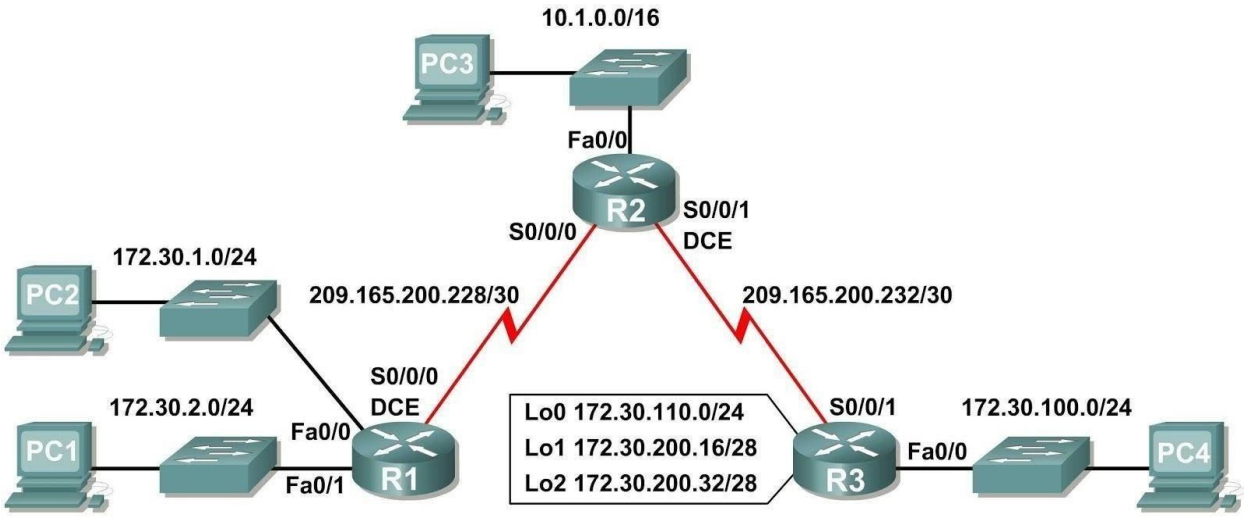
Name:Jainam Jain
TE COMPS
UID-2018130016
BATCH B

CEL 51, DCCN, Monsoon 2020

Lab 7: RIPv2 Router Configuration

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	**Fa0/0**	172.30.1.1	255.255.255.0	N/A
	Fa0/1	172.30.2.1	255.255.255.0	N/A
	S0/0/0	209.165.200.230	255.255.255.252	N/A
R2	**Fa0/0**	10.1.0.1	255.255.0.0	N/A
	S0/0/0	209.165.200.229	255.255.255.252	N/A
	S0/0/1	209.165.200.233	255.255.255.252	N/A
R3	**Fa0/0**	172.30.100.1	255.255.255.0	N/A
	S0/0/1	209.165.200.234	255.255.255.252	N/A
	Lo0	172.30.110.1	255.255.255.0	N/A
	Lo1	172.30.200.17	255.255.255.240	N/A
	Lo2	172.30.200.33	255.255.255.240	N/A
PC1	**NIC**	172.30.2.10	255.255.255.0	172.30.2.1

PC2	**NIC**	172.30.1.10	255.255.255.0	172.30.1.1
PC3	**NIC**	10.1.0.10	255.255.0.0	10.1.0.1
PC4	**NIC**	172.30.100.10	255.255.255.0	172.30.100.1

Learning Objectives

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

- Cable a network according to the Topology Diagram.
- Load provided scripts onto the routers.
- Examine the current status of the network.
- Configure RIPv2 on all routers.
- Examine the automatic summarization of routes.
- Examine routing updates with **debug ip rip**.
- Disable automatic summarization.
- Examine the routing tables.
- Verify network connectivity.
- Document the RIPv2 configuration.

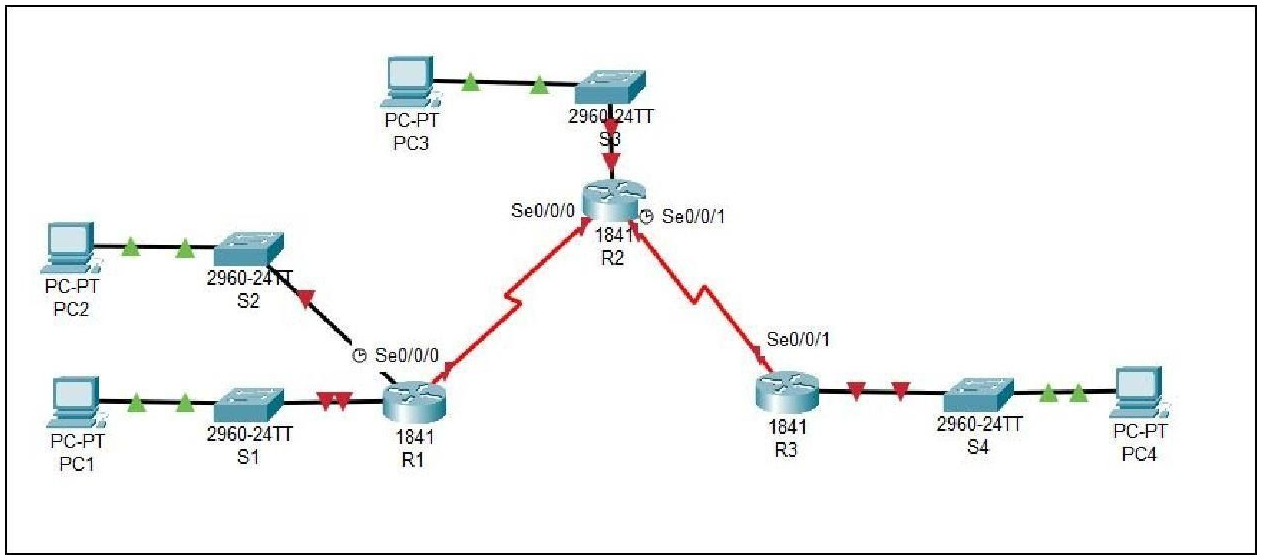
Scenario

The network shown in the Topology Diagram contains a discontiguous network, 172.30.0.0. This network has been subnetted using VLSM. The 172.30.0.0 subnets are physically and logically divided by at least one other classful or major network, in this case the two serial networks 209.165.200.228/30 and 209.165.200.232/30. This can be an issue when the routing protocol used does not include enough information to distinguish the individual subnets. RIPv2 is a classless routing protocol that can be used to provide subnet mask information in the routing updates. This will allow VLSM subnet information to be propagated throughout the network.

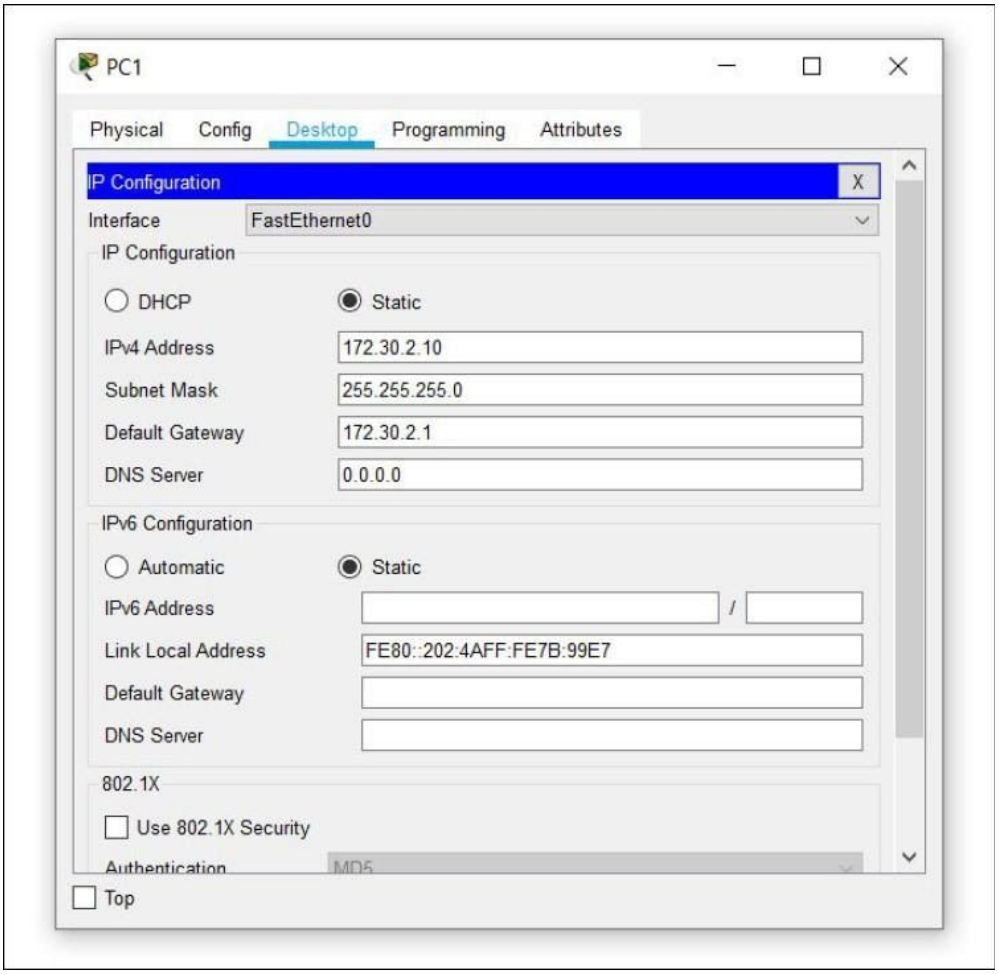
Task 1: Cable, Erase, and Reload the Routers.

Step 1: Cable a network.

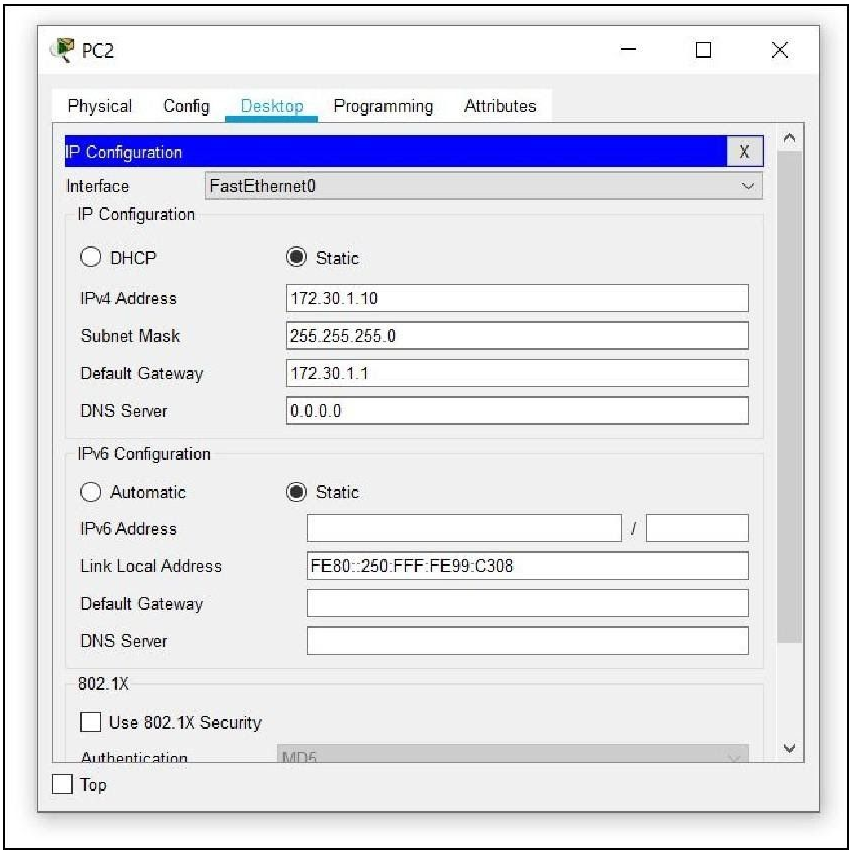
Cable a network that is similar to the one in the Topology Diagram.



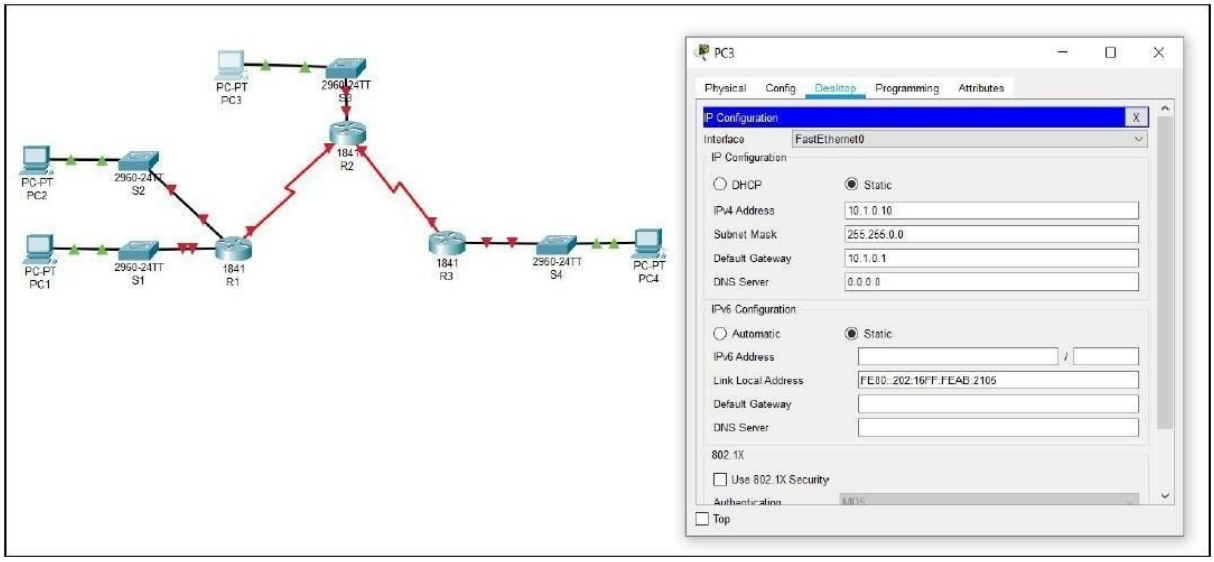
Configuration of PC1



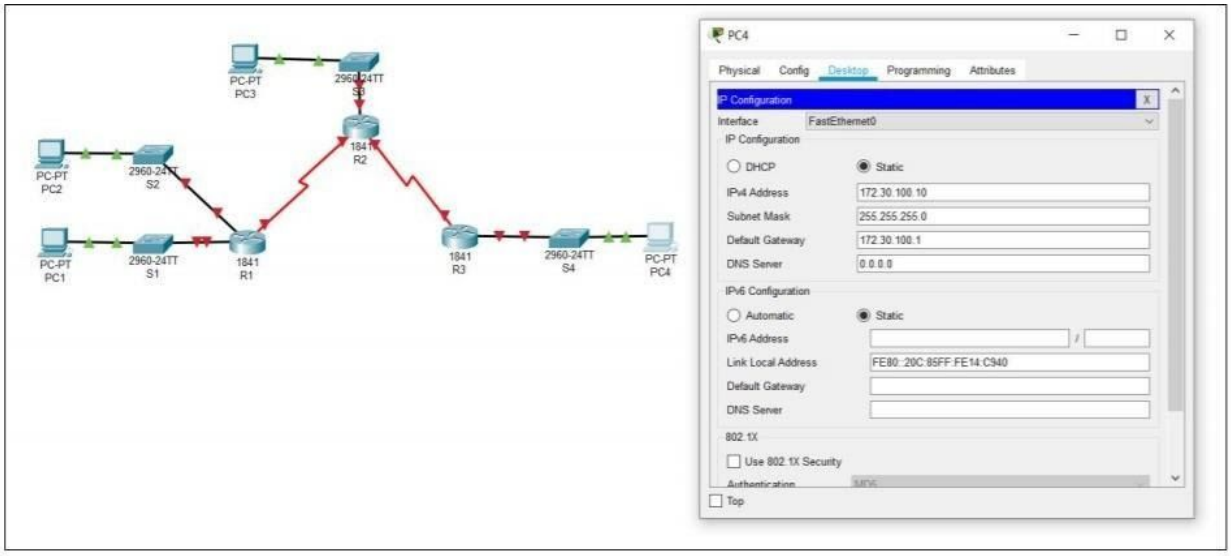
Configuration of PC2



Configuration of PC3



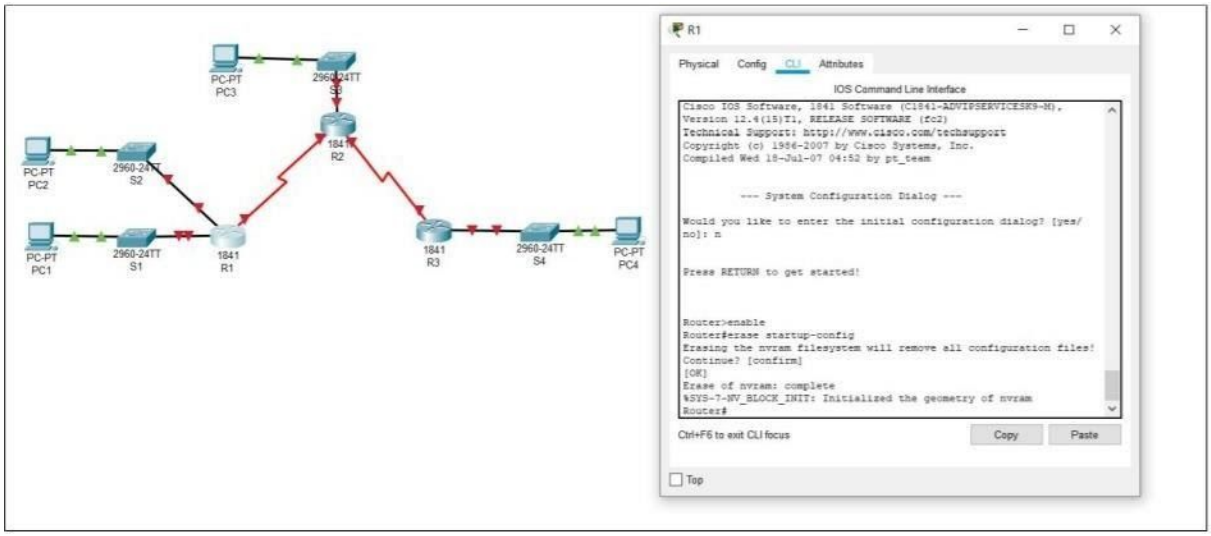
Configuration of PC4



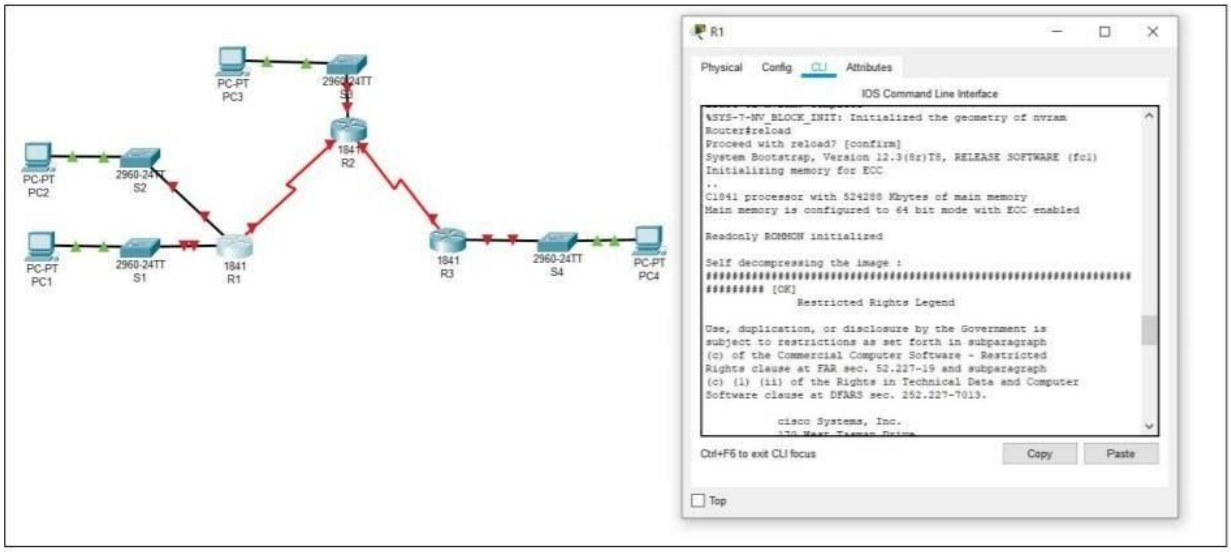
Step 2: Clear the configuration on each router.

Clear the configuration on each of routers using the **erase startup-config** command and then **reload** the routers. Answer **no** if asked to save changes.

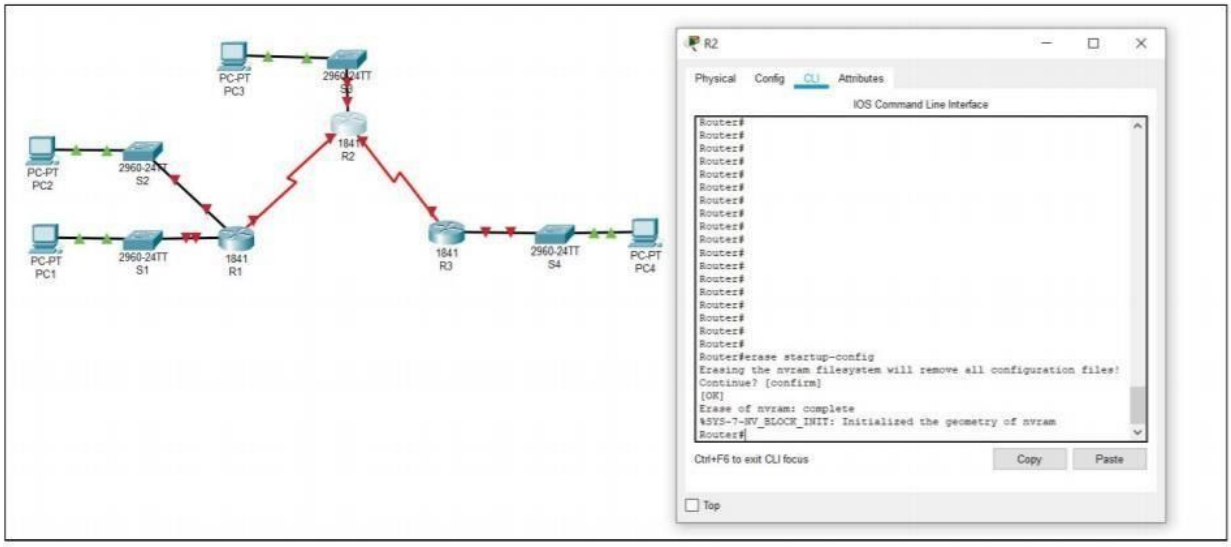
Clearing configuration of R1



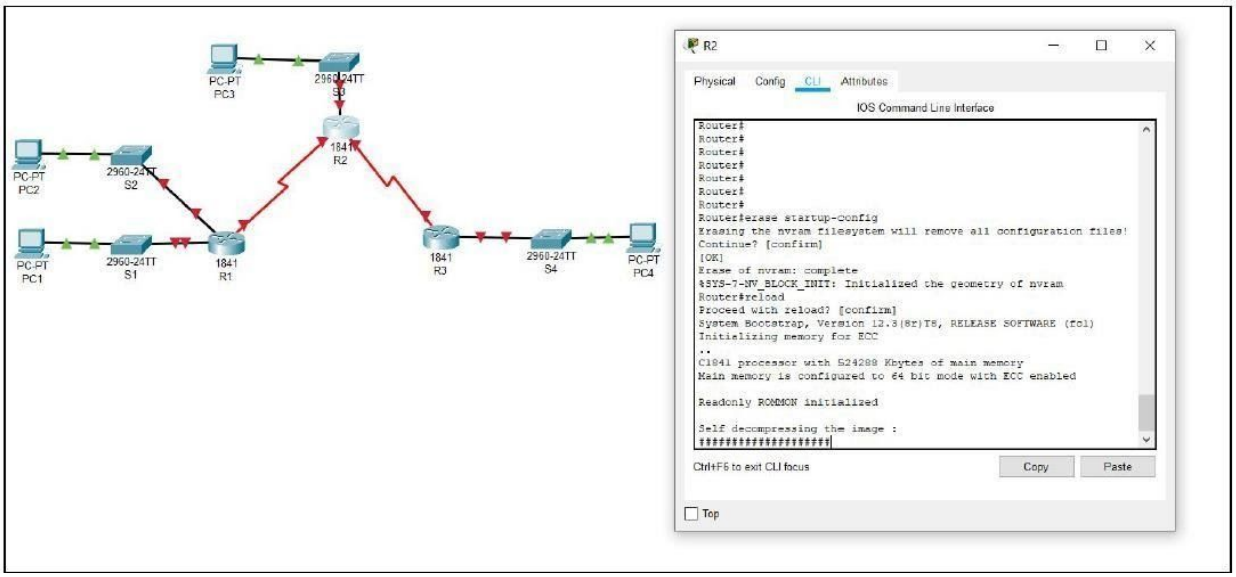
Reloading R1 using reload command



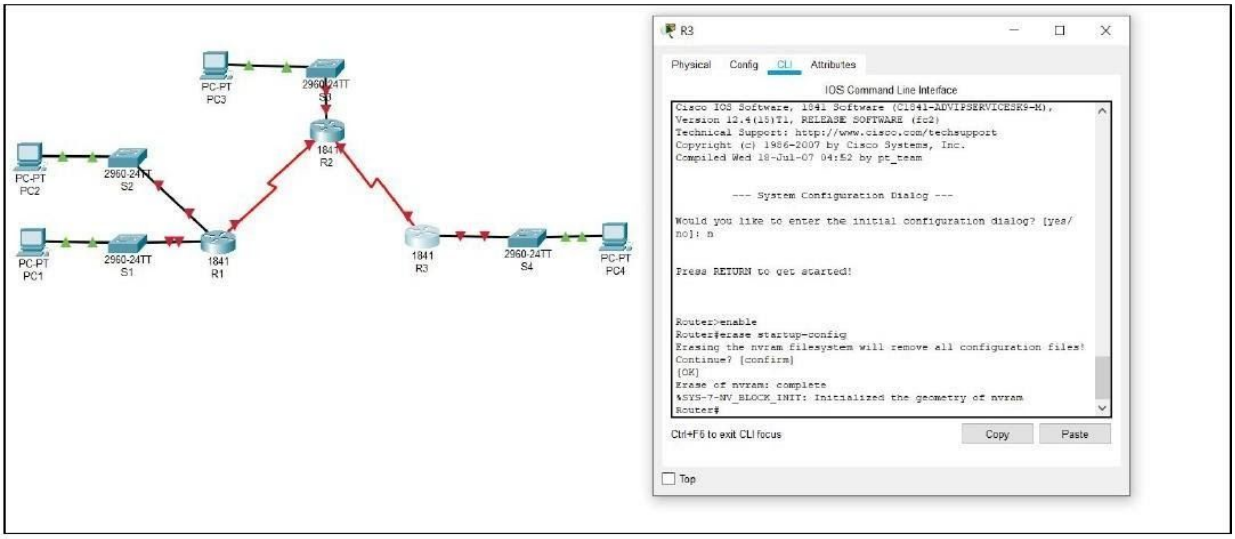
Clearing configuration of R2



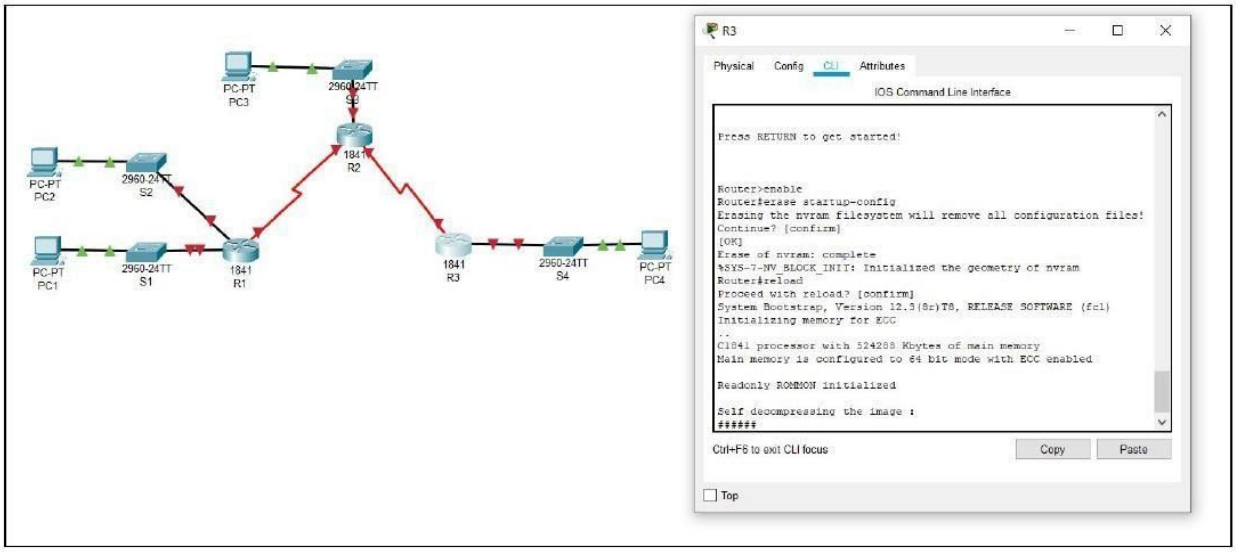
Reloading R2 using reload command



Clearing configuration of R3



Reloading R3



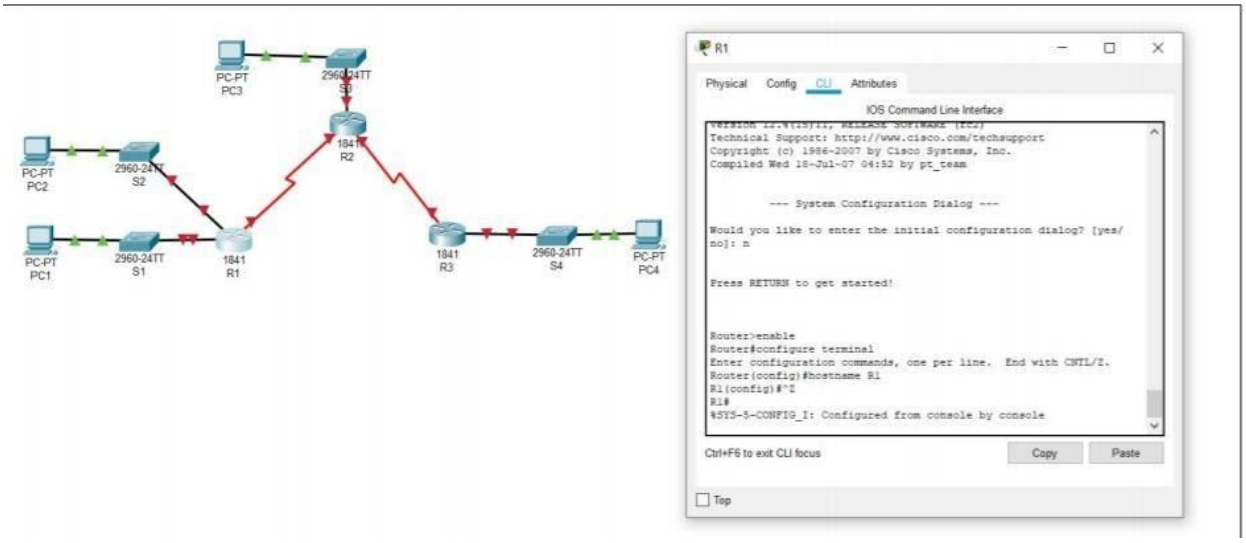
Task 2: Load Routers with the Supplied Scripts.

Step 1: Load the following script onto R1.

