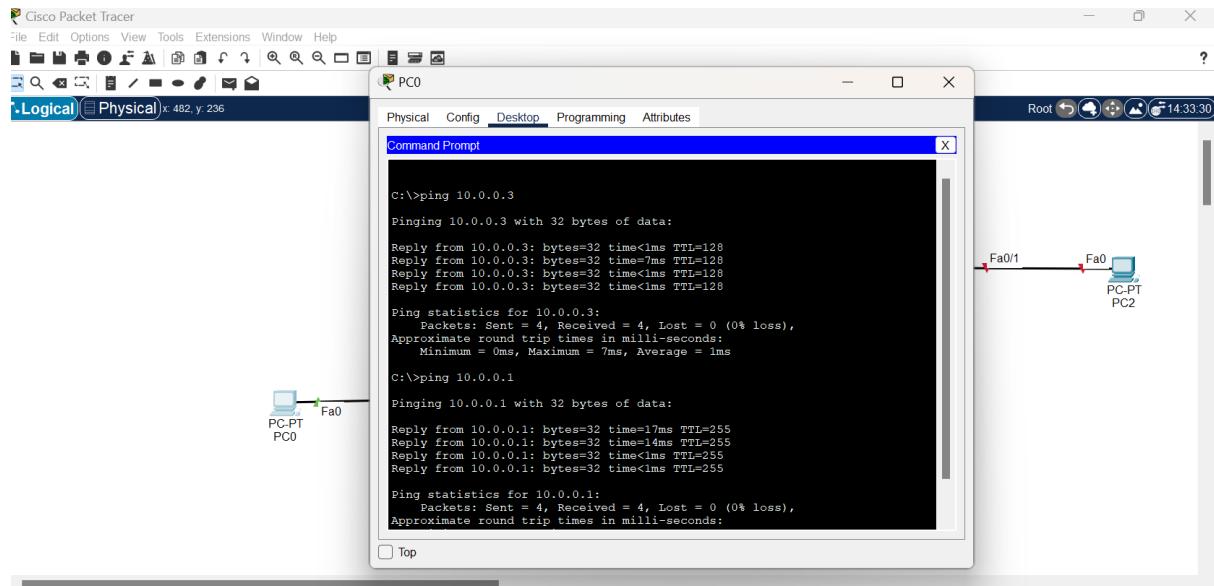
Lab 1 - Connecting the Devices.

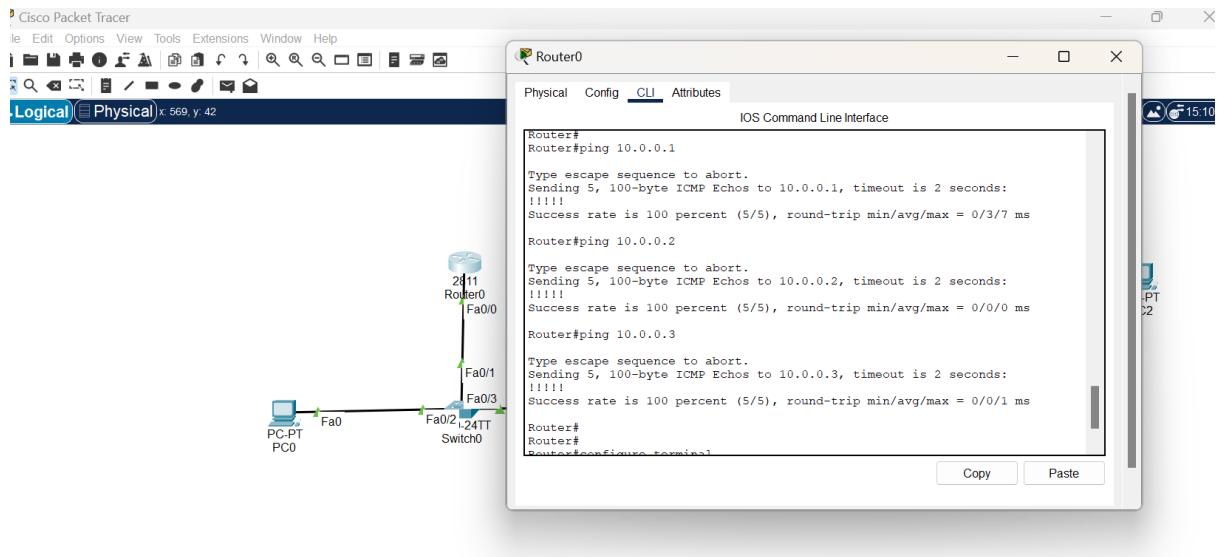


Lab 2 - IP Address Configuration and Ping check.

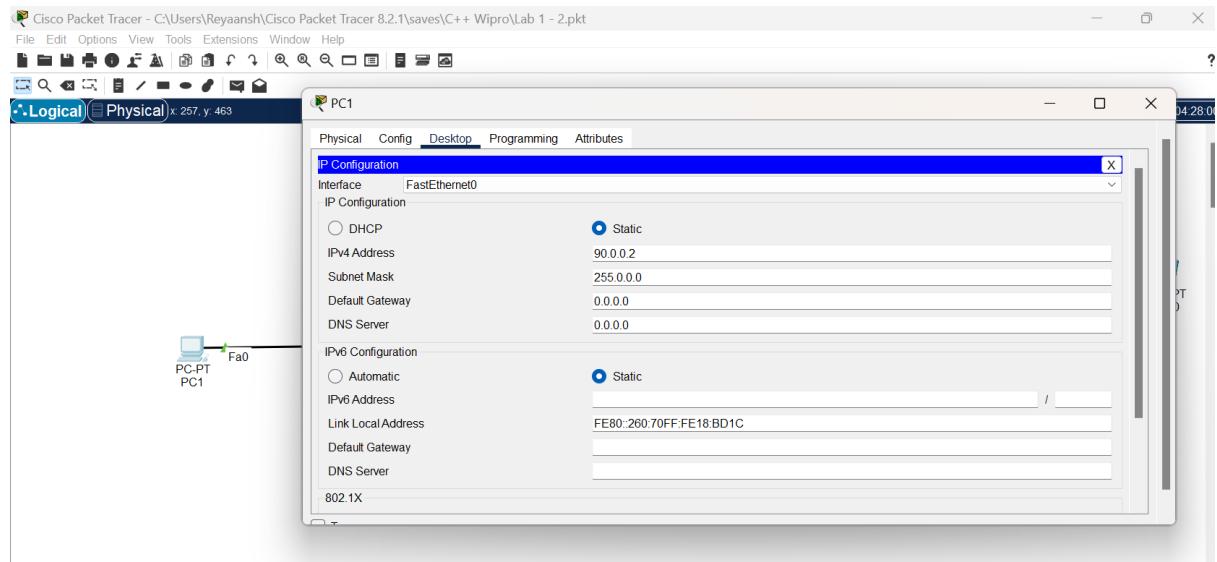


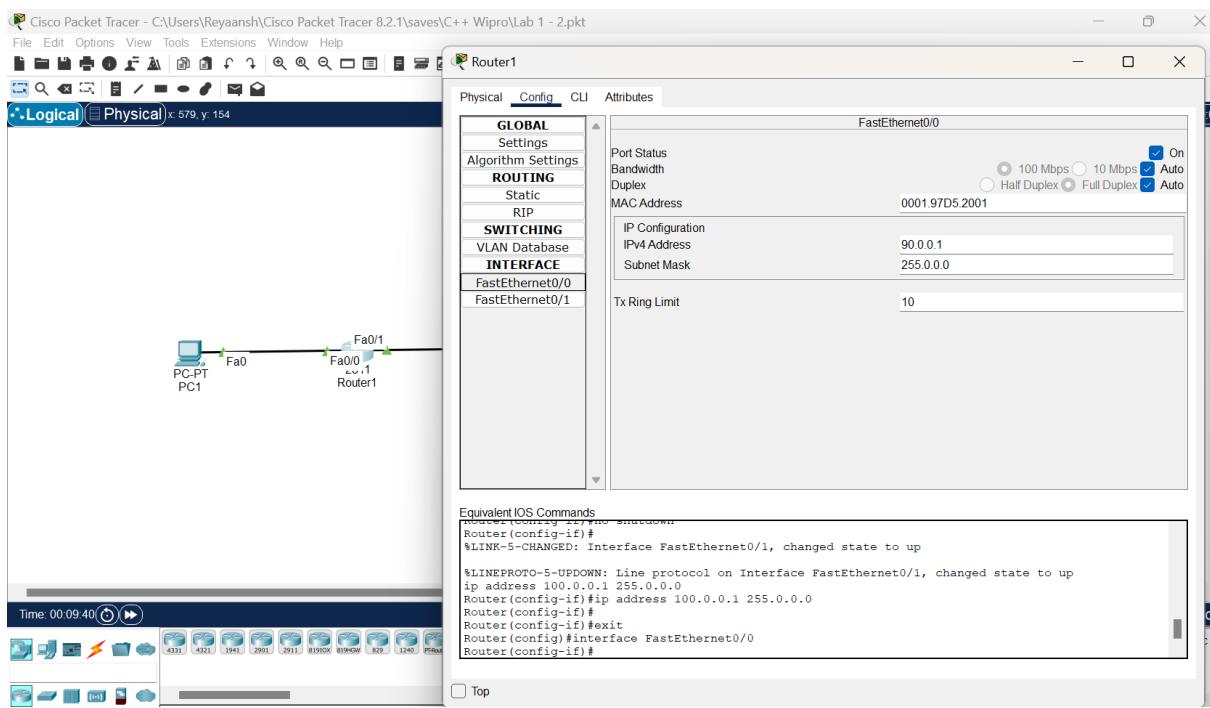
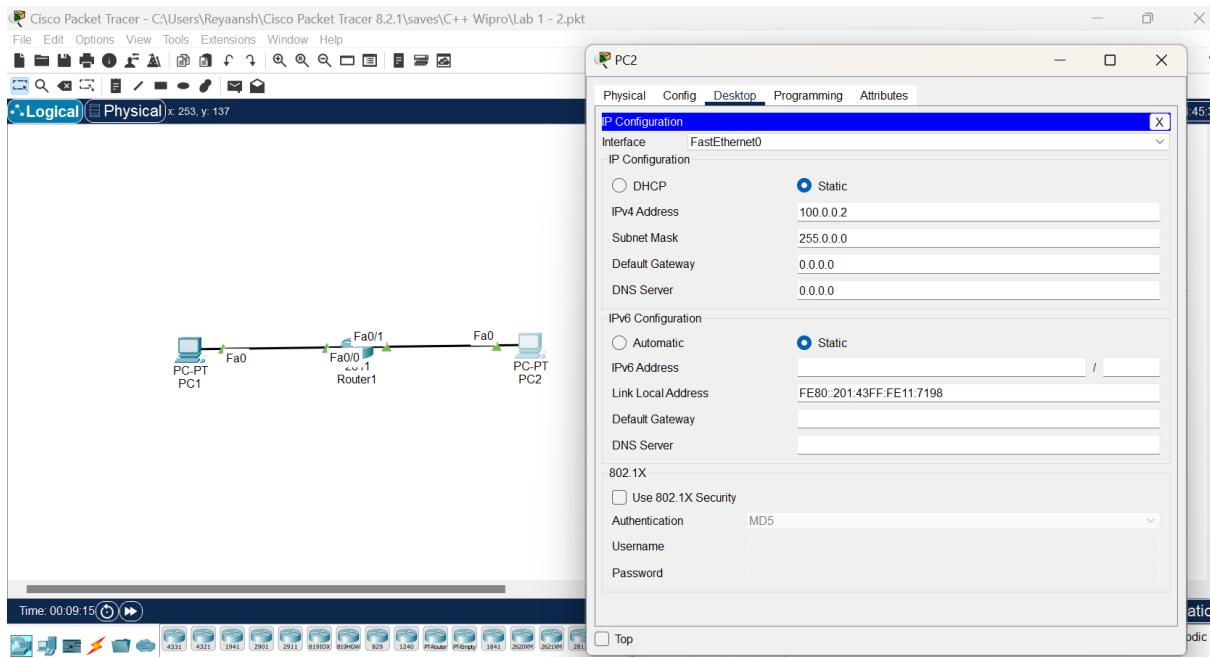


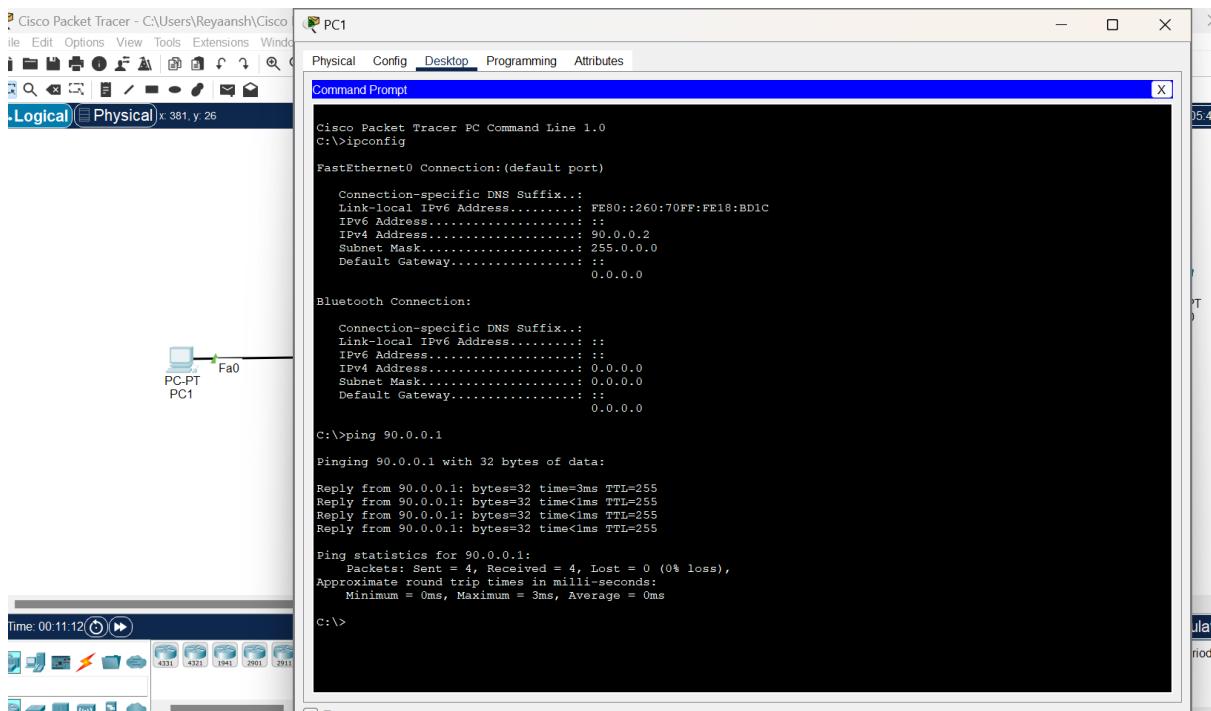
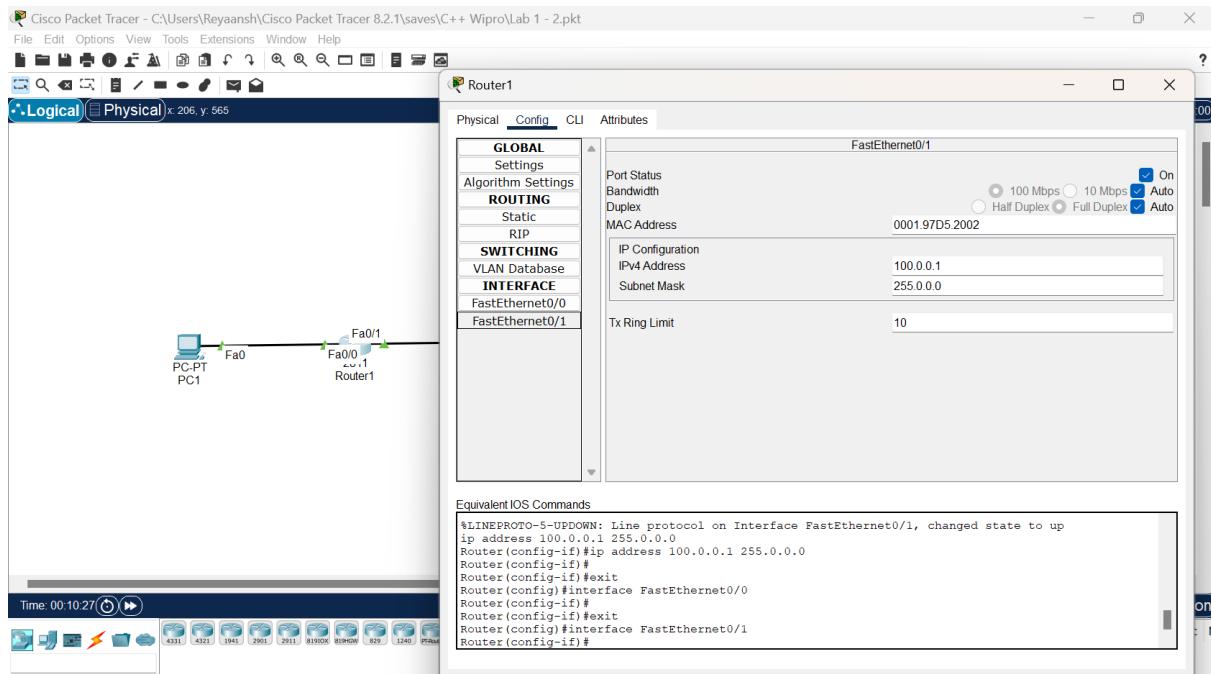


