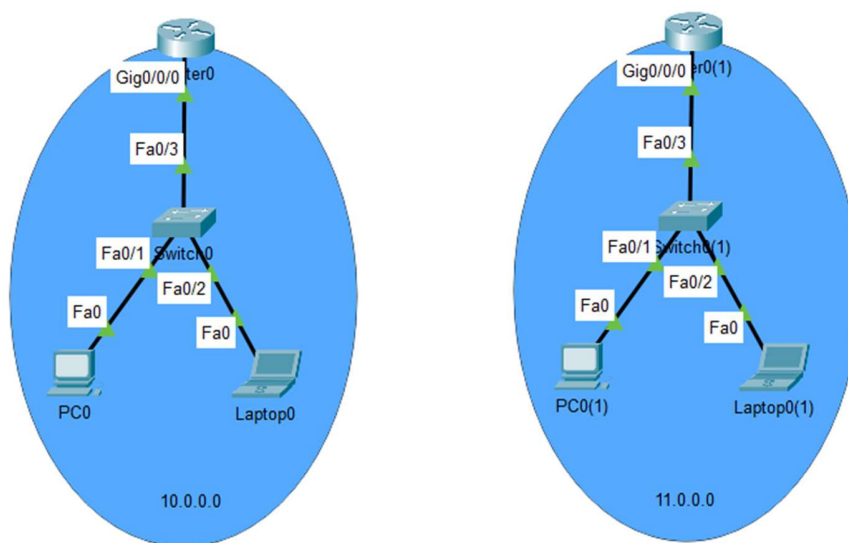
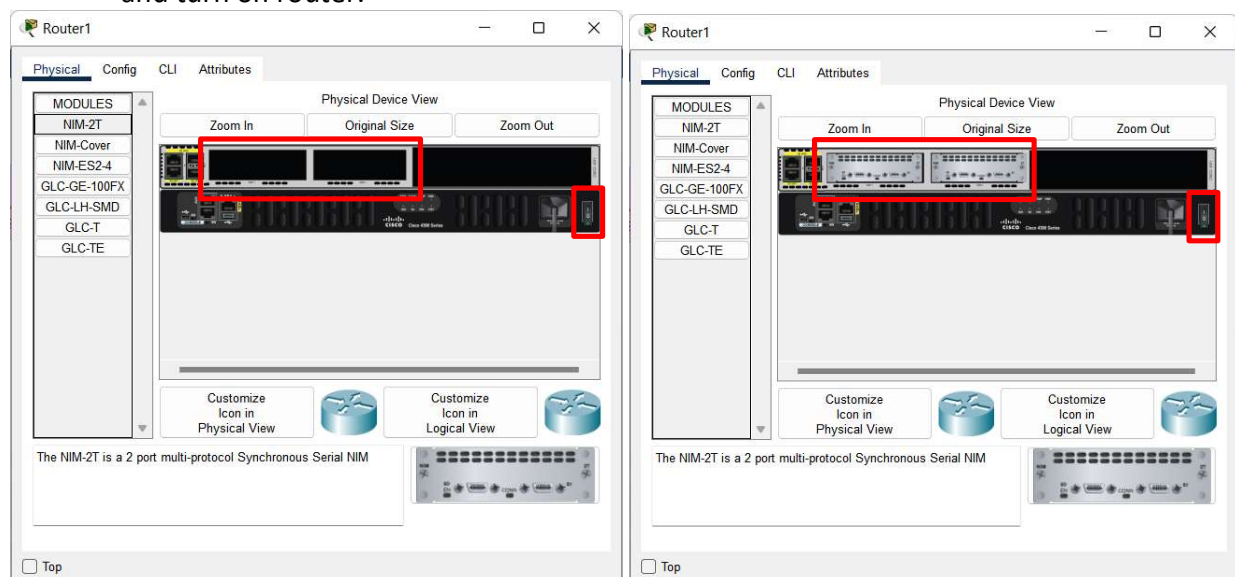
 Marwadi University Marwadi Chandarana Group	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Computer Networks (01CT0503)	Aim: Perform static routing protocol and analyze the results.	
Experiment No: 05	Date: 11-09-2023	Enrolment No: 92210133006


Aim: Perform static routing protocol and analyze the results.

Step 1: Create a 2 small network with 1 router, 1 switch, and 2 devices and connect them using copper straight through cable.