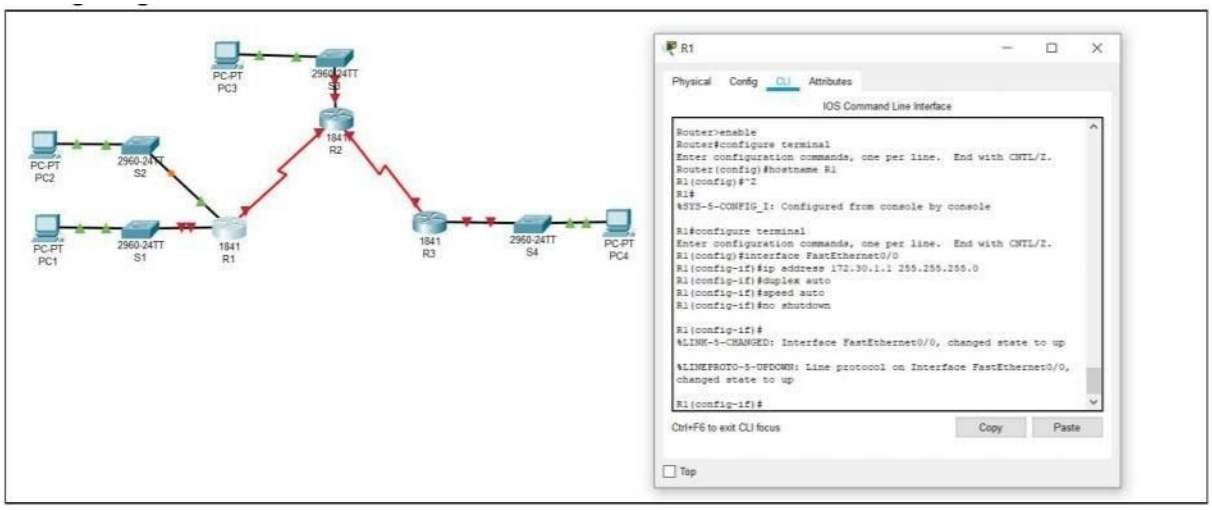
```
!
hostname R1
!
!
!
interface FastEthernet0/0
 ip address 172.30.1.1 255.255.255.0
 duplex auto
 speed auto
 no shutdown
!
interface FastEthernet0/1
 ip address 172.30.2.1 255.255.255.0
 duplex auto
 speed auto
 no shutdown
!
interface Serial0/0/0
 ip address 209.165.200.230 255.255.255.252
 clock rate 64000
 no shutdown
!
router rip
 passive-interface
 FastEthernet0/0
 passive-interface
 FastEthernet0/1              network
 172.30.0.0
 network 209.165.200.0
!
```

```
line con 0
line vty 0 4
 login
!
end
```

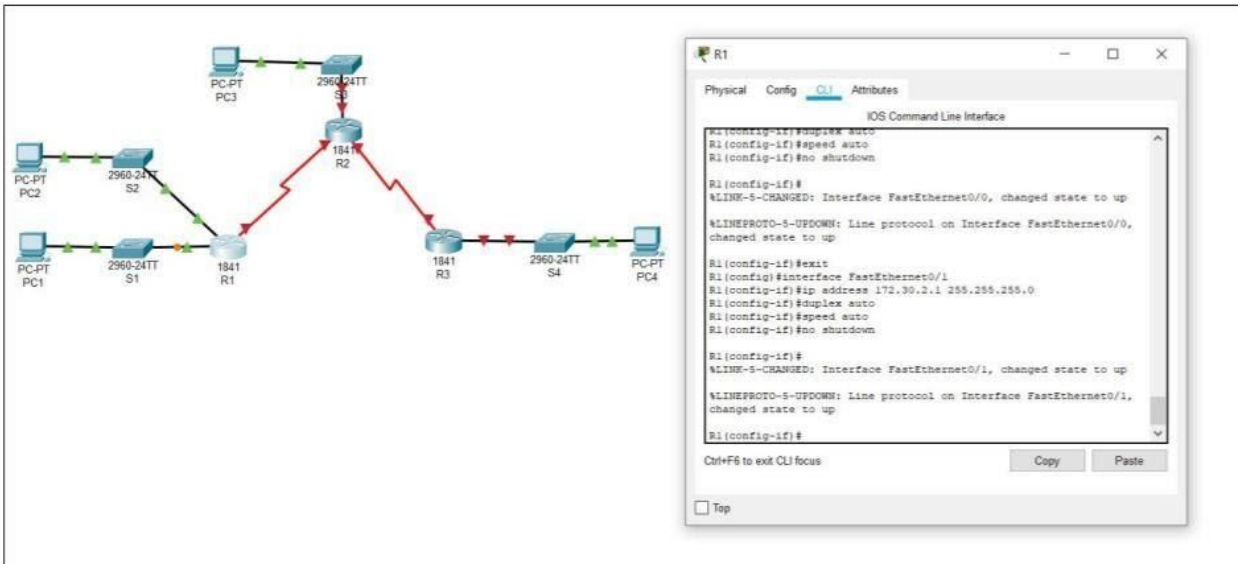
Assigning hostname as R1



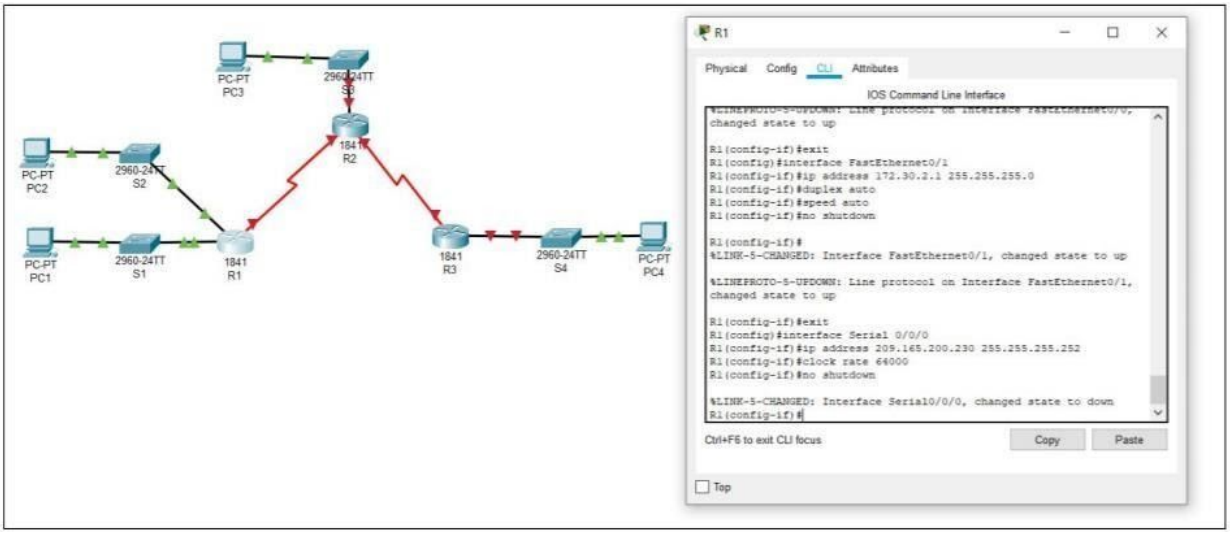
Configuring FastEthernet0/0



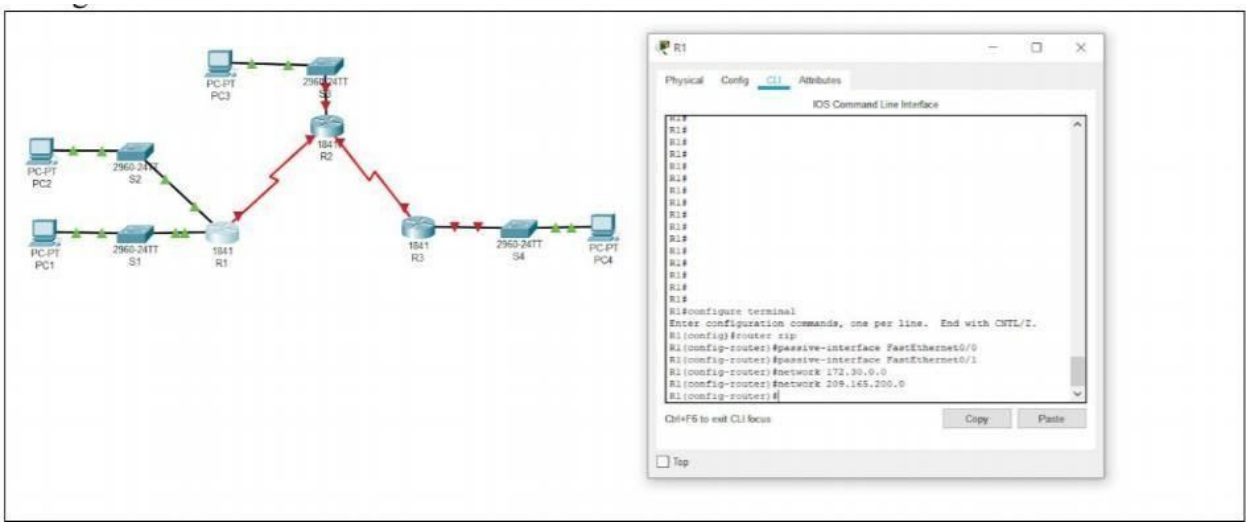
Configuring FastEthernet0/1



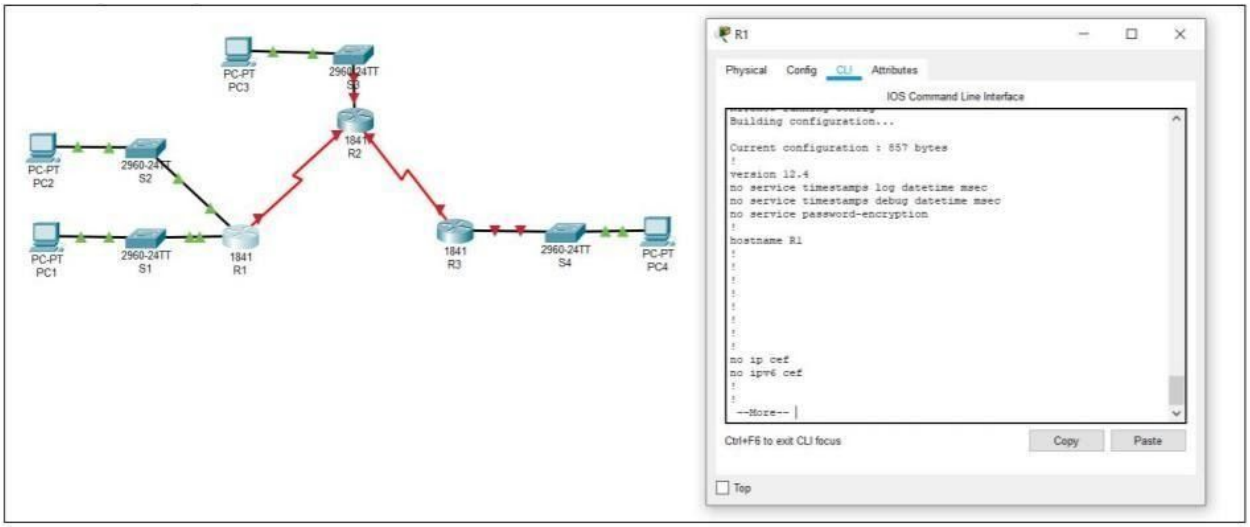
Configuring Serial0/0/0

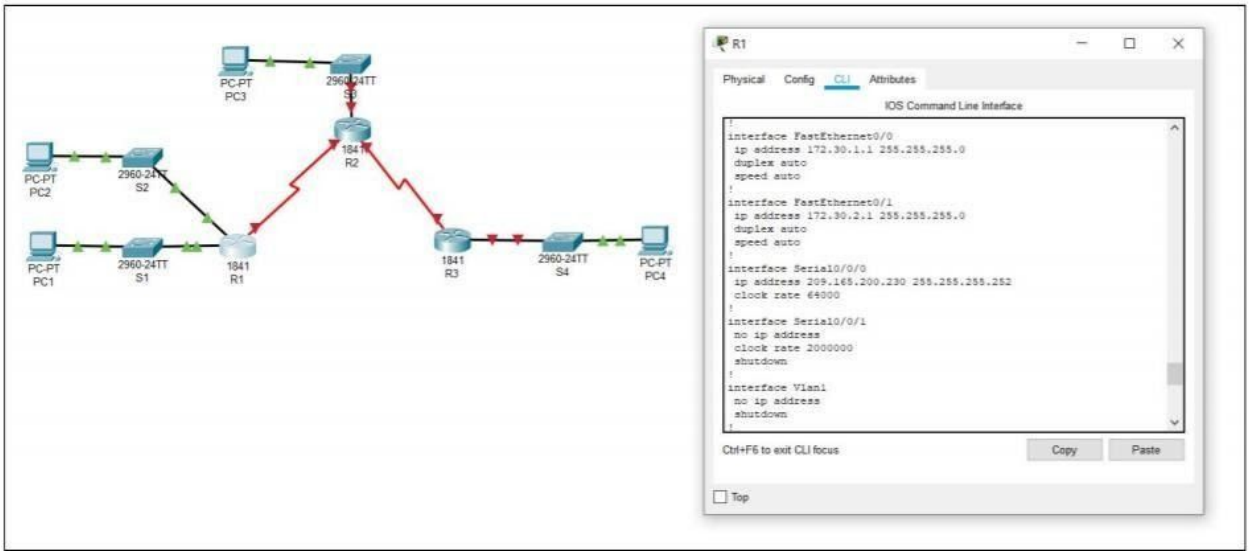


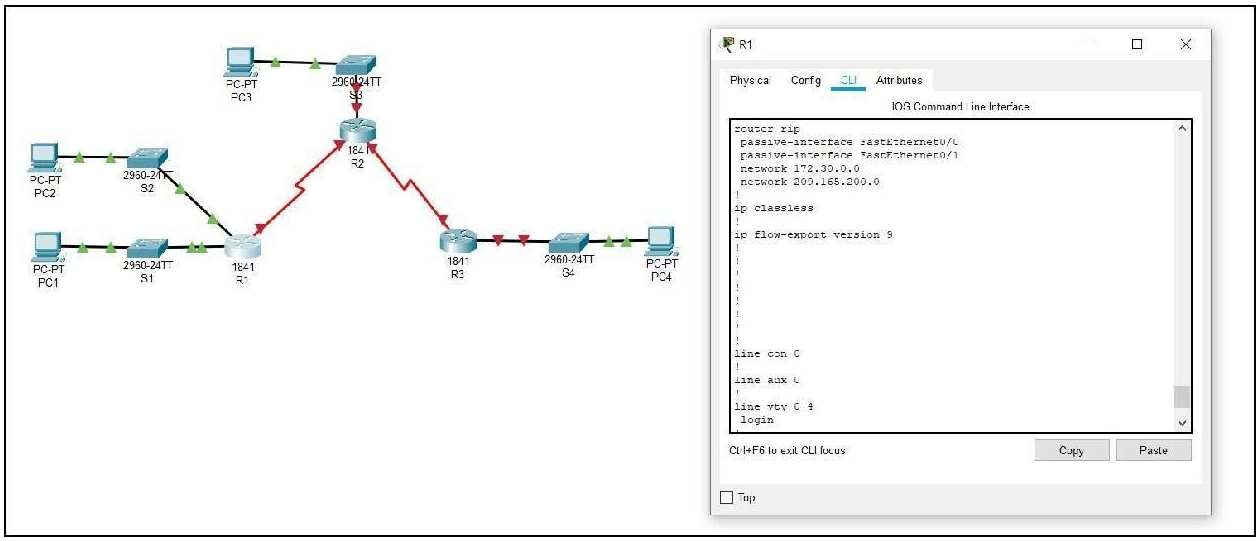
Configuration of RIP



Running Configuration



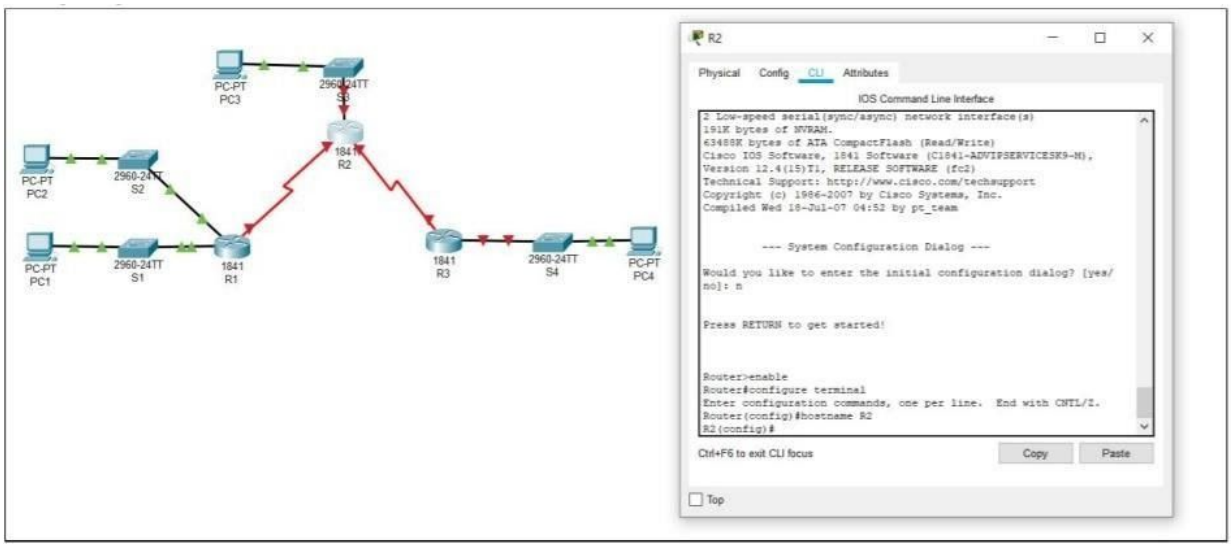




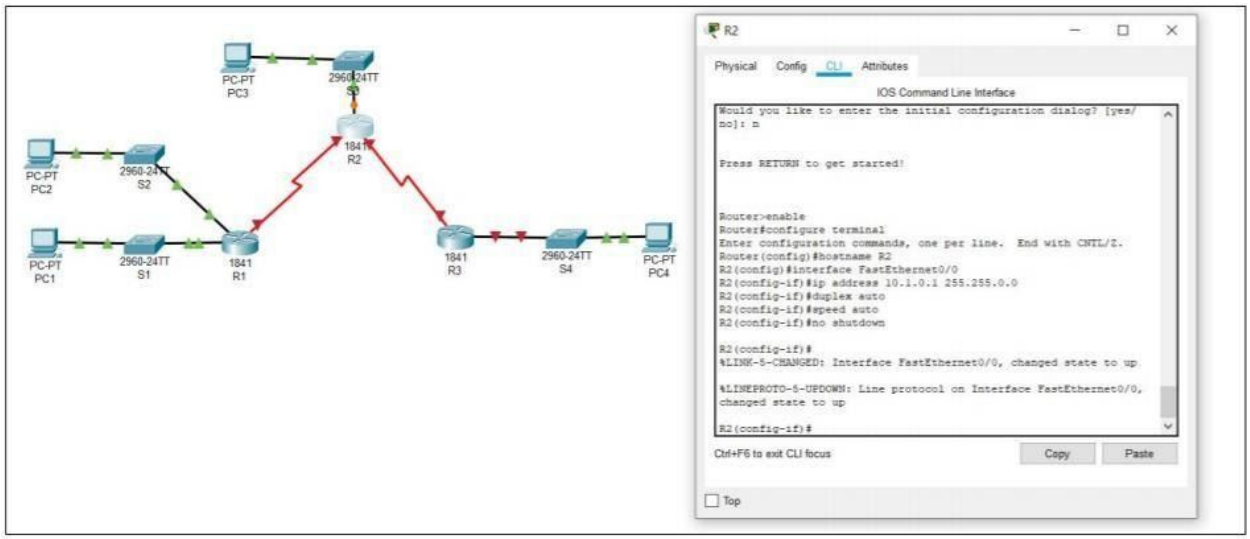
Step 2: Load the following script onto R2.

```
hostname R2
!
!
!
interface FastEthernet0/0
 ip address 10.1.0.1 255.255.0.0
 duplex auto
 speed auto
 no shutdown
!
interface Serial0/0/0
 ip address 209.165.200.229 255.255.255.252
 no shutdown
!
interface Serial0/0/1
 ip address 209.165.200.233 255.255.255.252
 clock rate 64000
 no shutdown
!
router rip
 passive-interface FastEthernet0/0
 network 10.0.0.0
 network 209.165.200.0
!
line con 0
line vty 0 4
 login
!
end
```

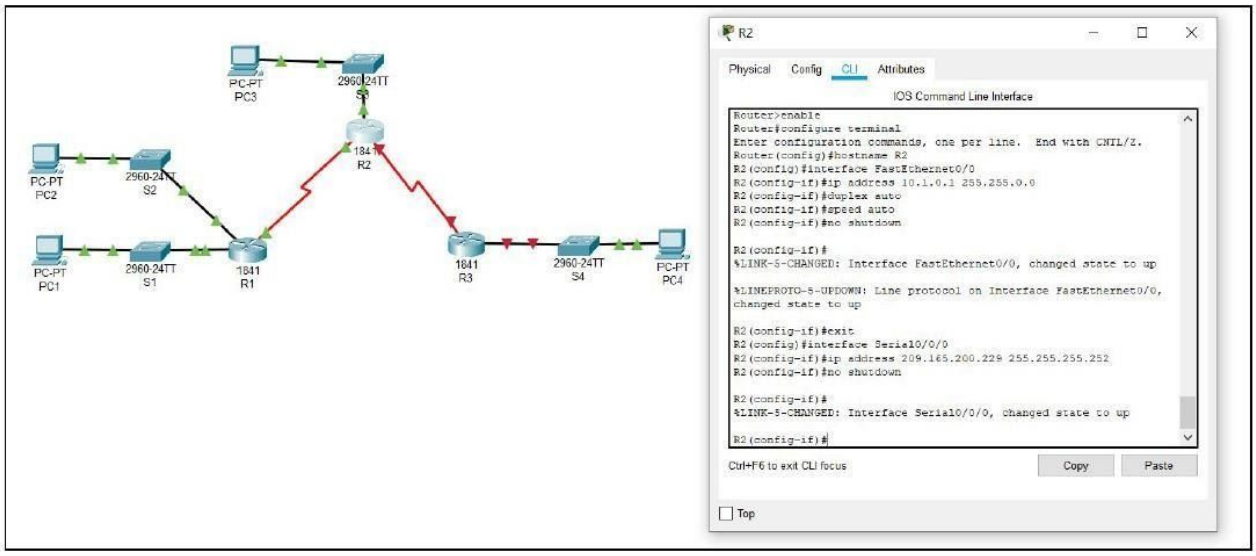
Assigning hostname as R2



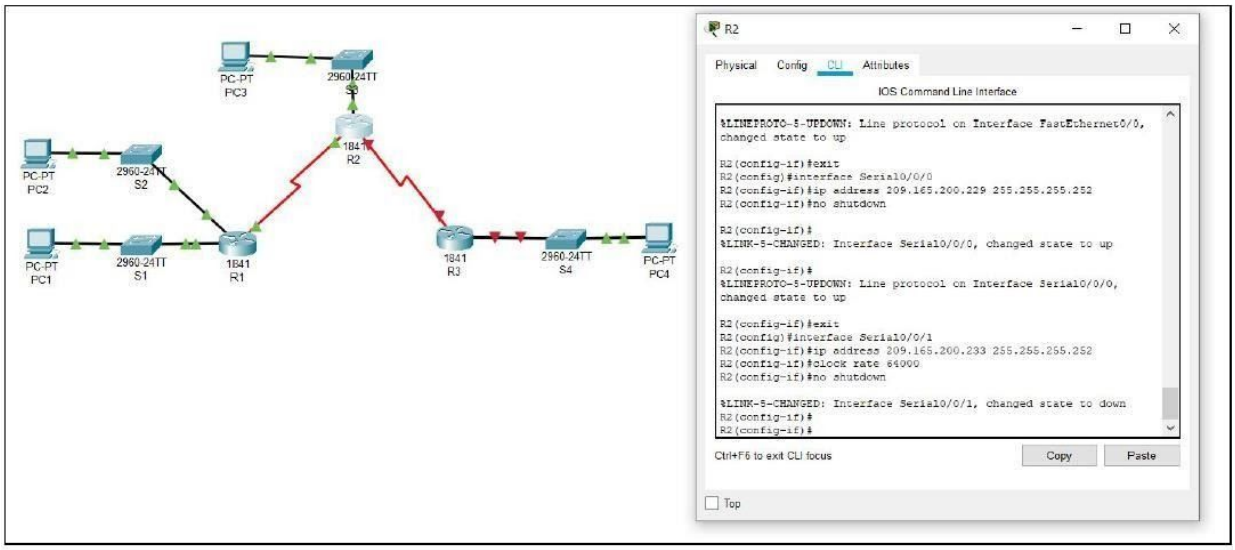
Configuration of FastEthernet0/0



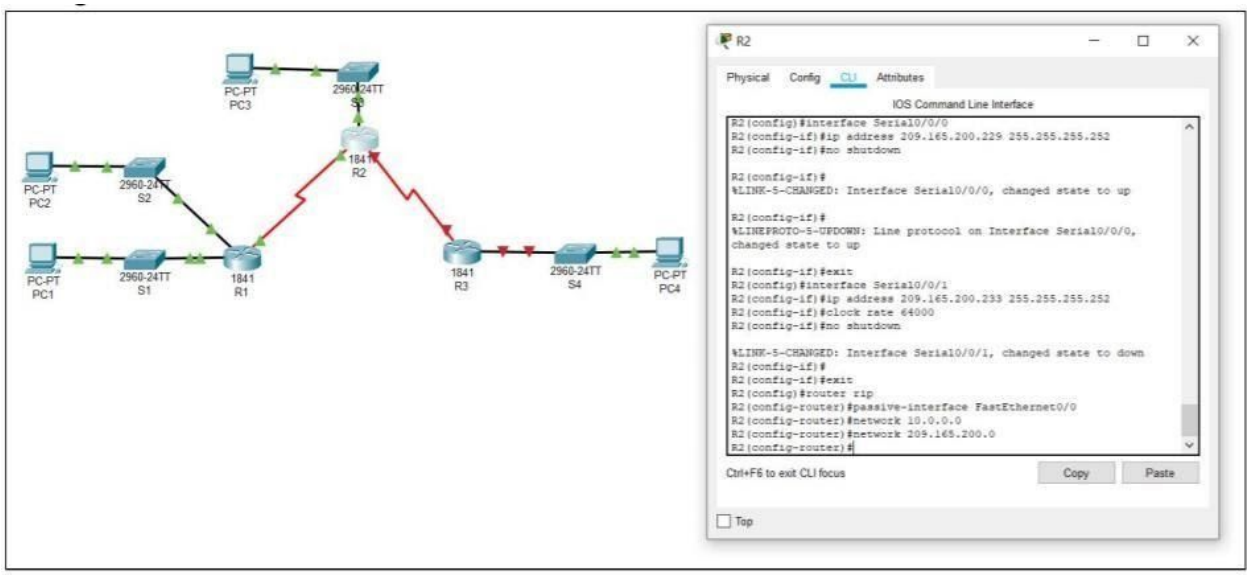
Configuration of Serial0/0/0



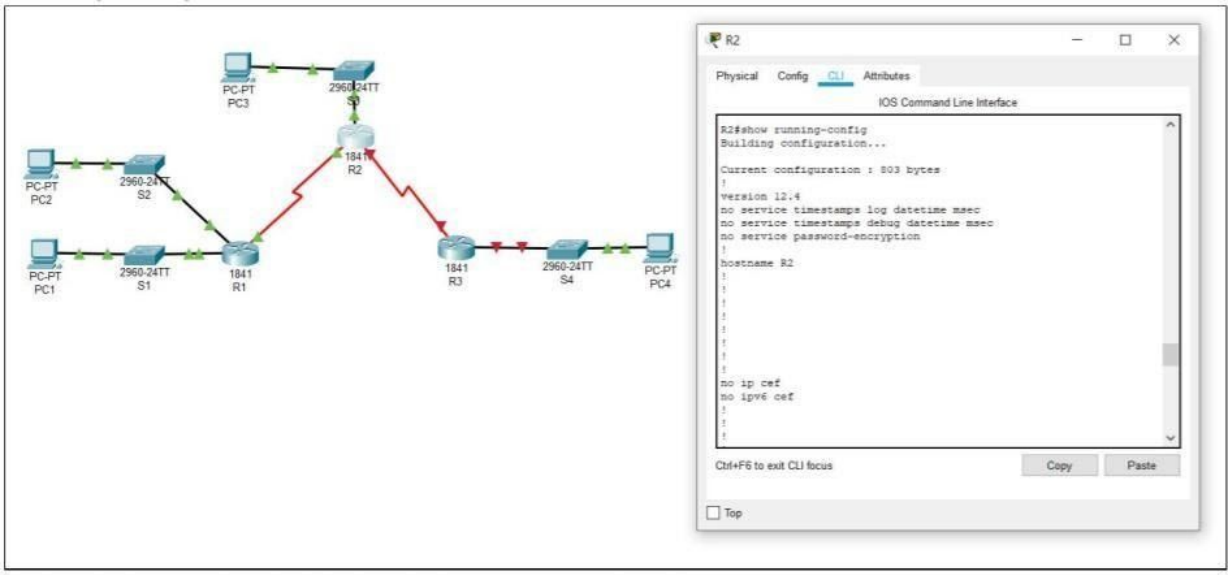
Configuration of Serial0/0/1

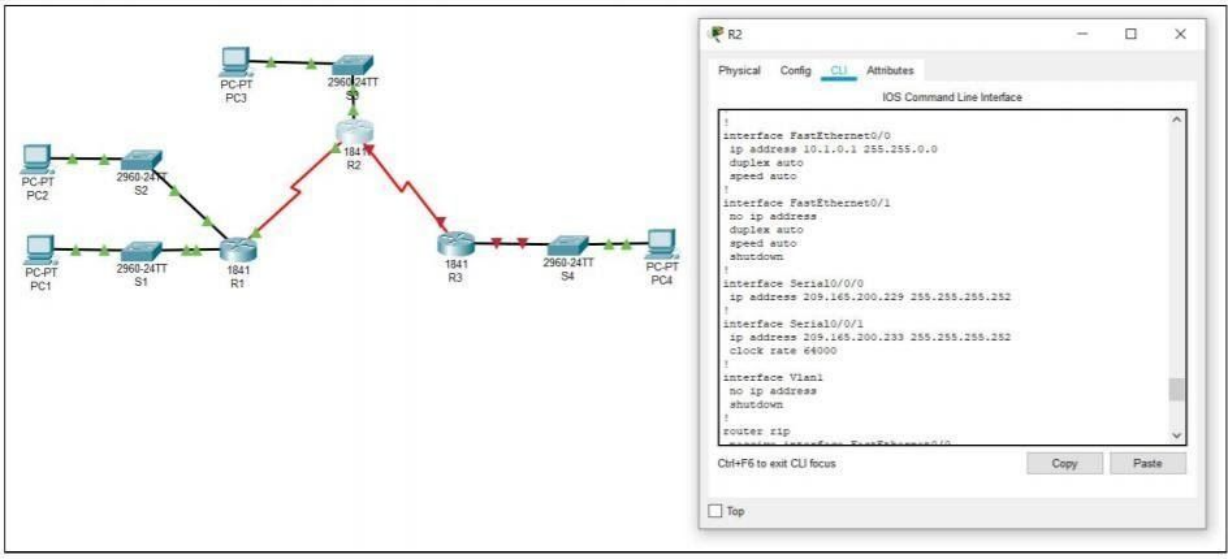


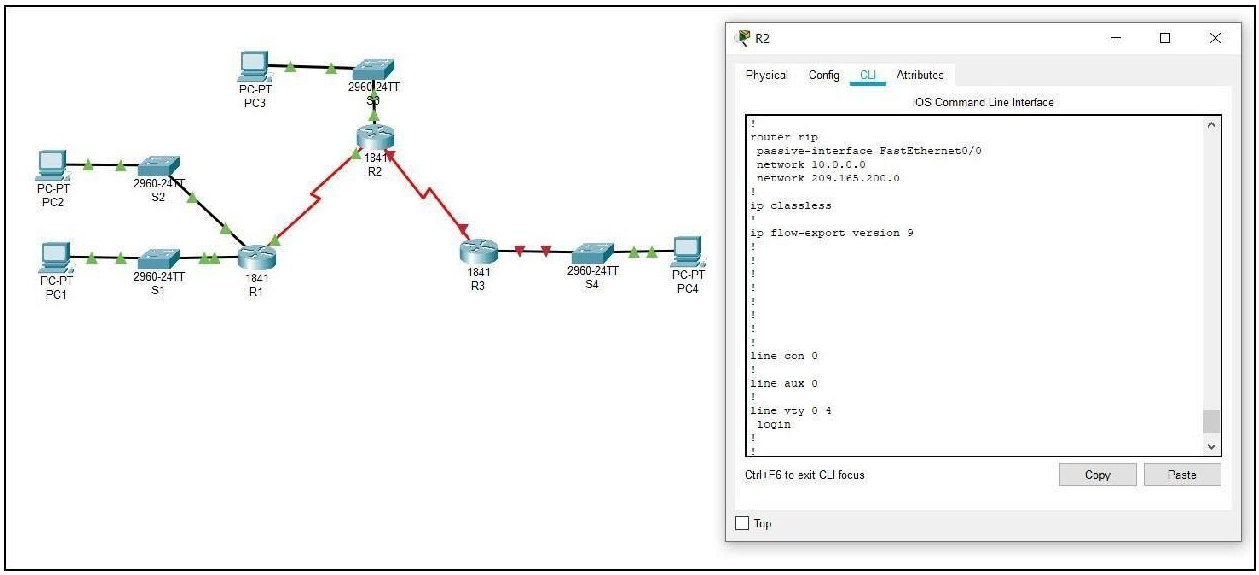
Configuration of RIP



Running configuration of R2







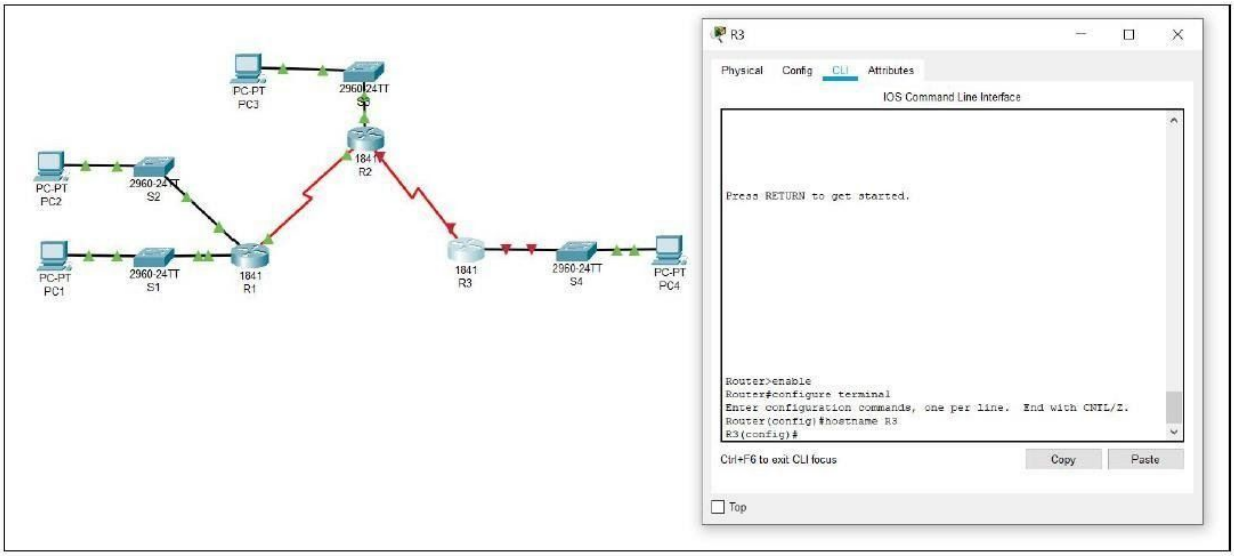
Step 3: Load the following script onto R3.

```
hostname R3
!
!
!
interface FastEthernet0/0
 ip address 172.30.100.1 255.255.255.0
 duplex auto
 speed auto
 no shutdown
!
interface Serial0/0/1
 ip address 209.165.200.234 255.255.255.252
 no shutdown
!
interface Loopback0
 ip address 172.30.110.1 255.255.255.0
!
interface Loopback1
 ip address 172.30.200.17 255.255.255.240
!
interface Loopback2
 ip address 172.30.200.33 255.255.255.240
!
router rip
 passive-interface FastEthernet0/0
 network 172.30.0.0
 network 209.165.200.0
!
line con 0
```