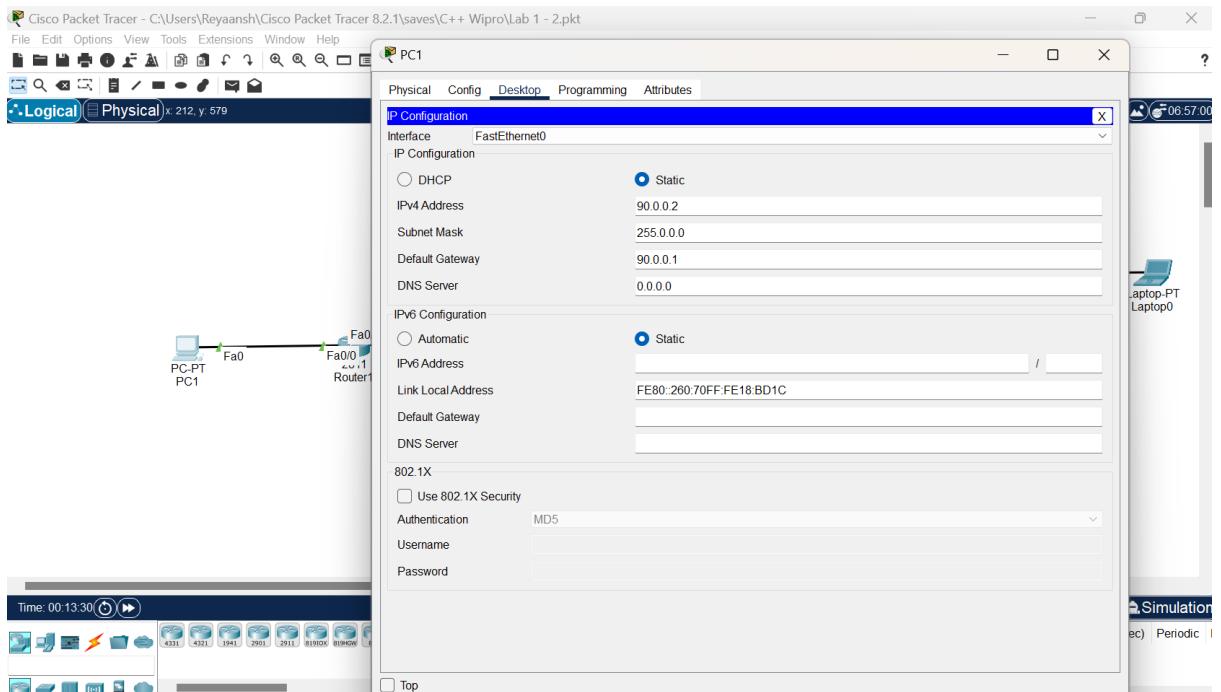
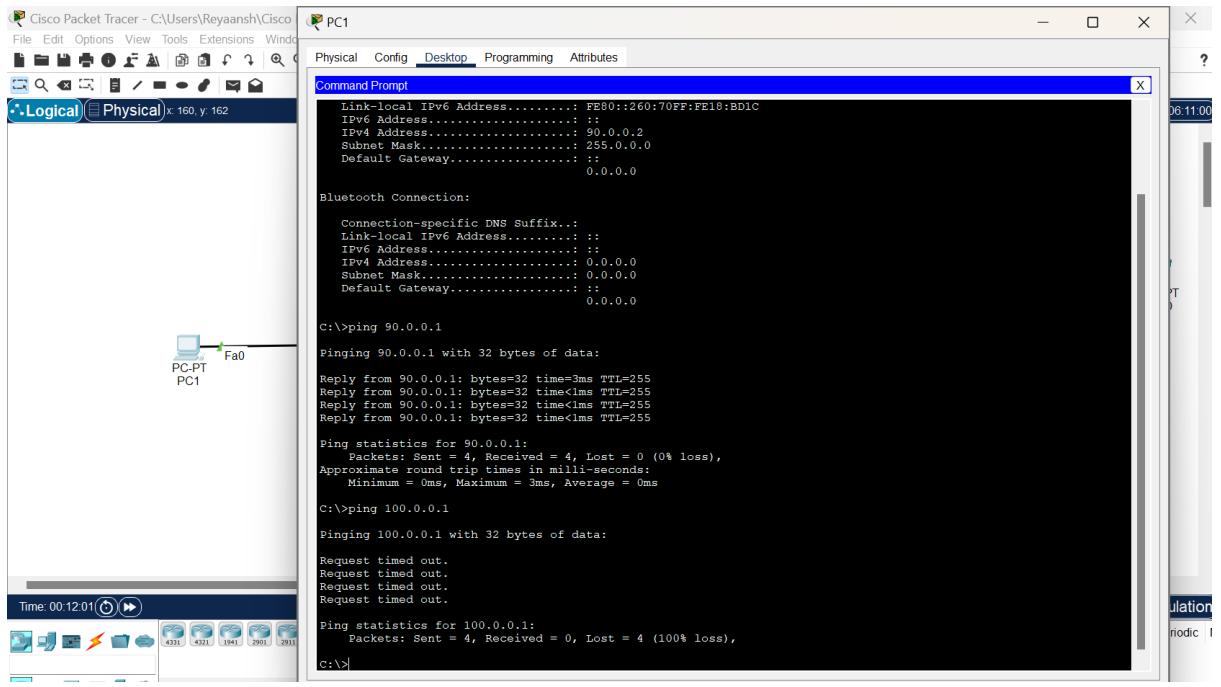


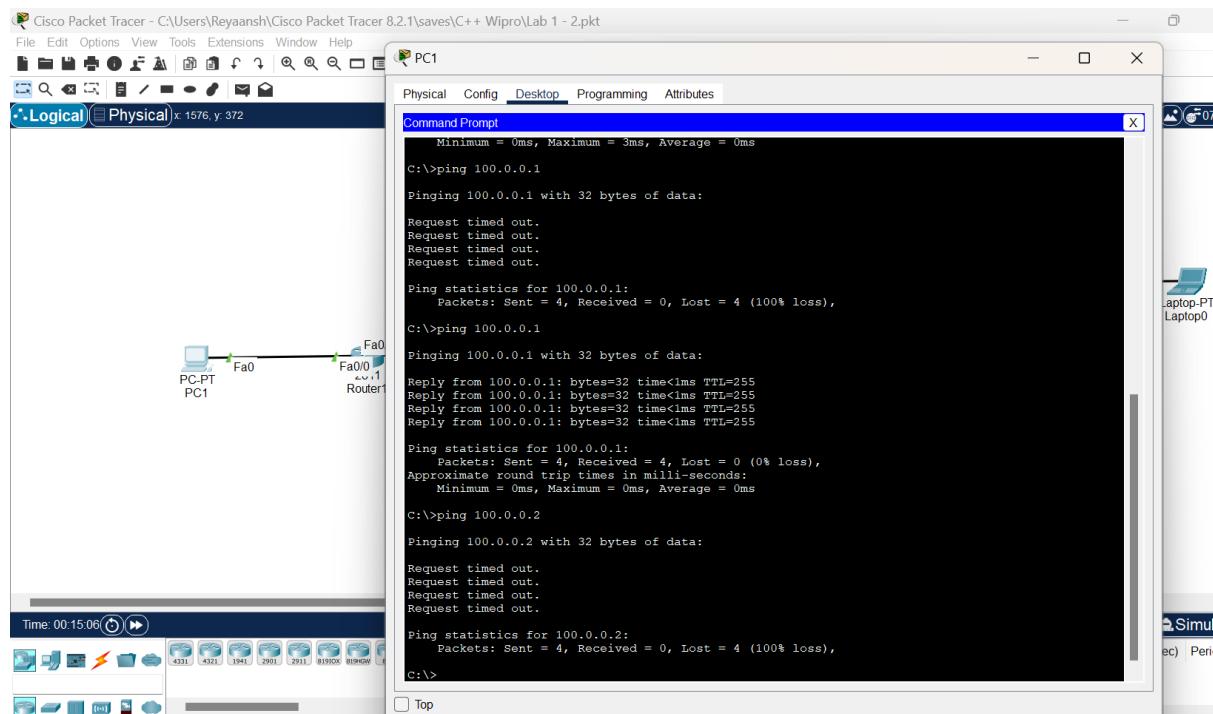
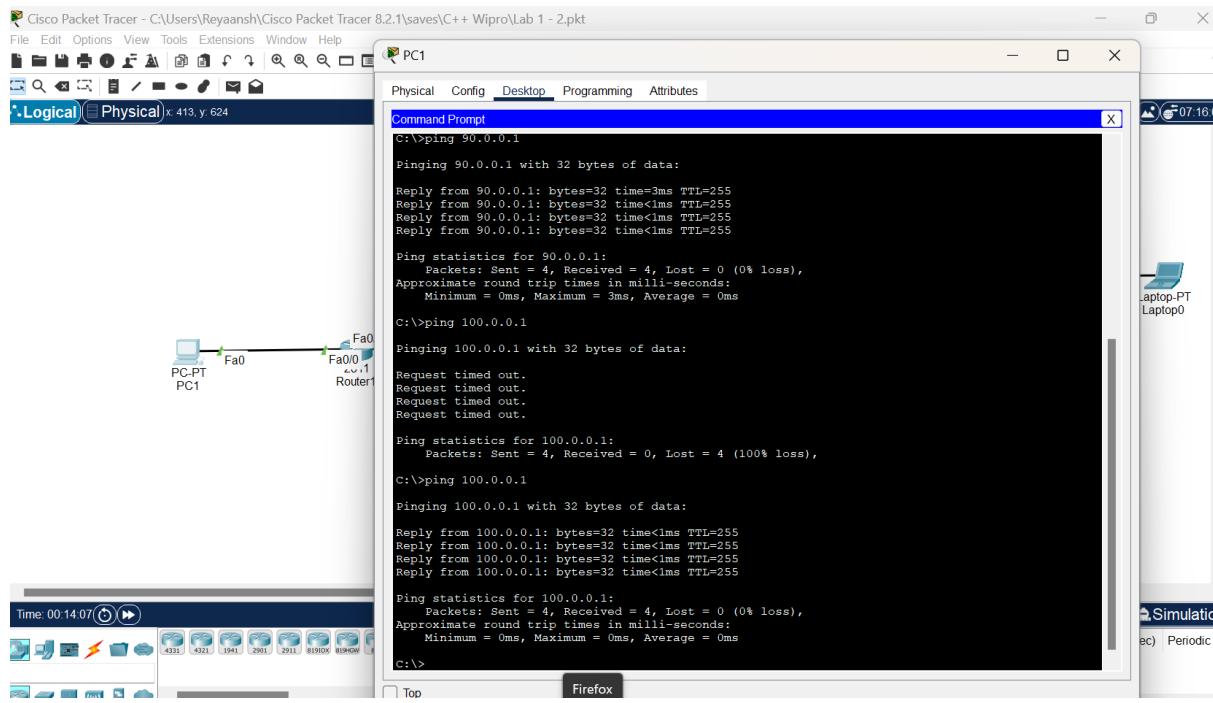
Lab 3 – Configuration Default Gateway.

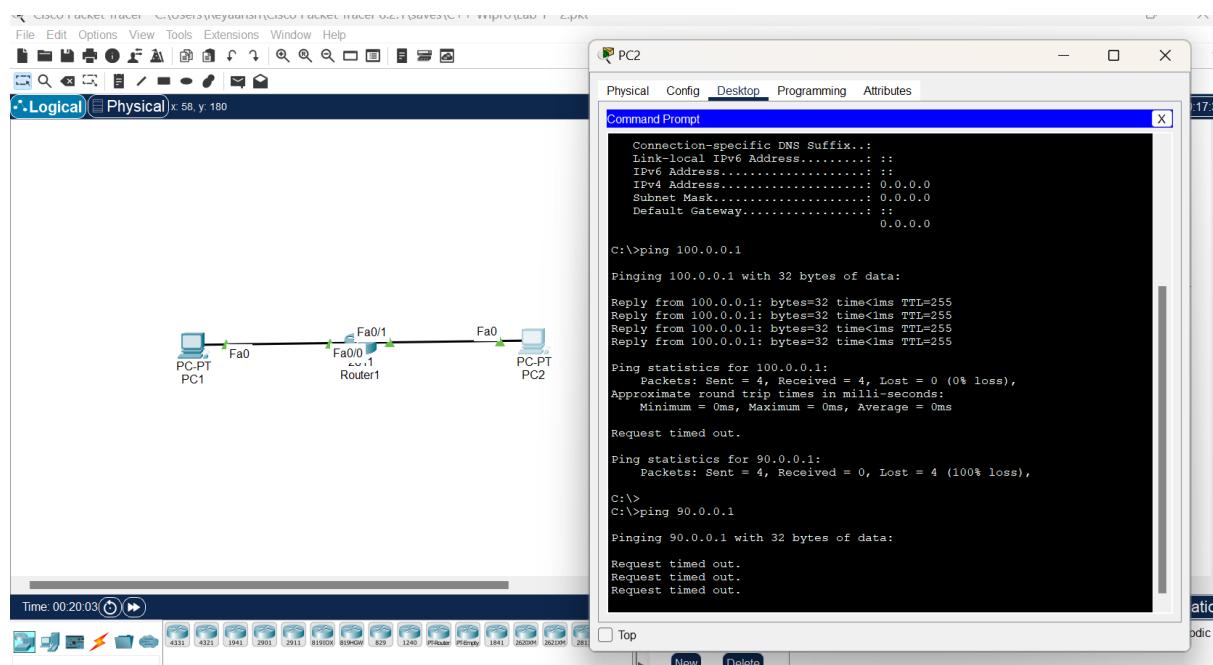
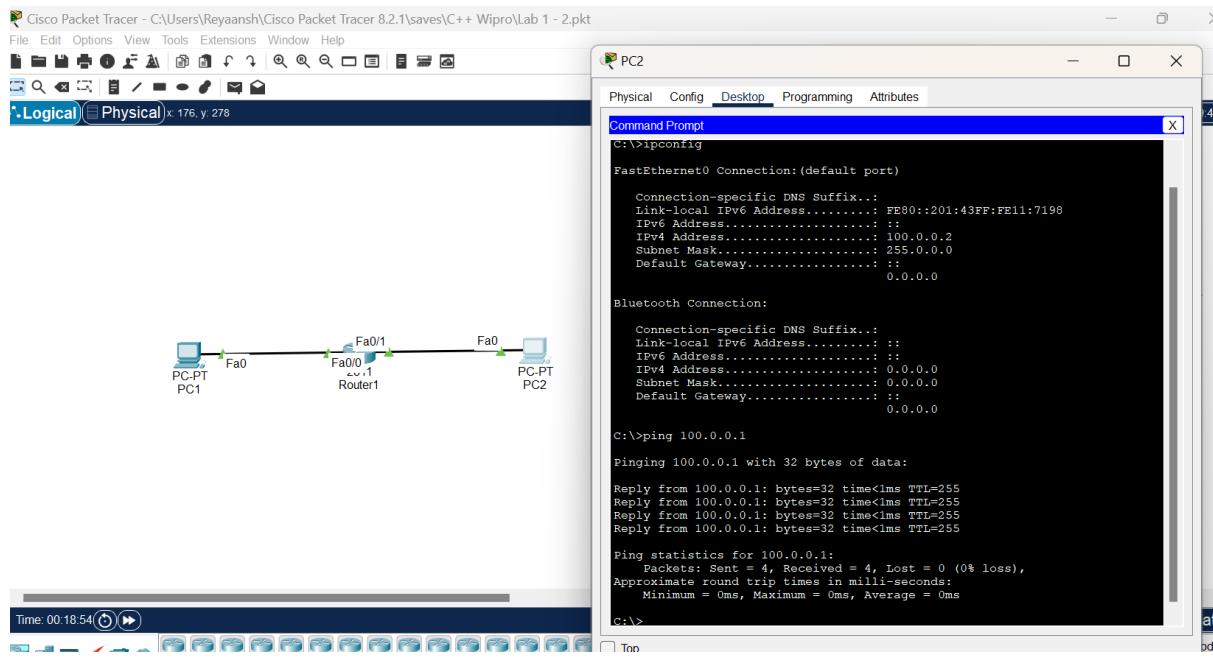


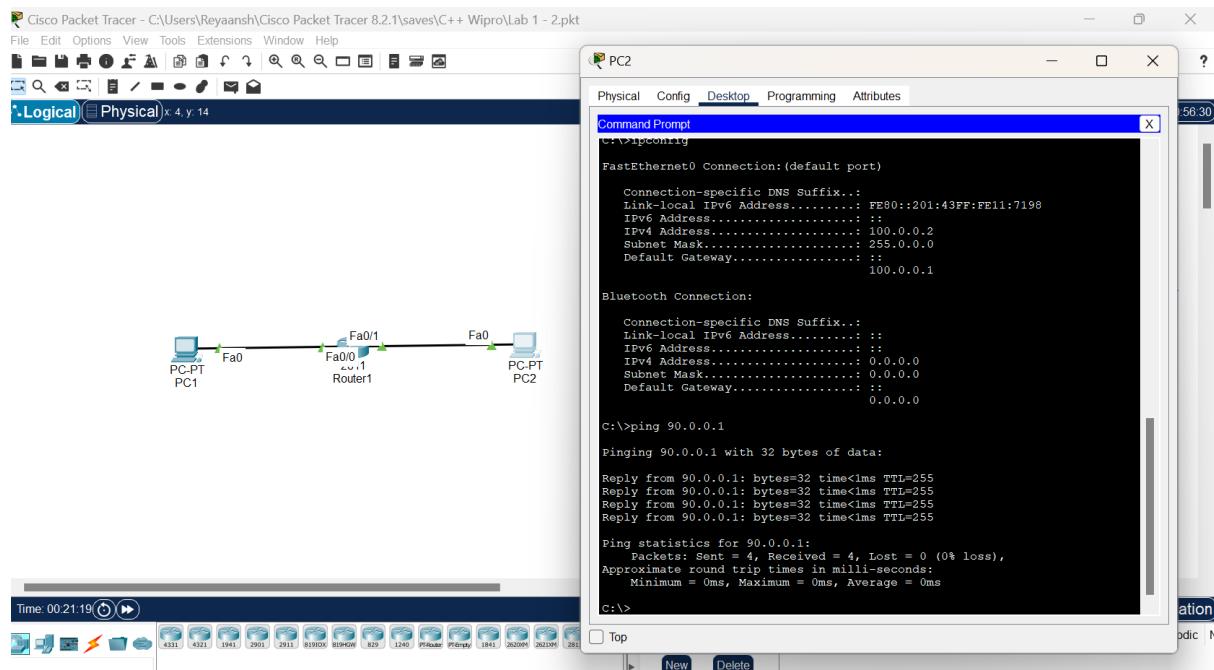
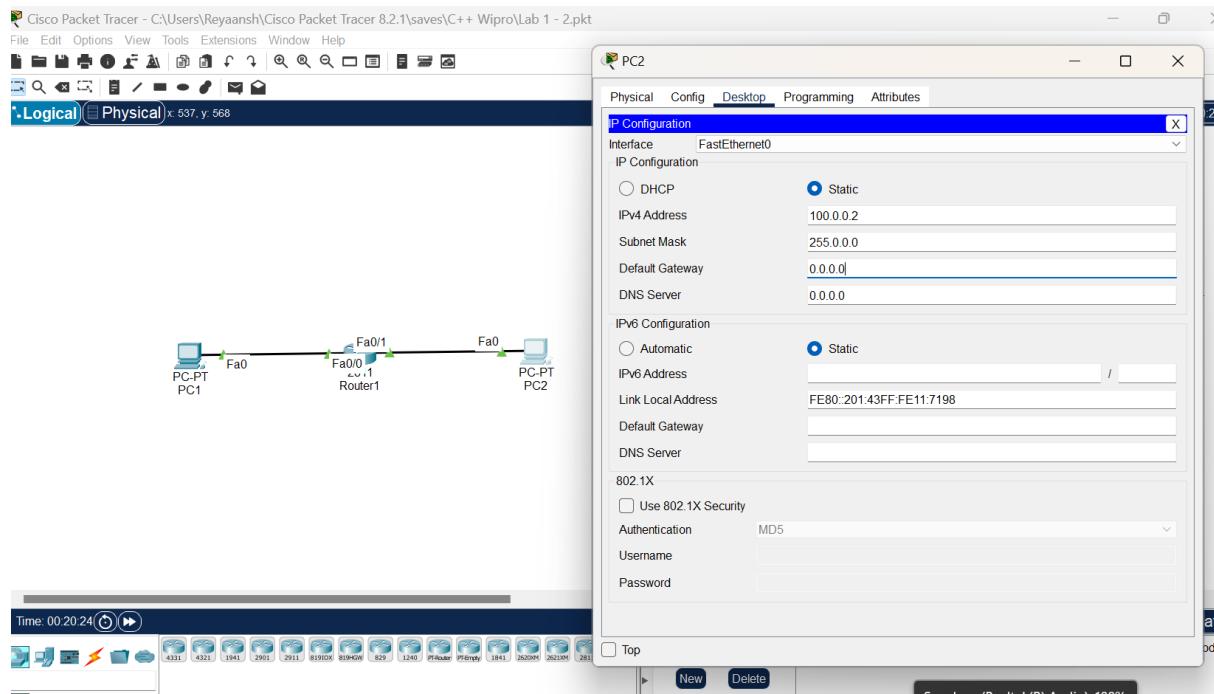