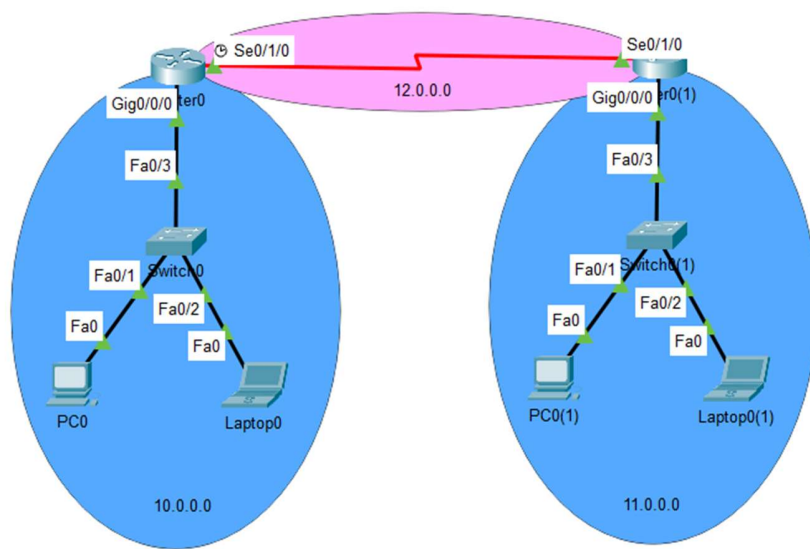


Step 2: To long distance communication we need to connect router using Serial DTE cable. For the serial port we have to open router turn off it and drag and drop NIM-2T on router and turn on router.

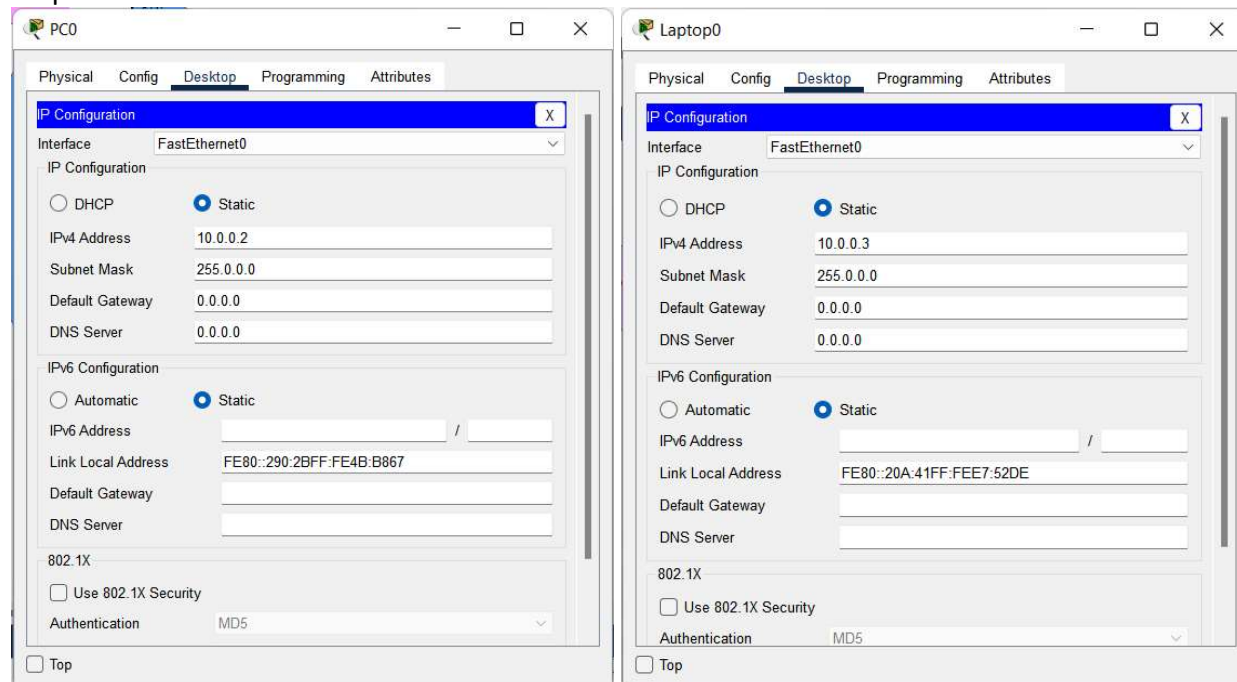



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Step 3: Now connect both router using Serial DTE cable.