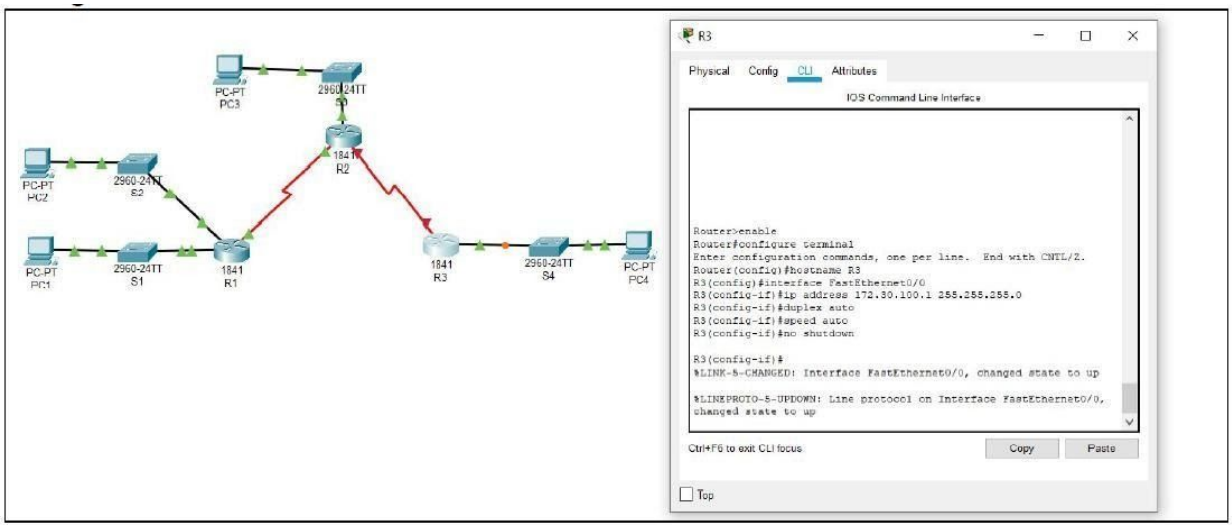
```
line vty 0 4
```

login
!
end

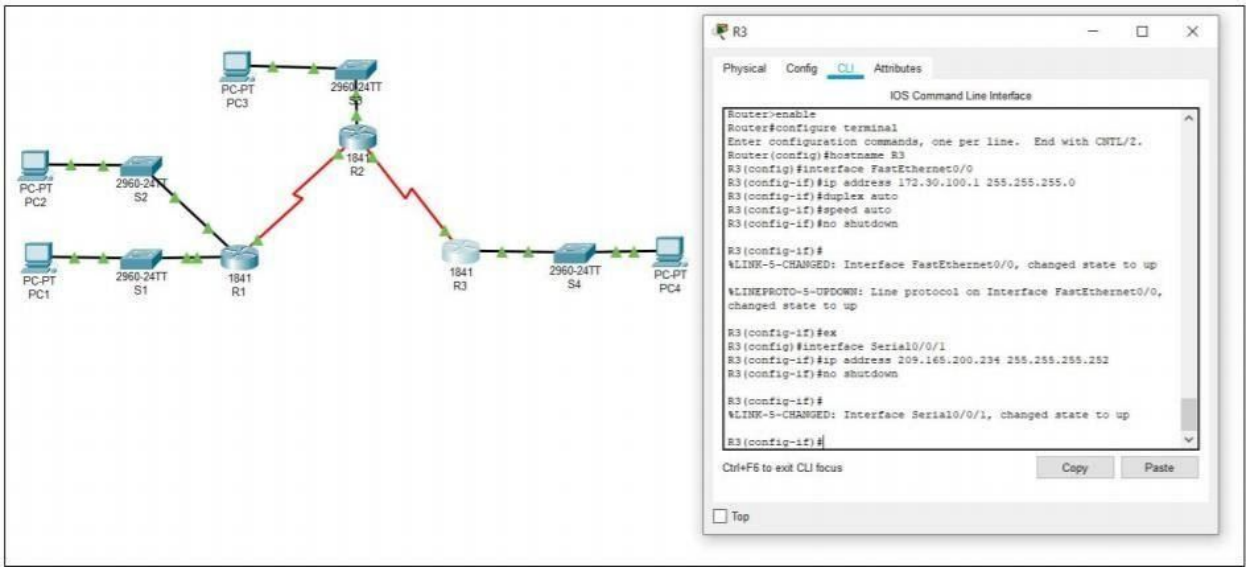
Assigning hostname as R3



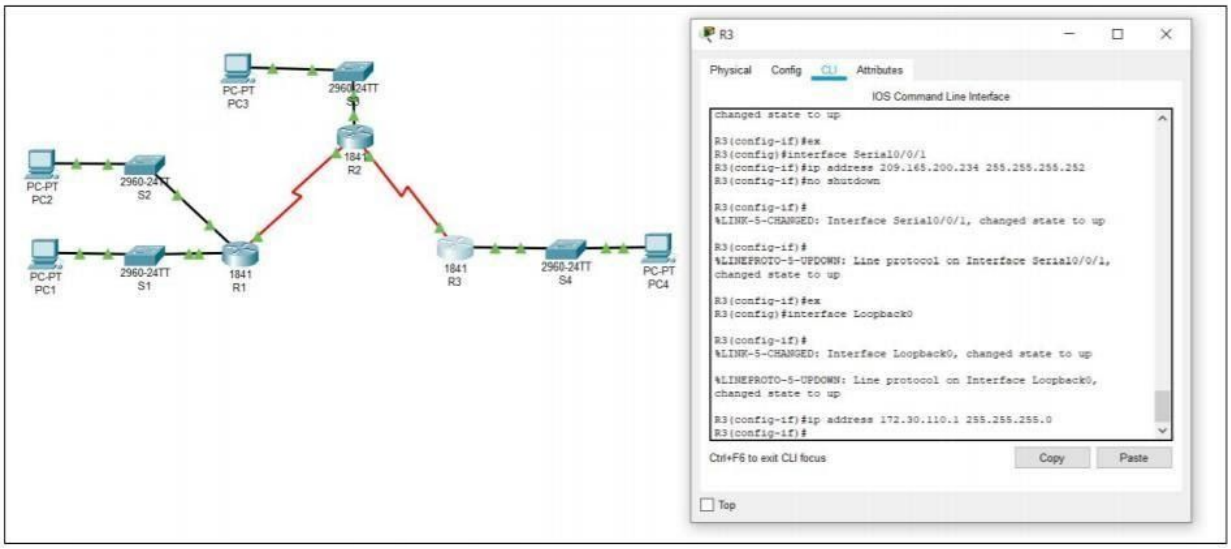
Configuration of FastEthernet0/0



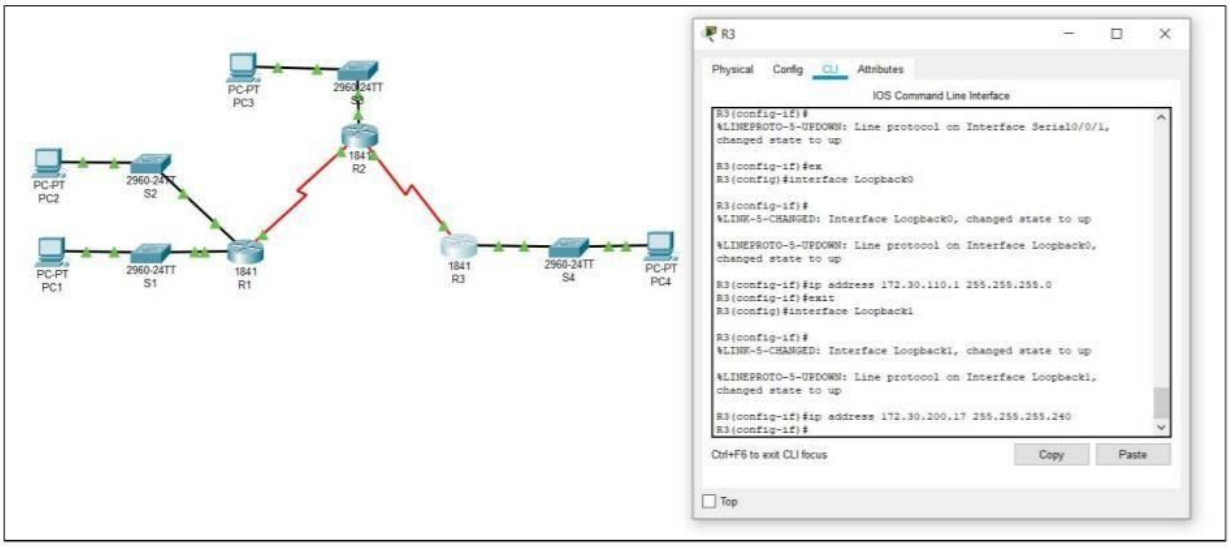
Configuration of Serial0/0/0



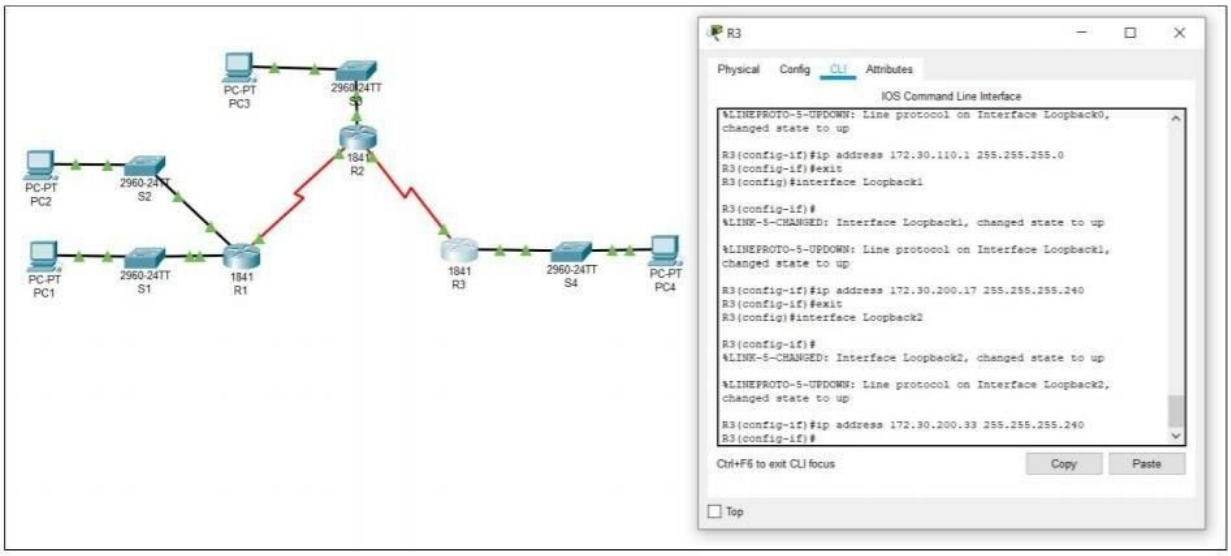
Configuration of Loopback0



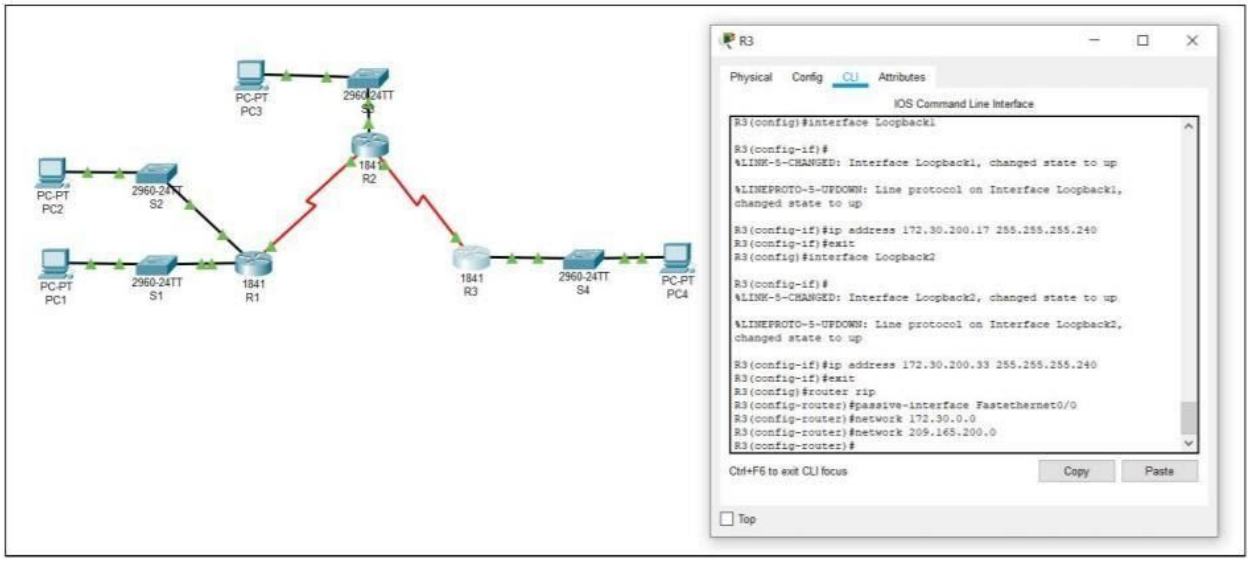
Configuration of Loopback1



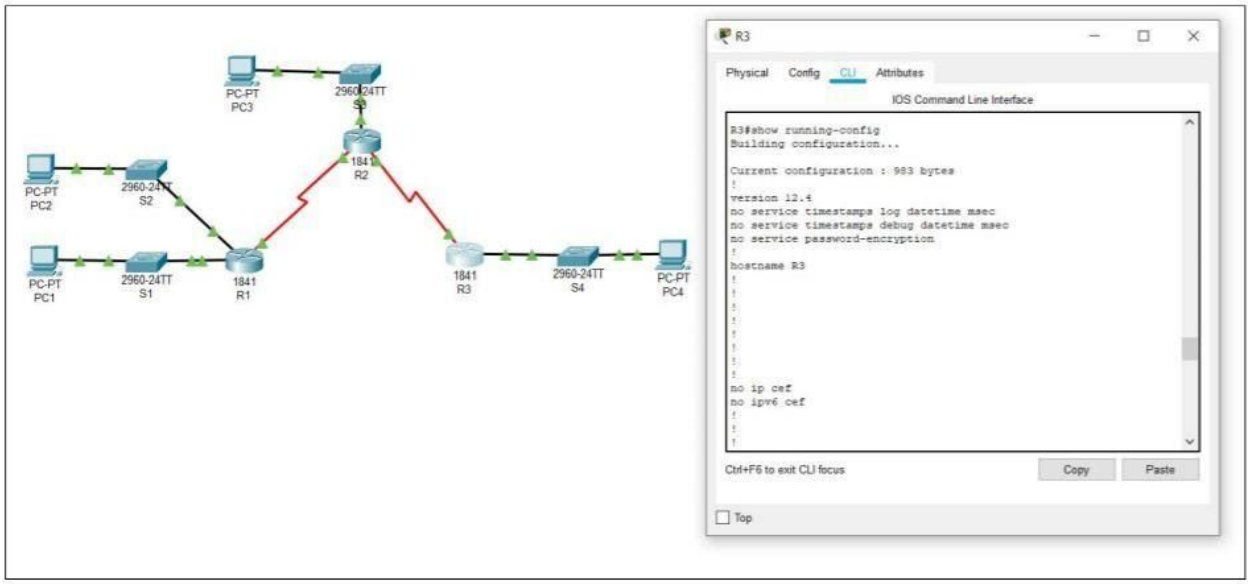
Configuration of Loopback2

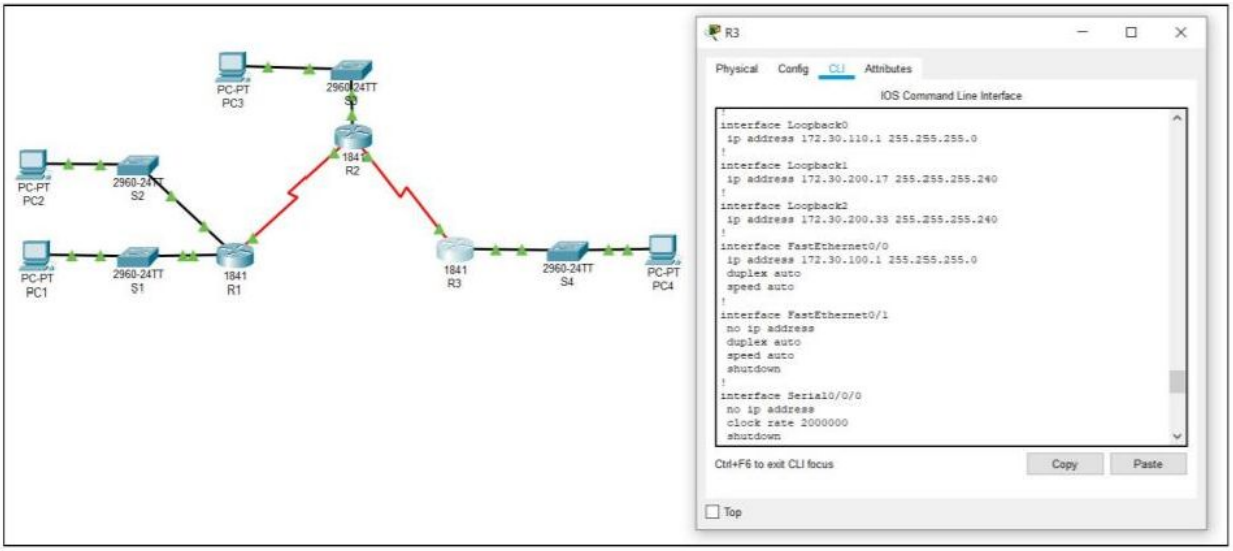


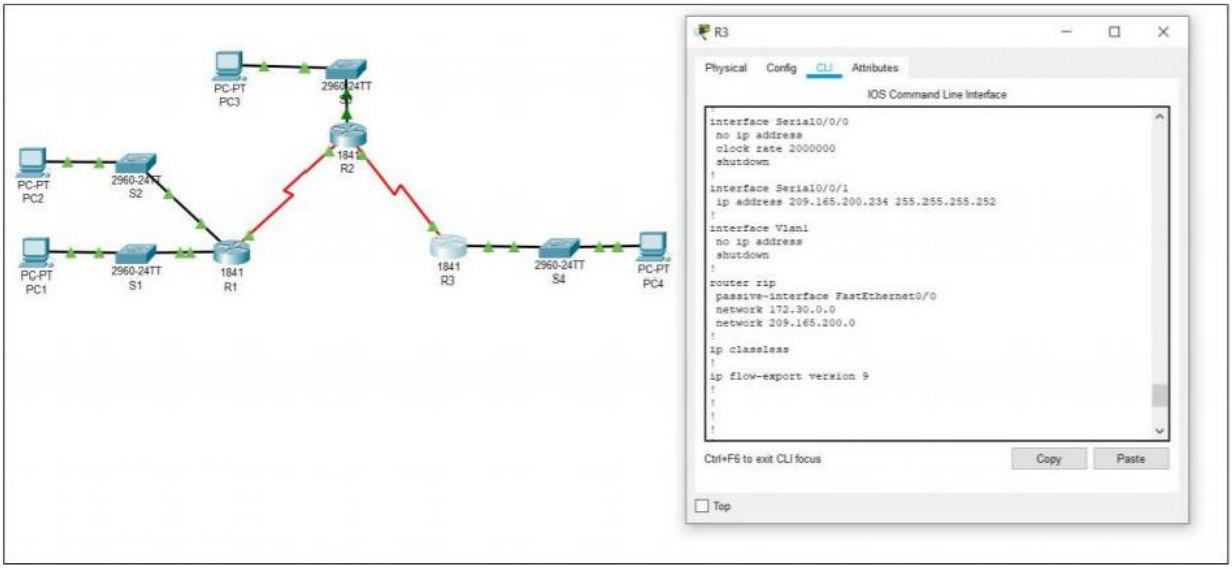
Configuration of RIP

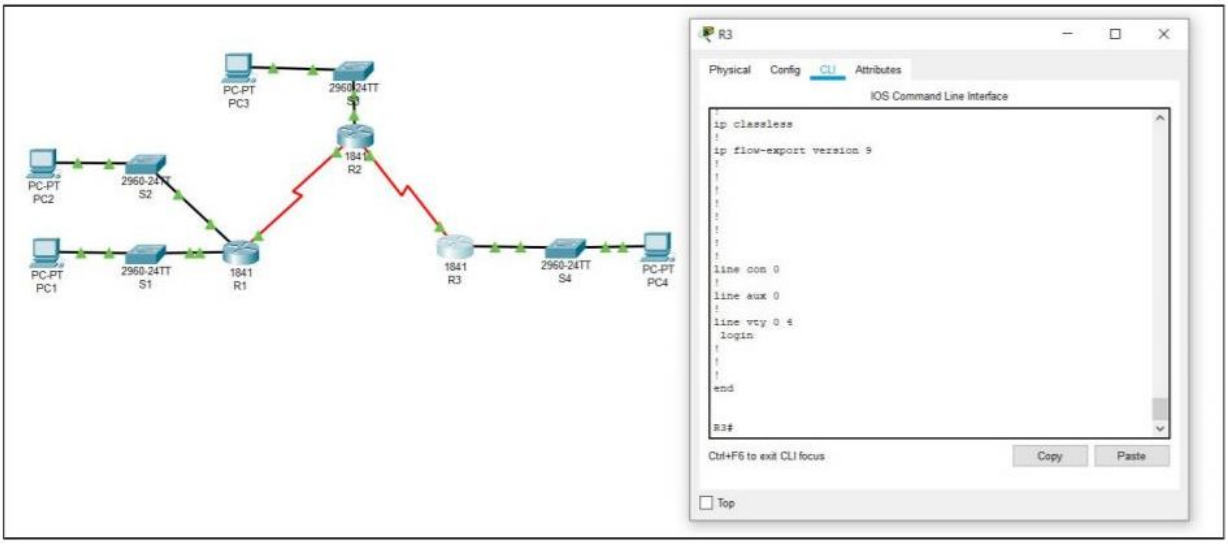


Running configuration

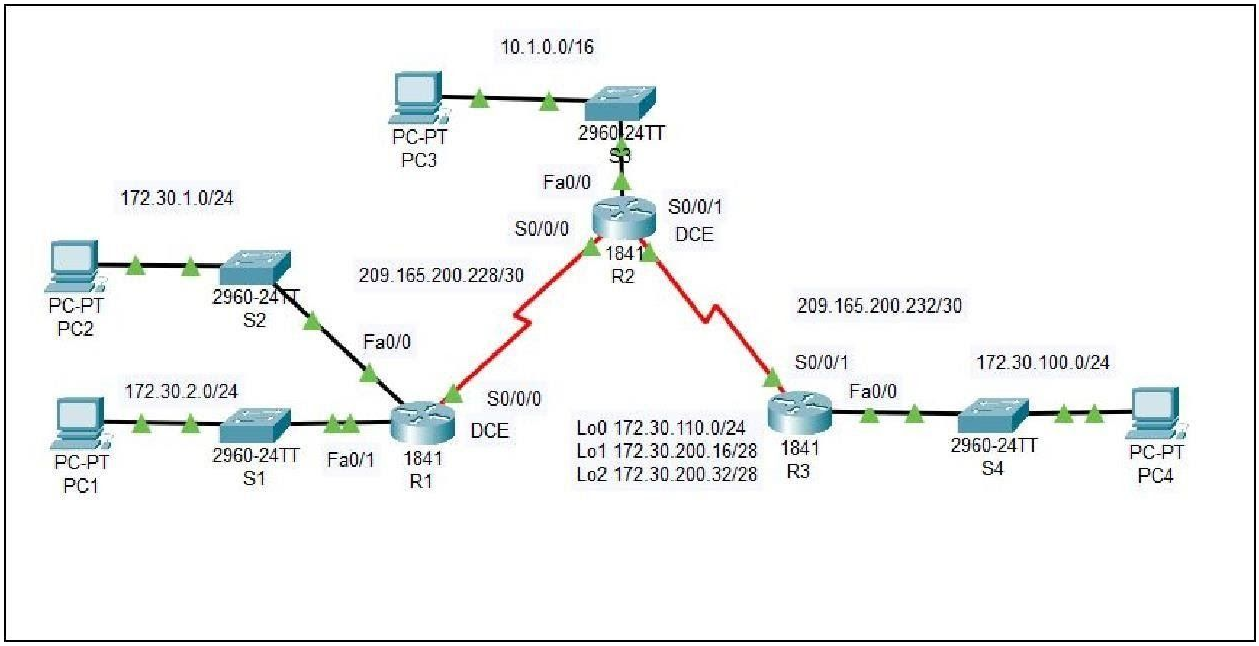



PC-PT PC3
2960-24TT S3
1841 R2
PC-PT PC2
2960-24TT S2
PC-PT PC1
2960-24TT S1
1841 R1
1841 R3
2960-24TT S4
PC-PT PC4
R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
interface Loopback0
 ip address 172.30.110.1 255.255.255.0
!
interface Loopback1
 ip address 172.30.200.17 255.255.255.240
!
interface Loopback2
 ip address 172.30.200.33 255.255.255.240
!
interface FastEthernet0/0
 ip address 172.30.100.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 no ip address
 clock rate 2000000
 shutdown
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


PC-PT PC3
2960-24TT S3
1841 R2
PC-PT PC2
2960-24TT S2
PC-PT PC1
2960-24TT S1
1841 R1
1841 R3
2960-24TT S4
PC-PT PC4
R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
interface Serial0/0/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/0/1
 ip address 209.165.200.234 255.255.255.252
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 passive-interface FastEthernet0/0
 network 172.30.0.0
 network 209.165.200.0
!
ip classless
!
ip flow-export version 9
!
!
!
!
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


PC-PT PC3
2960-24TT S3
1841 R2
PC-PT PC2
2960-24TT S2
PC-PT PC1
2960-24TT S1
1841 R1
1841 R3
2960-24TT S4
PC-PT PC4
R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
R3#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

Complete Network

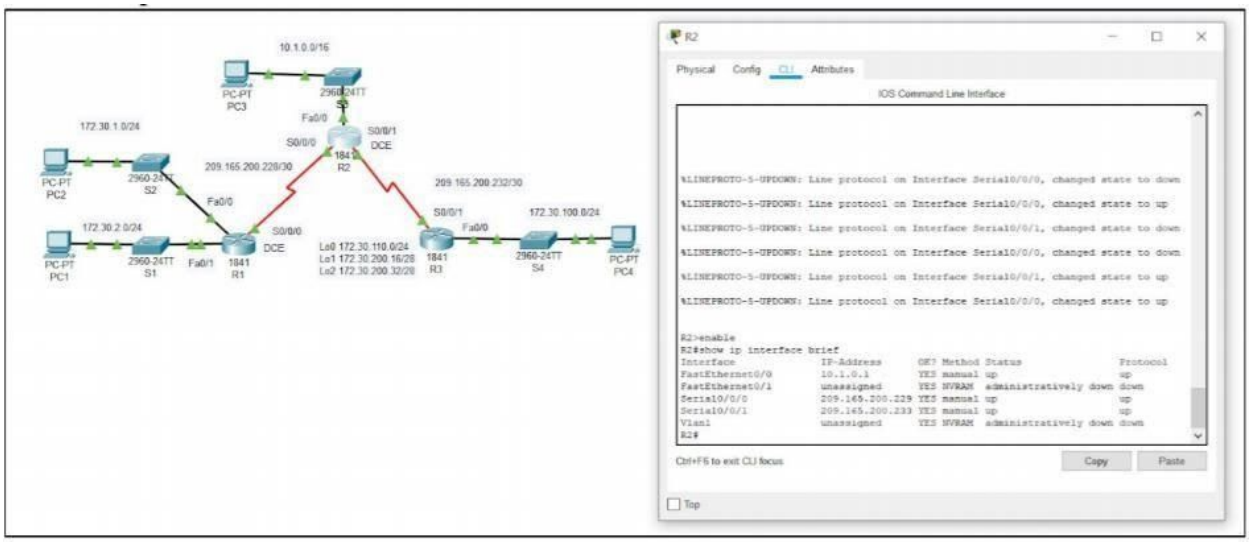


Task 3: Examine the Current Status of the Network.

Step 1: Verify that both serial links are up.

The two serial links can quickly be verified using the **show ip interface brief** command on R2.