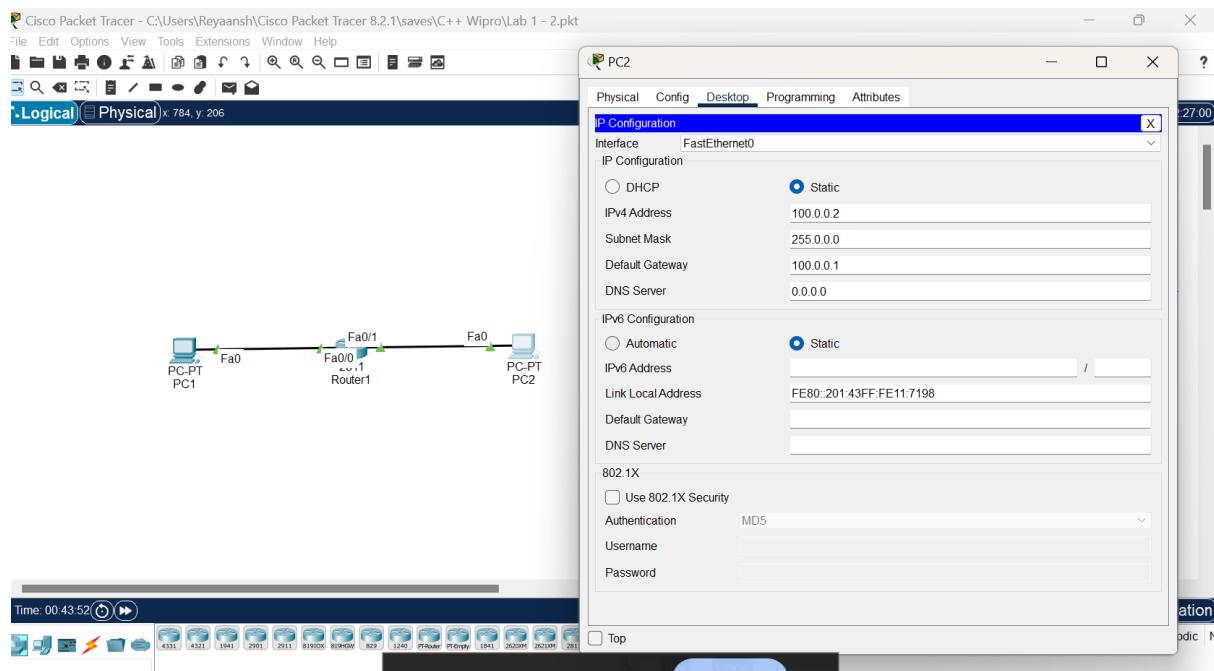






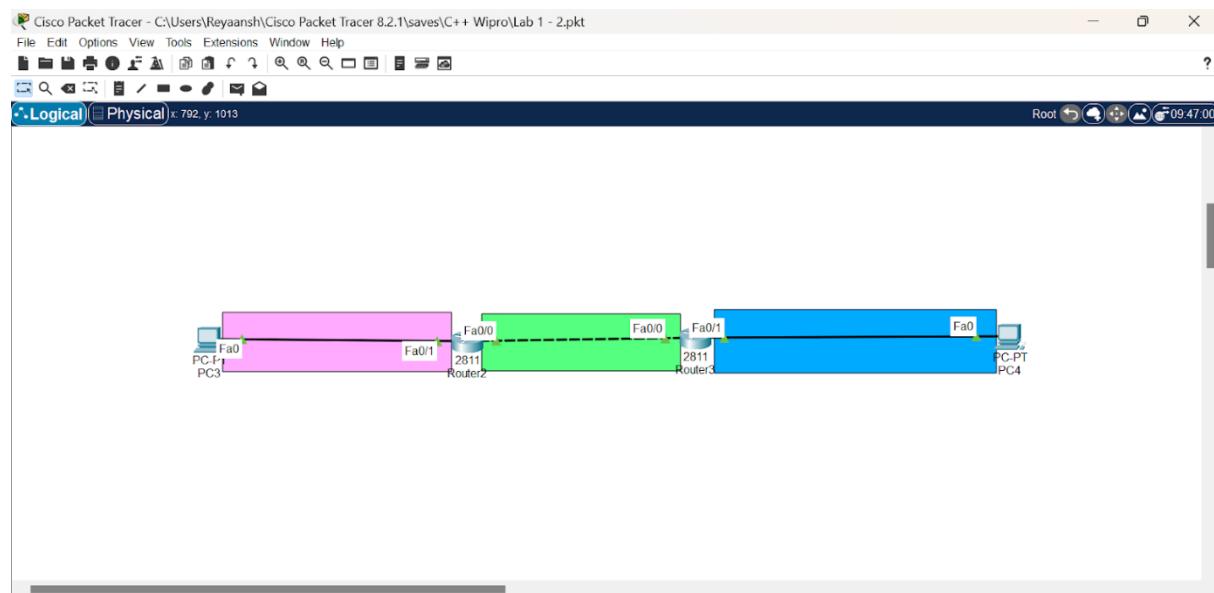


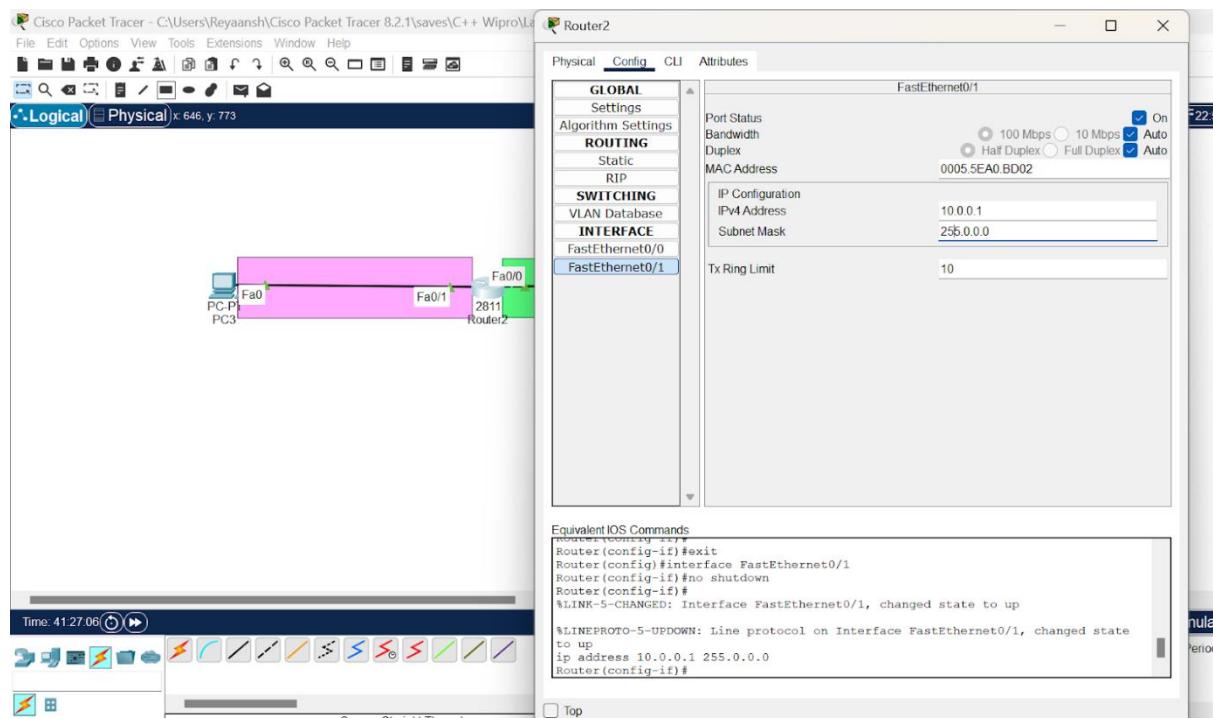
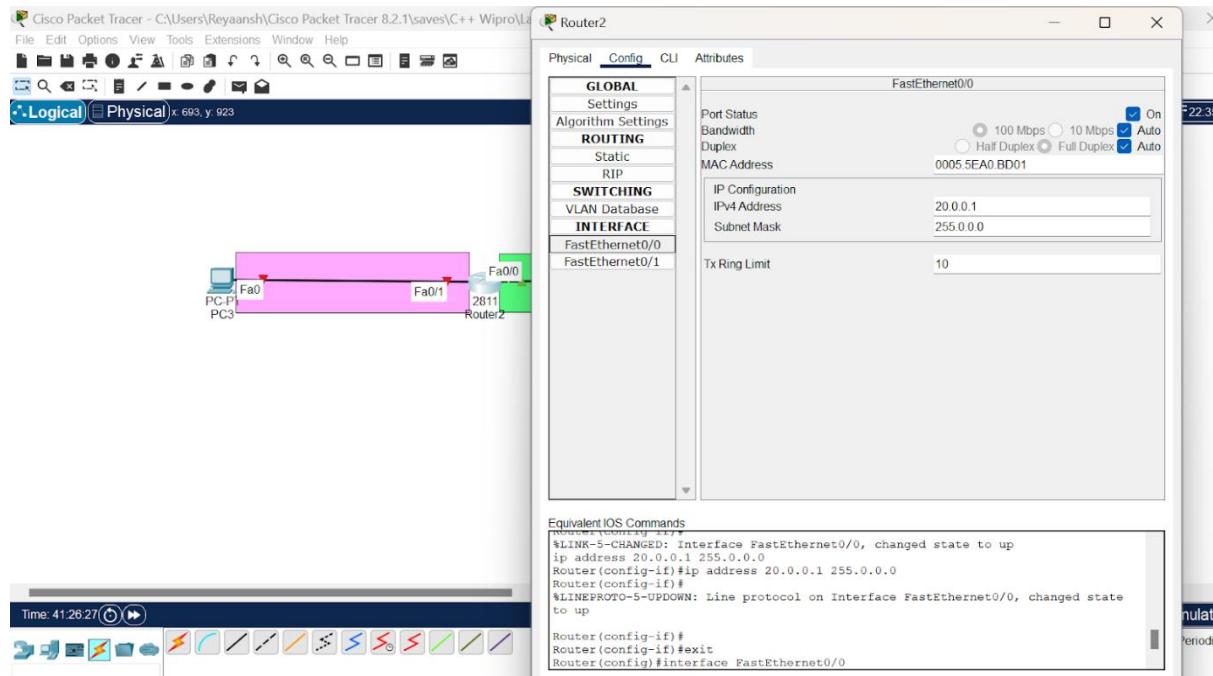


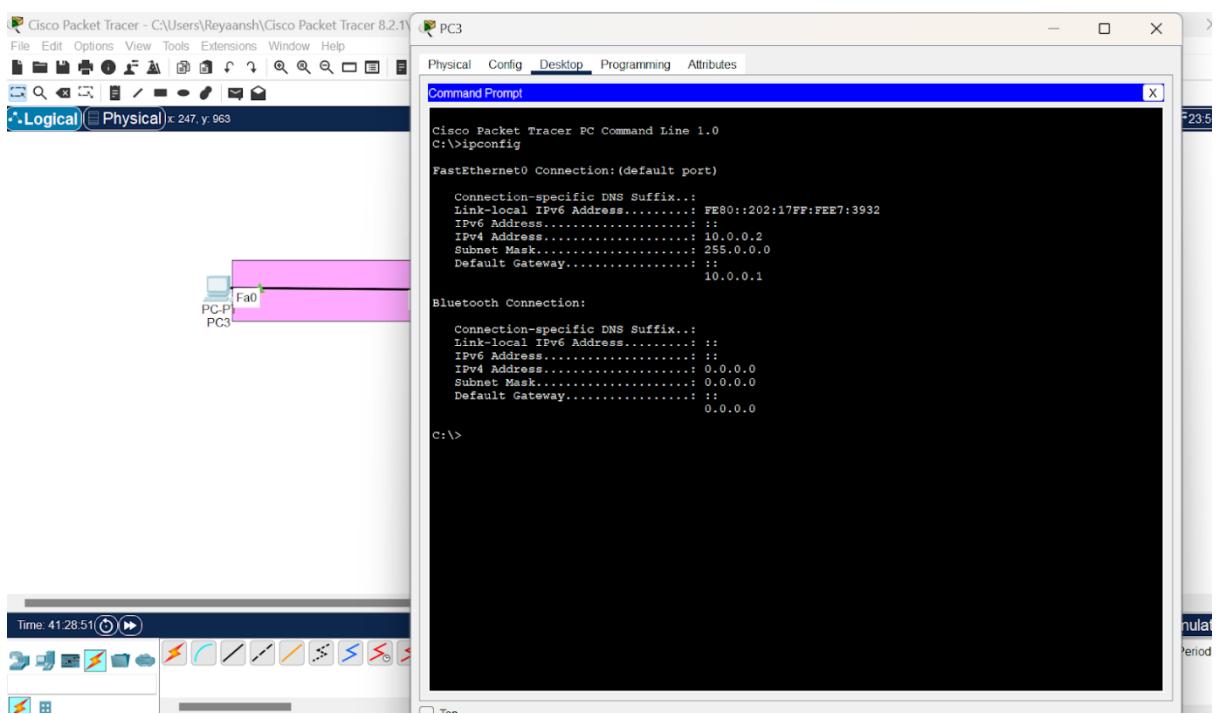
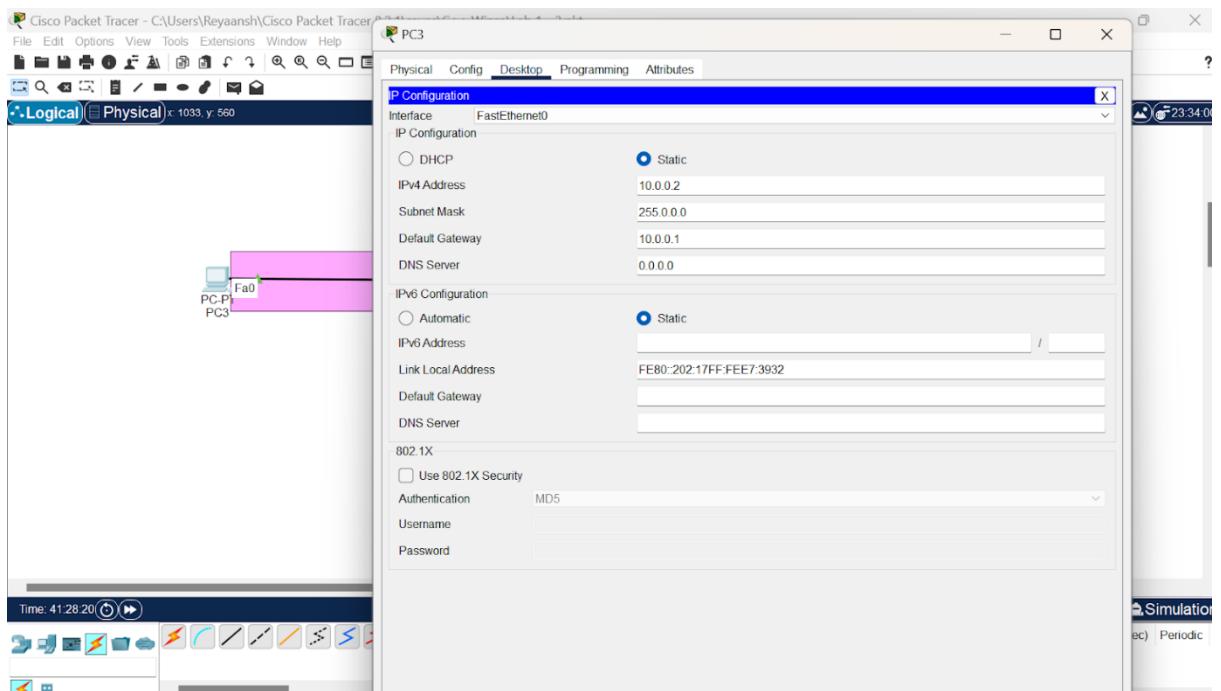


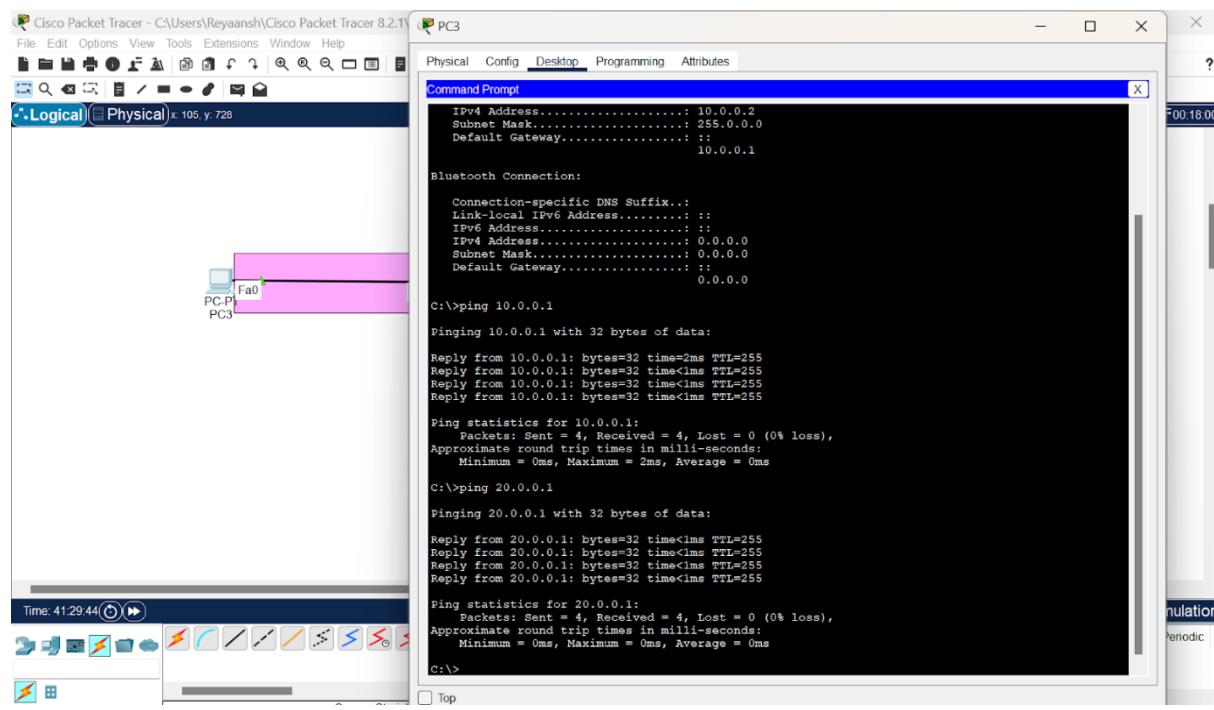
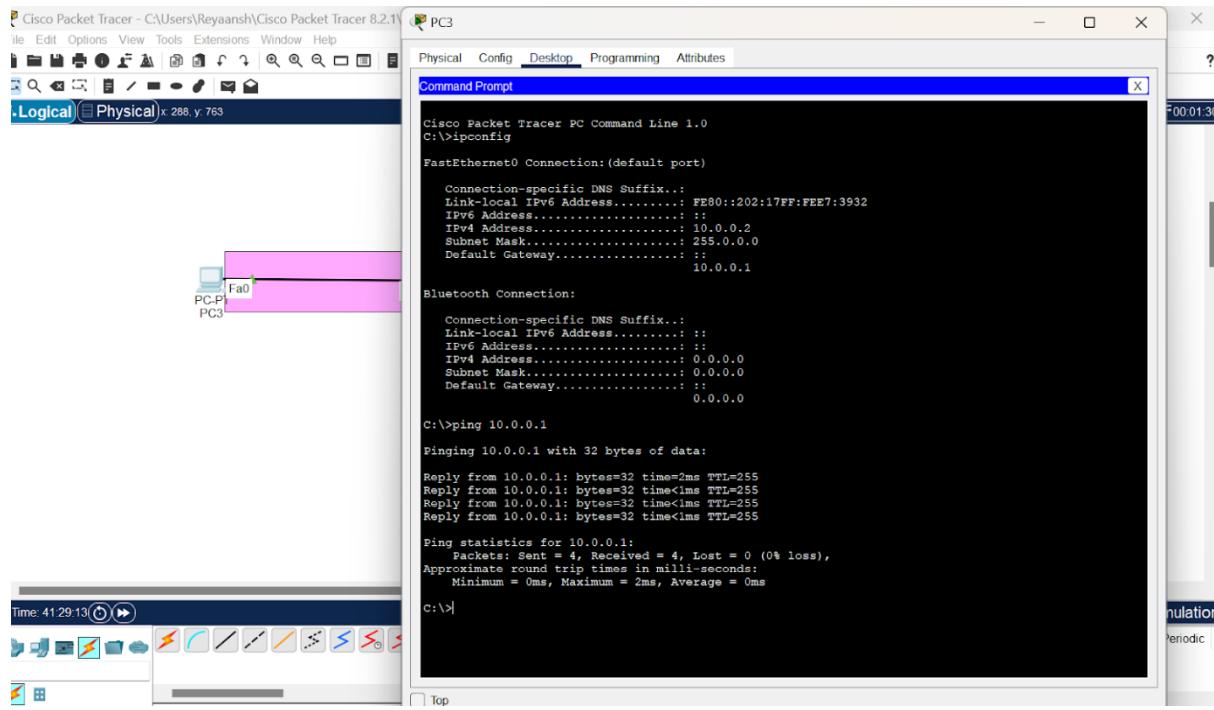
Date:07/06/24