Step 4: Give IP address to network 1 and network 2 devices with different network address.



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PC0(1)

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

☐ DHCP
☒ Static

IPv4 Address 11.0.0.2

Subnet Mask 255.0.0.0

Default Gateway 0.0.0.0

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic
☒ Static

IPv6 Address

Link Local Address FE80::207:ECFF:FE82:C6B9

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

☐ Top

Laptop0(1)

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

☐ DHCP
☒ Static

IPv4 Address 11.0.0.3

Subnet Mask 255.0.0.0

Default Gateway 0.0.0.0

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic
☒ Static

IPv6 Address

Link Local Address FE80::20D:BDFF:FE81:8D36

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

☐ Top

Step 5: Assign Ip addresses to Router.

Commands are "enable", "config t" or "configure terminal", "int interface_name" or "interface interface_name", "ip add ipv4_address subnet_mask", "no shut", "exit".

Router0

Physical Config CLI Attributes

IOS Command Line Interface

--- System Configuration Dialog ---
Would you like to enter the initial configuration dialog? [yes/no]: n
Press RETURN to get started!

Router>enable
Router#
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#int g0/0/0
Router(config-if)#
Router(config-if)#ip add 10.0.0.1 255.0.0.0
Router(config-if)#
Router(config-if)#no shut

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

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

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

Router0

Physical Config CLI Attributes


IOS Command Line Interface

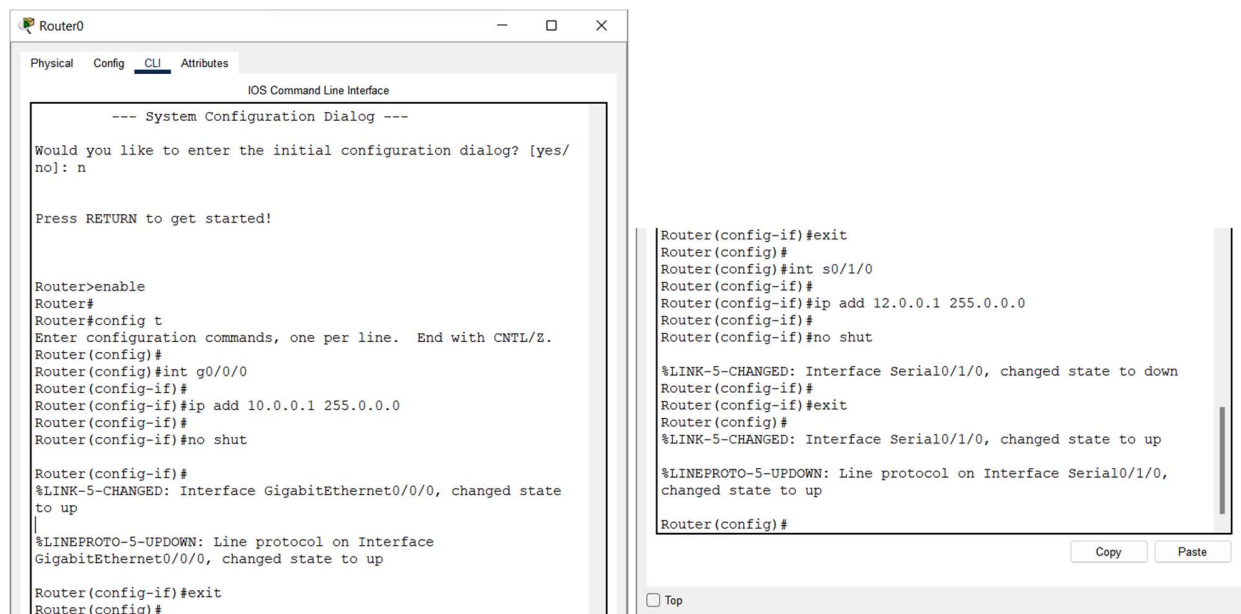
Router(config-if)#exit
Router(config)#
Router(config)#int s0/1/0
Router(config-if)#
Router(config-if)#ip add 12.0.0.1 255.0.0.0
Router(config-if)#
Router(config-if)#no shut