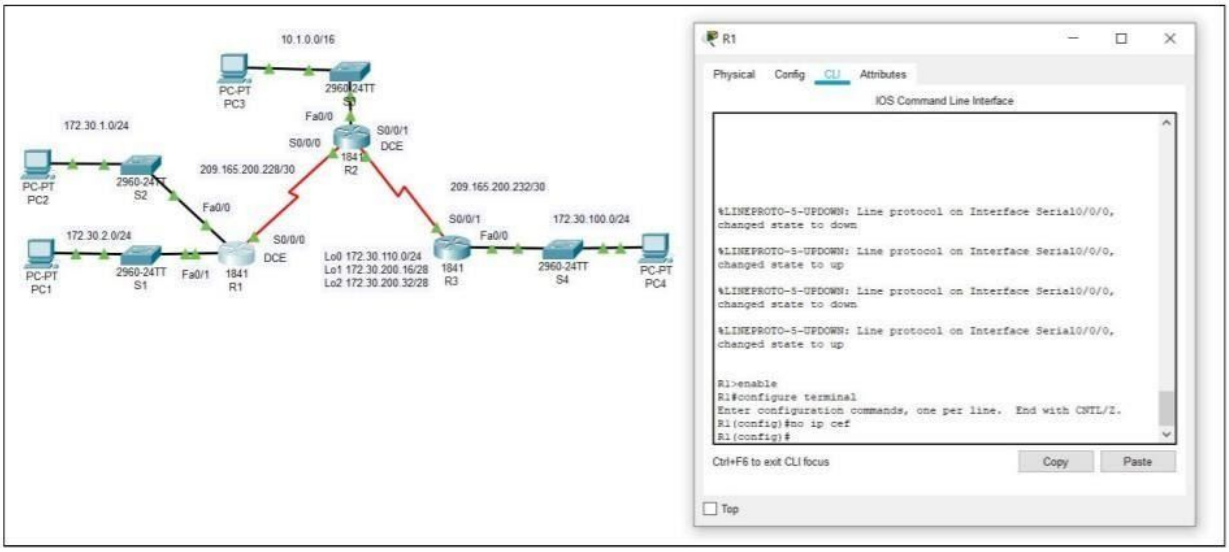
R2#**show ip interface brief**

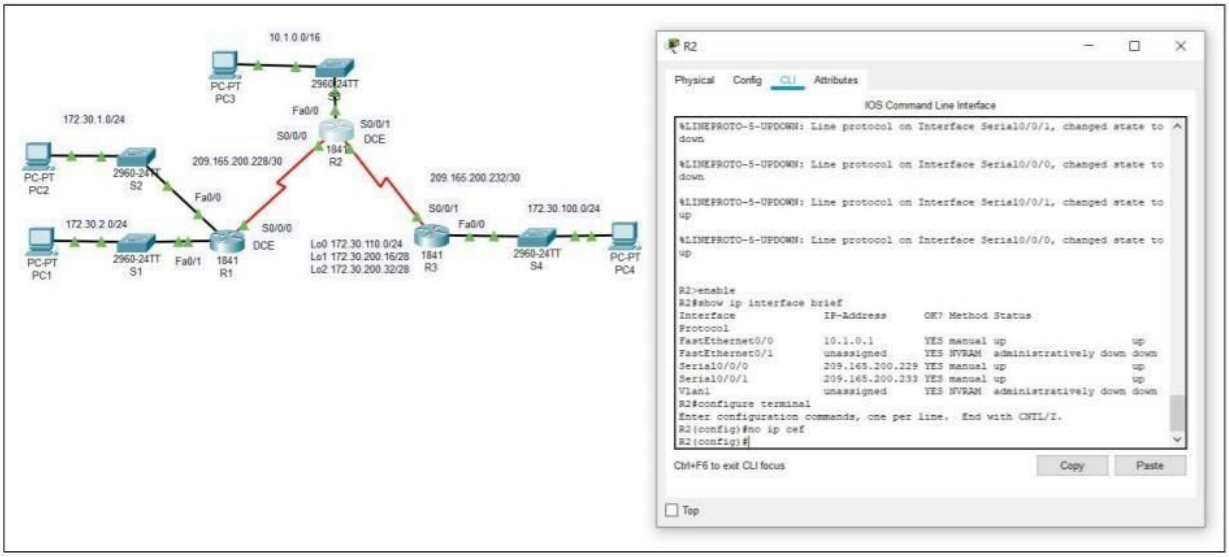


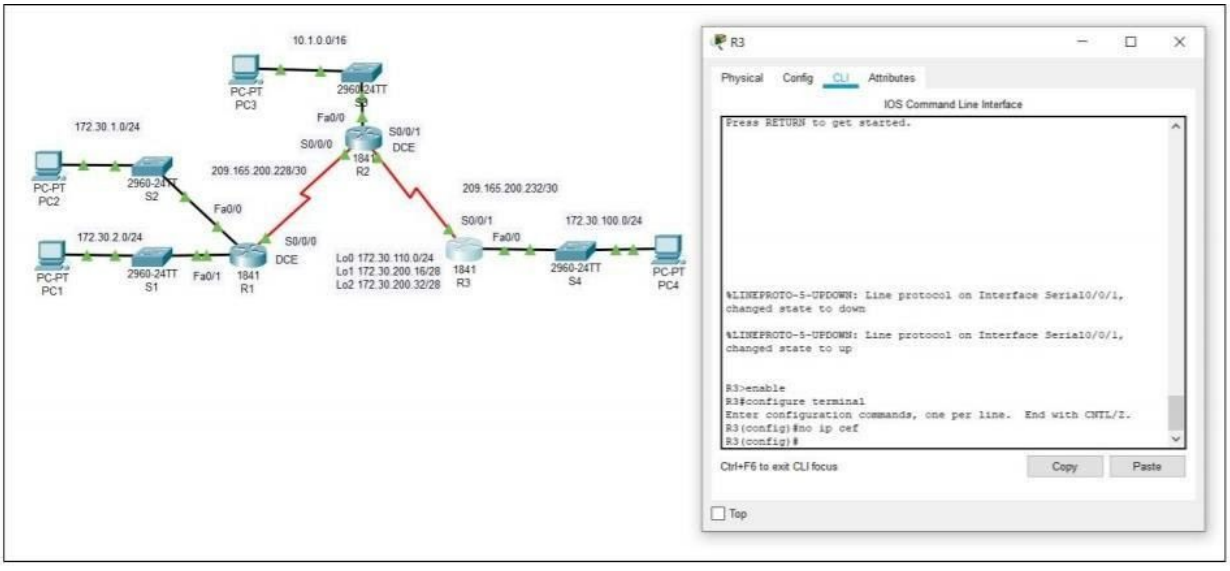
Step 2: Check the connectivity from R2 to the hosts on the R1 and R3 LANs.

Note: For the 1841 router, you will need to disable IP CEF to obtain the correct output from the **ping** command. Although a discussion of IP CEF is beyond the scope of this course, you may disable IP CEF by using the following command in global configuration mode:

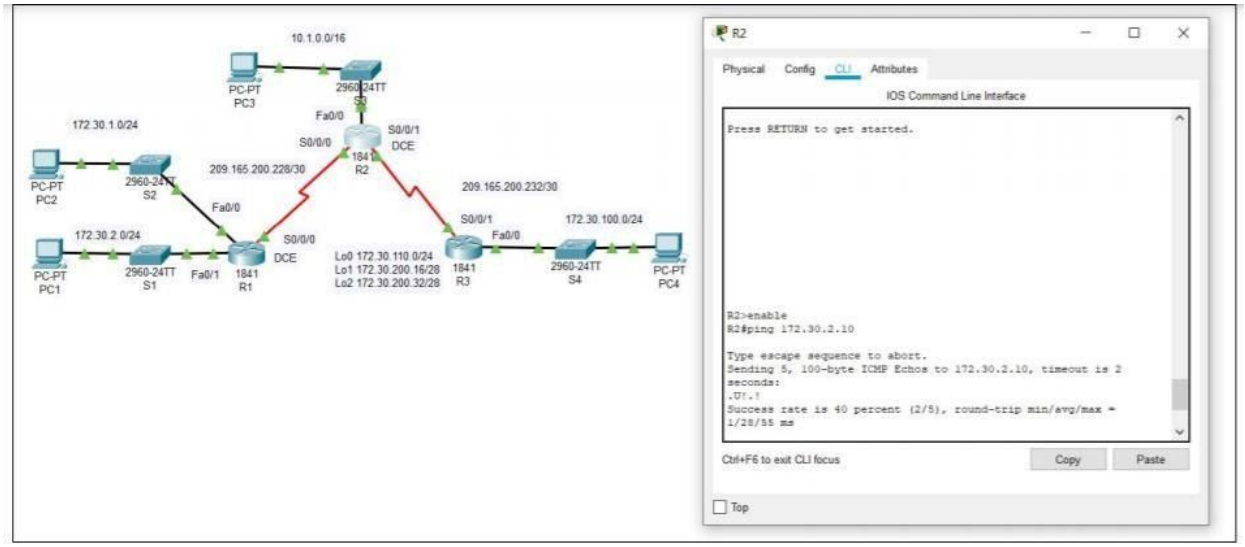
R2(config)#**no ip cef**







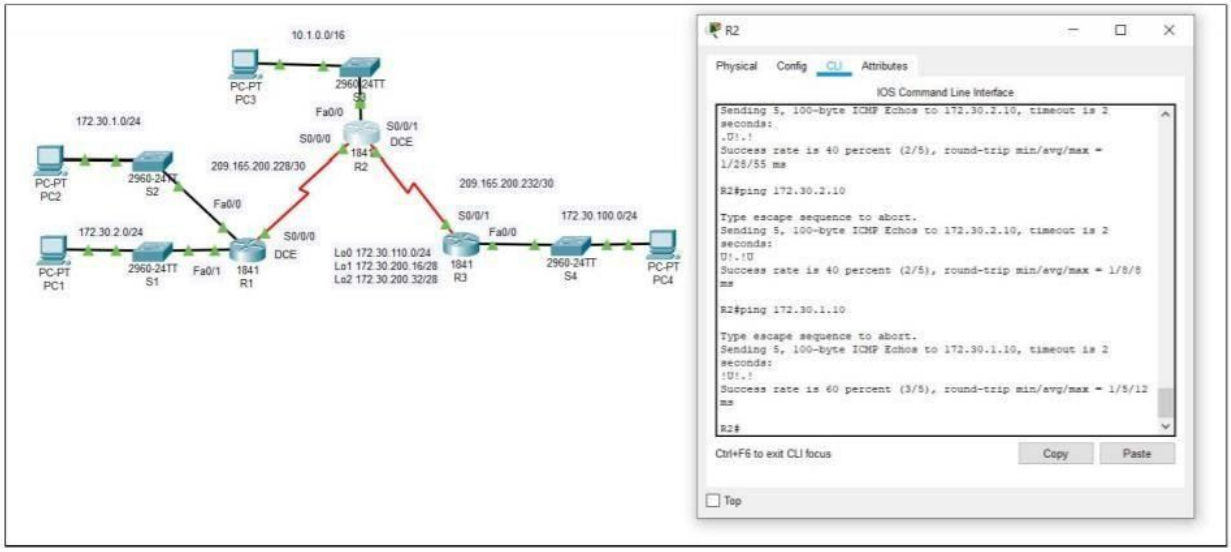
Pinging PC1 from R2



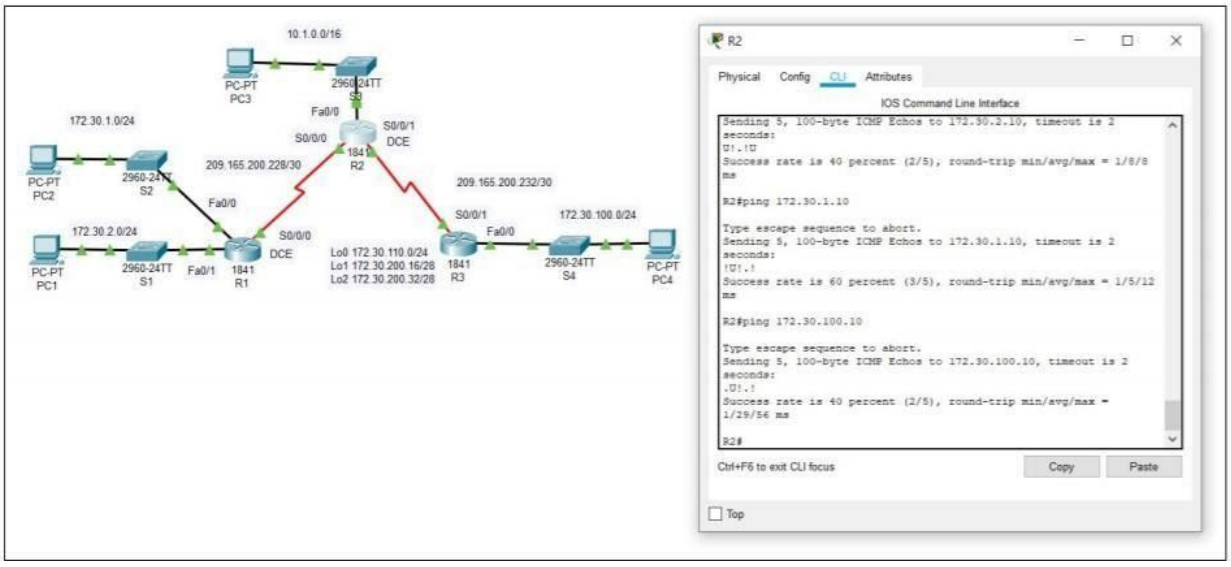
From the R2 router, how many ICMP messages are successful when pinging PC1?

Ans: 2 ICMP messages are successful

Pinging PC2 from R2



Pinging PC4 from R2

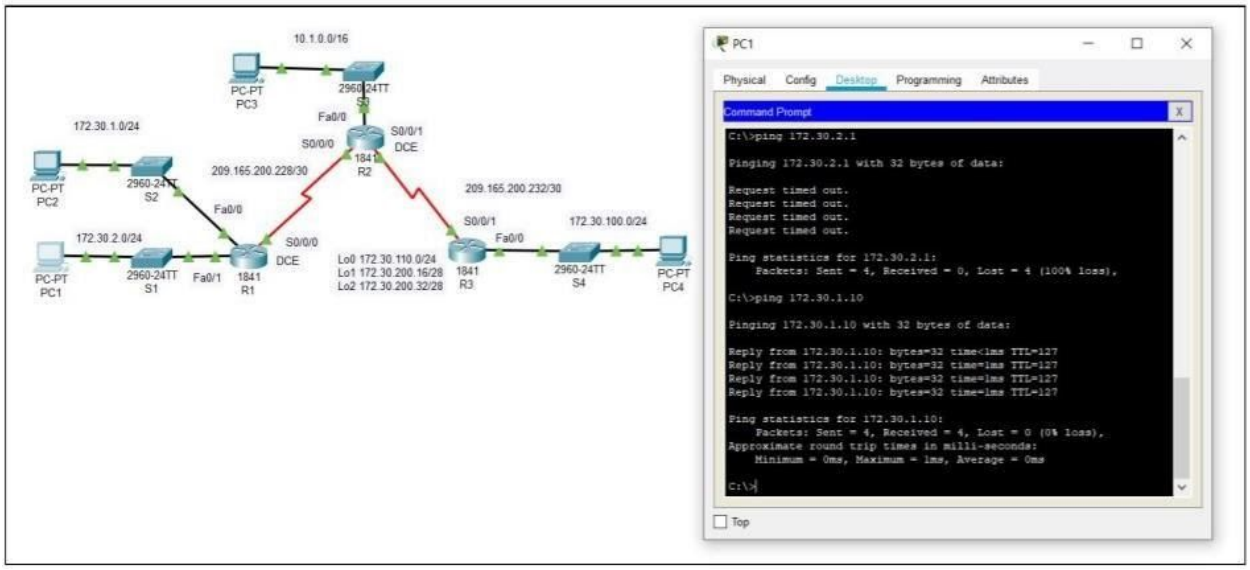


From the R2 router, how many ICMP messages are successful when pinging PC4?

Ans: 2 ICMP messages are successful

Step 3: Check the connectivity between the PCs.

Pinging PC2 from PC1



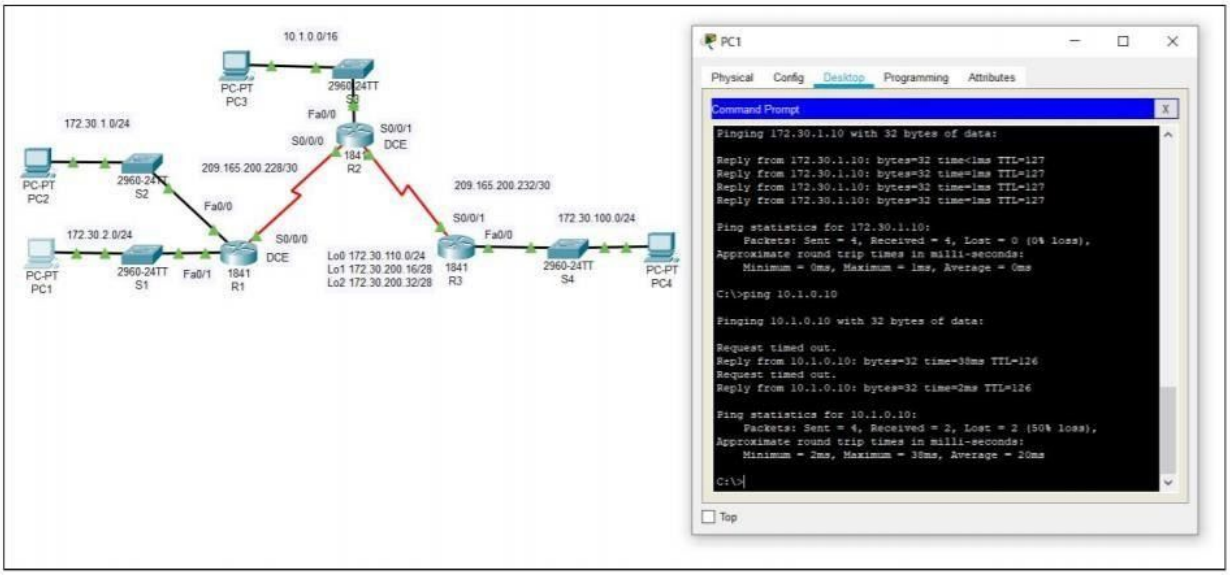
From the PC1, is it possible to ping PC2?

Ans: Yes

What is the success rate?

Ans: 100%

Pinging PC3 from PC1



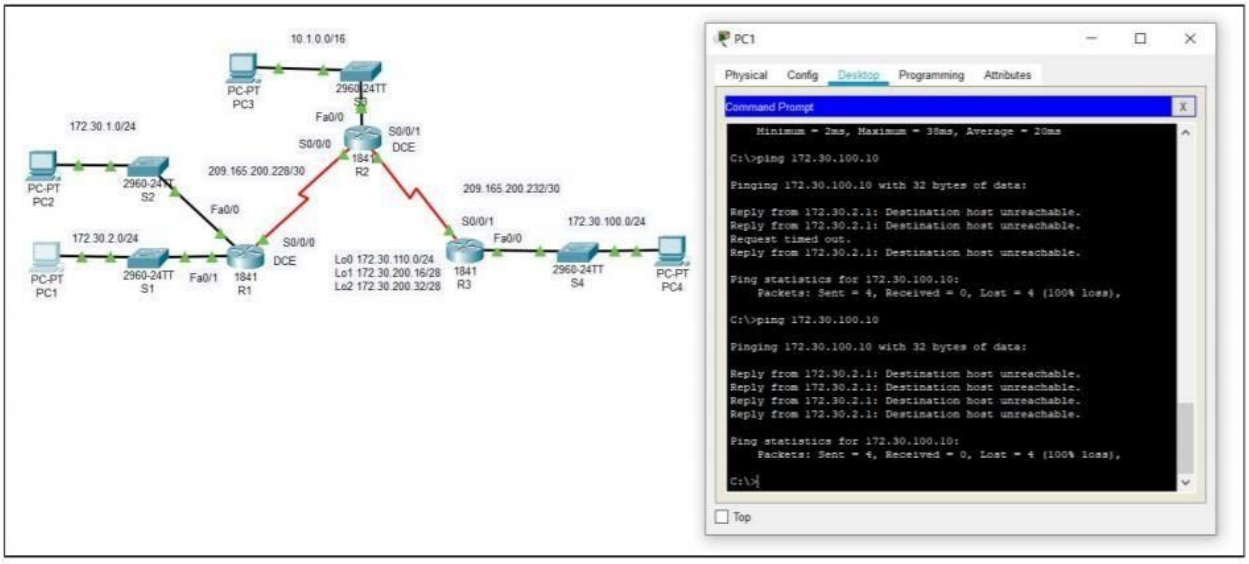
From the PC1, is it possible to ping PC3?

Ans: Yes

What is the success rate?

Ans: 50%

Pinging PC4 from PC1



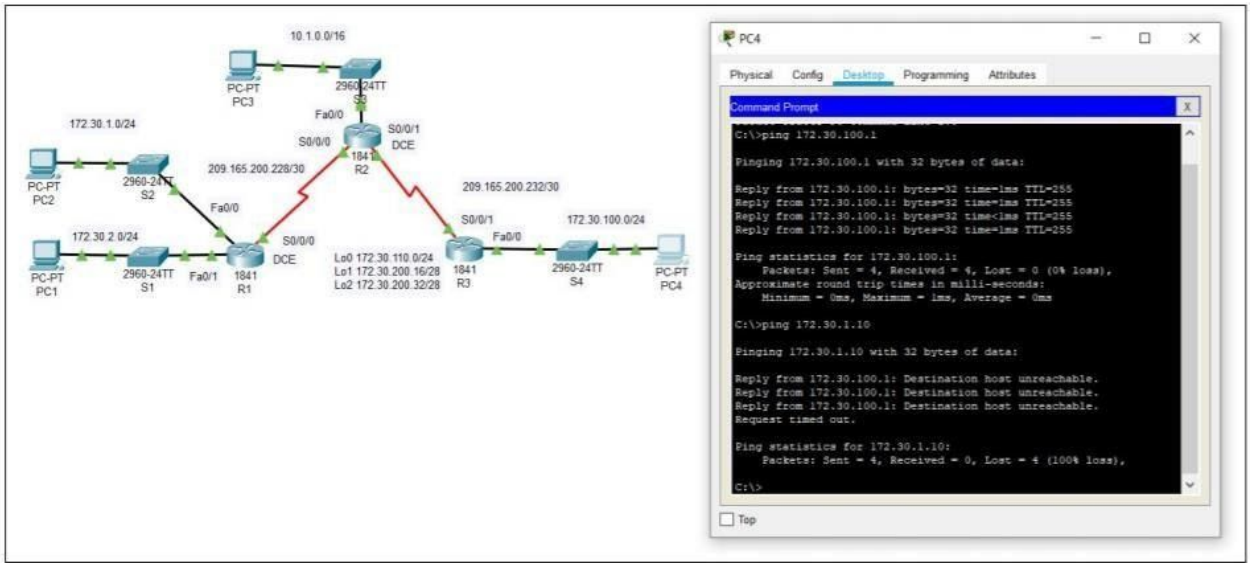
From the PC1, is it possible to ping PC4?

Ans: No

What is the success rate?

Ans: 0%

Pinging PC2 from PC4



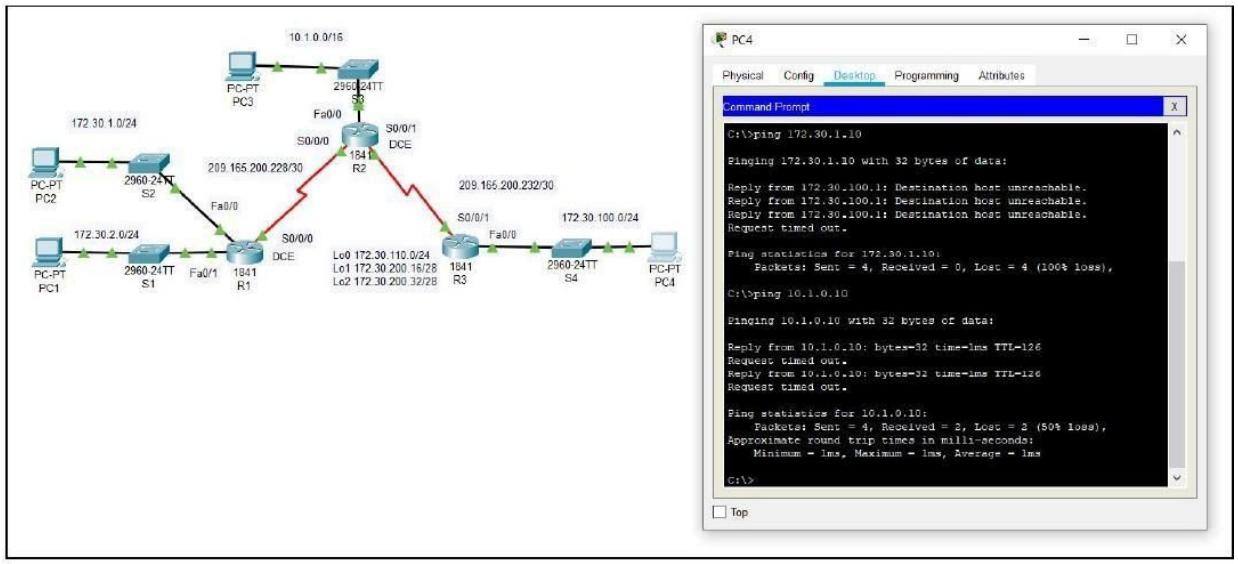
From the PC4, is it possible to ping PC2?

Ans: No

What is the success rate?

Ans: 0%

Pinging PC3 from PC4



From the PC4, is it possible to ping PC3?

Ans: Yes

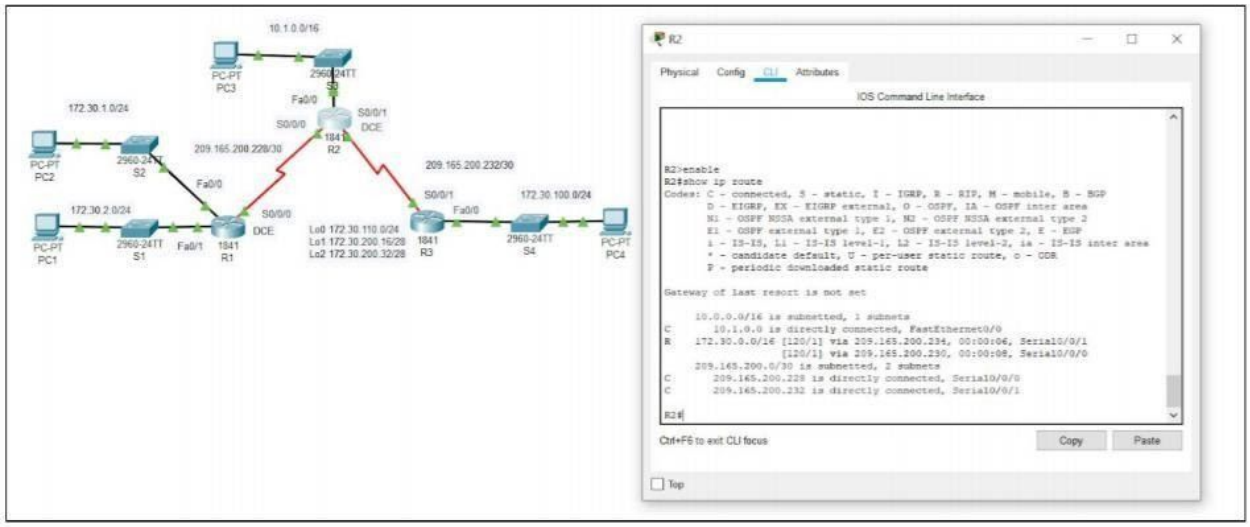
What is the success rate?

Ans: 50%

Step 4: View the routing table on R2.

Both the R1 and R3 are advertising routes to the 172.30.0.0/16 network; therefore, there are two entries for this network in the R2 routing table. The R2 routing table only shows the major classful network address of 172.30.0.0—it does not show any of the subnets for this network that are used on the LANs attached to R1 and R3. Because the routing metric is the same for both entries, the router alternates the routes that are used when forwarding packets that are destined for the 172.30.0.0/16 network.

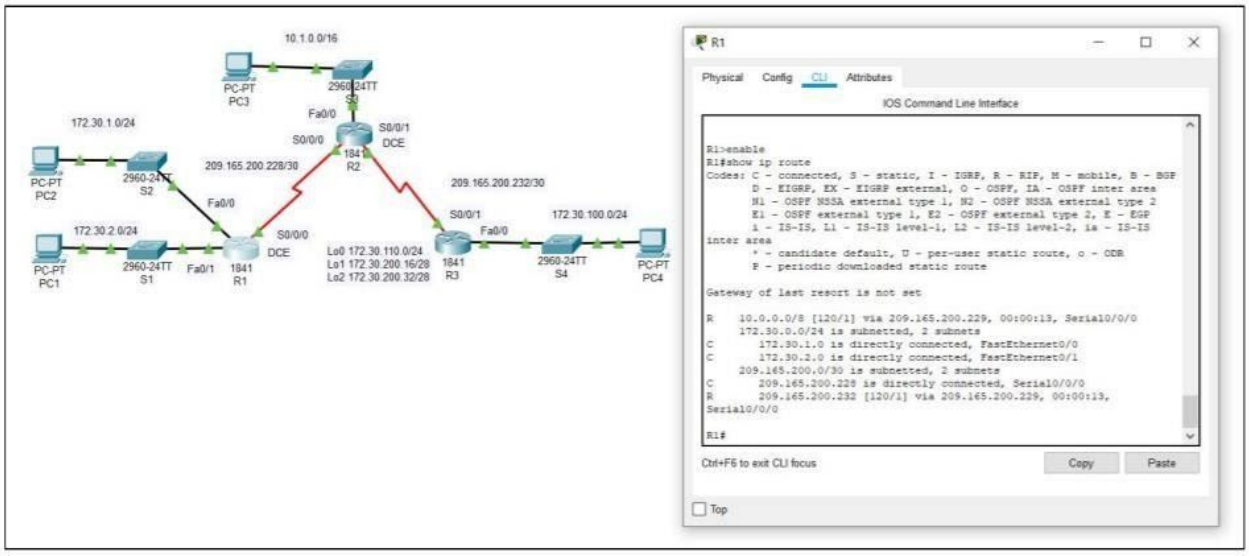
R2#**show ip route**



Step 5: Examine the routing table on the R1 router.

Both R1 and R3 are configured with interfaces on a discontiguous network, 172.30.0.0. The 172.30.0.0 subnets are physically and logically divided by at least one other classful or major network—in this case, the two serial networks 209.165.200.228/30 and 209.165.200.232/30. Classful routing protocols like RIPv1 summarize networks at major network boundaries. Both R1 and R3 will be summarizing 172.30.0.0/24 subnets to 172.30.0.0/16. Because the route to 172.30.0.0/16 is directly connected, and because R1 does not have any specific routes for the 172.30.0.0 subnets on R3, packets destined for the R3 LANs will not be forwarded properly.

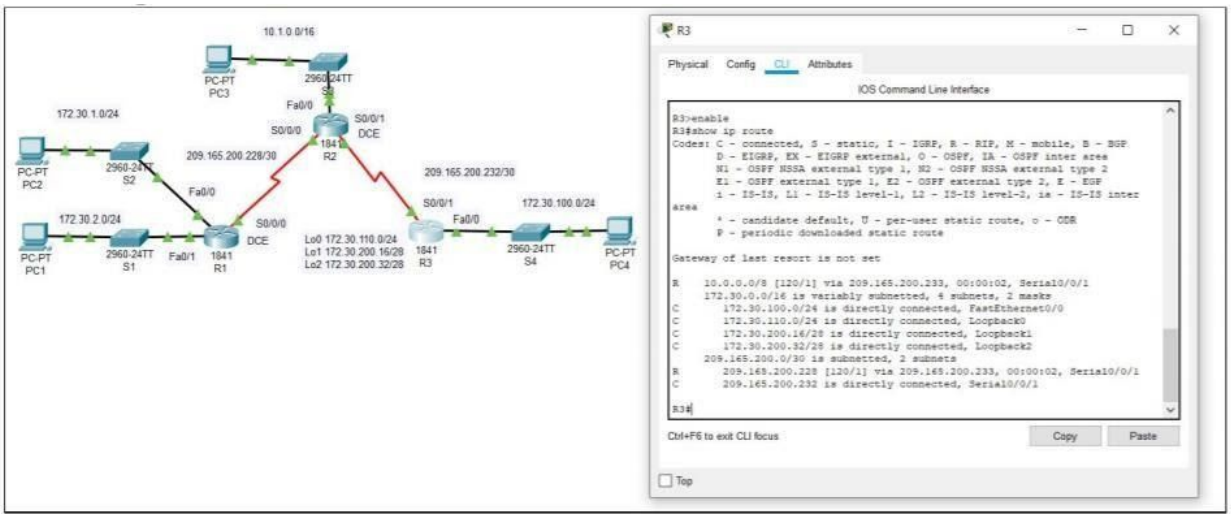
R1#**show ip route**



Step 6: Examine the routing table on the R3 router.

R3 only shows its own subnets for 172.30.0.0 network: 172.30.100/24, 172.30.110/24, 172.30.200.16/28, and 172.30.200.32/28. R3 does not have any routes for the 172.30.0.0 subnets on R1.