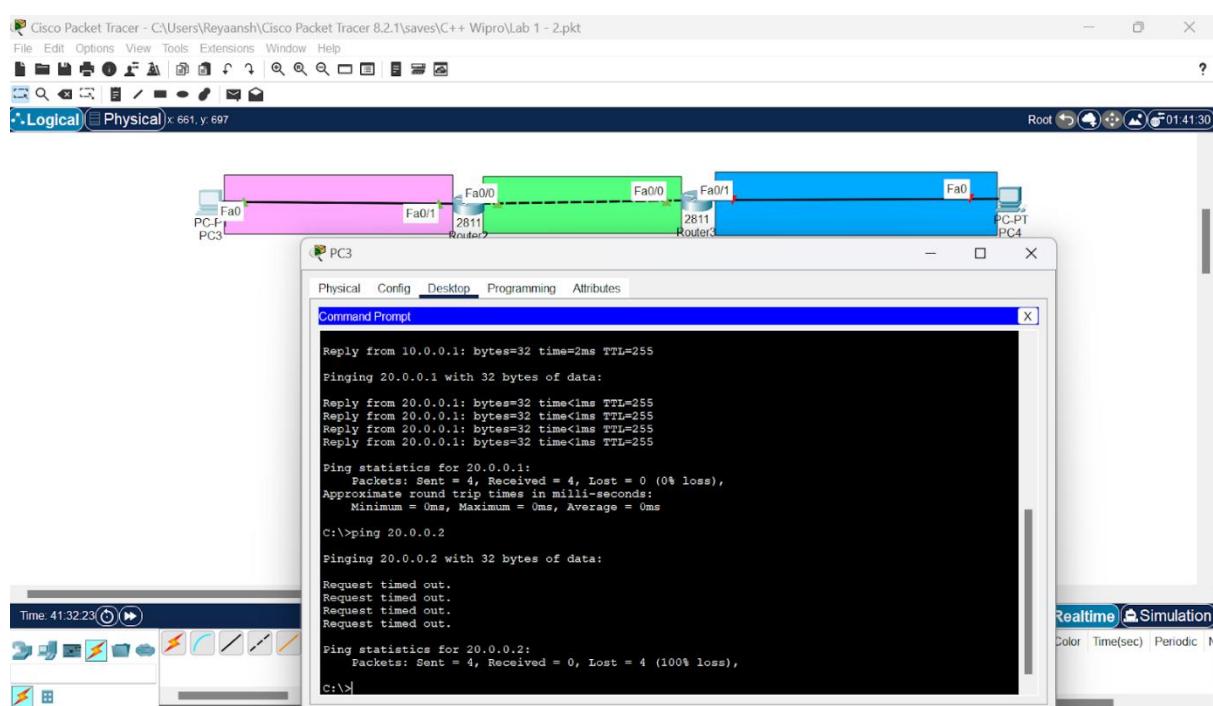
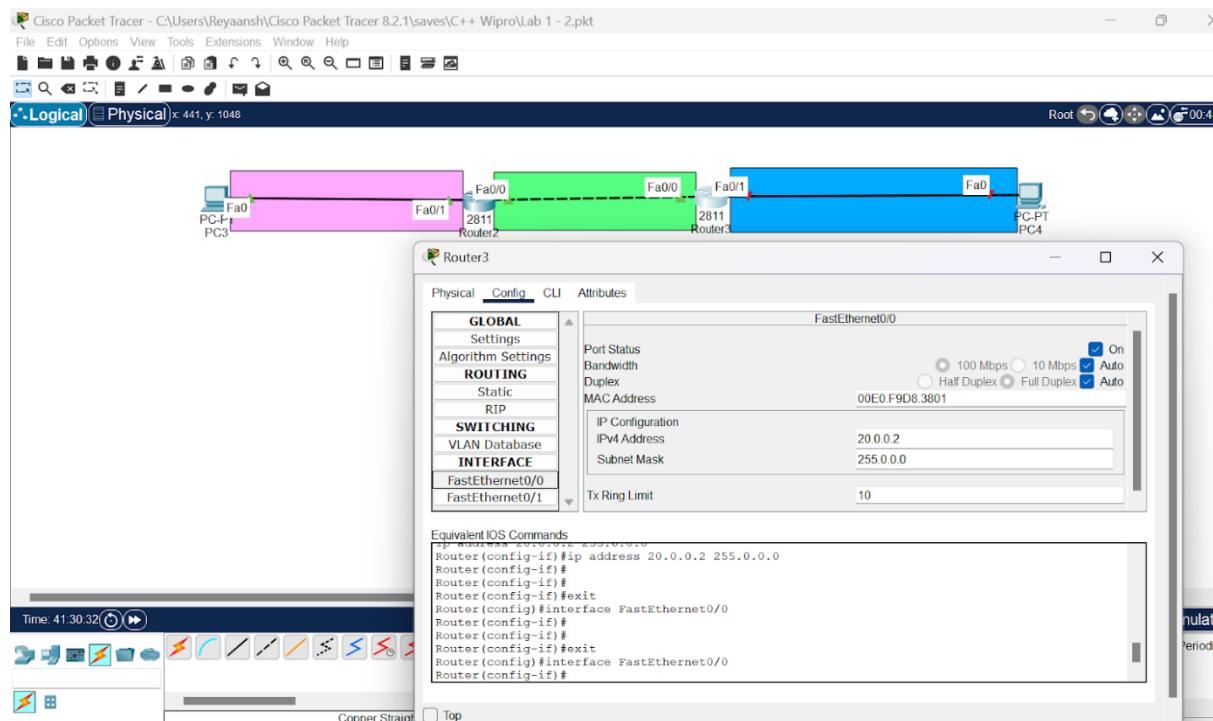
Lab 4 : Static Routing

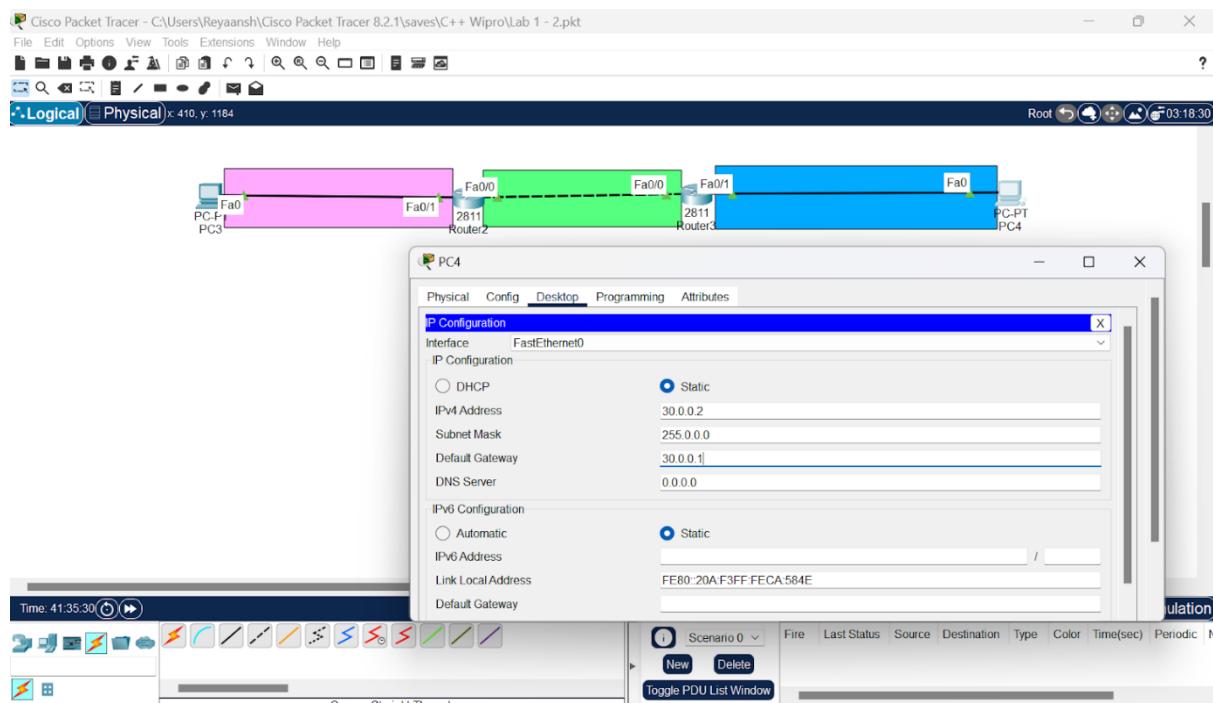
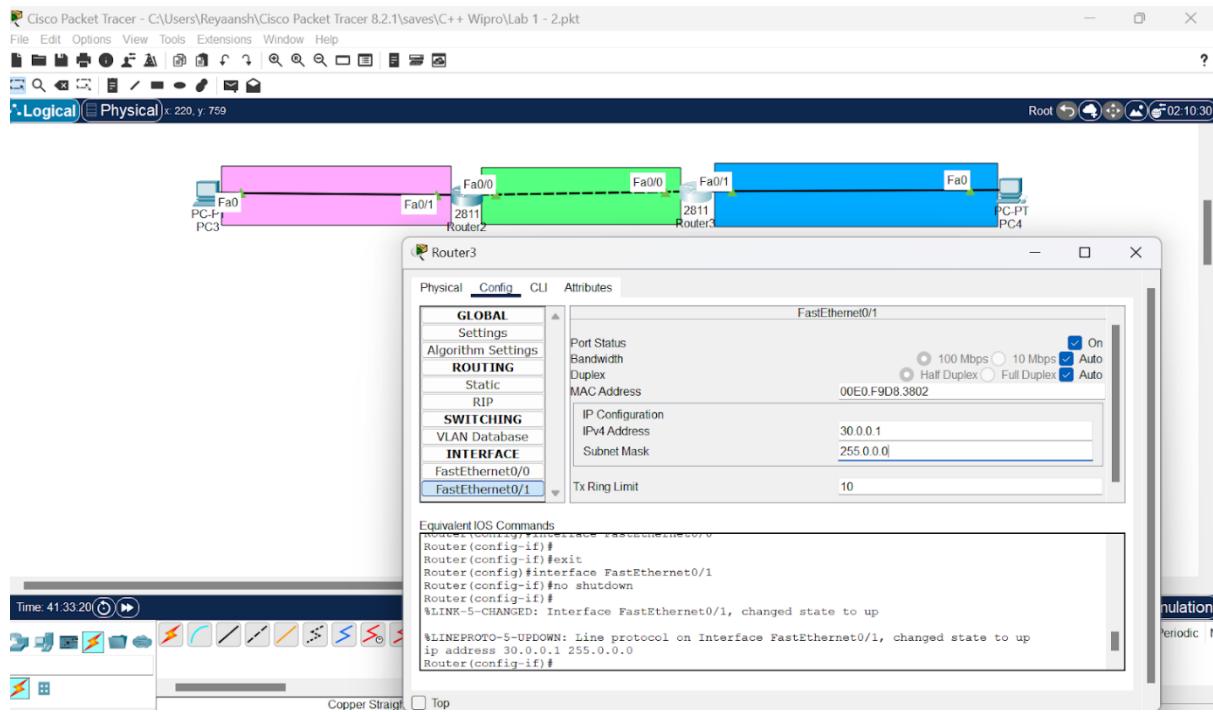


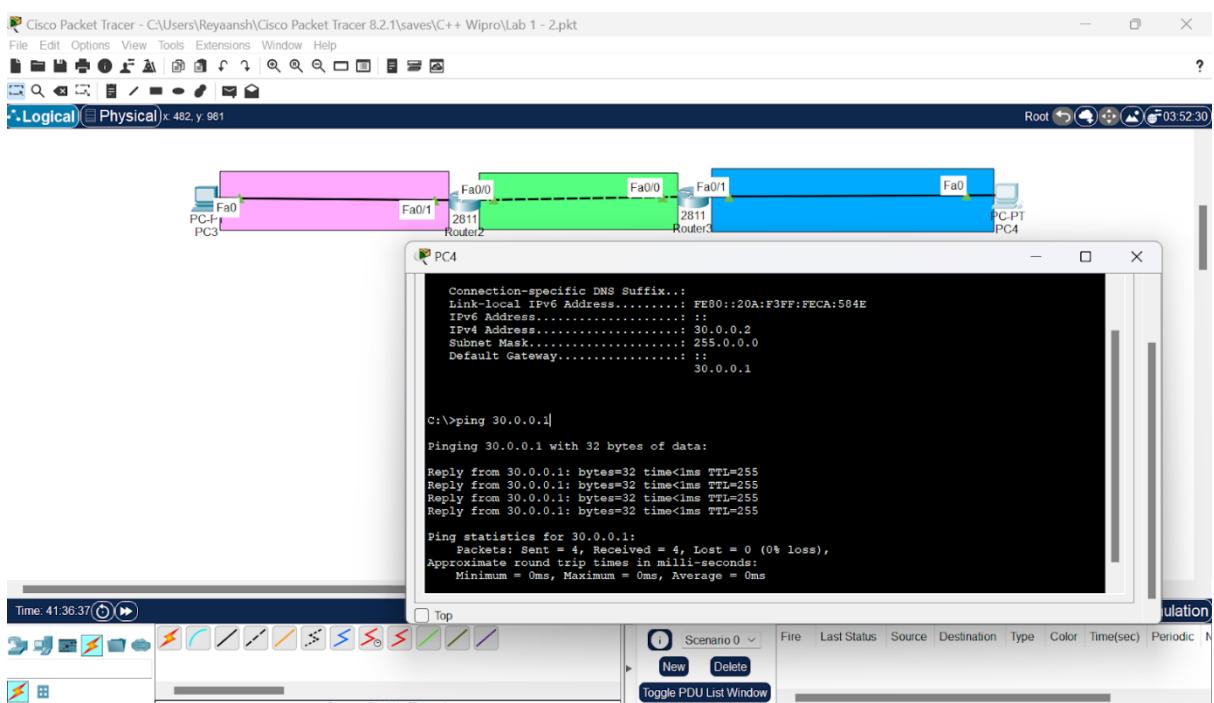
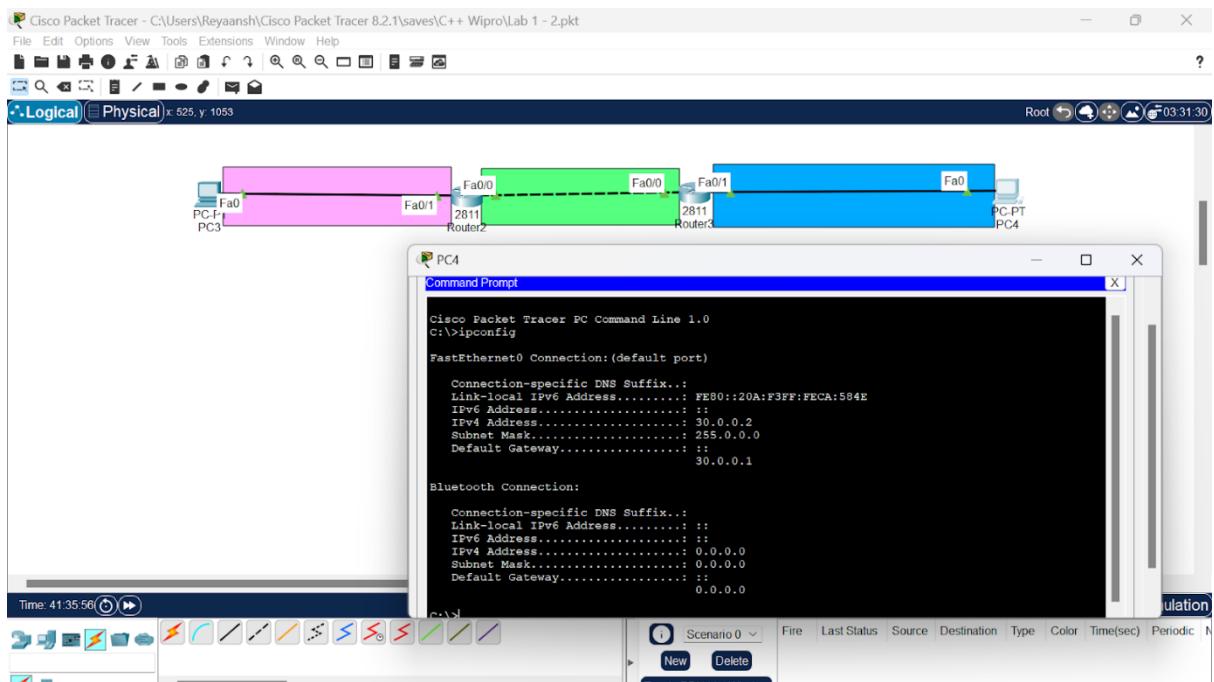