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

Copy Paste

☐ Top

 Marwadi University Marwadi Chandarana Group	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Computer Networks (01CT0503)	Aim: Perform static routing protocol and analyze the results.	
Experiment No: 05	Date: 11-09-2023	Enrolment No: 92210133006



```


Router0
Physical Config CLI Attributes
IOS Command Line Interface
--- System Configuration Dialog ---
Would you like to enter the initial configuration dialog? [yes/no]: n
Press RETURN to get started!


Router>enable
Router#
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#int g0/0/0
Router(config-if)#
Router(config-if)#ip add 10.0.0.1 255.0.0.0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
Router(config-if)#exit
Router(config)#

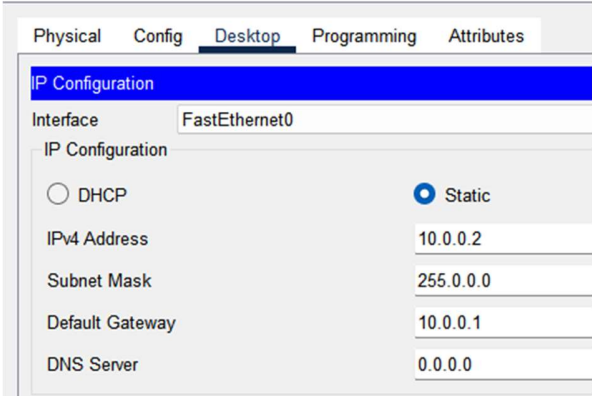
Router(config-if)#exit
Router(config)#
Router(config)#int s0/1/0
Router(config-if)#
Router(config-if)#ip add 12.0.0.1 255.0.0.0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#
Router(config-if)#exit
Router(config)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
Router(config)#
Copy Paste
Top

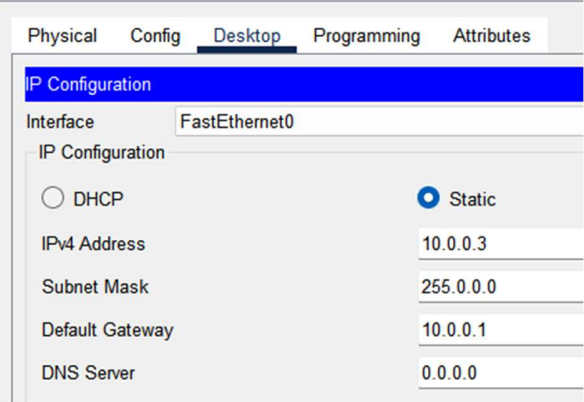
```


Step 6: Now for network-to-network communication we provide default Gateway of network to all PCs..