R3#**show ip route**

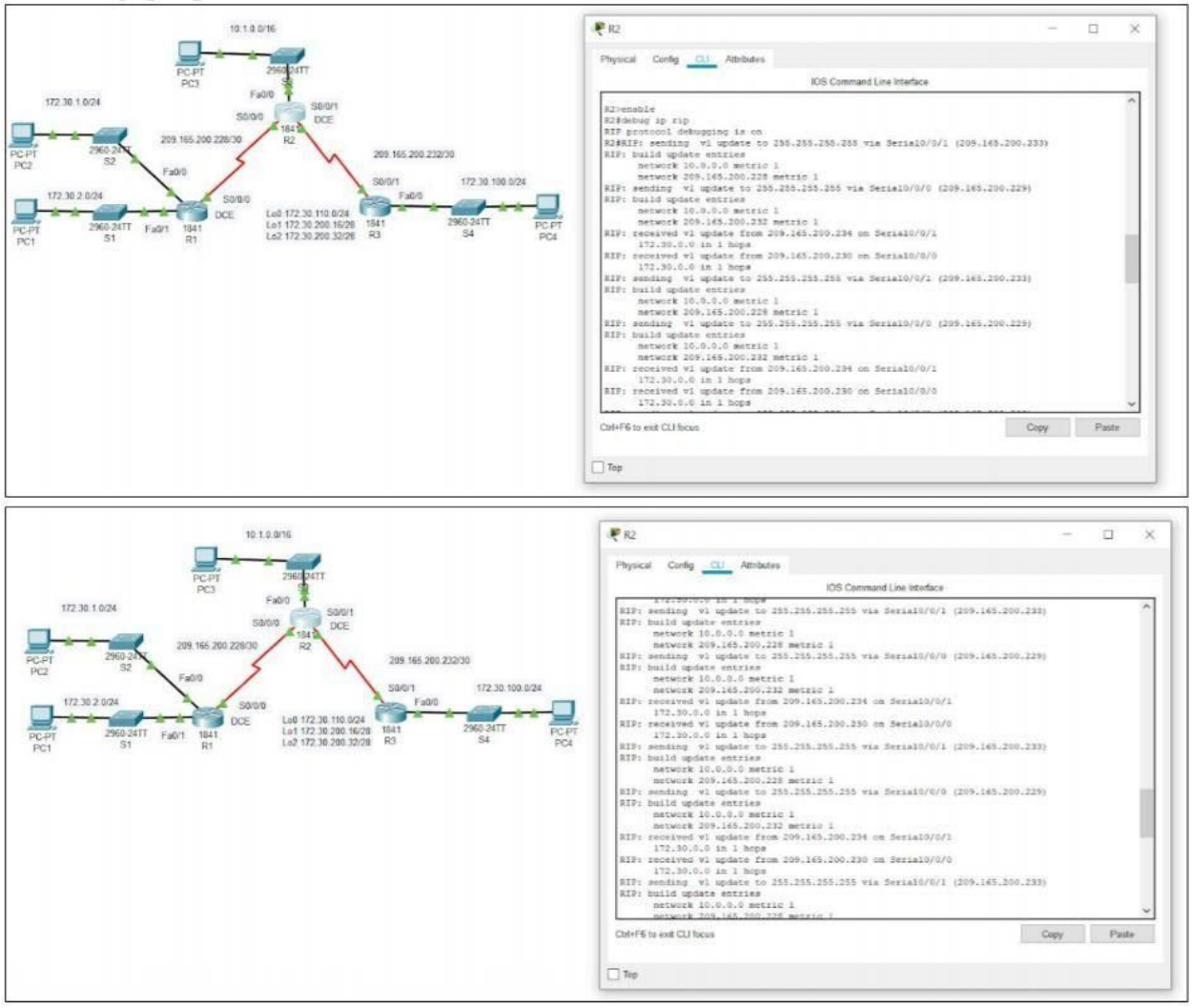


Step 7: Examine the RIPv1 packets that are being received by R2.

Use the **debug ip rip** command to display RIP routing updates.

R2 is receiving the route 172.30.0.0, with 1 hop, from both R1 and R3. Because these are equal cost metrics, both routes are added to the R2 routing table. Because RIPv1 is a classful routing protocol, no subnet mask information is sent in the update.

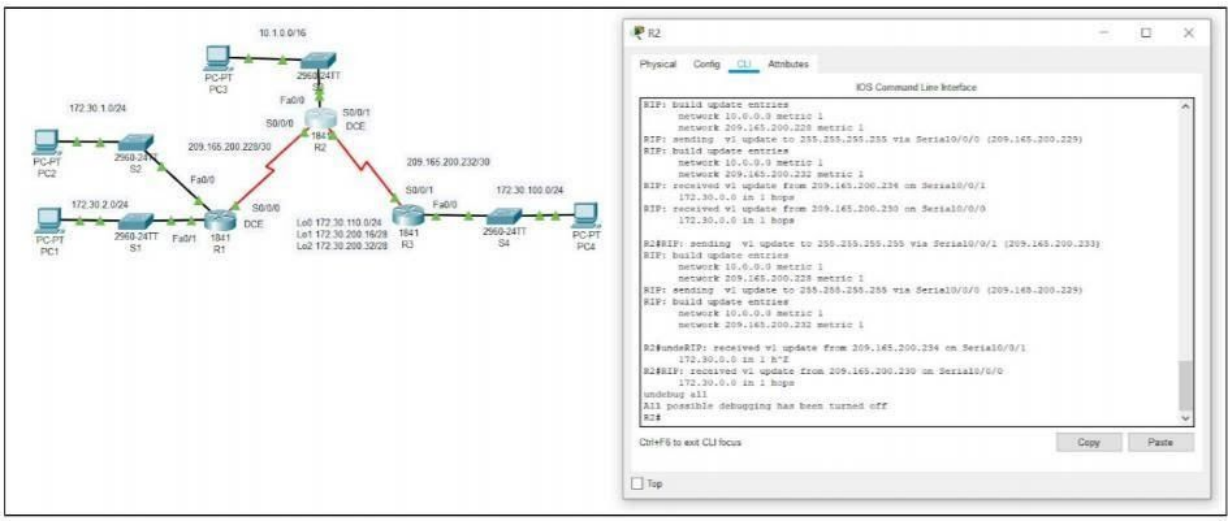
R2#**debug ip rip**



R2 is sending only the routes for the 10.0.0.0 LAN and the two serial connections to R1 and R3. R1 and R3 are not receiving any information about the 172.30.0.0 subnet routes.

When you are finished, turn off the debugging.

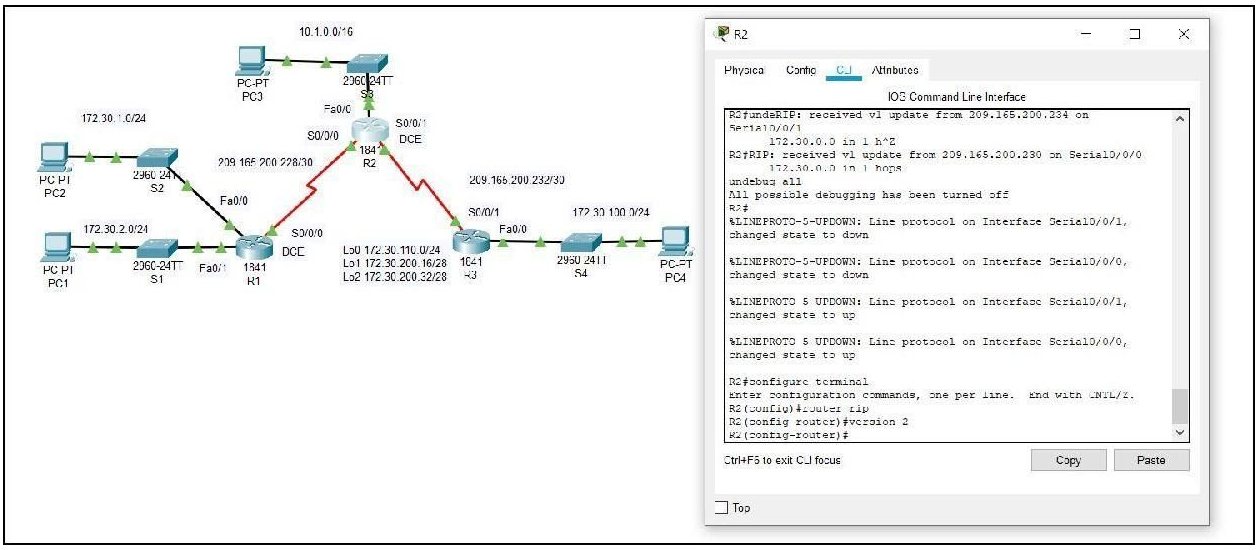
R2#**undebug all**

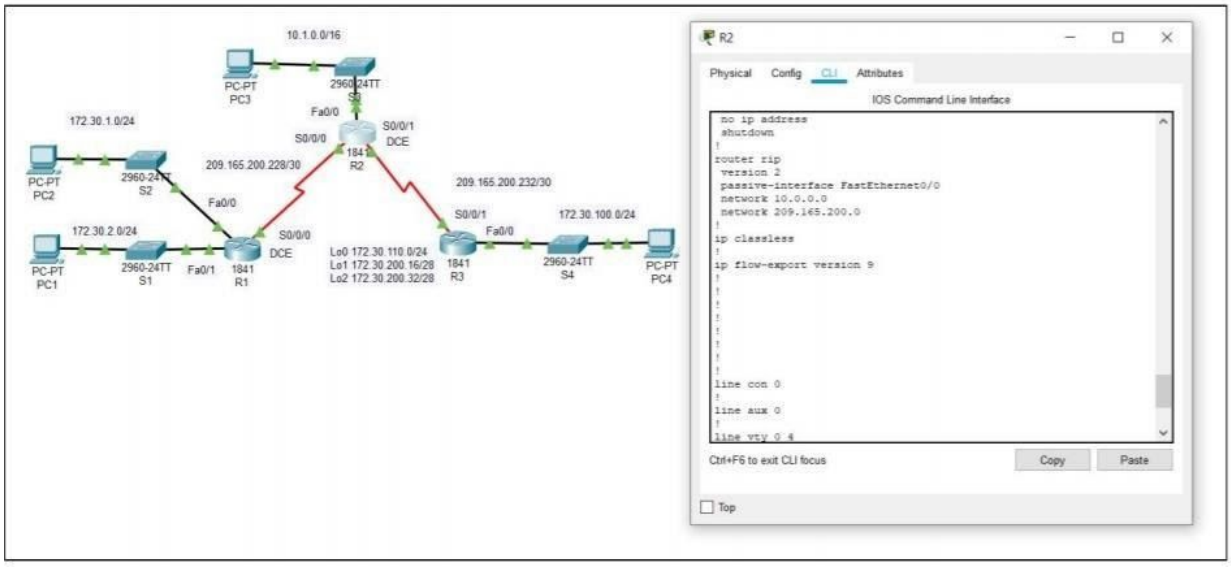


Task 4: Configure RIP Version 2.

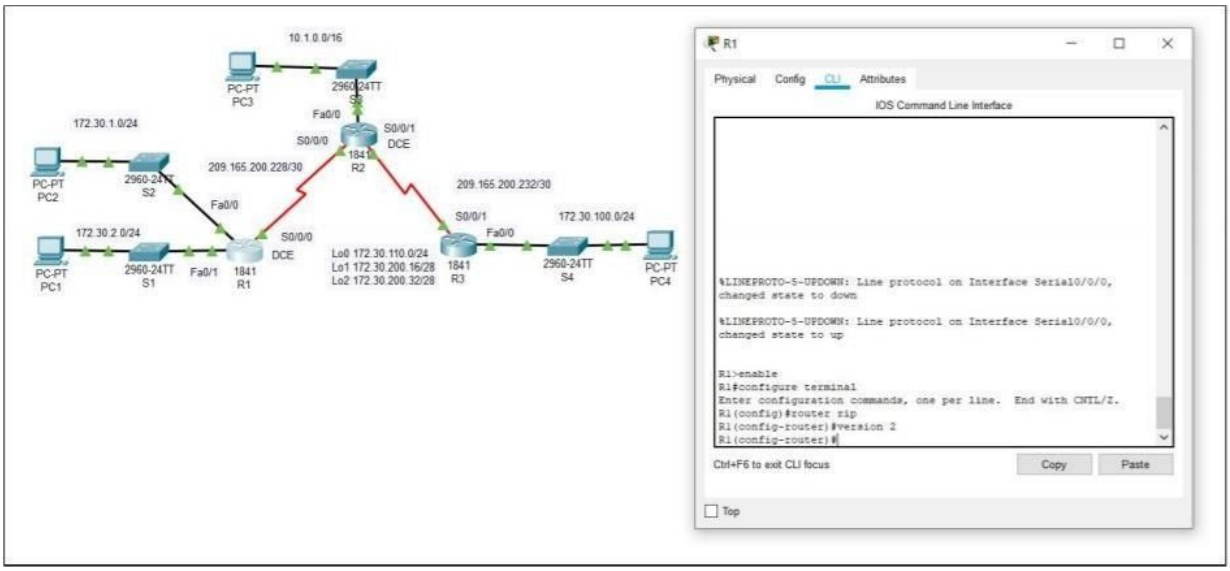
Step 1: Use the version 2 command to enable RIP version 2 on each of the routers.

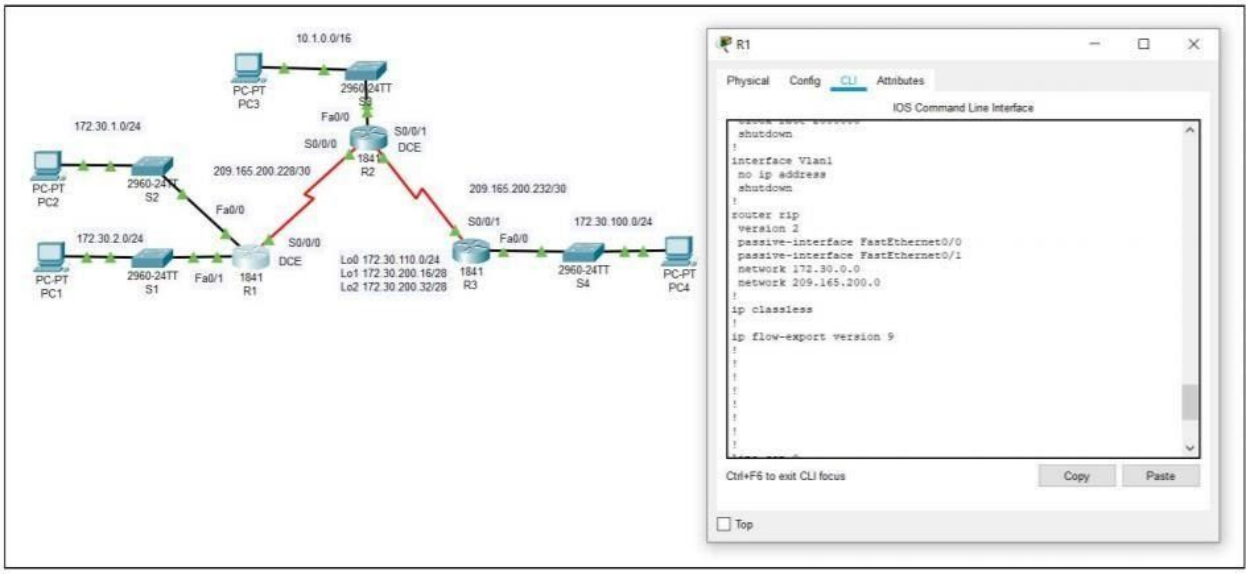
R2(config)#**router rip**
R2(config-router)#**version 2**



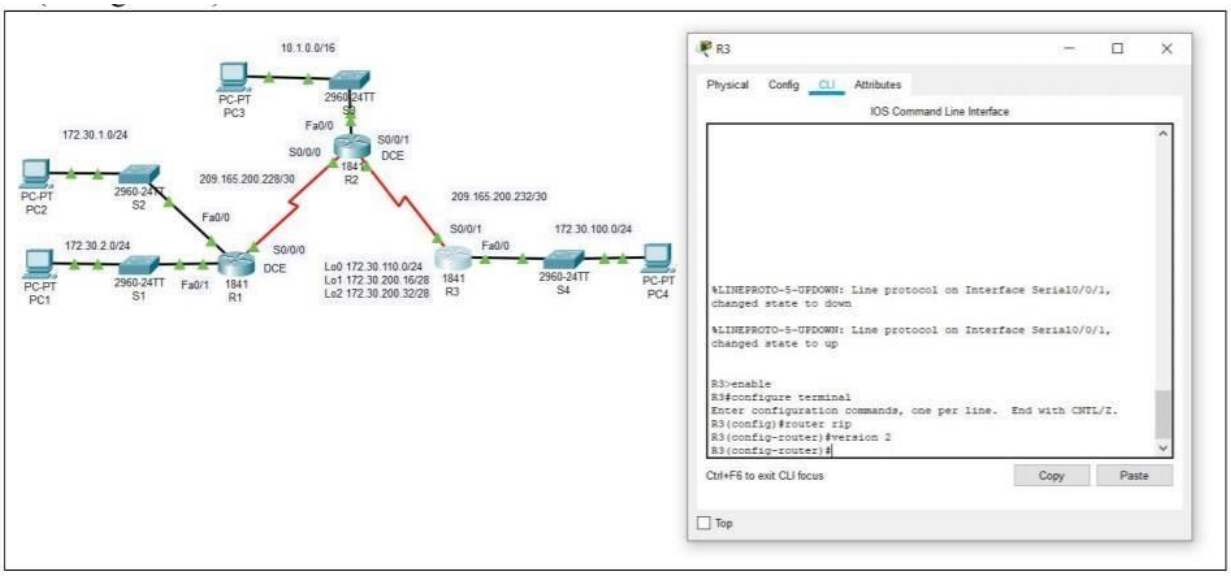


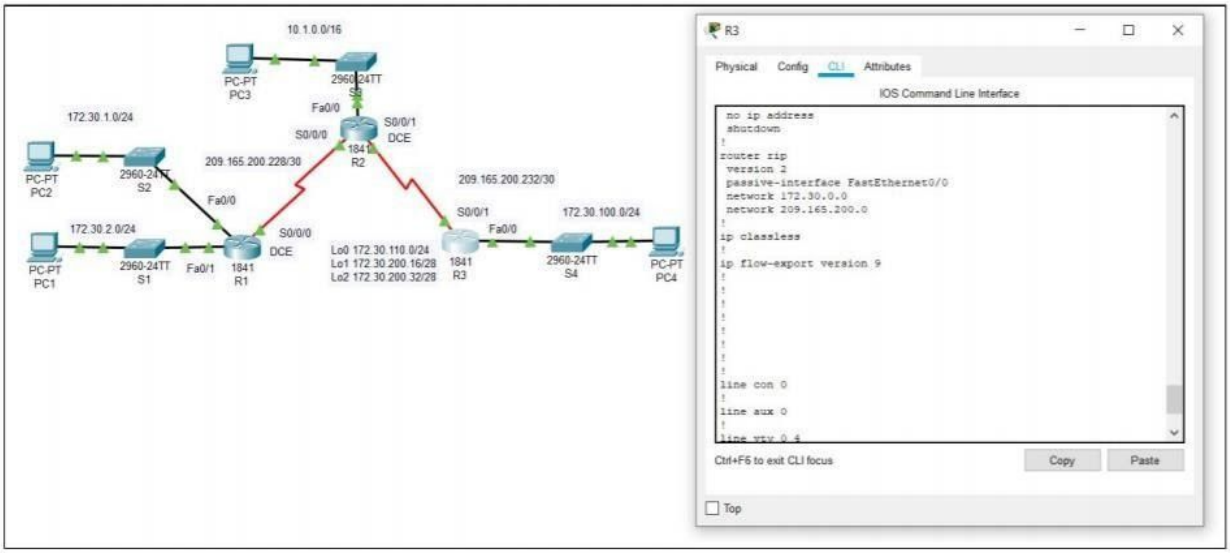
R1(config)#**router rip**
R1(config-router)#**version 2**





R3(config)#**router rip**
R3(config-router)#**version 2**



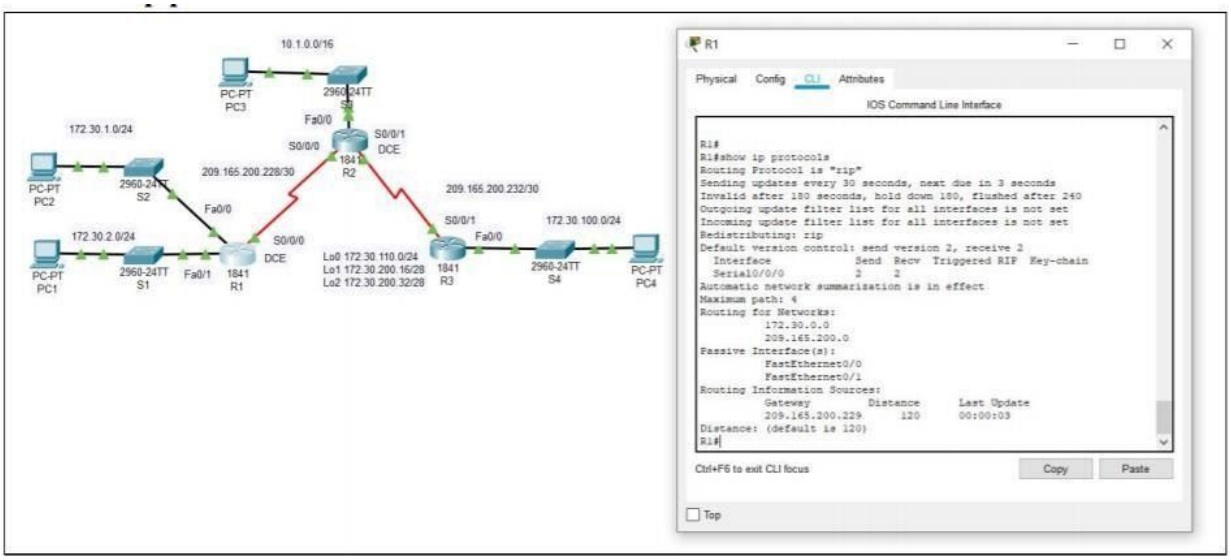


RIPv2 messages include the subnet mask in a field in the routing updates. This allows subnets and their masks to be included in the routing updates. However, by default RIPv2 summarizes networks at major network boundaries, just like RIPv1, except that the subnet mask is included in the update.

Step 2: Verify that RIPv2 is running on the routers.

The **debug ip rip**, **show ip protocols**, and **show run** commands can all be used to confirm that RIPv2 is running. The output of the **show ip protocols** command for R1 is shown below.

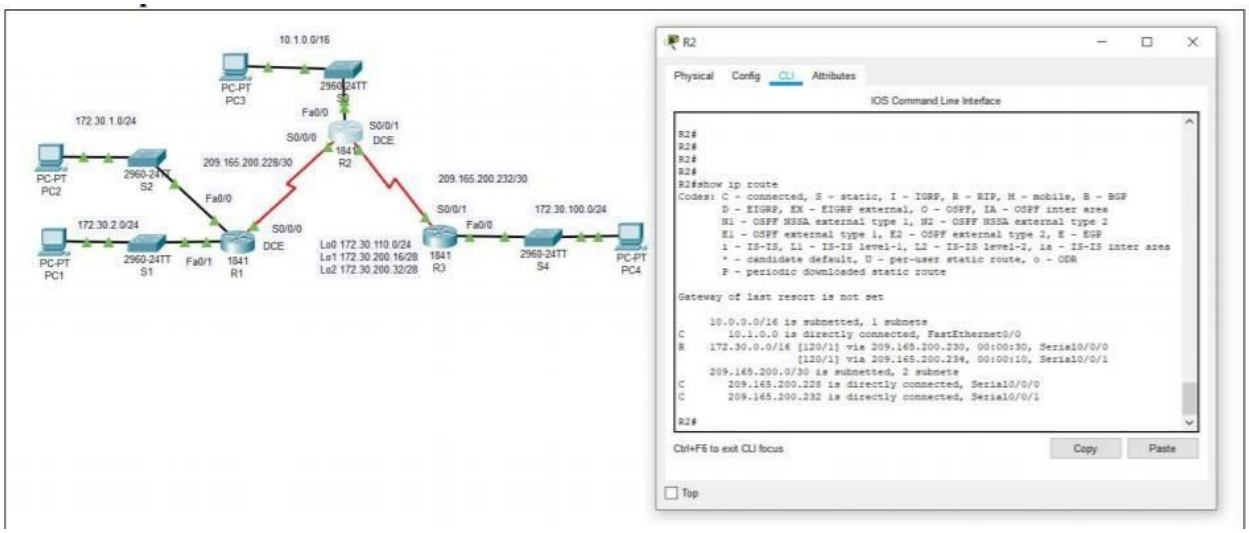
R1# **show ip protocols**



Task 5: Examine the Automatic Summarization of Routes.

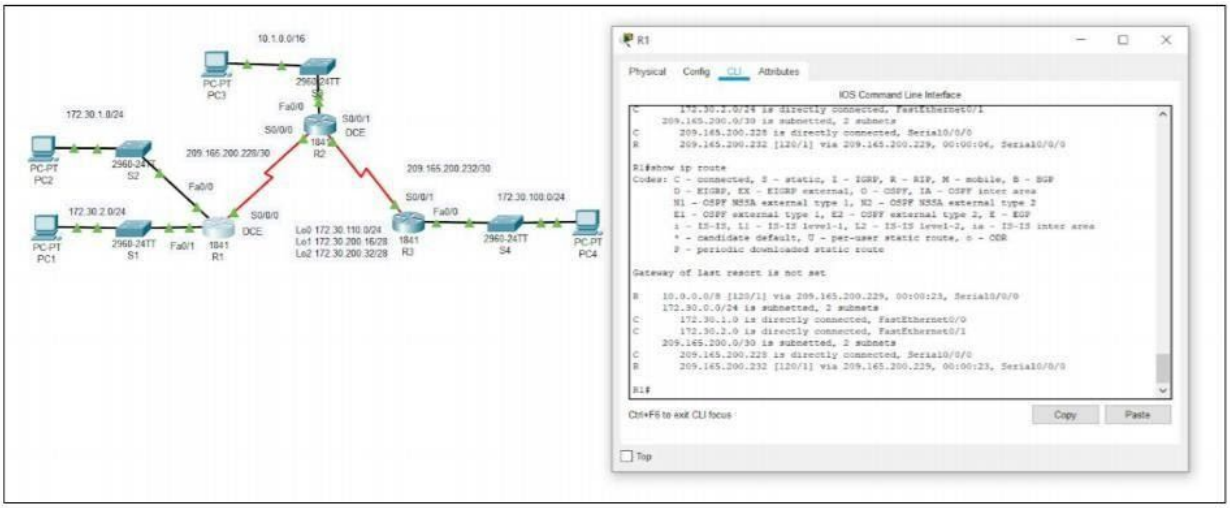
The LANs connected to R1 and R3 are still composed of discontiguous networks. R2 still shows two equal cost paths to the 172.30.0.0/16 network in the routing table. R2 still shows only the major classful network address of 172.30.0.0 and does not show any of the subnets for this network.

R2#**show ip route**



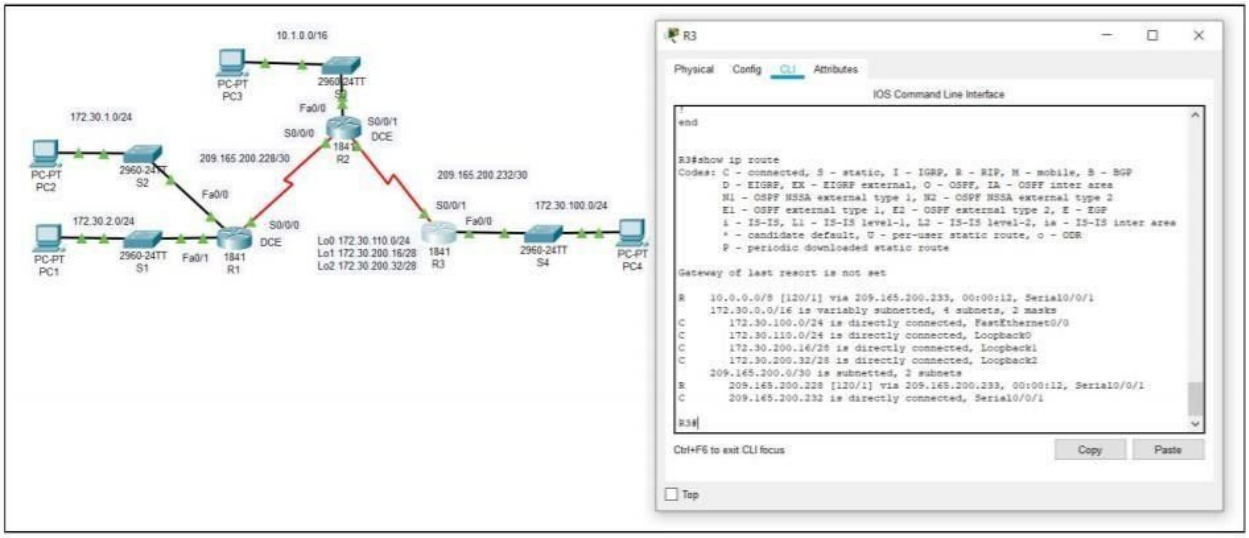
R1 still shows only its own subnets for the 172.30.0.0 network. R1 still does not have any routes for the 172.30.0.0 subnets on R3.

R1#**show ip route**



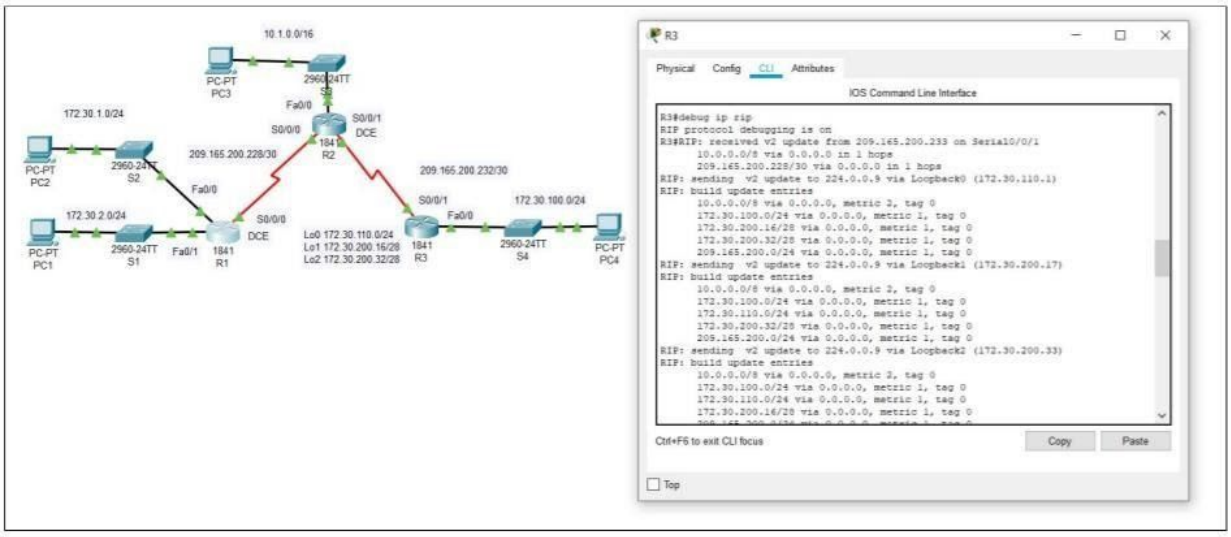
R3 still only shows its own subnets for the 172.30.0.0 network. R3 still does not have any routes for the 172.30.0.0 subnets on R1.