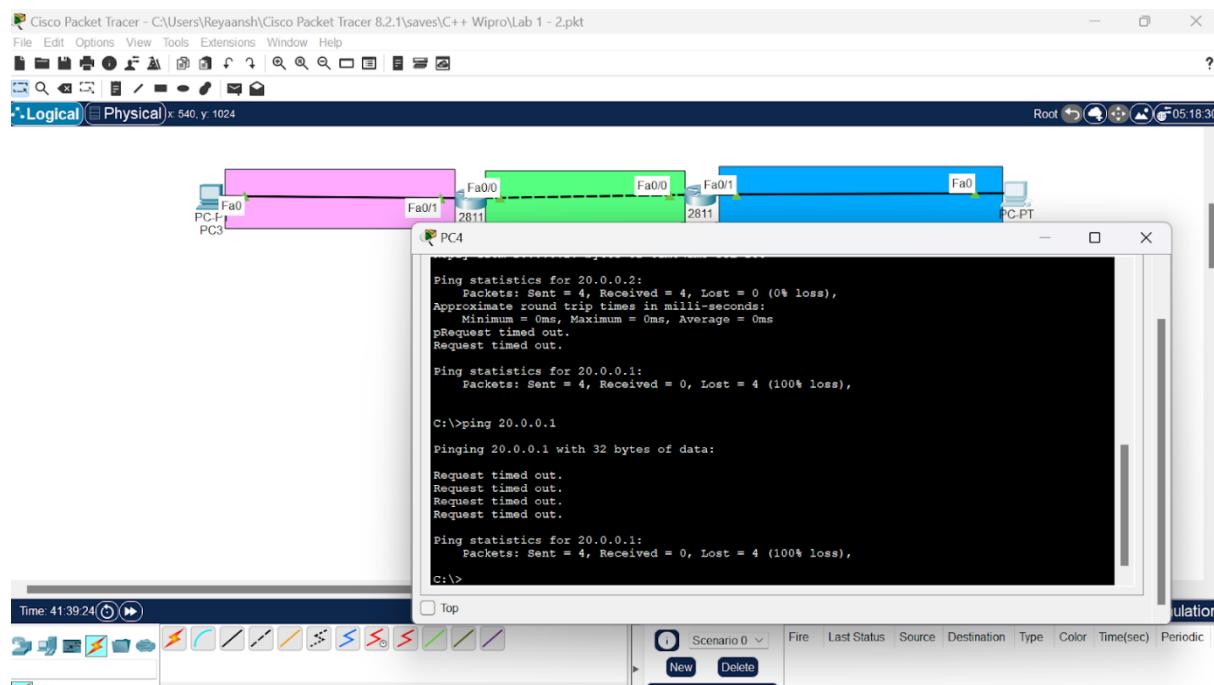
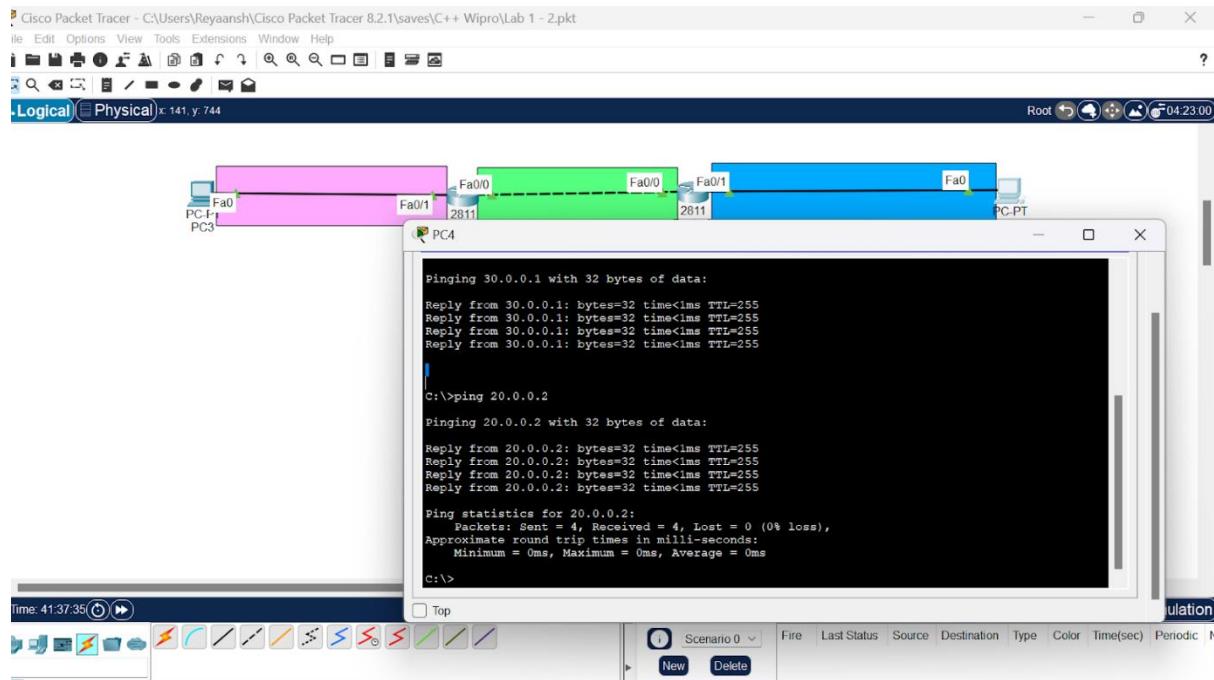


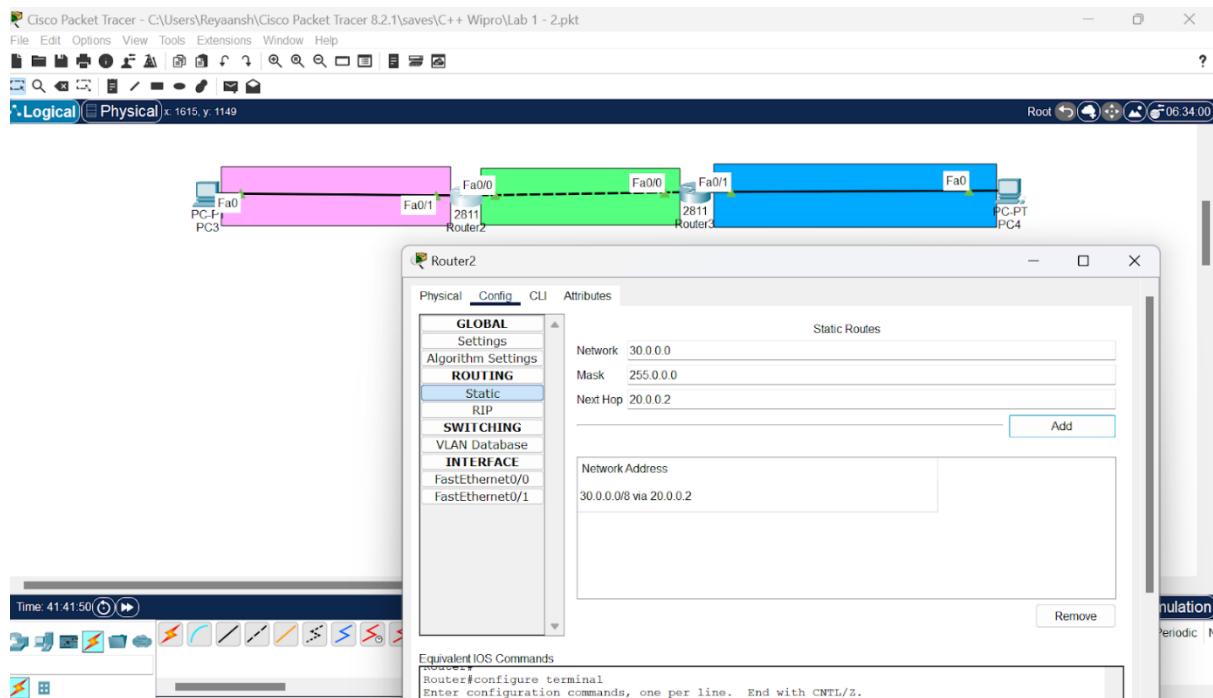
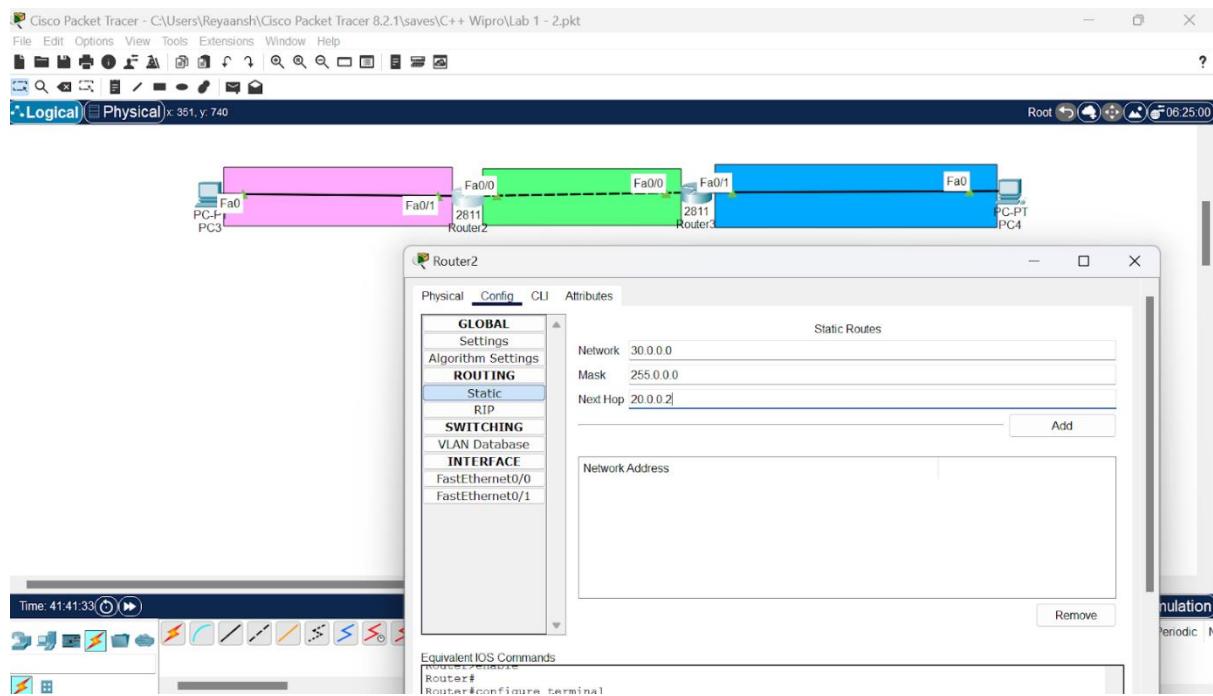


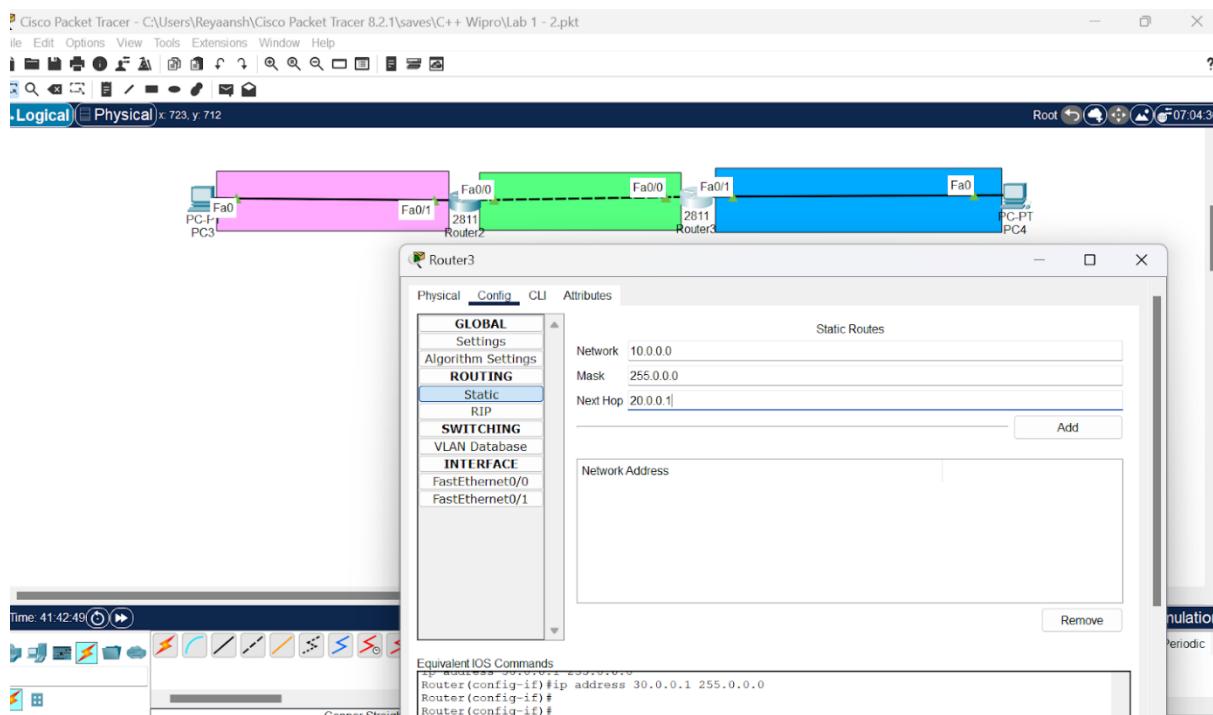
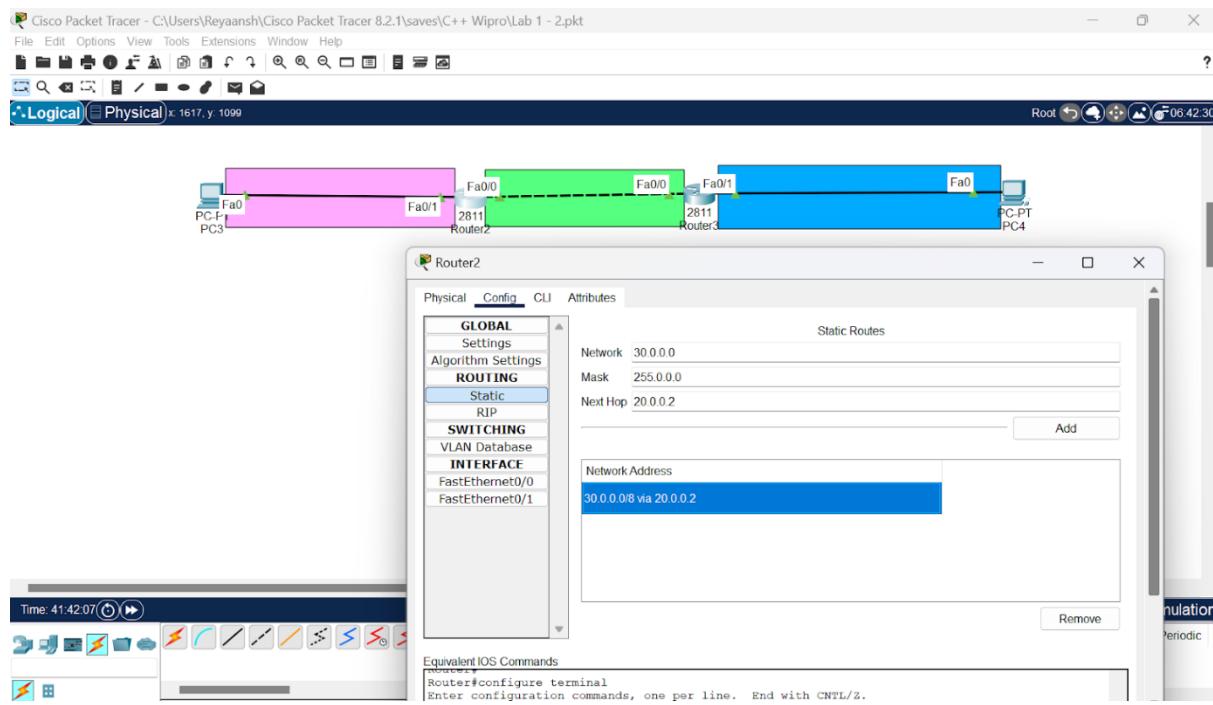


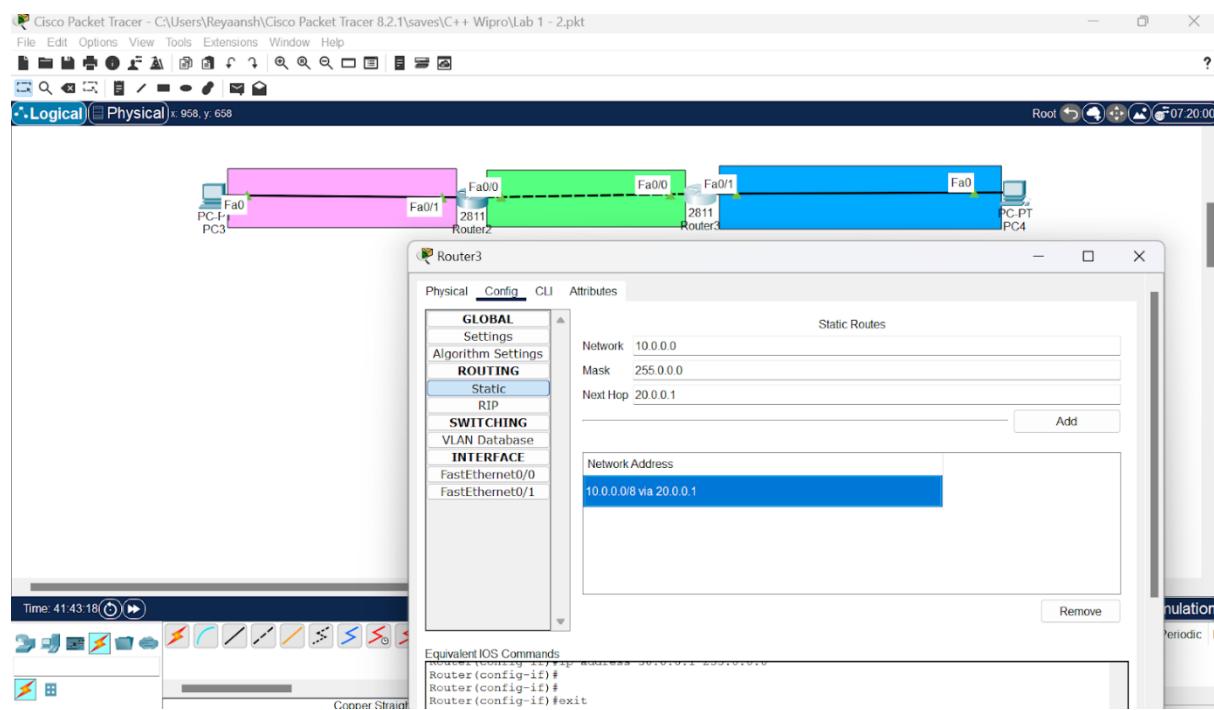
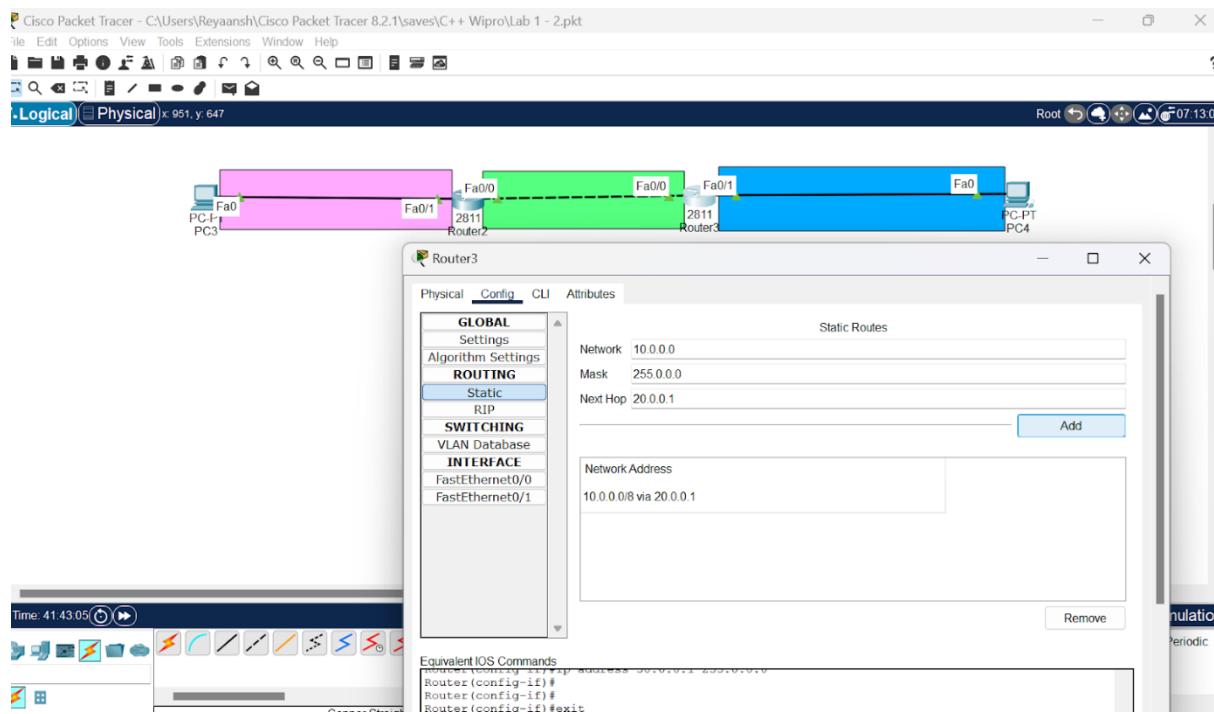