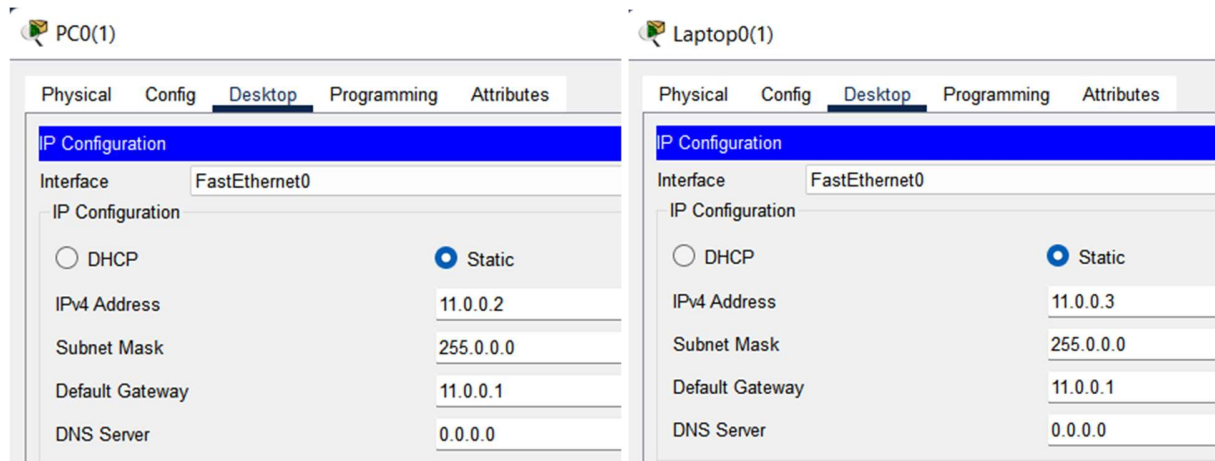

PC0


Laptop0

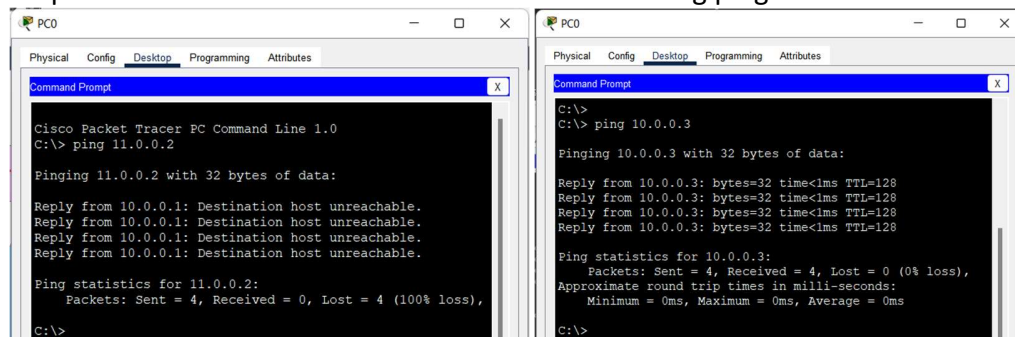




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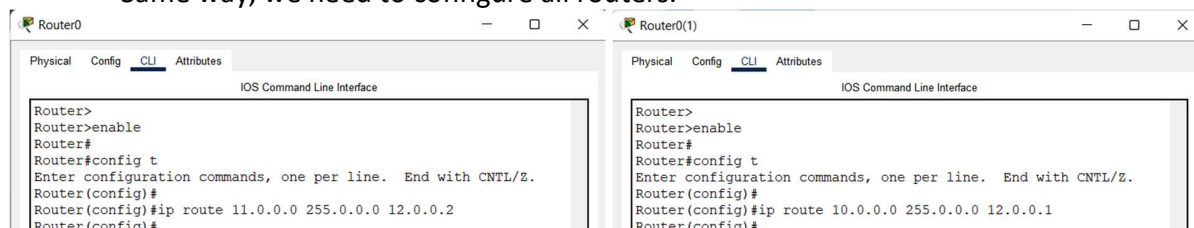
Step 7: Check connection between two network using ping command.




We can see that we only able to communicate with same network for other network destination host is unreachable because it not able to find route.

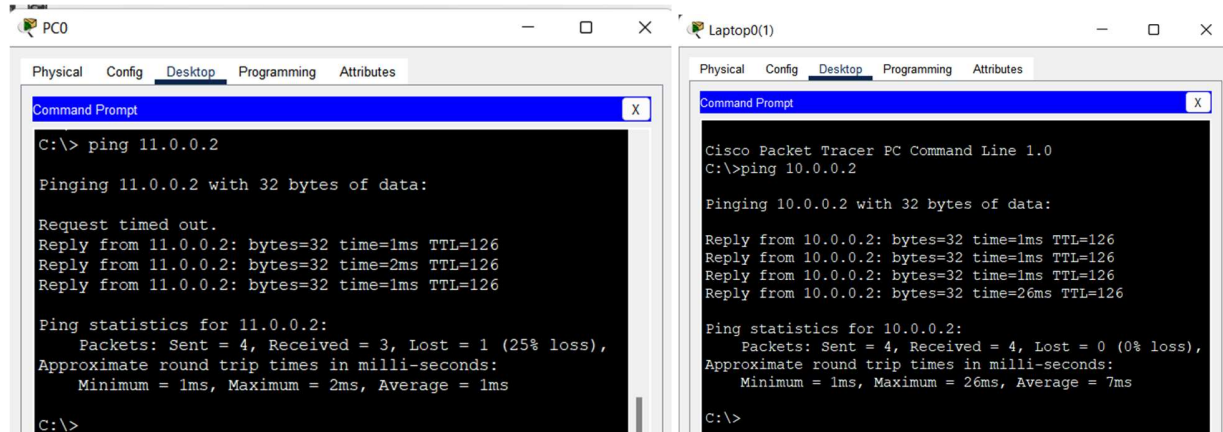
Step 8: We need to implement routing protocol onto routers so that router can find destination for another network, for that in static routing protocol we have command “ip route <network address> <subnet mask> <next hop IP address>”.