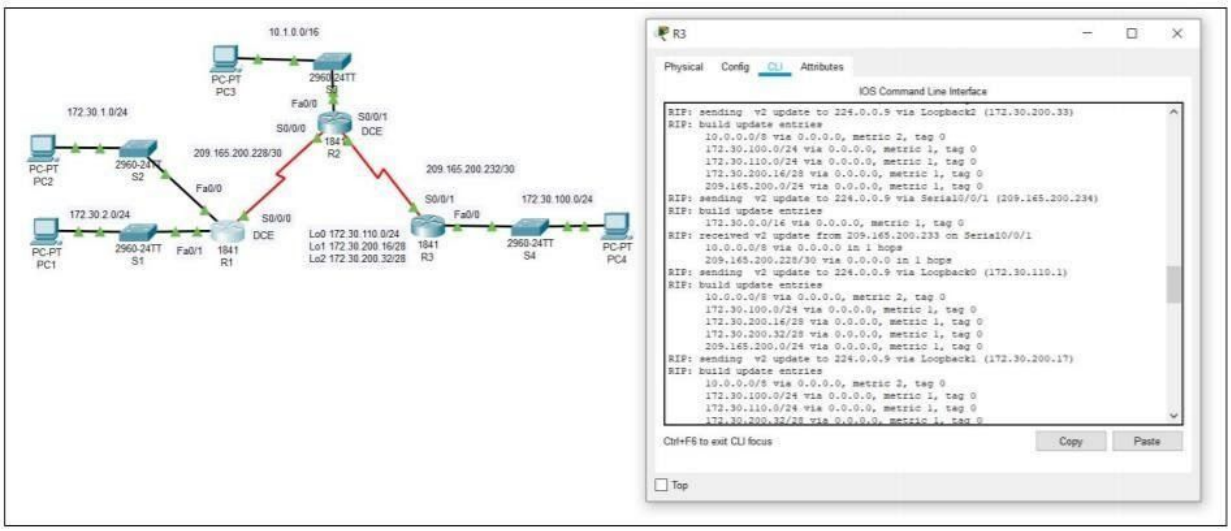
R3#**show ip route**

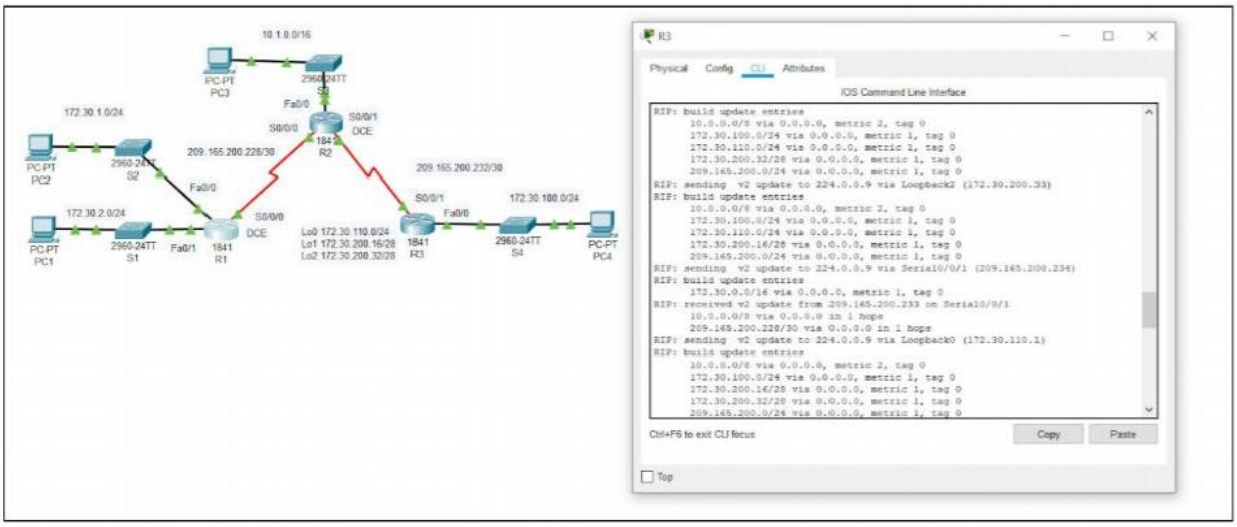


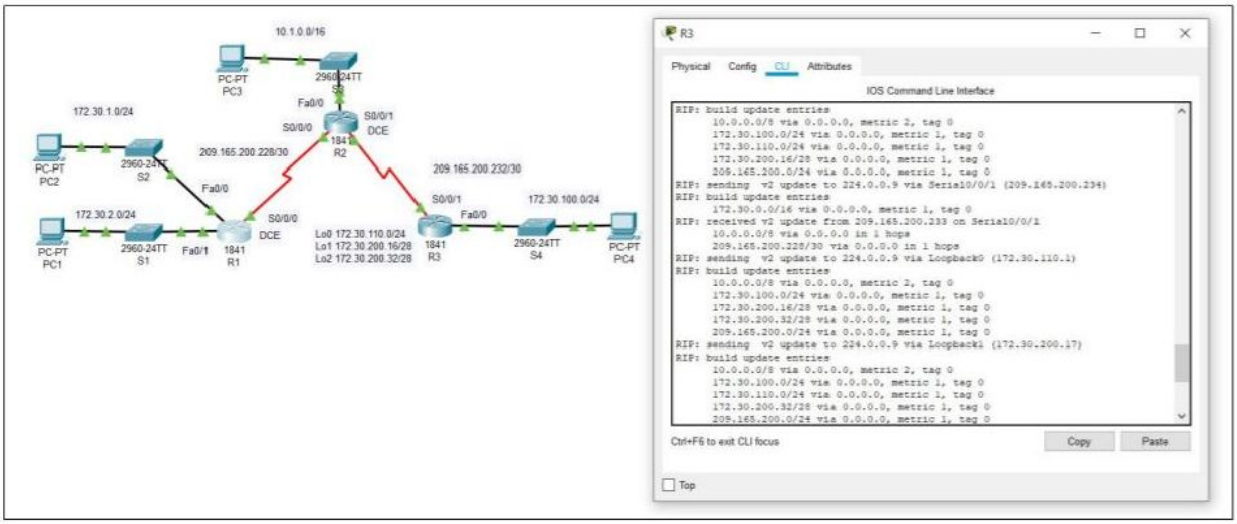
Use the output of the **debug ip rip** command to answer the following questions:

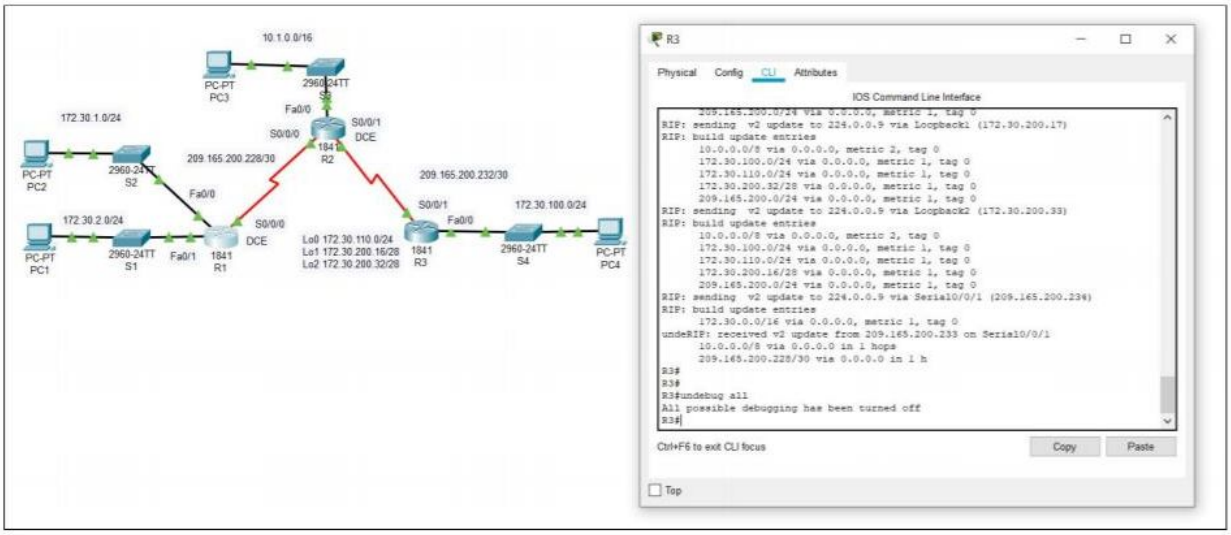
On R3



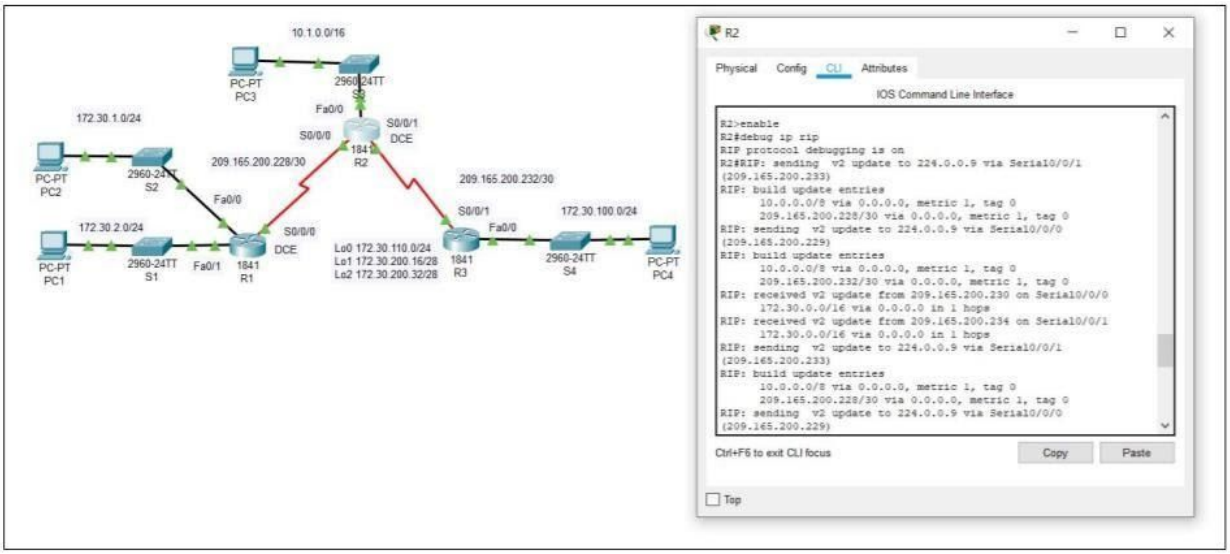


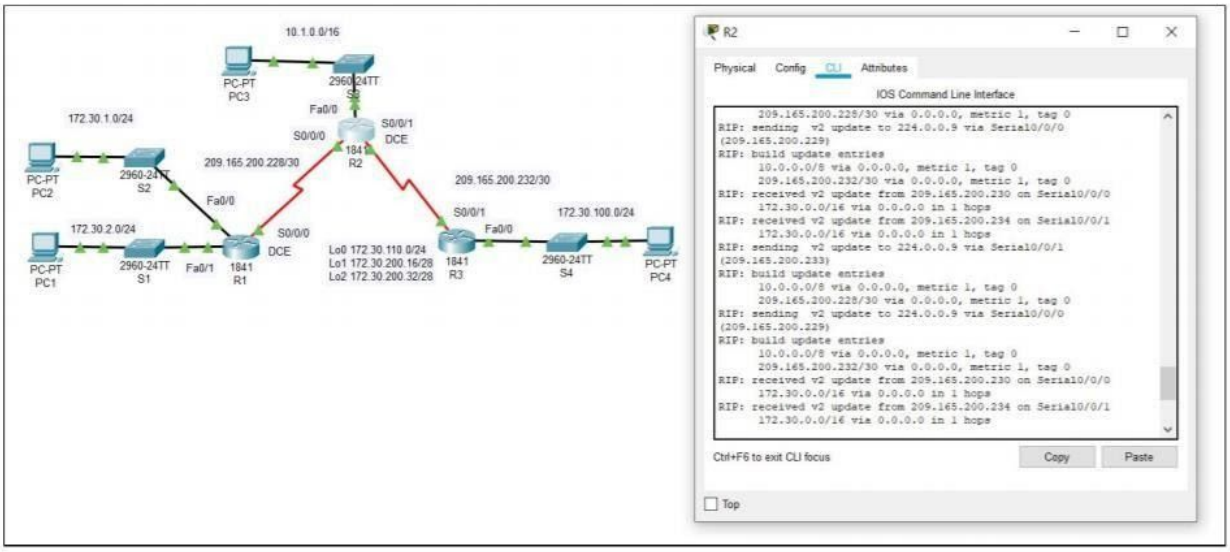

10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
209.165.200.228/30
209.165.200.232/30
172.30.1.0/24
PC-PT PC2
2960-24TT S2
Fa0/0
S0/0/1
Fa0/0
172.30.100.0/24
S0/0/0
DCE
172.30.2.0/24
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
2960-24TT S4
PC-PT PC4
R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Loopback2 (172.30.200.33)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.16/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.234)
RIP: build update entries
172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.233 on Serial0/0/1
10.0.0.0/8 via 0.0.0.0 in 1 hops
209.165.200.228/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Loopback0 (172.30.110.1)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.16/28 via 0.0.0.0, metric 1, tag 0
172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

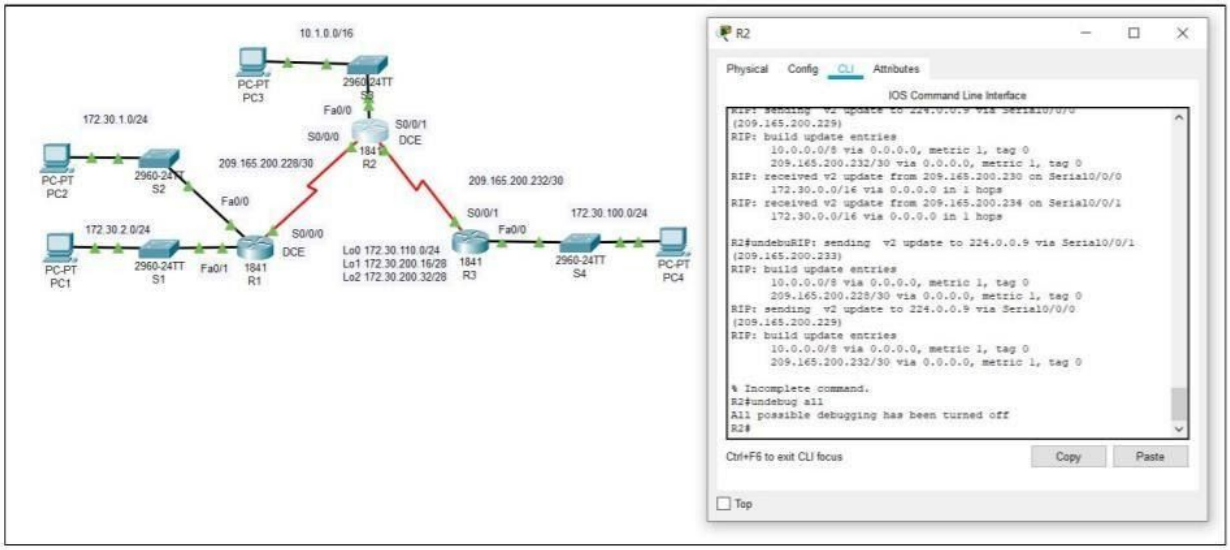

10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
172.30.1.0/24
209.165.200.228/30
209.165.200.232/30
PC-PT PC2
2960-24TT S2
Fa0/0
S0/0/1
Fa0/0
172.30.100.0/24
172.30.2.0/24
S0/0/0
DCE
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
2960-24TT S4
PC-PT PC4
R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.16/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.234)
RIP: build update entries
172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.233 on Serial0/0/1
10.0.0.0/8 via 0.0.0.0 in 1 hops
209.165.200.228/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Loopback0 (172.30.110.1)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.16/28 via 0.0.0.0, metric 1, tag 0
172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Loopback1 (172.30.200.17)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
172.30.1.0/24
209.165.200.228/30
209.165.200.232/30
PC-PT PC2
2960-24TT S2
Fa0/0
S0/0/1
Fa0/0
172.30.100.0/24
172.30.2.0/24
S0/0/0
DCE
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
2960-24TT S4
PC-PT PC4
R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Loopback1 (172.30.200.17)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Loopback2 (172.30.200.33)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.16/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.234)
RIP: build update entries
172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
undeRIP: received v2 update from 209.165.200.233 on Serial0/0/1
10.0.0.0/8 via 0.0.0.0 in 1 hops
209.165.200.228/30 via 0.0.0.0 in 1 h
R3#
R3#
R3#undebug all
All possible debugging has been turned off
R3#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

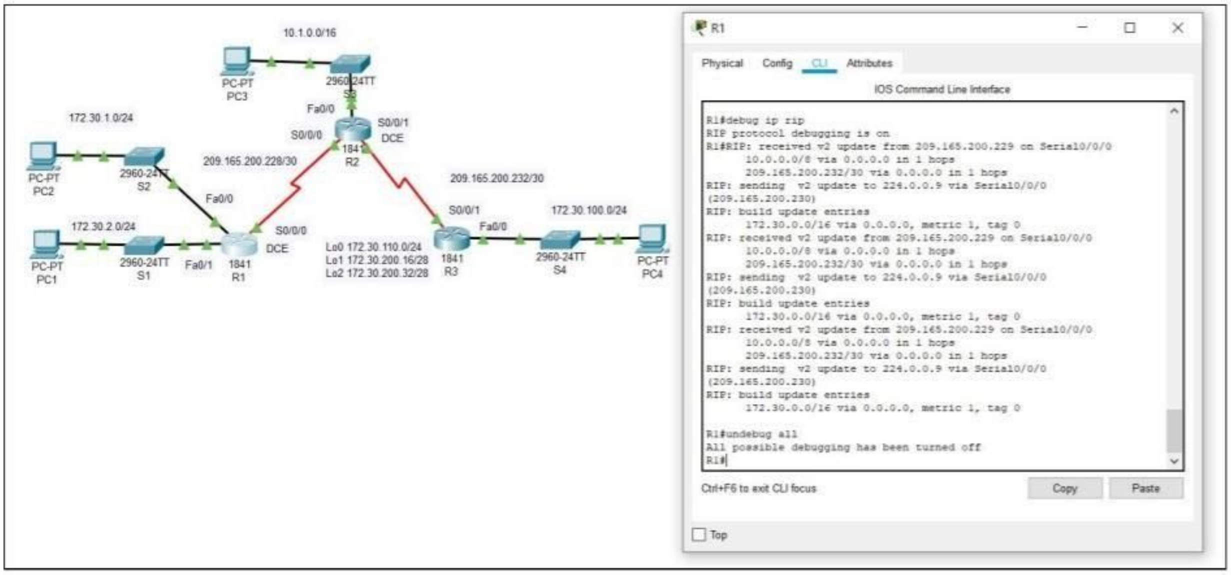
On R2


10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
172.30.1.0/24
PC-PT PC2
2960-24TT S2
209.165.200.228/30
209.165.200.232/30
Fa0/0
S0/0/1
172.30.100.0/24
172.30.2.0/24
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
S0/0/0 DCE
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
Fa0/0
2960-24TT S4
PC-PT PC4
R2
Physical Config CLI Attributes
IOS Command Line Interface
R2>enable
R2#debug ip rip
RIP protocol debugging is on
R2#RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.234 on Serial0/0/1
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.229)
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
172.30.1.0/24
PC-PT PC2
2960-24TT S2
209.165.200.228/30
209.165.200.232/30
Fa0/0
S0/0/1
172.30.100.0/24
172.30.2.0/24
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
S0/0/0 DCE
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
Fa0/0
2960-24TT S4
PC-PT PC4
R2
Physical Config CLI Attributes
IOS Command Line Interface
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.234 on Serial0/0/1
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.234 on Serial0/0/1
172.30.0.0/16 via 0.0.0.0 in 1 hops
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
172.30.1.0/24
PC-PT PC2
2960-24TT S2
209.165.200.228/30
209.165.200.232/30
Fa0/0
S0/0/1
172.30.100.0/24
172.30.2.0/24
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
S0/0/0 DCE
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
Fa0/0
2960-24TT S4
PC-PT PC4
R2
Physical Config CLI Attributes
IOS Command Line Interface
(209.165.200.229)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.234 on Serial0/0/1
172.30.0.0/16 via 0.0.0.0 in 1 hops
R2#undebuRIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
% Incomplete command.
R2#undebug all
All possible debugging has been turned off
R2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

On R1



What entries are included in the RIP updates sent out from R3?

Ans:

1. 10.0.0.0/8
2. 172.30.100.0/24
3. 172.30.110.0/24
4. 172.30.200.16/24
5. 209.165.200.0/24

On R2, what routes are in the RIP updates that are received from R3?

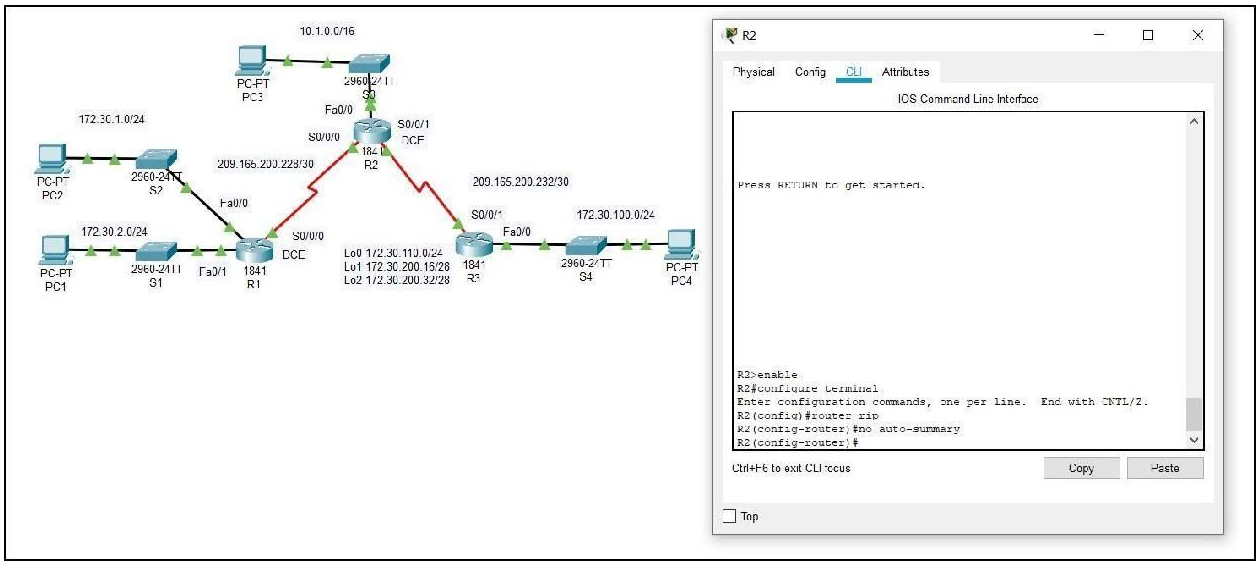
Ans: 172.30.0.0/16

R3 is not sending any of the 172.30.0.0 subnets—only the summarized route of 172.30.0.0/16, including the subnet mask. This is why R2 and R1 are not seeing the 172.30.0.0 subnets on R3.

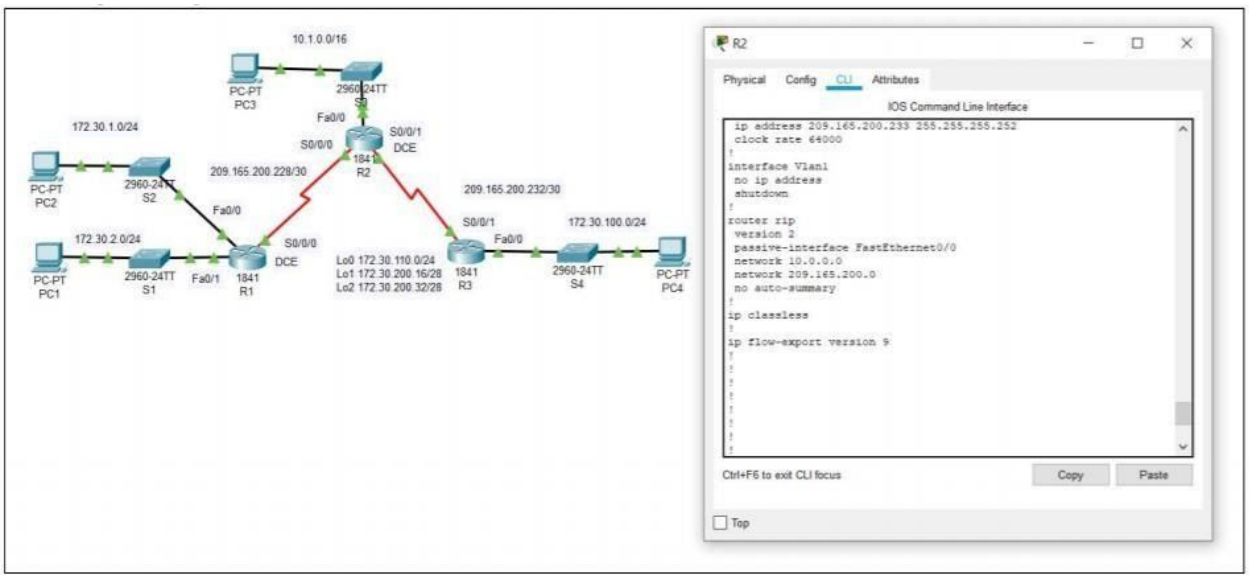
Task 6: Disable Automatic Summarization.

The **no auto-summary** command is used to turn off automatic summarization in RIPv2. Disable auto summarization on all routers. The routers will no longer summarize routes at major network boundaries.

R2(config)#**router rip**
R2(config-router)#**no auto-summary**

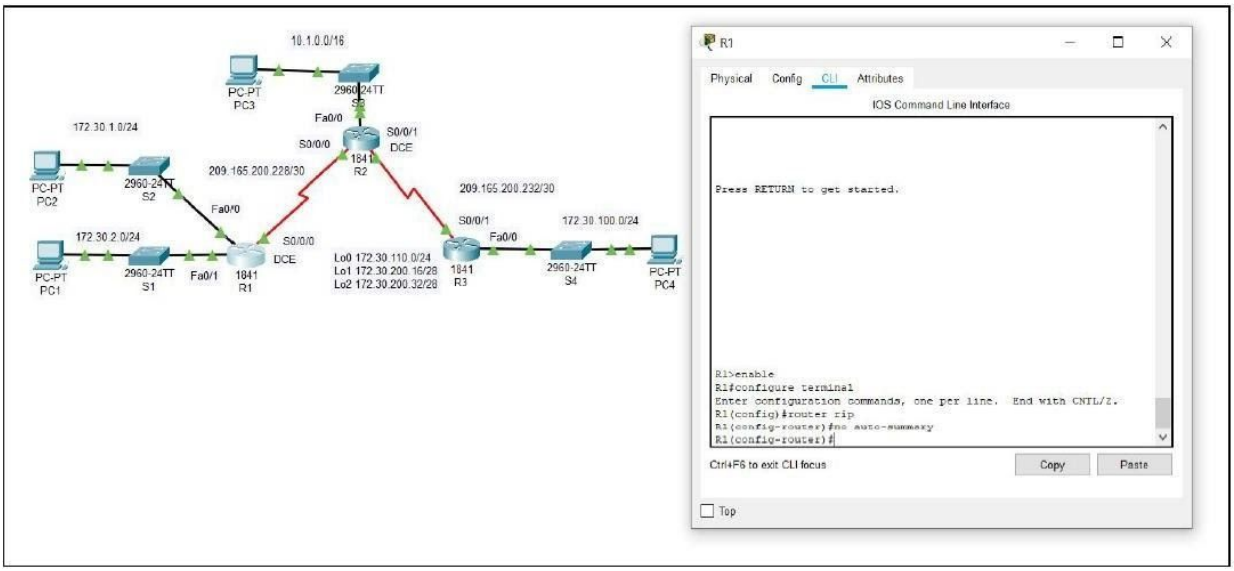


Running Configuration

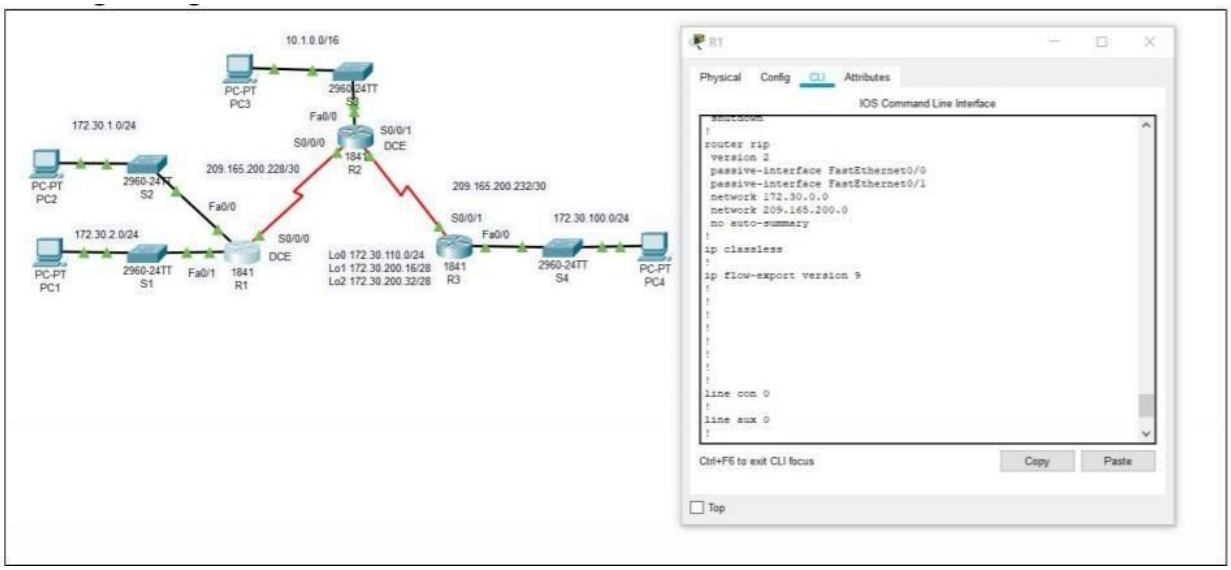


R1(config)#**router rip**

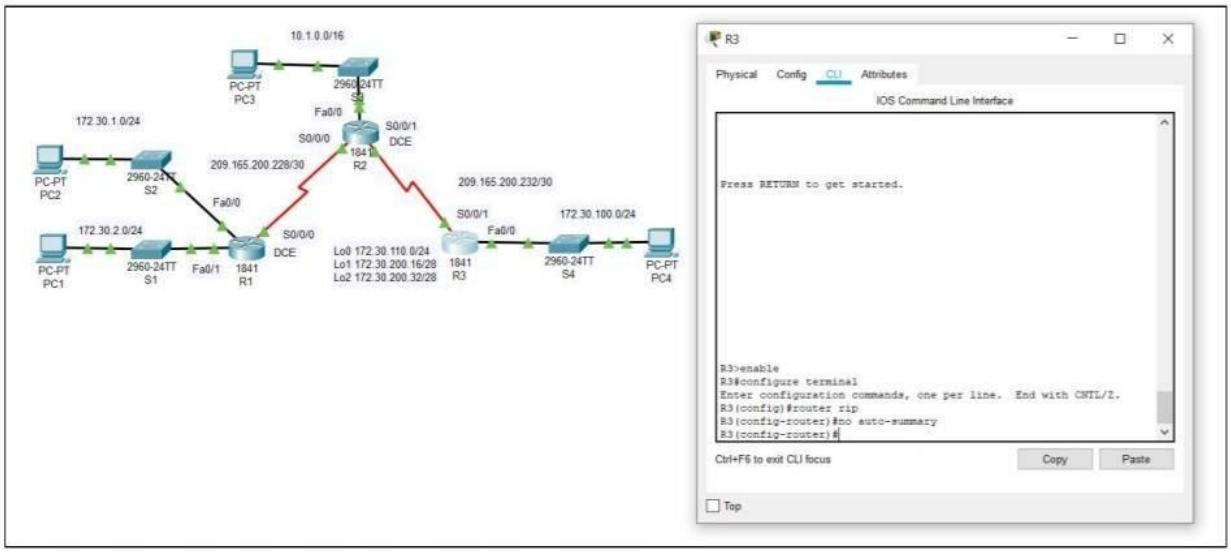
R1(config-router)#**no auto-summary**



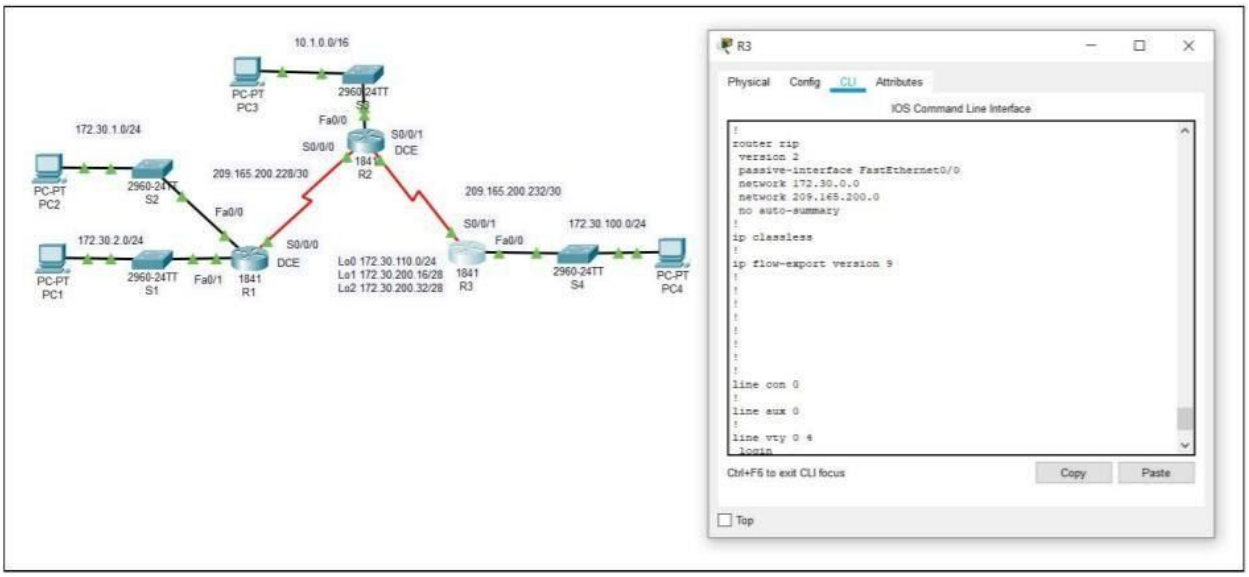
Running Configuration



R3(config)#**router rip**
R3(config-router)#**no auto-summary**



Running Configuration

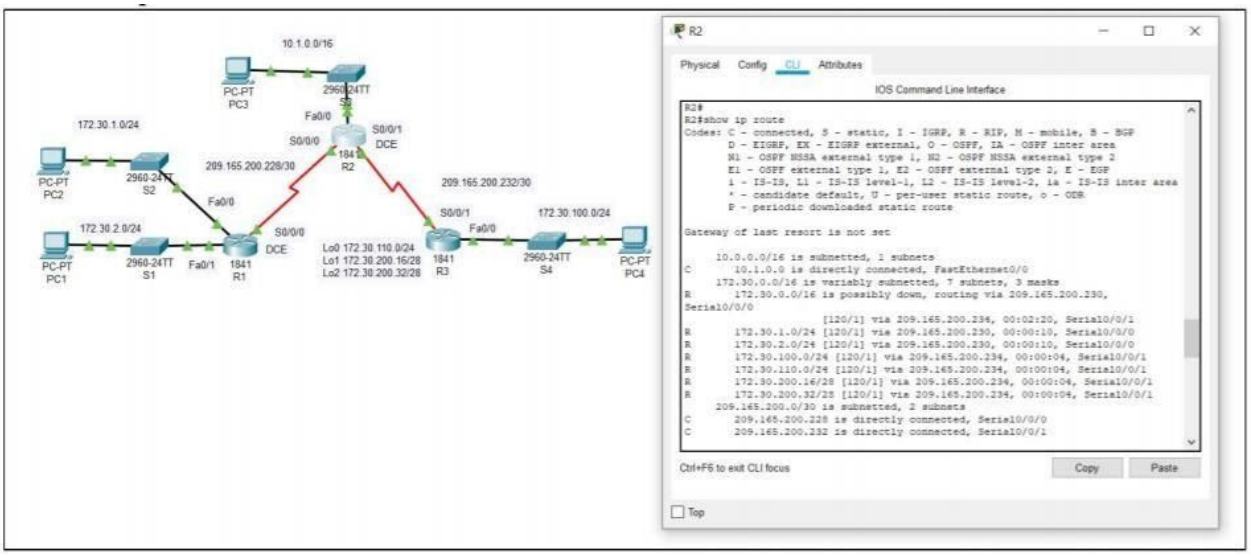


The **show ip route** and **ping** commands can be used to verify that automatic summarization is off.