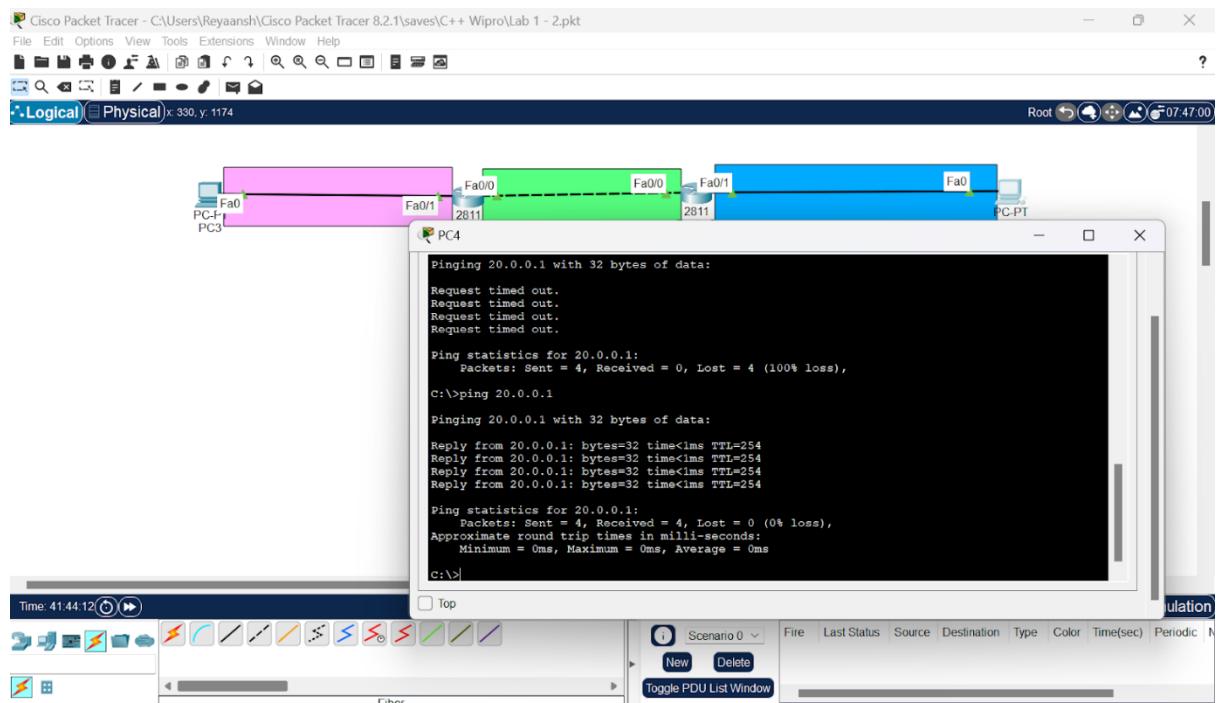
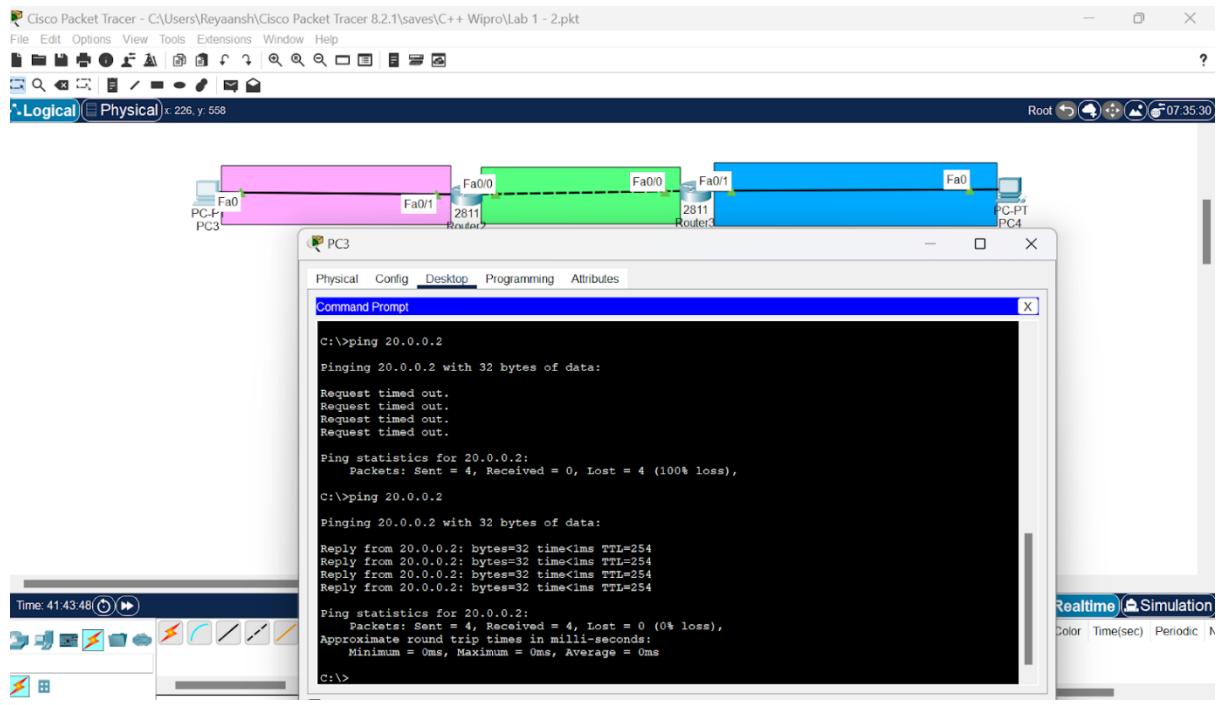


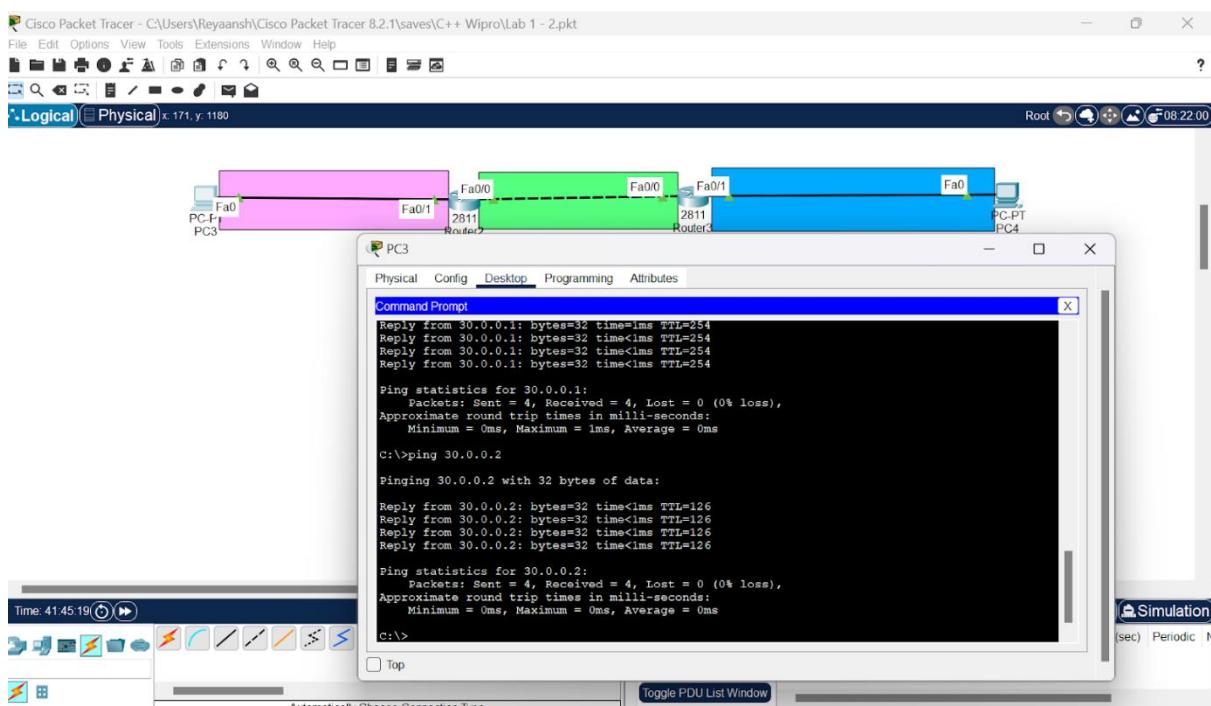
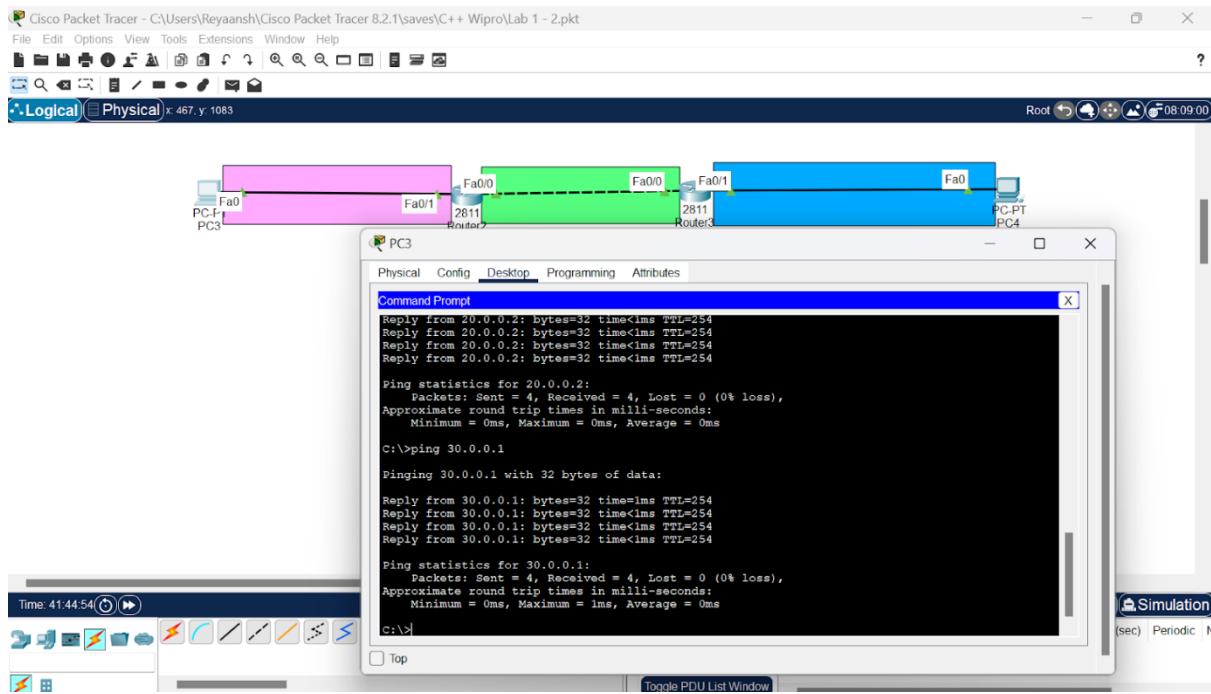


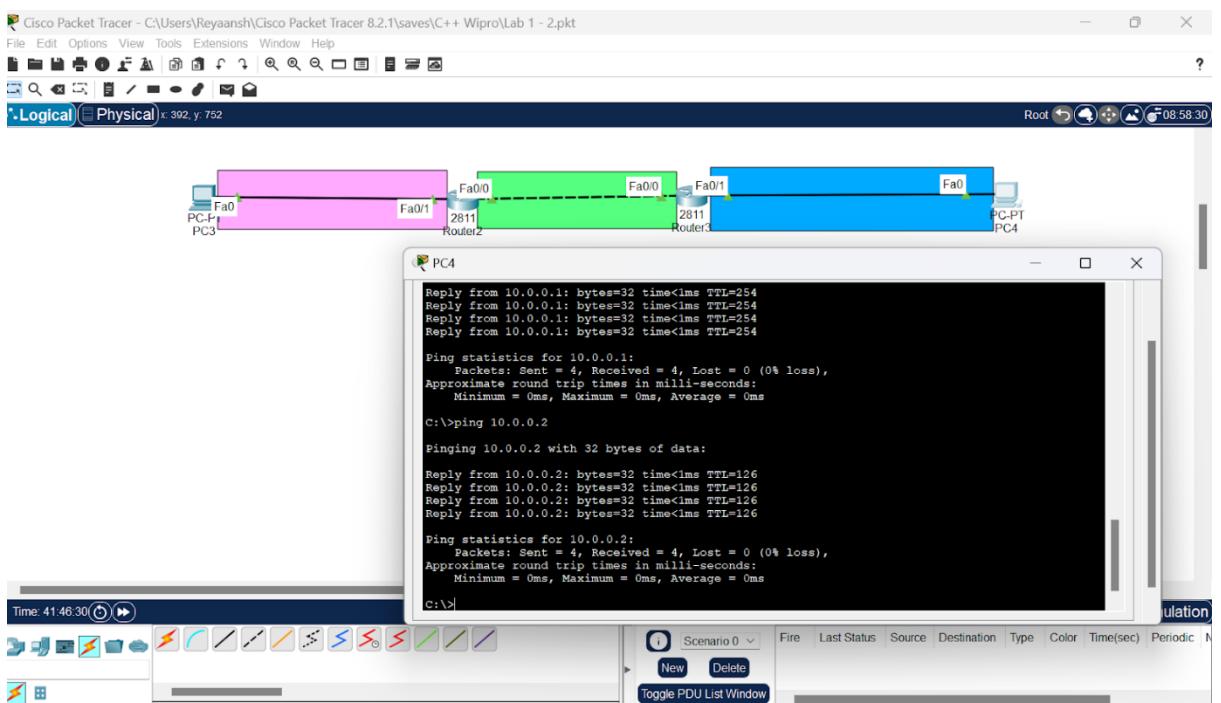
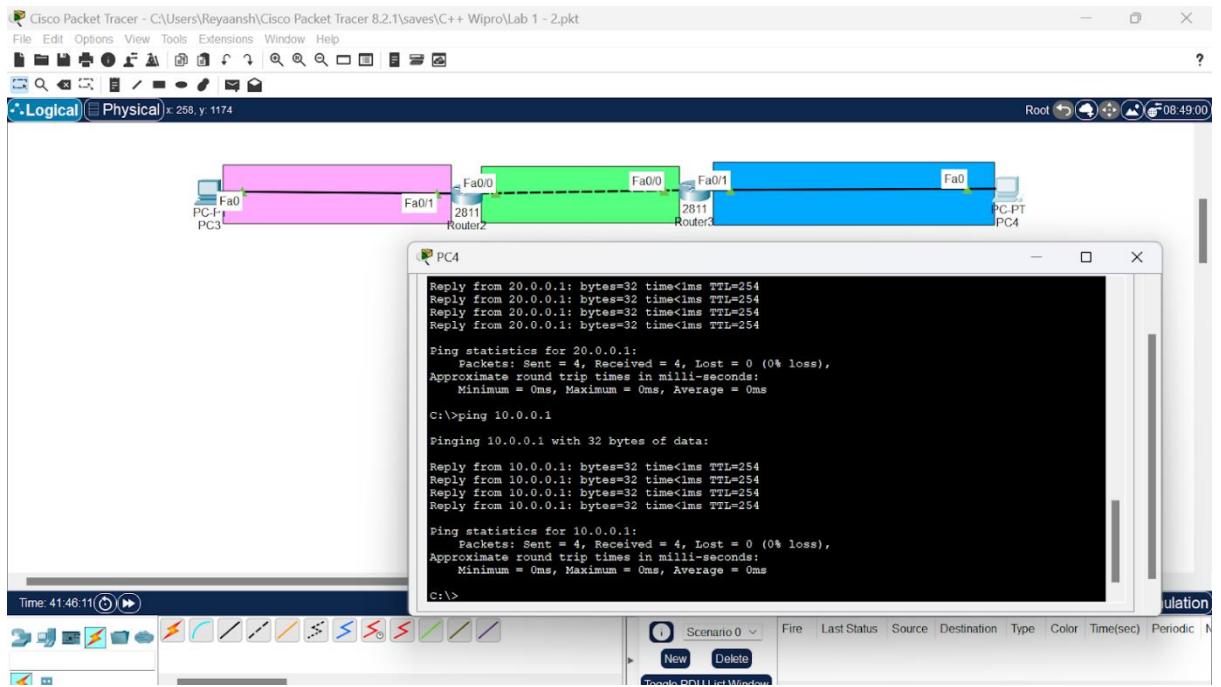