Same way, we need to configure all routers.



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Step 9: Now again check that connection between two networks is established or not using ping command.



```

PC0 Command Prompt:
C:\> ping 11.0.0.2

Pinging 11.0.0.2 with 32 bytes of data:

Request timed out.
Reply from 11.0.0.2: bytes=32 time=1ms TTL=126
Reply from 11.0.0.2: bytes=32 time=2ms TTL=126
Reply from 11.0.0.2: bytes=32 time=1ms TTL=126

Ping statistics for 11.0.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
C:\>

Laptop0(1) Command Prompt:
Cisco Packet Tracer PC Command Line 1.0
C:\> ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

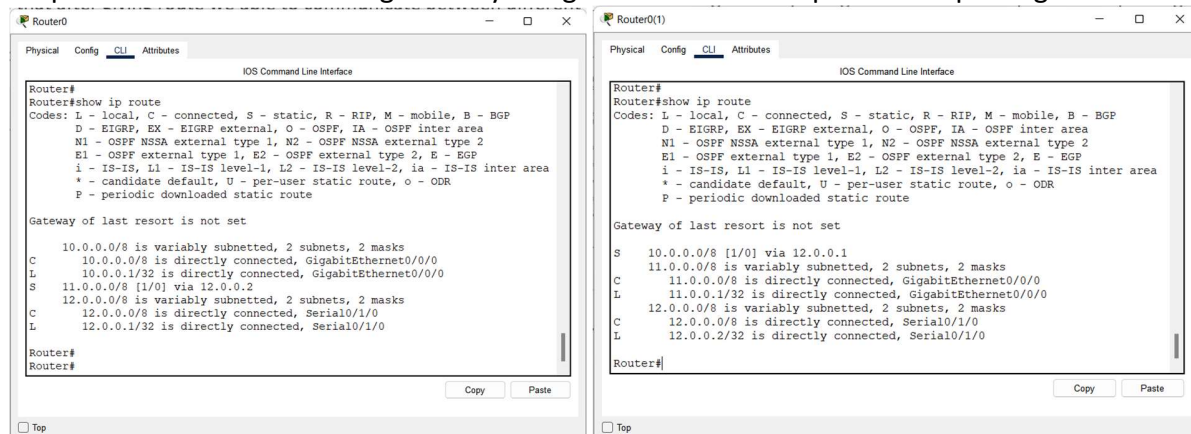
Reply from 10.0.0.2: bytes=32 time=1ms TTL=126
Reply from 10.0.0.2: bytes=32 time=1ms TTL=126
Reply from 10.0.0.2: bytes=32 time=1ms TTL=126
Reply from 10.0.0.2: bytes=32 time=26ms TTL=126

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 26ms, Average = 7ms
C:\>

```

Now we can see that after giving route we able to communicate between different networks.

Step 10: We can check routing table by using command "show ip route" in privilege mode.



```

Router0 CLI:
Router# show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.0.0.0/8 is directly connected, GigabitEthernet0/0/0
L    10.0.0.1/32 is directly connected, GigabitEthernet0/0/0
S    11.0.0.0/8 [1/0] via 12.0.0.2
C    12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    12.0.0.0/8 is directly connected, Serial0/1/0
L    12.0.0.1/32 is directly connected, Serial0/1/0

Router#

Router0(1) CLI:
Router# show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

S    10.0.0.0/8 [1/0] via 12.0.0.1
C    11.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    11.0.0.0/8 is directly connected, GigabitEthernet0/0/0
L    11.0.0.1/32 is directly connected, GigabitEthernet0/0/0
C    12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    12.0.0.0/8 is directly connected, Serial0/1/0
L    12.0.0.2/32 is directly connected, Serial0/1/0

Router#

```

Conclusion:

Through this experiment, I learned that to enable communication between different networks, we need to implement routing protocols. Specifically, I learned how to use static routing with the "ip route" command and assign default gateways to devices. By using "show ip route," I analyzed the routing table and identified that:

"L" (Local) means the router is directly connected to the mentioned network or IP (e.g., 10.0.0.1 and 12.0.0.1).

"C" (Connected) confirms the router's direct physical interfaces to networks (e.g., 10.0.0.0/8 and 12.0.0.0/8).

"S" (Static) represents a manually configured route, such as the one for 11.0.0.0/8 via 12.0.0.2, enabling specific network communication.