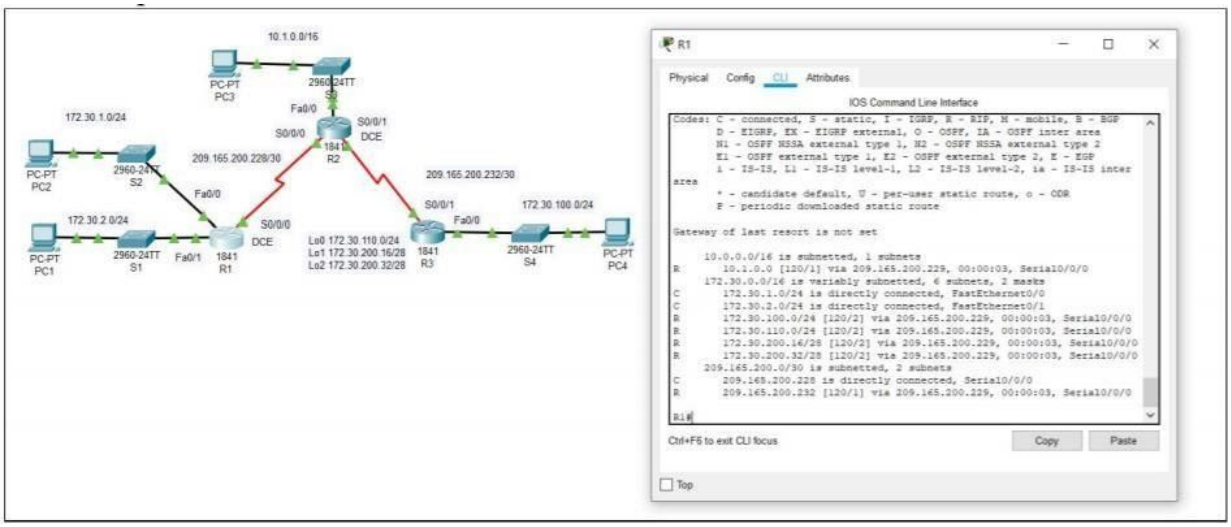
Task 7: Examine the Routing Tables.

The LANs connected to R1 and R3 should now be included in all three routing tables.

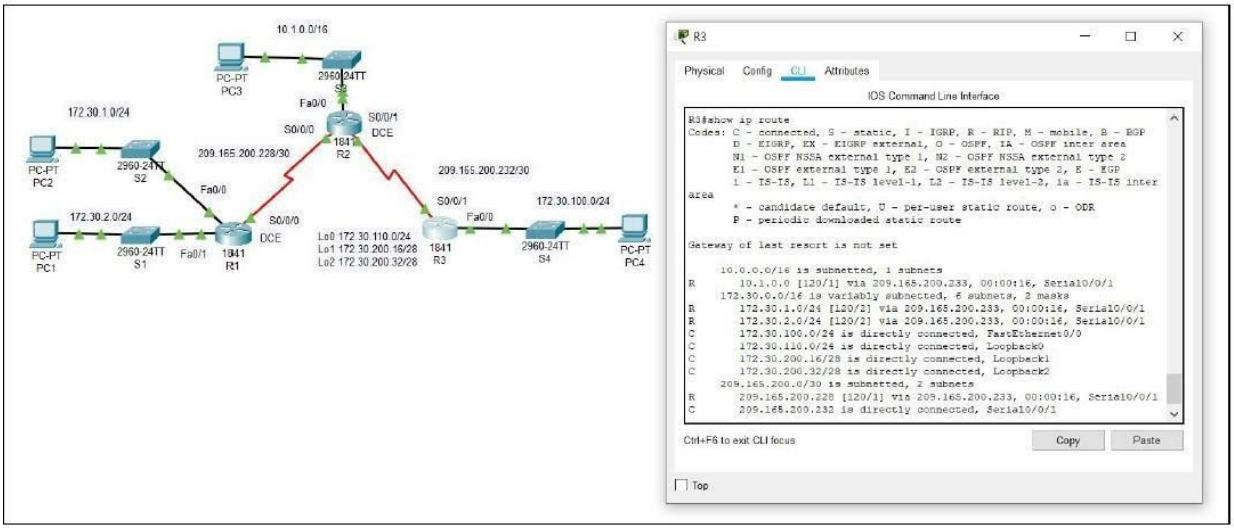
R2#**show ip route**



R1#**show ip route**

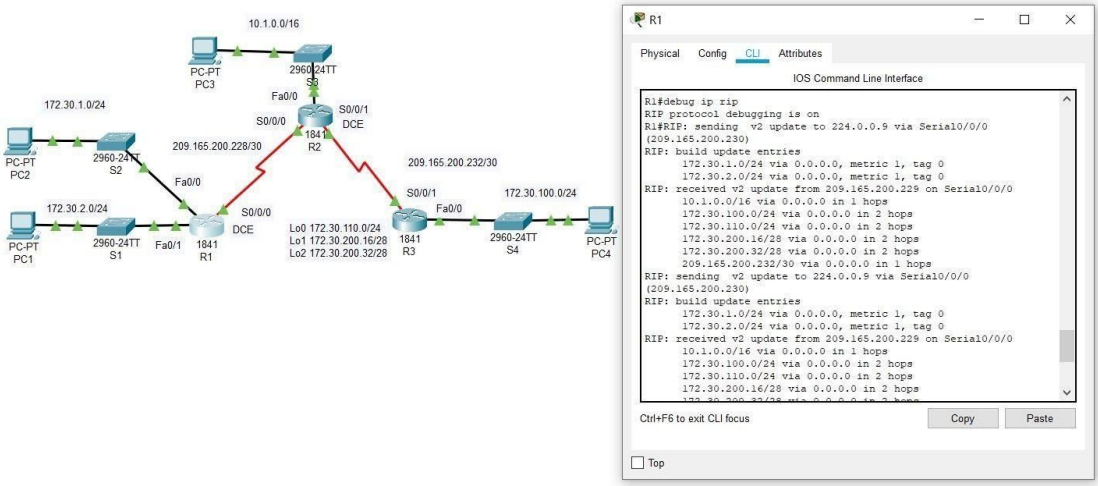


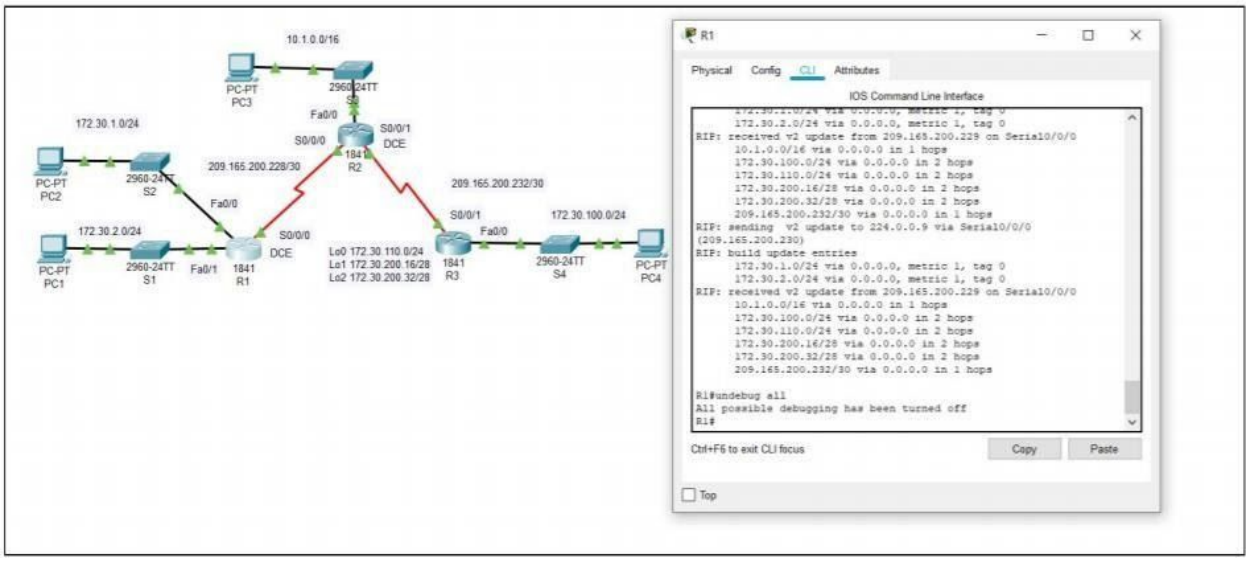
R3#**show ip route**



Use the output of the **debug ip rip** command to answer the following questions:

On R1



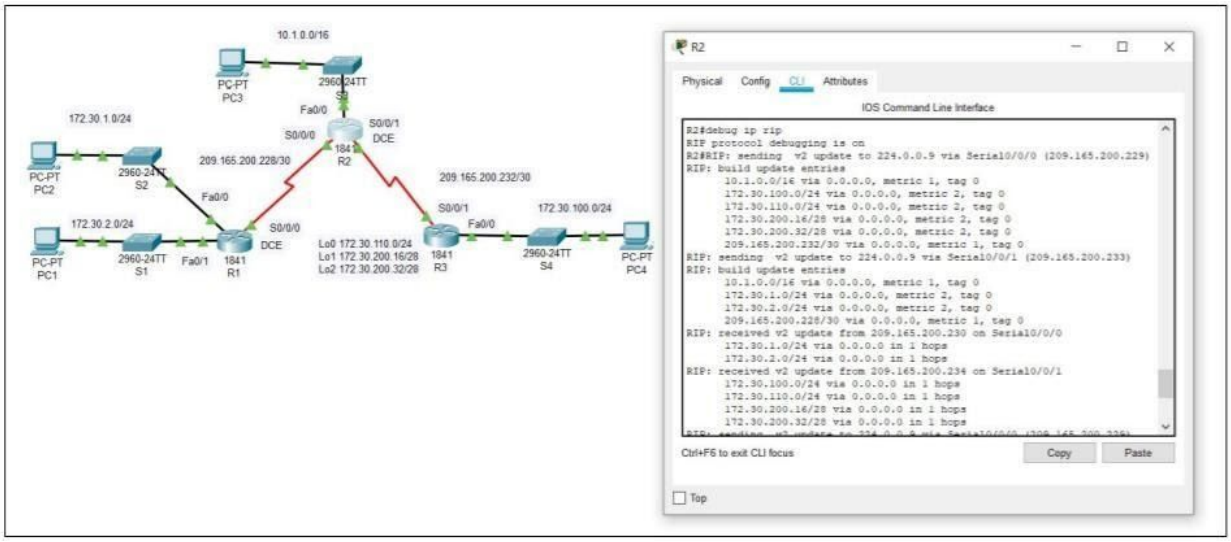


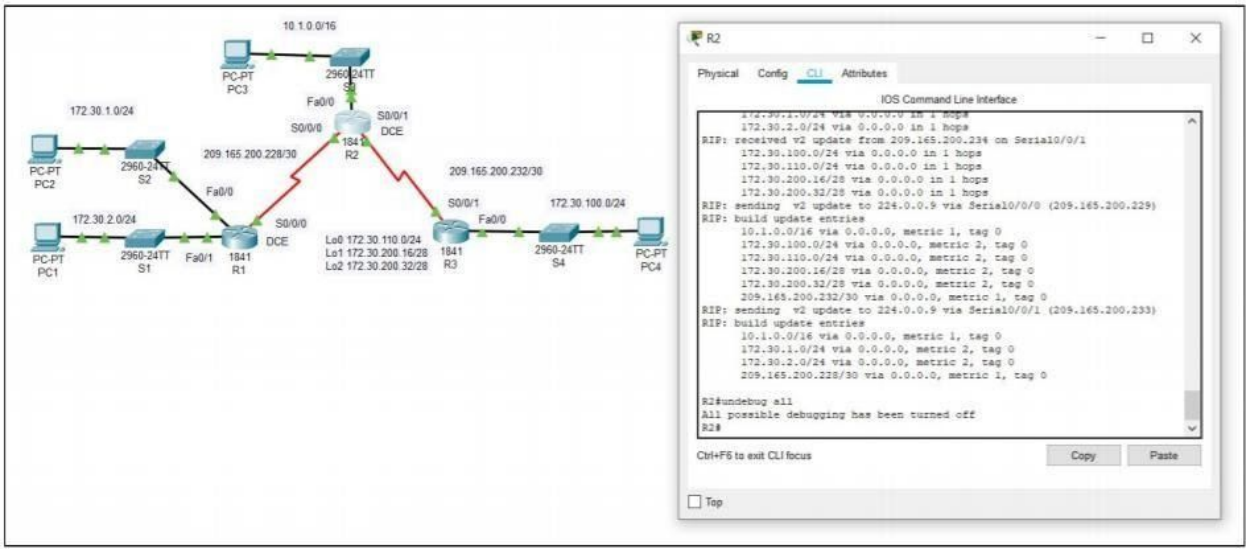
What entries are included in the RIP updates sent out from R1?

Ans:

1. 172.30.1.0/24
2. 172.30.2.0/24

On R2





On R2, what routes are in the RIP updates that are received from R1?

Ans:

1. 172.30.1.0/24
2. 172.30.2.0/24

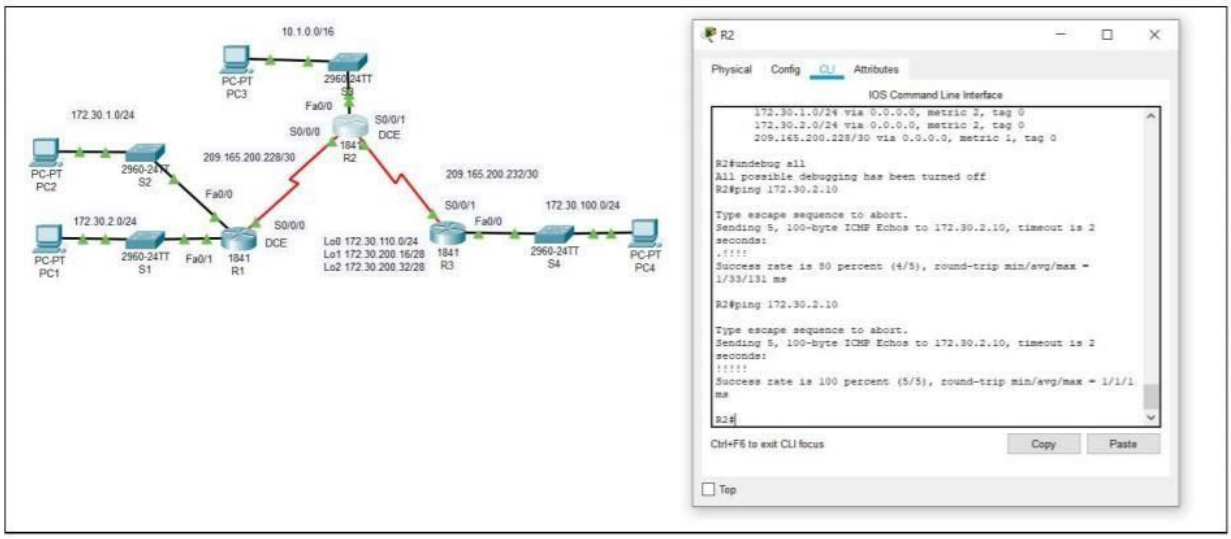
Are the subnet masks now included in the routing updates?

Ans: Yes

Task 8: Verify Network Connectivity.

Step 1: Check connectivity between R2 router and PCs.

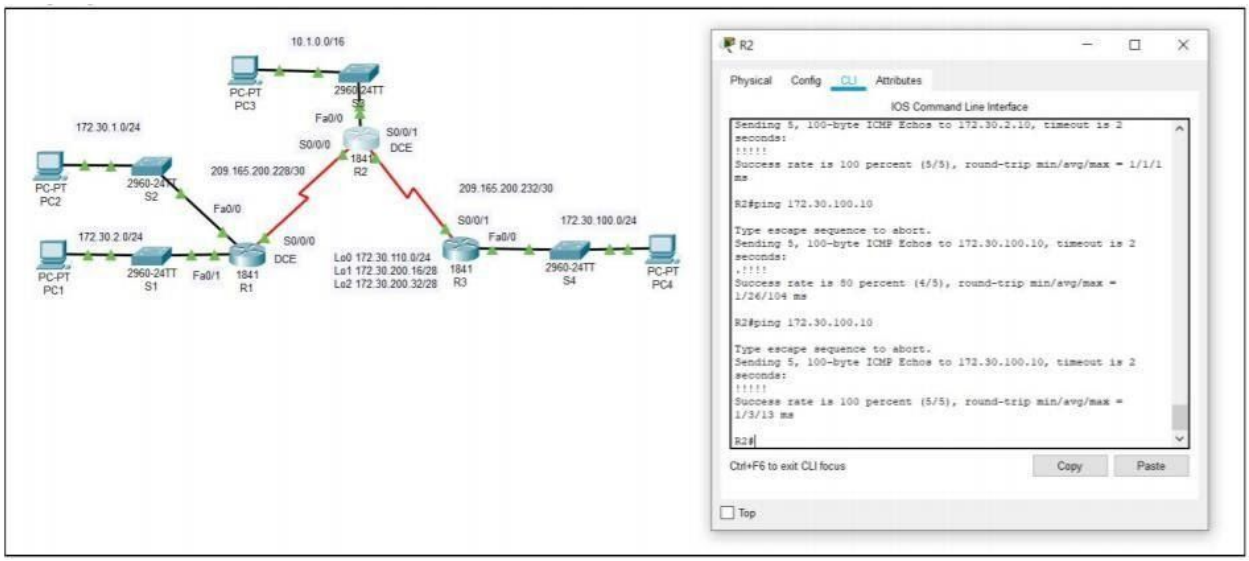
Pinging PC1 from R2



From R2, how many ICMP messages are successful when pinging PC1?

Ans: 5 ICMP messages are successful.

Pinging PC4 from R2

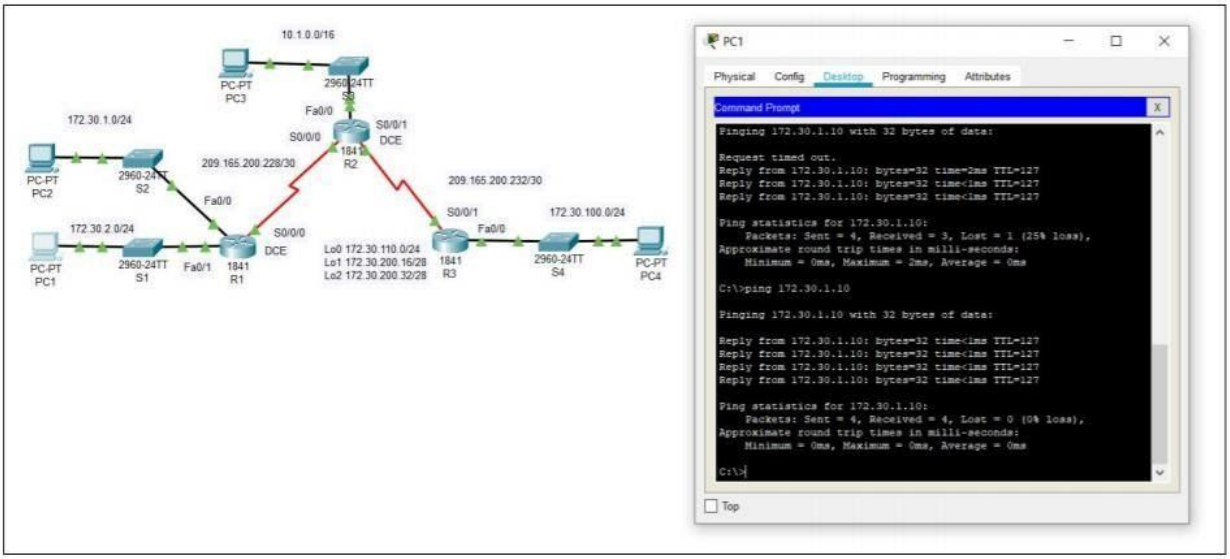


From R2, how many ICMP messages are successful when pinging PC4?

Ans: 5 ICMP messages are successful.

Step 2: Check the connectivity between the PCs.

Pinging PC2 from PC1



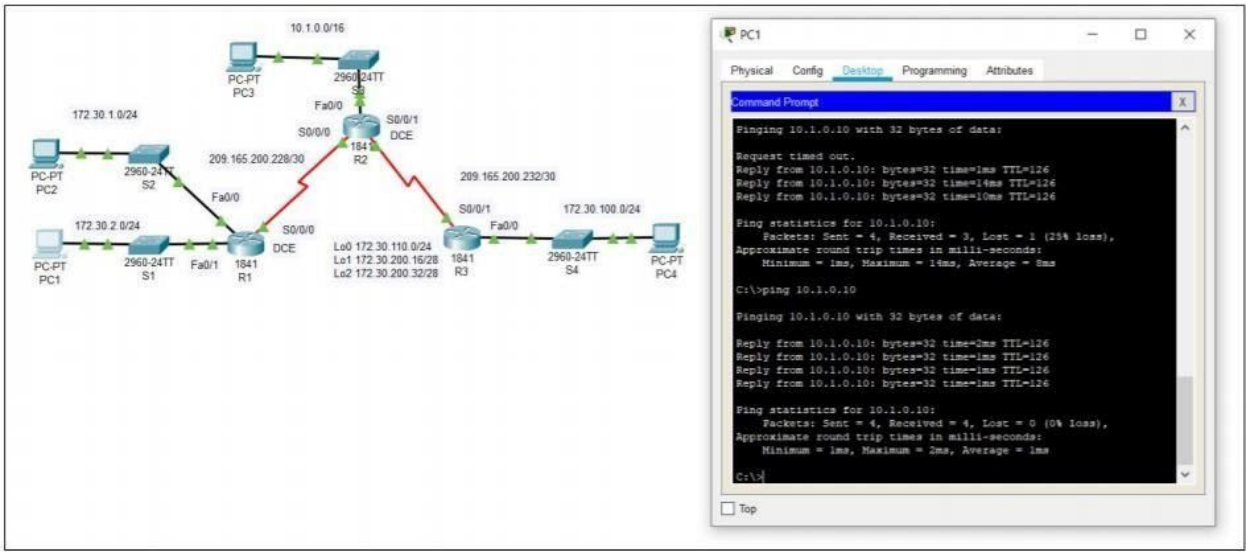
From PC1, is it possible to ping PC2?

Ans: Yes

What is the success
rate?

Ans: 100%

Pinging PC3 from PC1



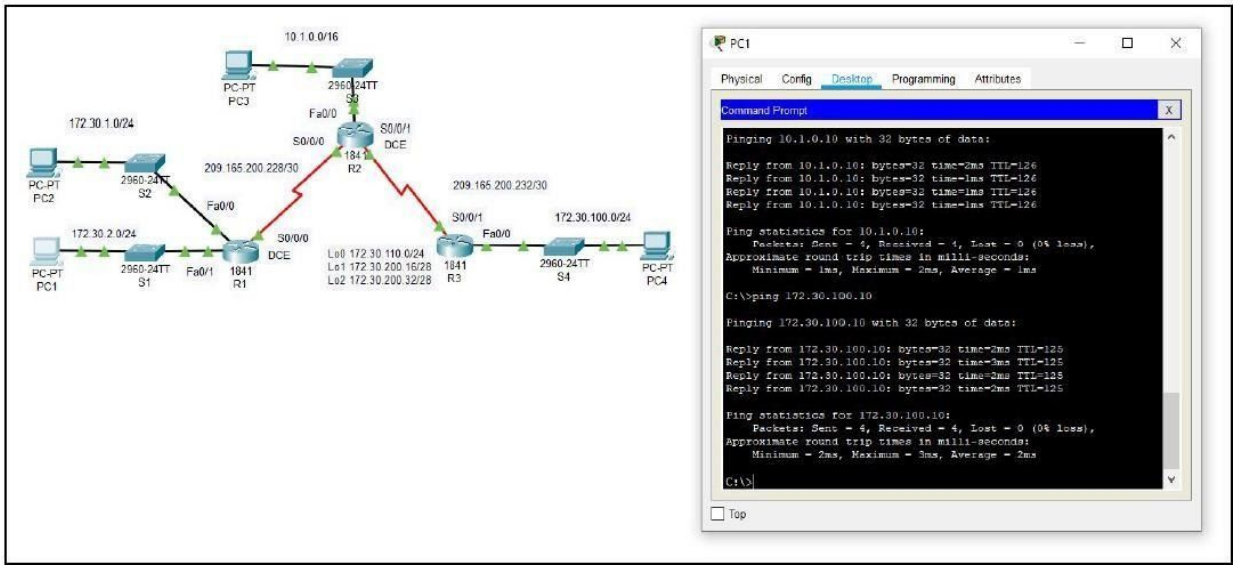
From PC1, is it possible to ping PC3?

Ans: Yes

What is the success
rate?

Ans: 100%

Pinging PC4 from PC1



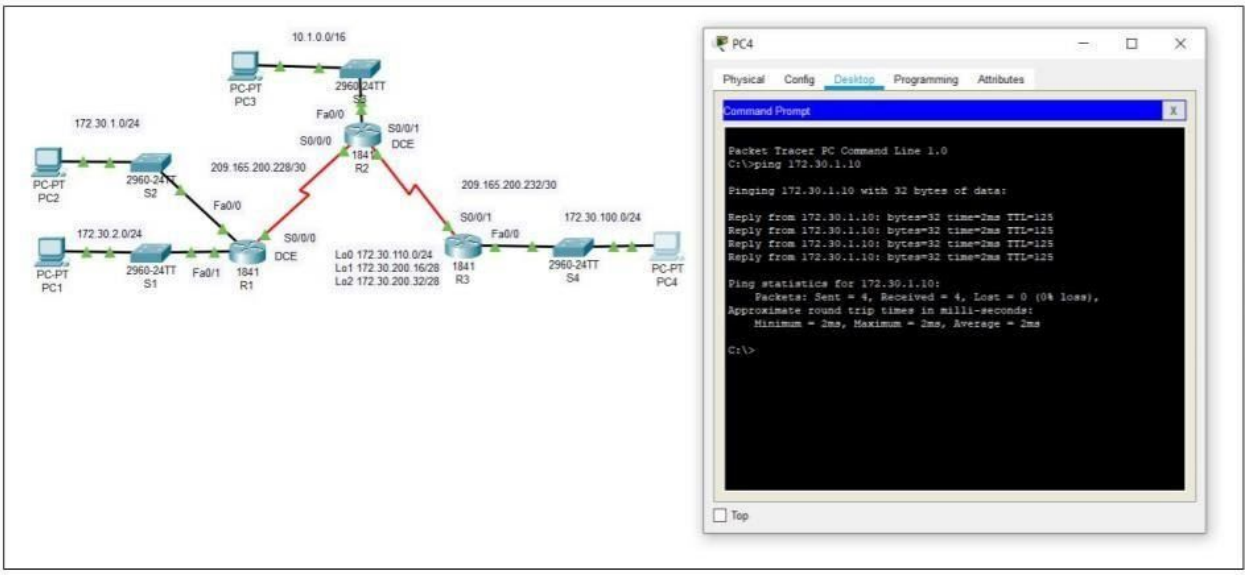
From PC1, is it possible to ping PC4?

Ans: Yes

What is the success rate?

Ans: 100%

Pinging PC2 from PC4



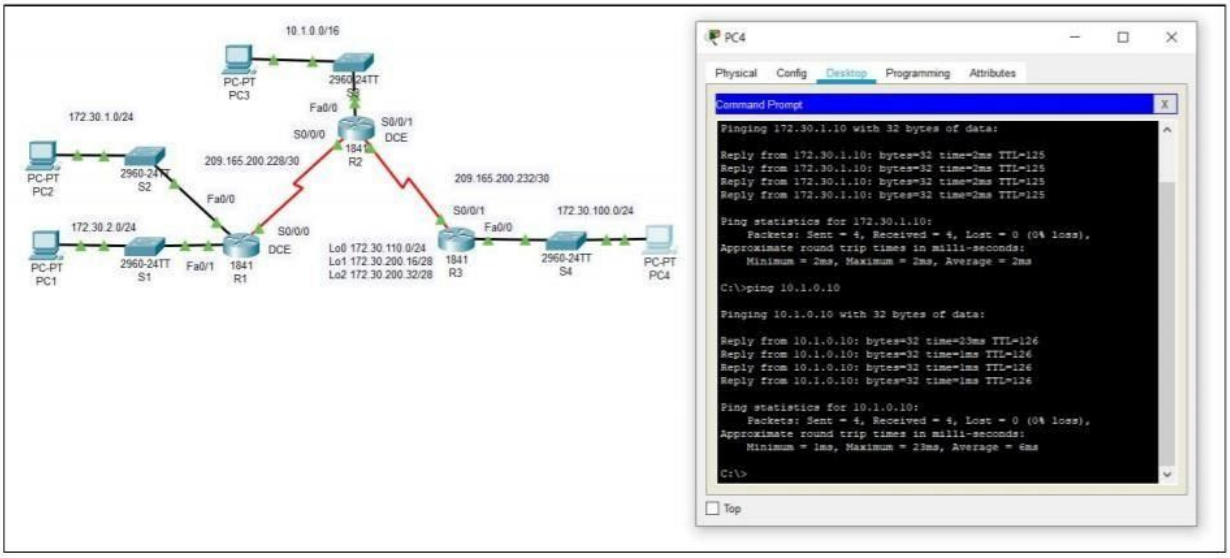
From PC4, is it possible to ping PC2?

Ans: Yes

What is the success rate?