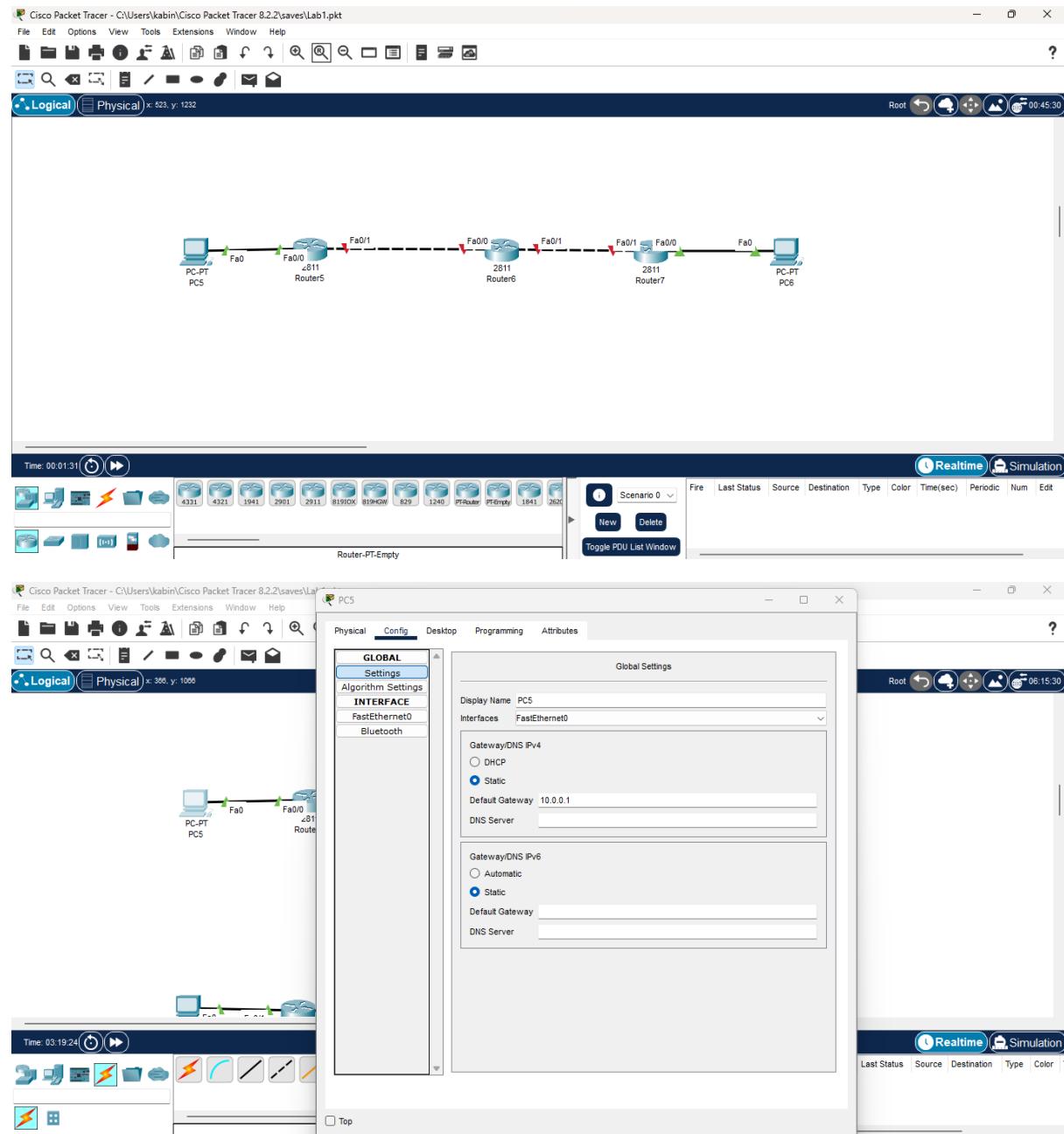


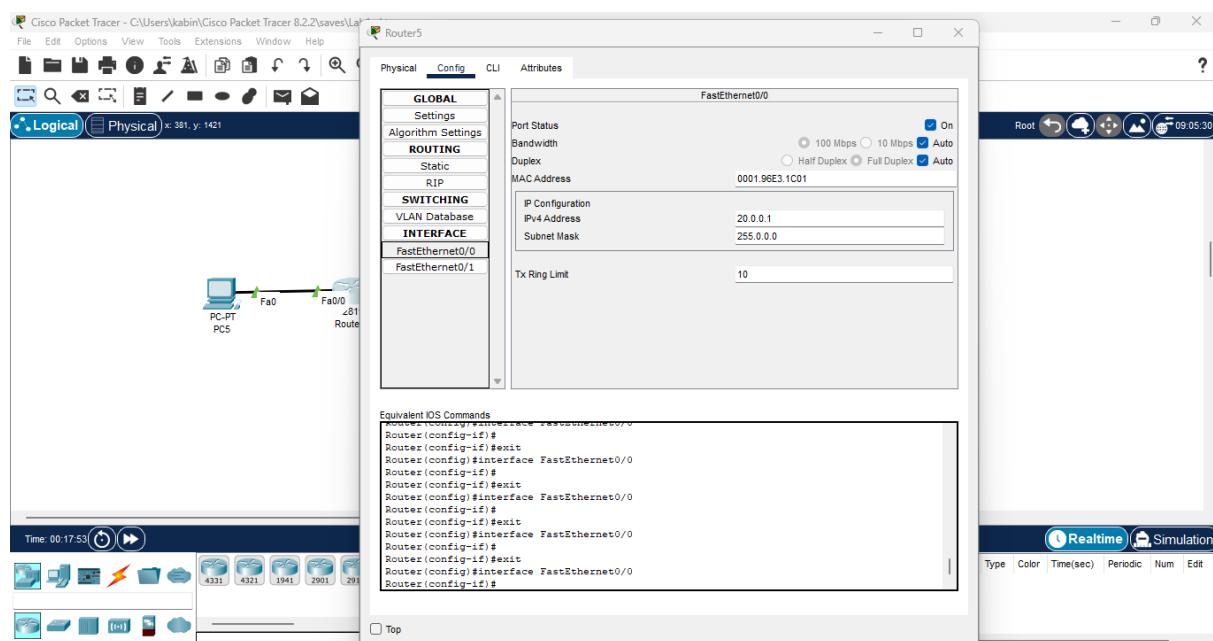
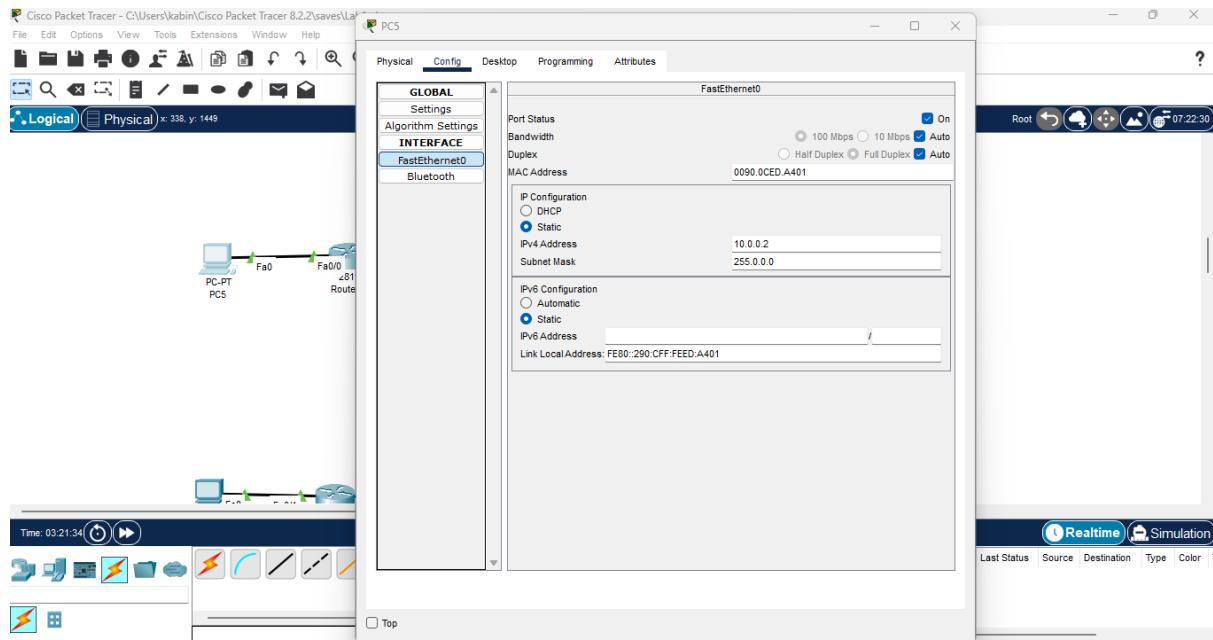


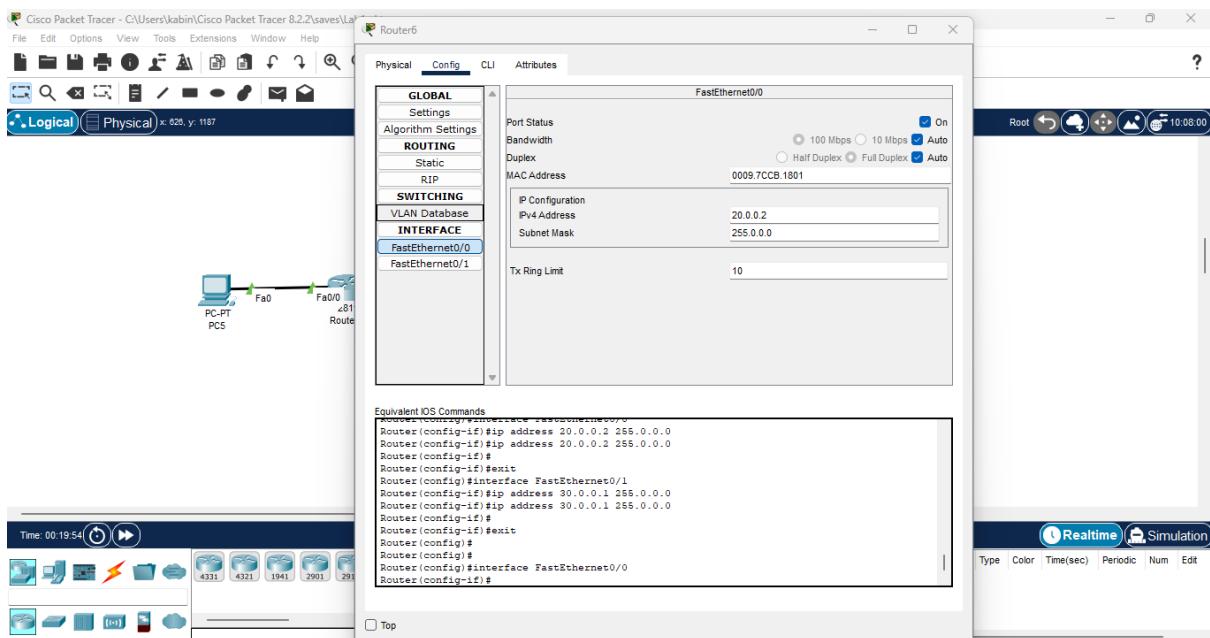
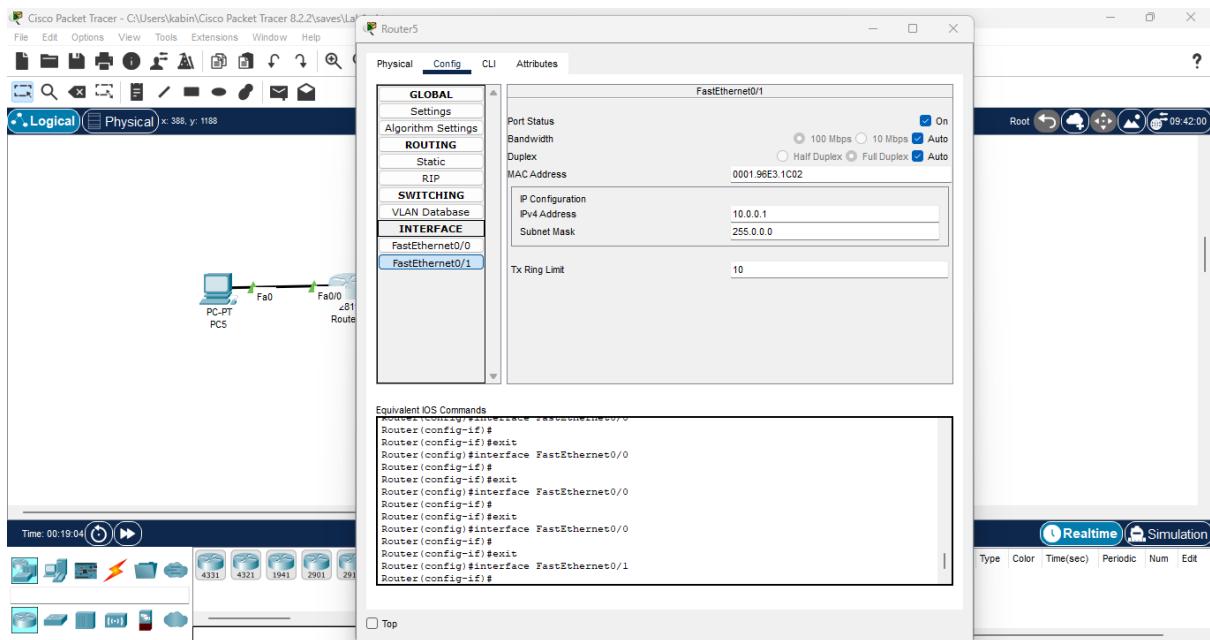


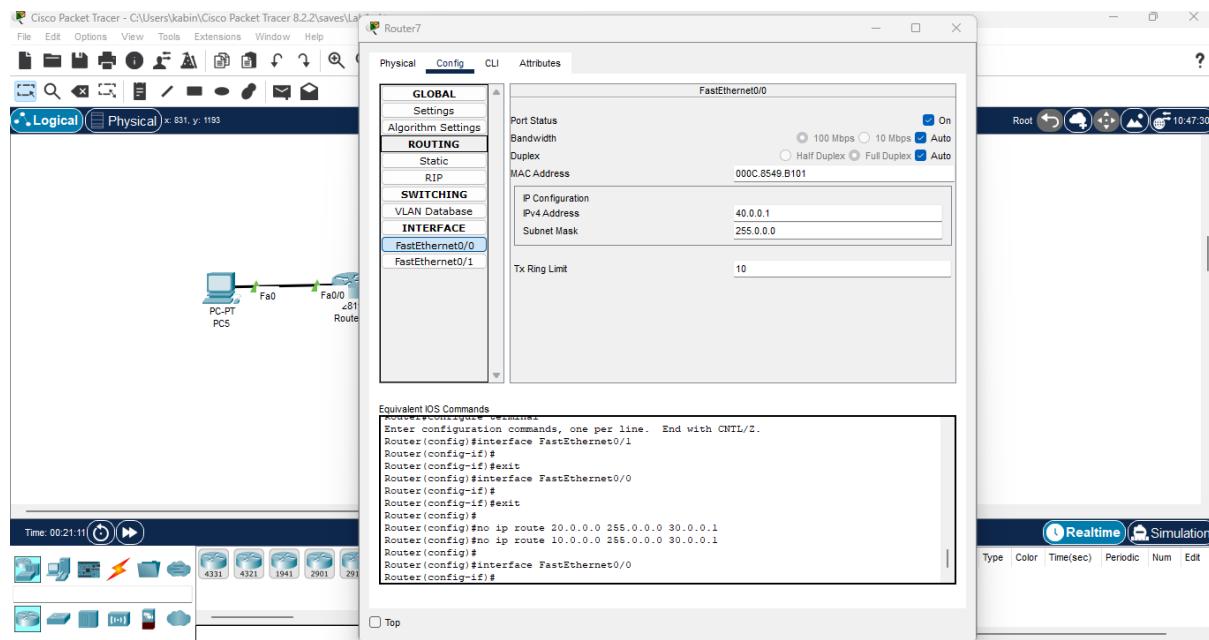
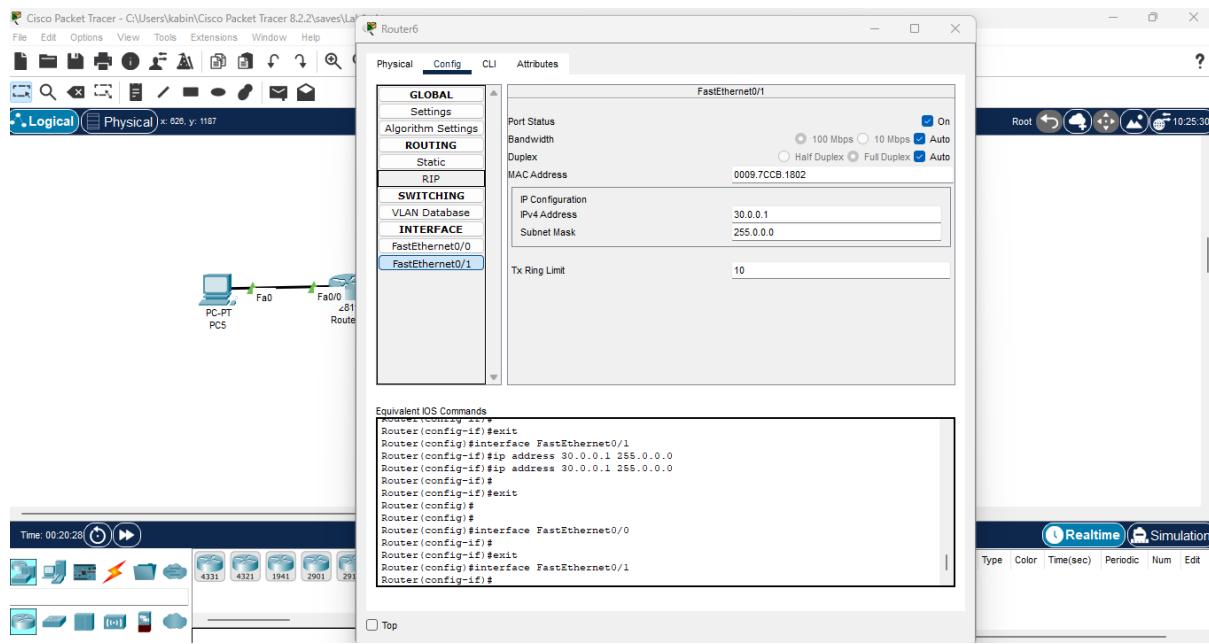


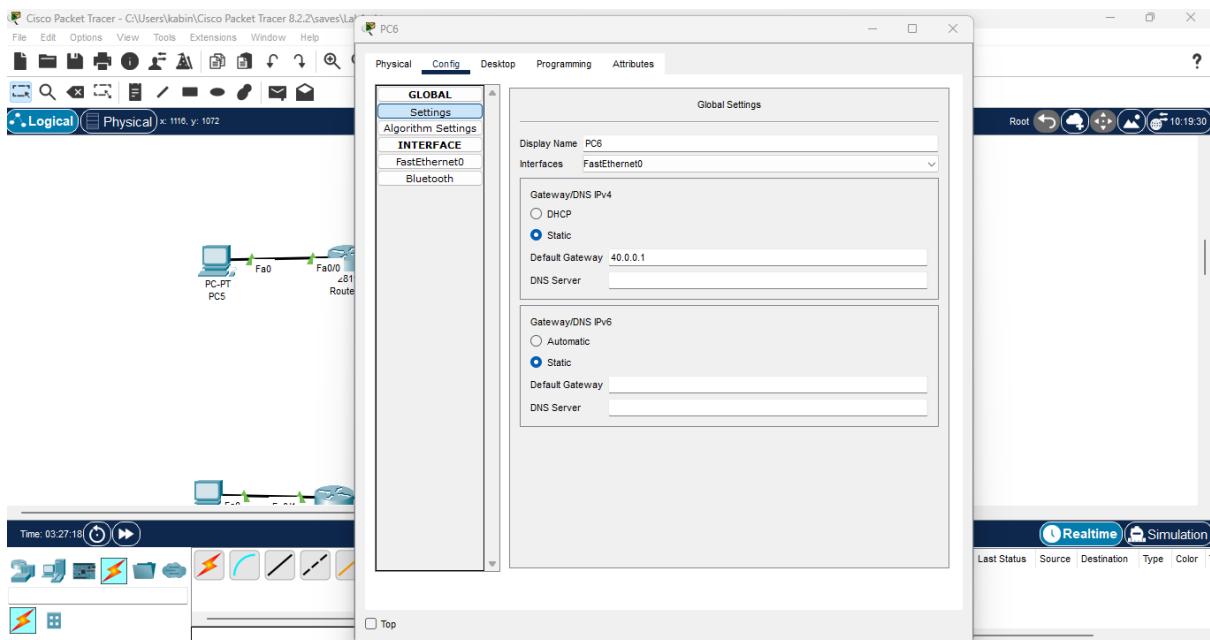
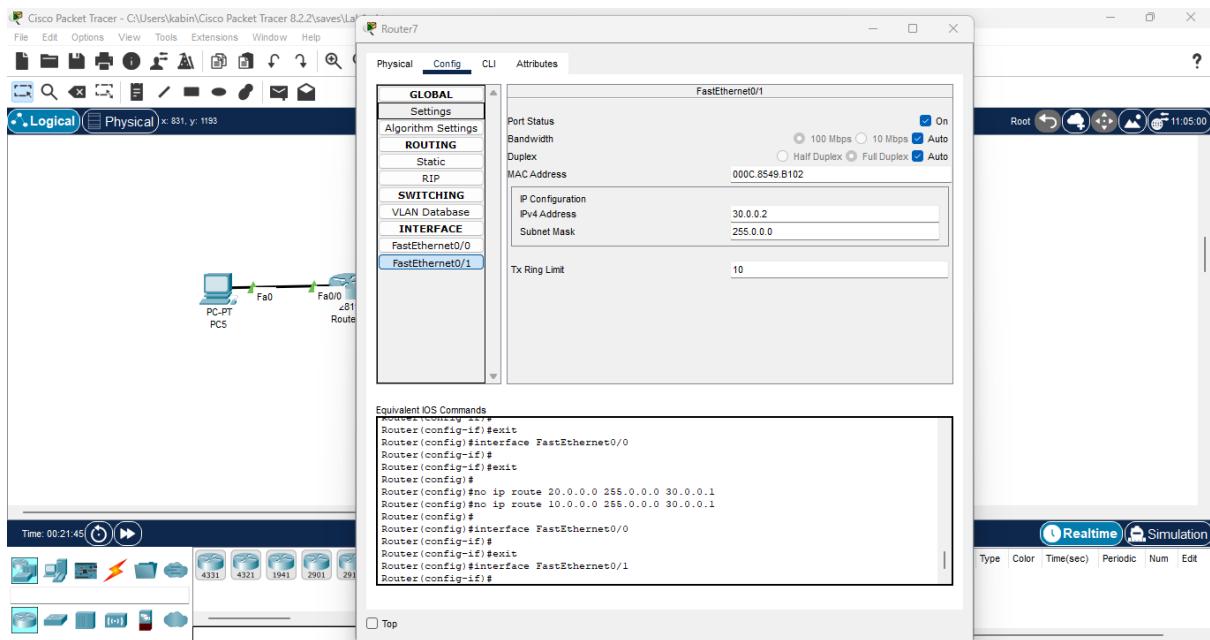
Lab 5: Static (3 routers)

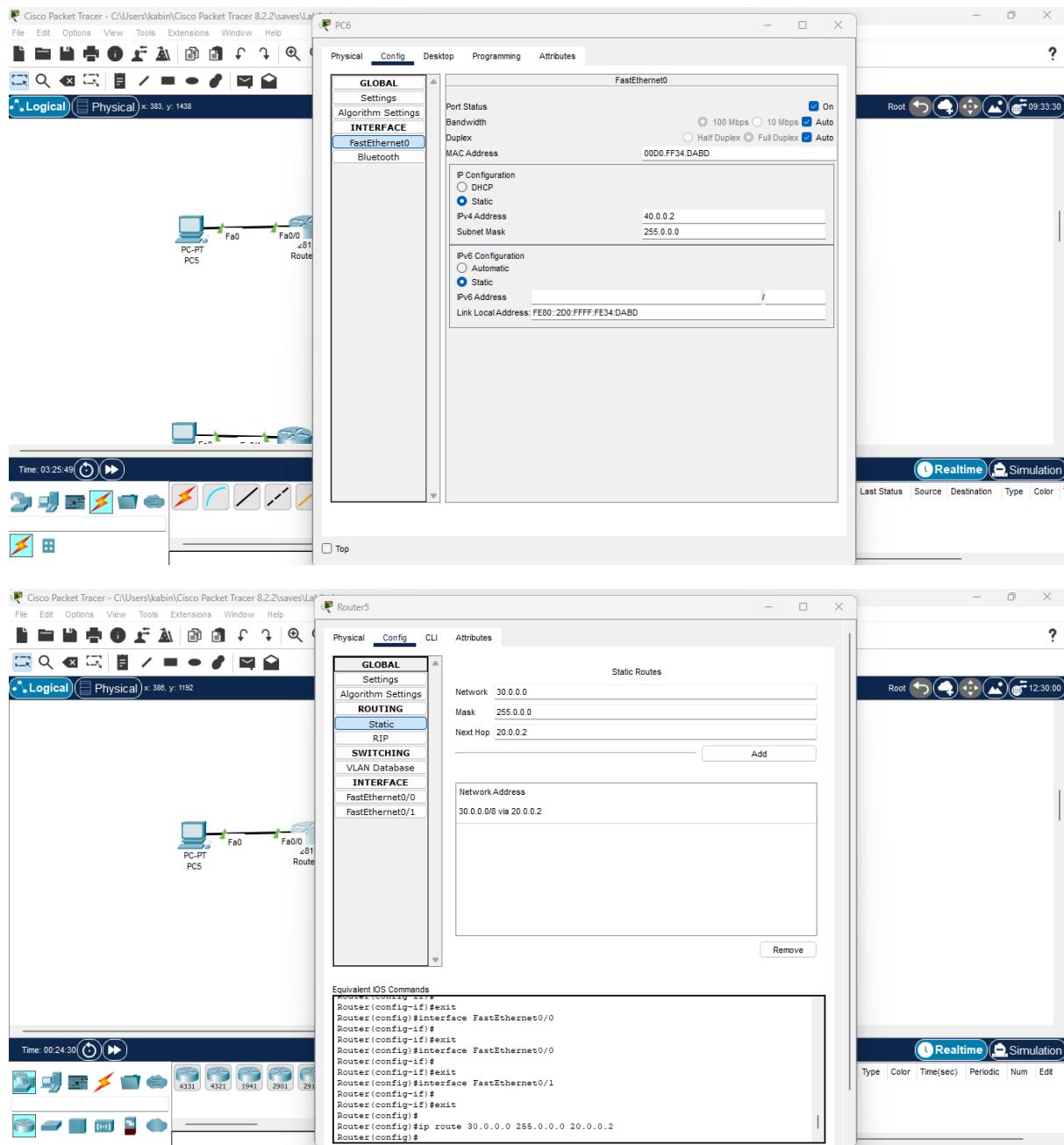












Router5 Configuration:

```

Cisco Packet Tracer - C:\Users\kabin\Cisco Packet Tracer 8.2.2\saves\Lab1
File Edit Options View Tools Extensions Window Help
Logical Physical x: 376, y: 1354
Physical Config CLI Attributes
GLOBAL Settings Algorithm Settings
ROUTING Static RIP
SWITCHING VLAN Database
INTERFACE FastEthernet0/0 FastEthernet0/1
PC-PT PCS

```

Static Routes:

Network	Mask	Next Hop
40.0.0.0	255.0.0.0	20.0.0.2

Network Address:

- 30.0.0.0/8 via 20.0.0.2
- 40.0.0.0/8 via 20.0.0.2

Equivalent IOS Commands:

```

Router(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2
Router(config)#ip route 40.0.0.0 255.0.0.0 20.0.0.2
Router(config)#

```

Router6 Configuration:

```

Cisco Packet Tracer - C:\Users\kabin\Cisco Packet Tracer 8.2.2\saves\Lab1
File Edit Options View Tools Extensions Window Help
Logical Physical x: 535, y: 1204
Physical Config CLI Attributes
GLOBAL Settings Algorithm Settings
ROUTING Static RIP
SWITCHING VLAN Database
INTERFACE FastEthernet0/0 FastEthernet0/1
PC-PT PCS

```

Static Routes:

Network	Mask	Next Hop
10.0.0.0	255.0.0.0	20.0.0.1

Network Address:

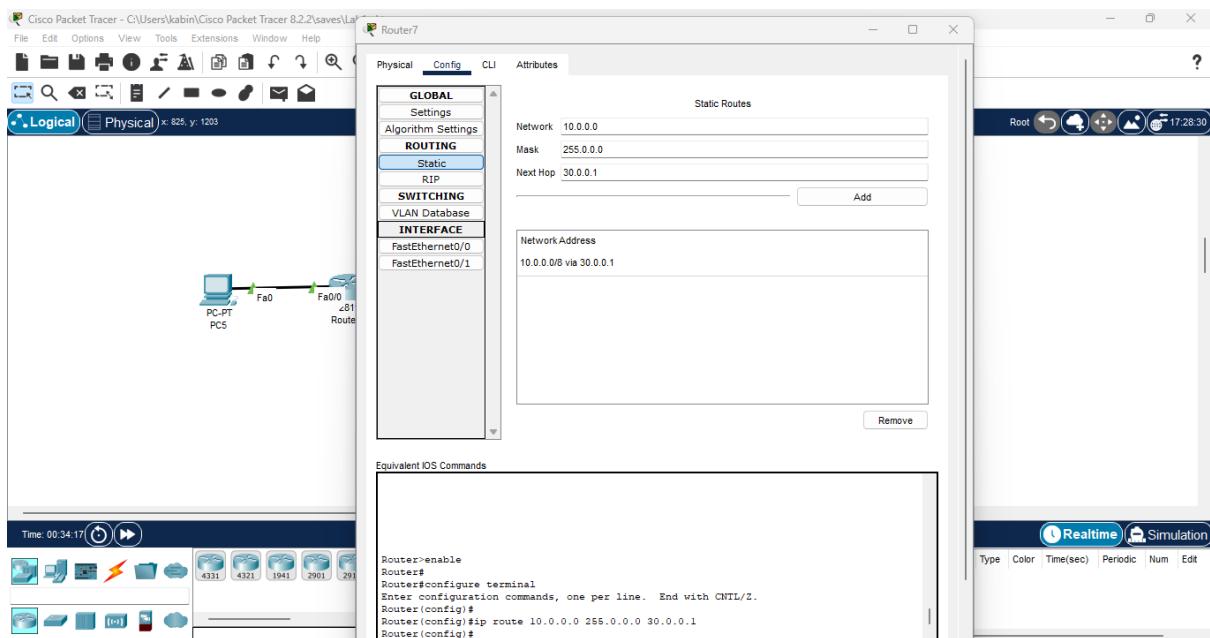
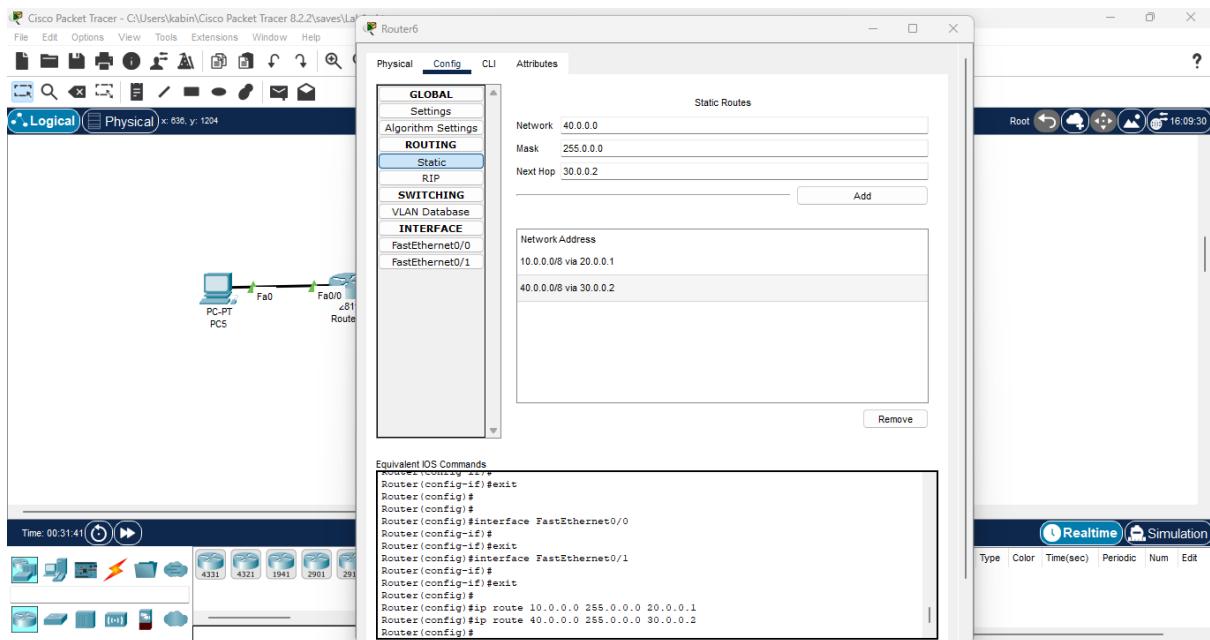
- 10.0.0.0/8 via 20.0.0.1

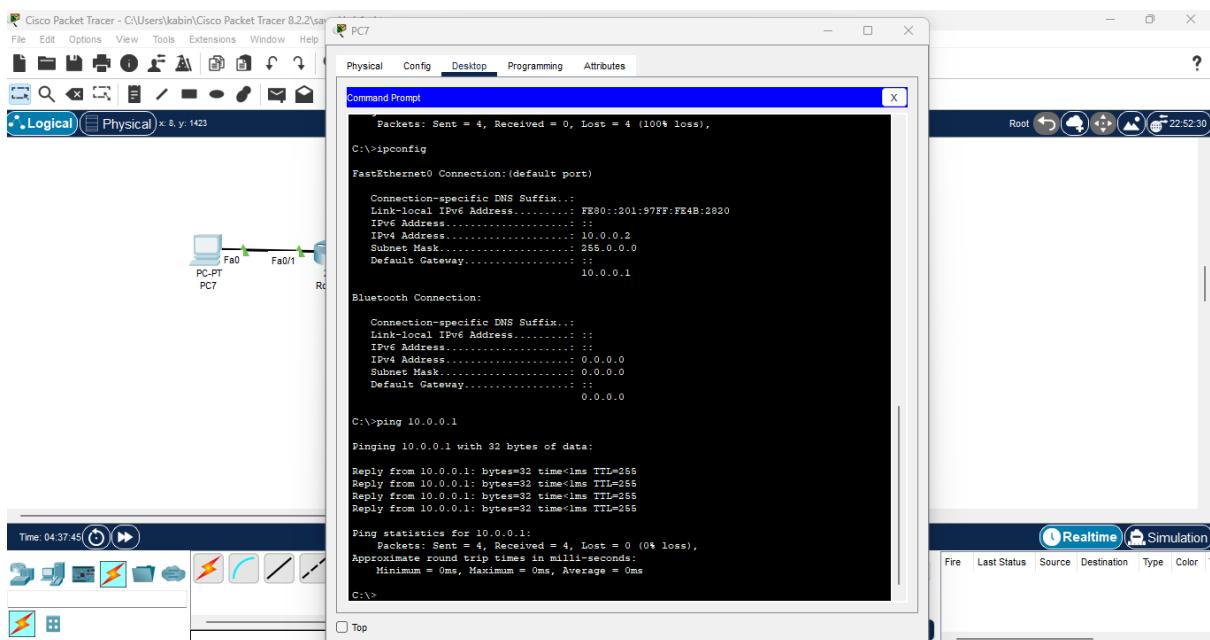
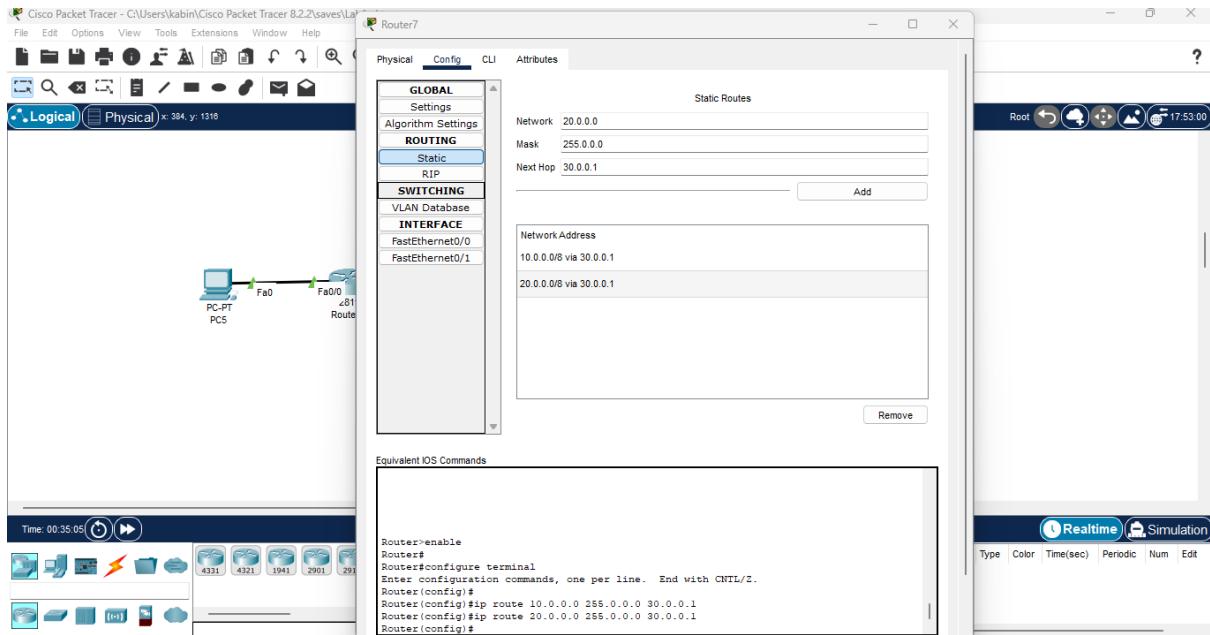
Equivalent IOS Commands:

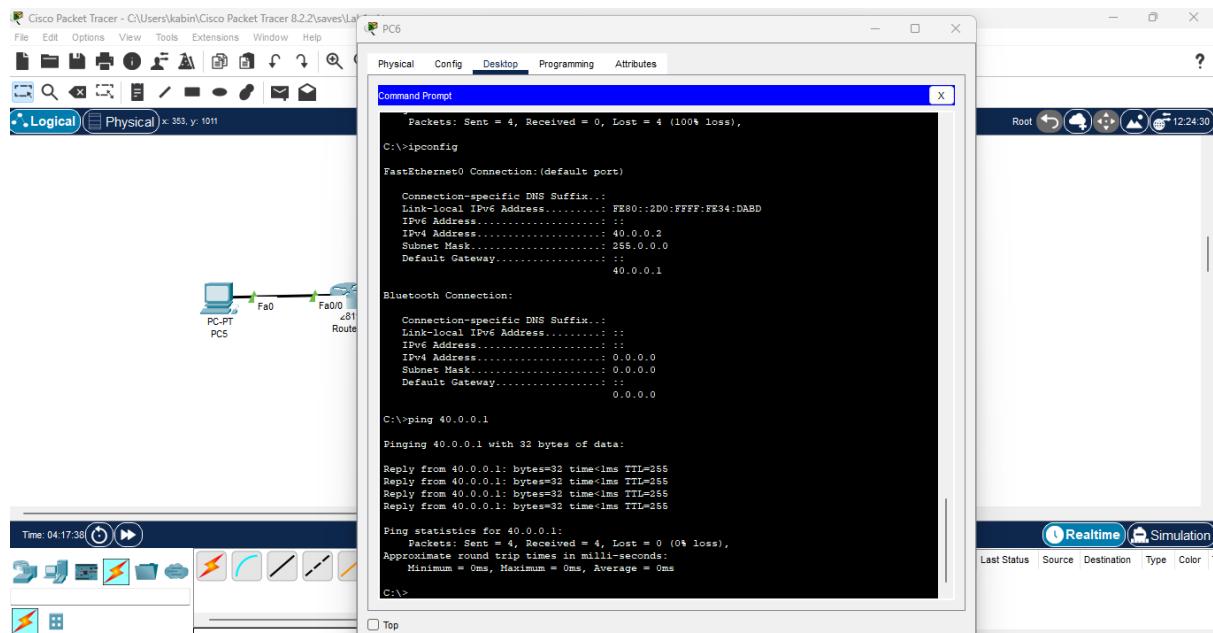
```

Router(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.1
Router(config)#

```







Lab 6:Dynamic Routing