Ans: 100%

Pinging PC3 from PC4



From PC4, is it possible to ping PC3?

Ans: Yes

What is the success
rate?

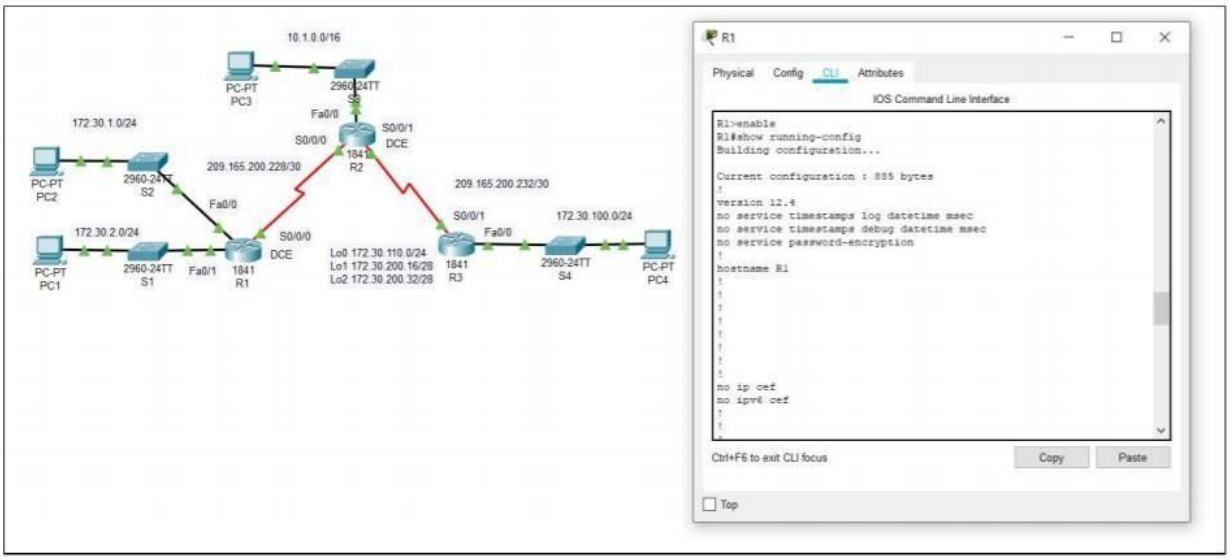
Ans: 100%

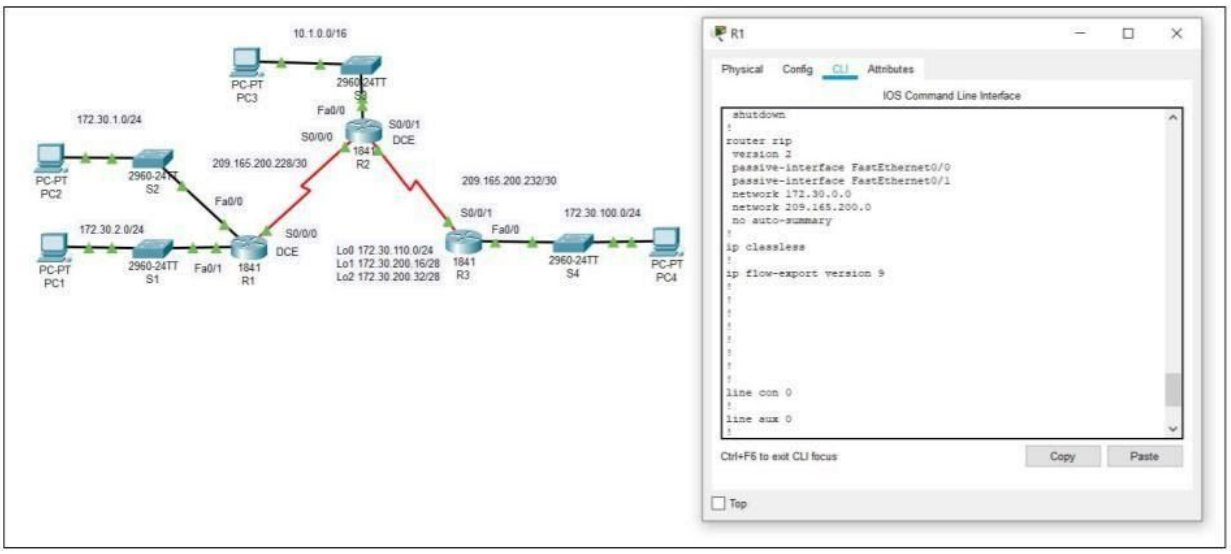
Task 9: Documentation

On each router, capture the following command output to a text (.txt) file and save for future reference.

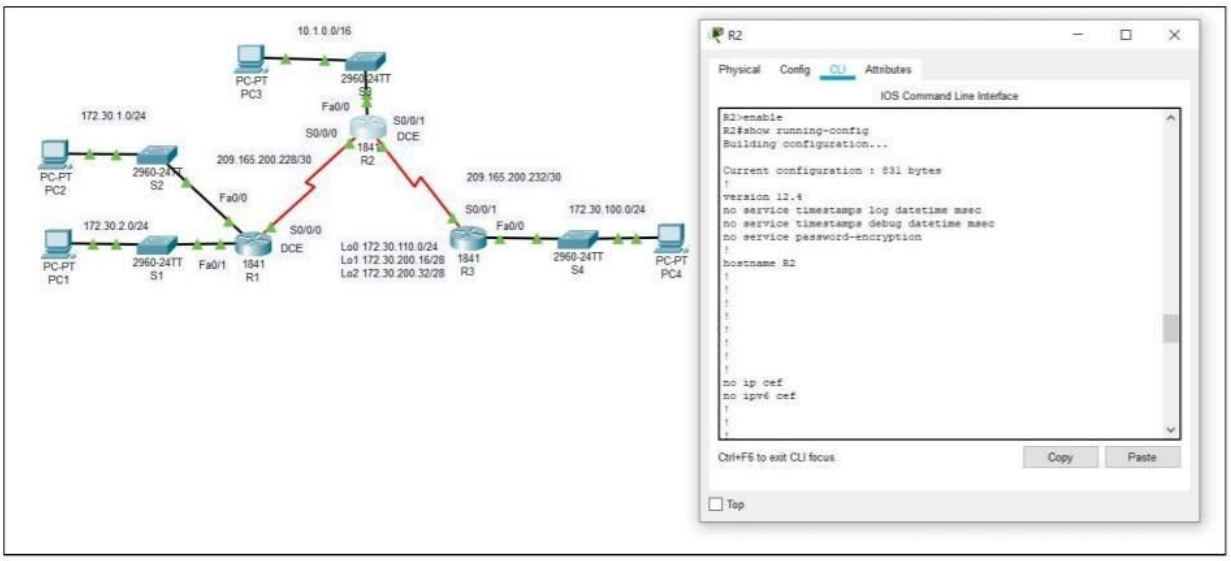
- **show running-config**

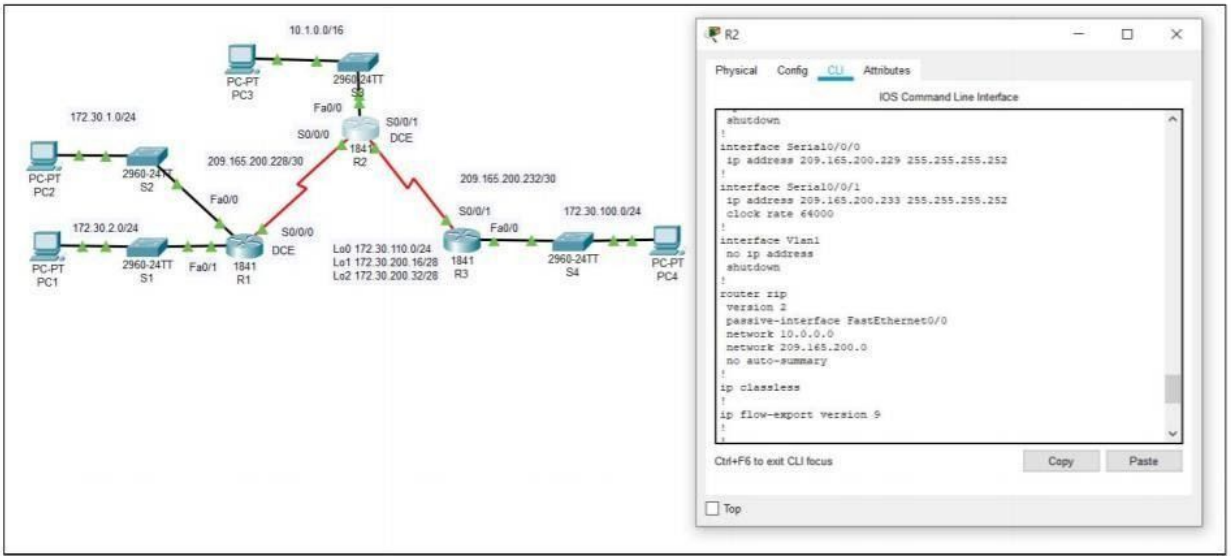
R1



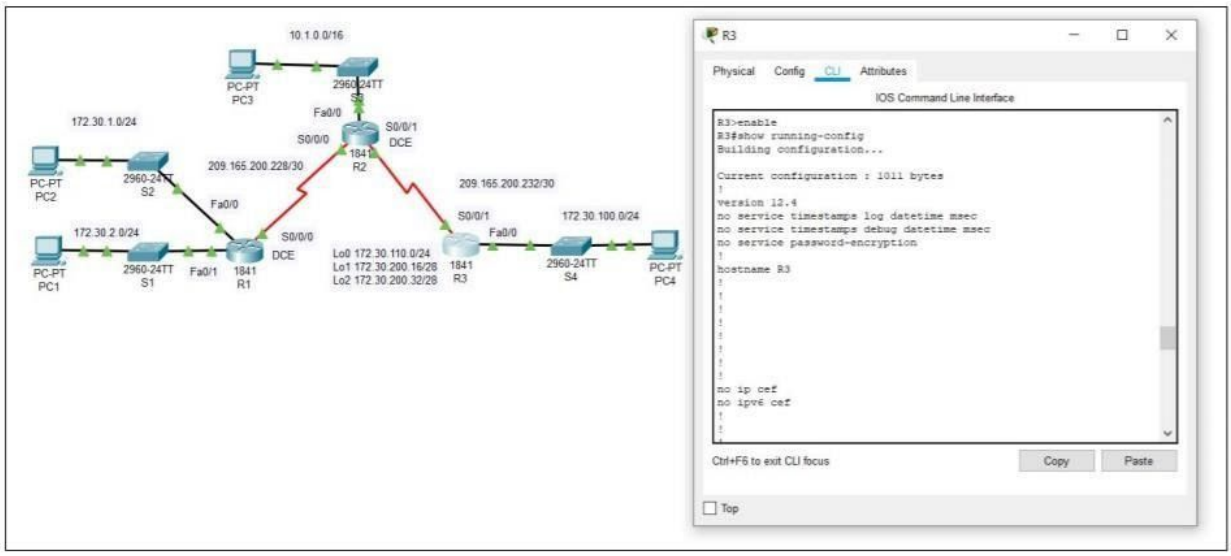


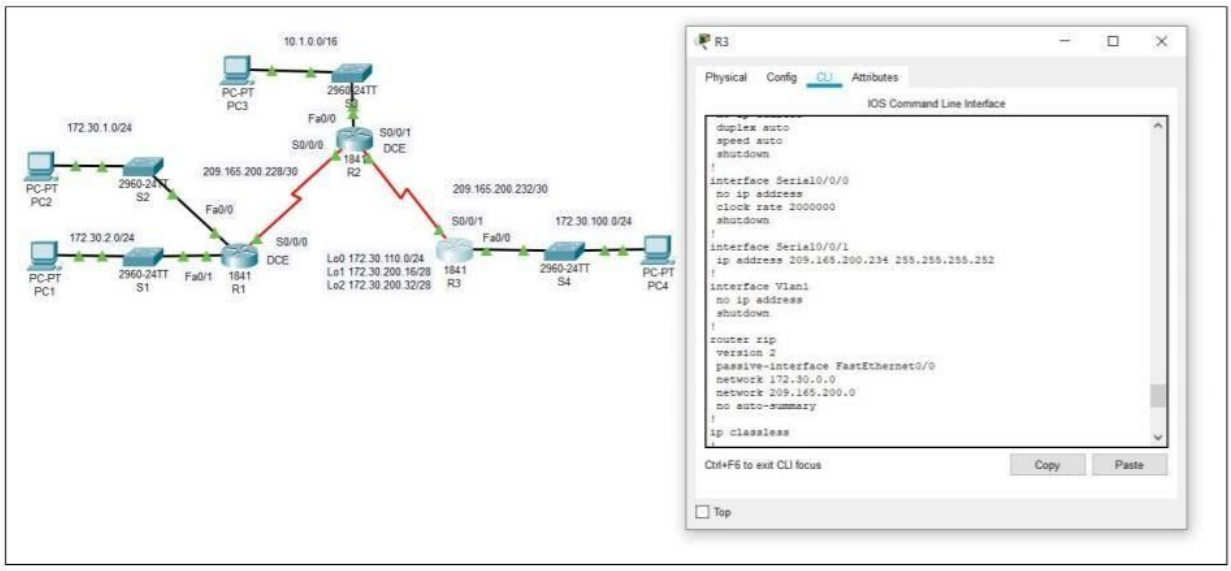
For R2


10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
172.30.1.0/24
PC-PT PC2
2960-24TT S2
209.165.200.228/30
209.165.200.232/30
Fa0/0
S0/0/1
172.30.100.0/24
172.30.2.0/24
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
S0/0/0 DCE
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
Fa0/0
2960-24TT S4
PC-PT PC4
R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
R2>enable
R2#show running-config
Building configuration...
Current configuration : 831 bytes
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
hostname R2
no ip cef
no ipv6 cef
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
172.30.1.0/24
PC-PT PC2
2960-24TT S2
209.165.200.228/30
209.165.200.232/30
Fa0/0
S0/0/1
172.30.100.0/24
172.30.2.0/24
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
S0/0/0 DCE
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
Fa0/0
2960-24TT S4
PC-PT PC4
R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
shutdown
!
interface Serial0/0/0
ip address 209.165.200.229 255.255.255.252
!
interface Serial0/0/1
ip address 209.165.200.233 255.255.255.252
clock rate 64000
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
passive-interface FastEthernet0/0
network 10.0.0.0
network 209.165.200.0
no auto-summary
!
ip classless
!
ip flow-export version 9
!
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

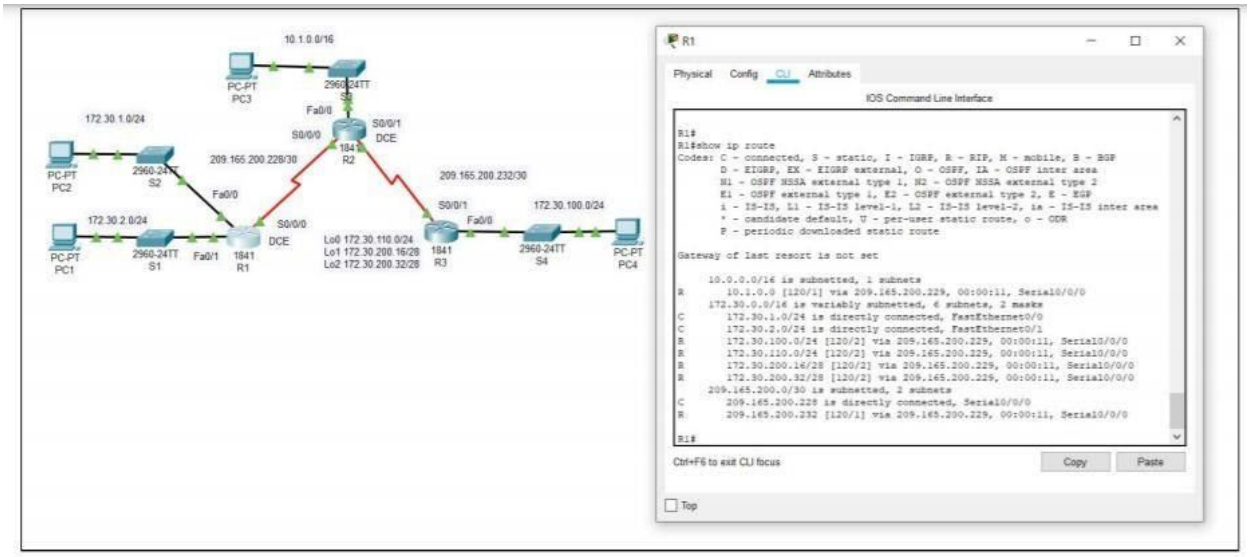
R3


10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
172.30.1.0/24
PC-PT PC2
2960-24TT S2
209.165.200.228/30
209.165.200.232/30
Fa0/0
S0/0/1
172.30.100.0/24
172.30.2.0/24
S0/0/0
DCE
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
Fa0/0
2960-24TT S4
PC-PT PC4
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
R3
Physical Config CLI Attributes
IOS Command Line Interface
R3>enable
R3#show running-config
Building configuration...
Current configuration : 1011 bytes
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
hostname R3
no ip cef
no ipv6 cef
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

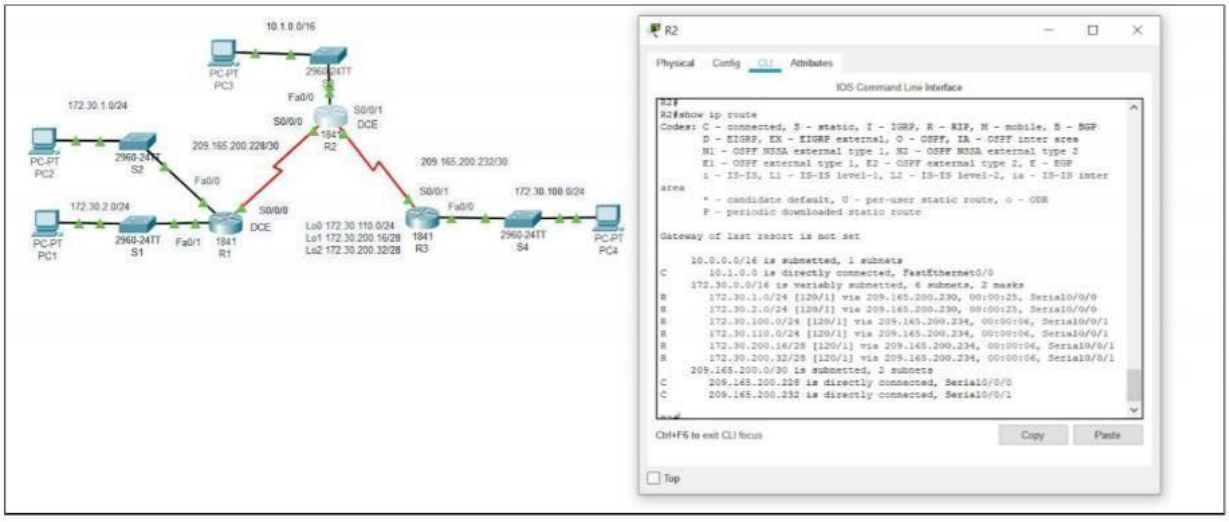

10.1.0.0/16
PC-PT PC3
2960-24TT S3
Fa0/0
S0/0/1 DCE
S0/0/0
1841 R2
172.30.1.0/24
PC-PT PC2
2960-24TT S2
209.165.200.228/30
209.165.200.232/30
Fa0/0
S0/0/1
172.30.100.0/24
172.30.2.0/24
S0/0/0
DCE
Lo0 172.30.110.0/24
Lo1 172.30.200.16/28
Lo2 172.30.200.32/28
1841 R3
Fa0/0
2960-24TT S4
PC-PT PC4
PC-PT PC1
2960-24TT S1
Fa0/1
1841 R1
R3
Physical Config CLI Attributes
IOS Command Line Interface
duplex auto
speed auto
shutdown
interface Serial0/0/0
no ip address
clock rate 2000000
shutdown
interface Serial0/0/1
ip address 209.165.200.234 255.255.255.252
interface Vlan1
no ip address
shutdown
router rip
version 2
passive-interface FastEthernet0/0
network 172.30.0.0
network 209.165.200.0
no auto-summary
ip classless
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

- **show ip route**

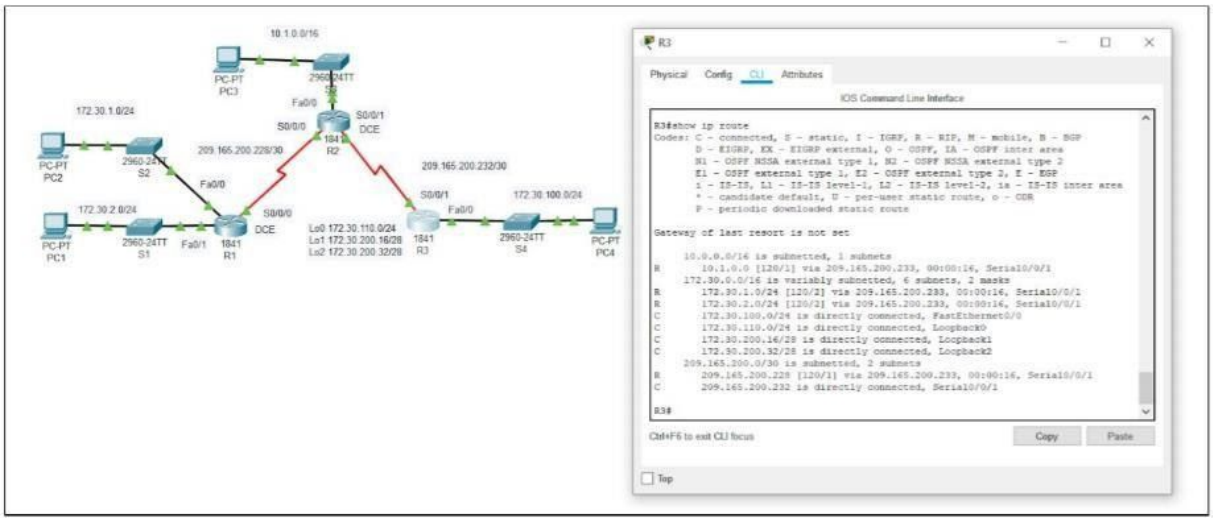
R1



R2

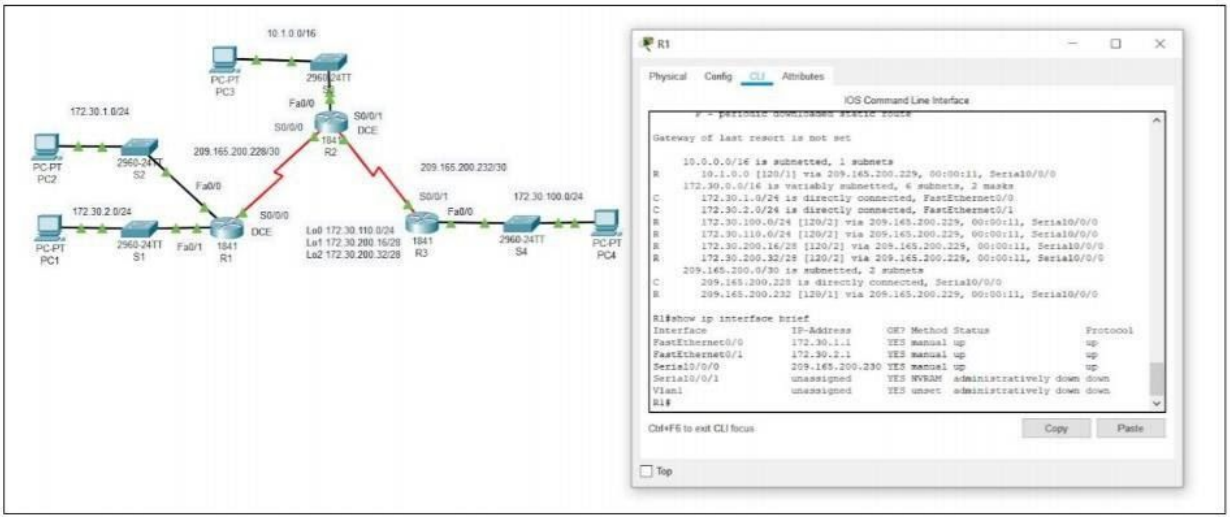


R3

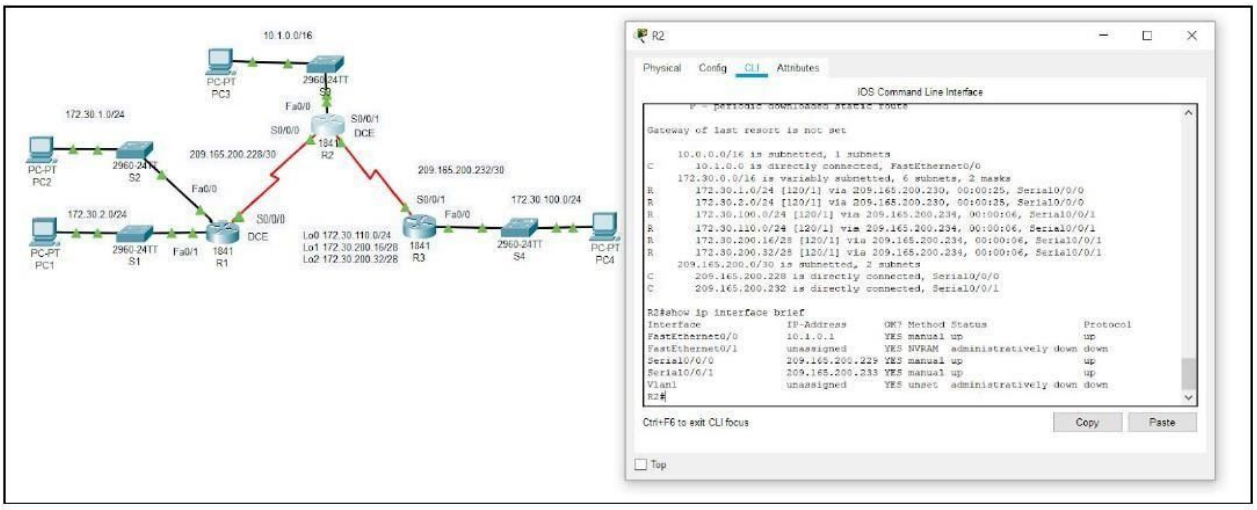


- **show ip interface brief**

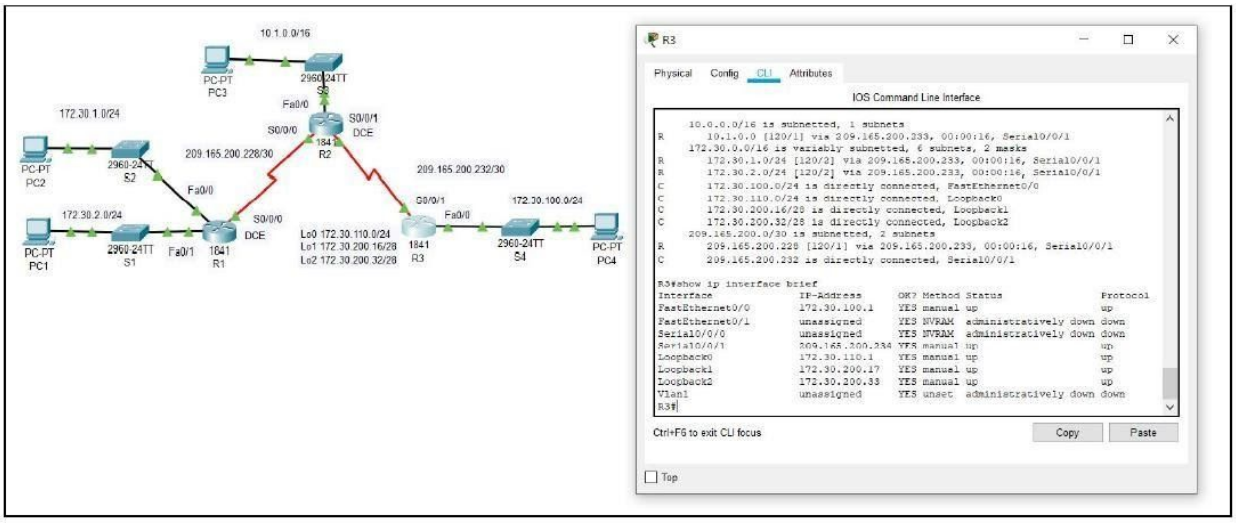
R1



R2

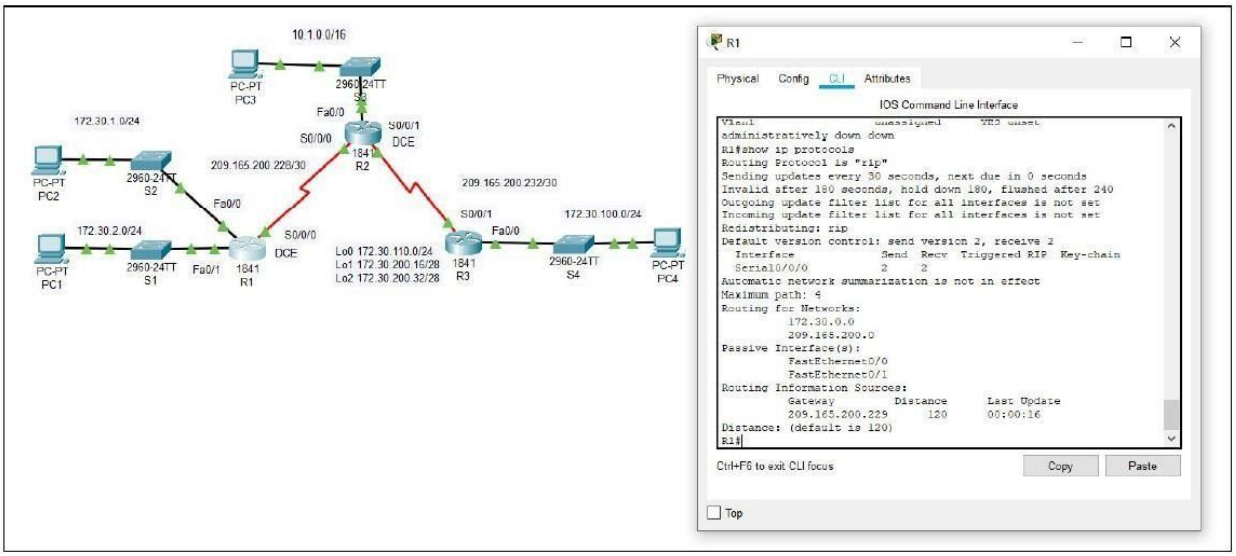


R3

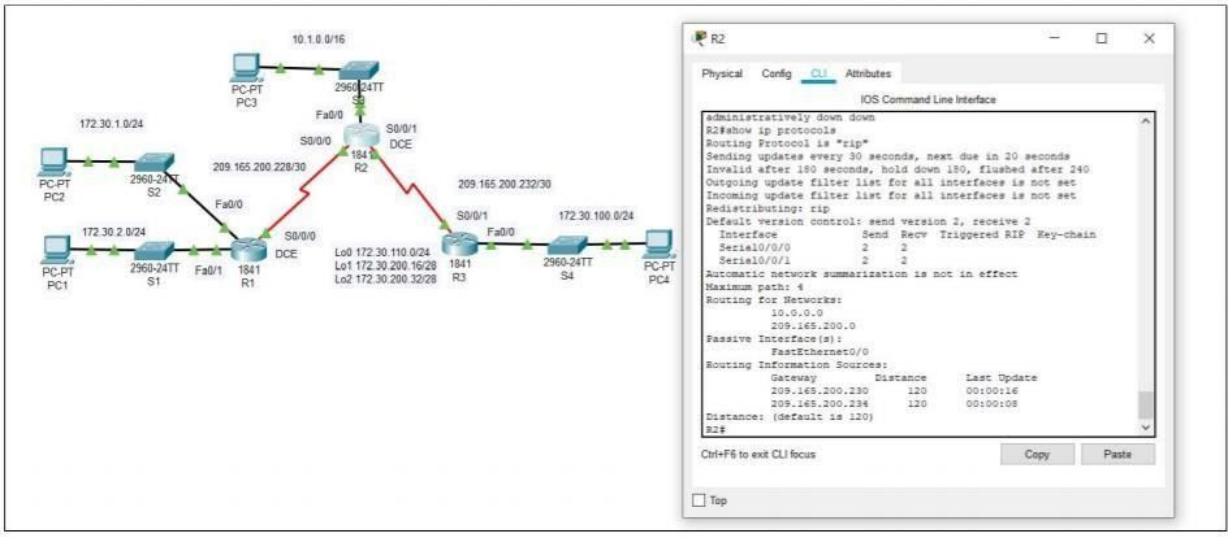


- **show ip protocols**

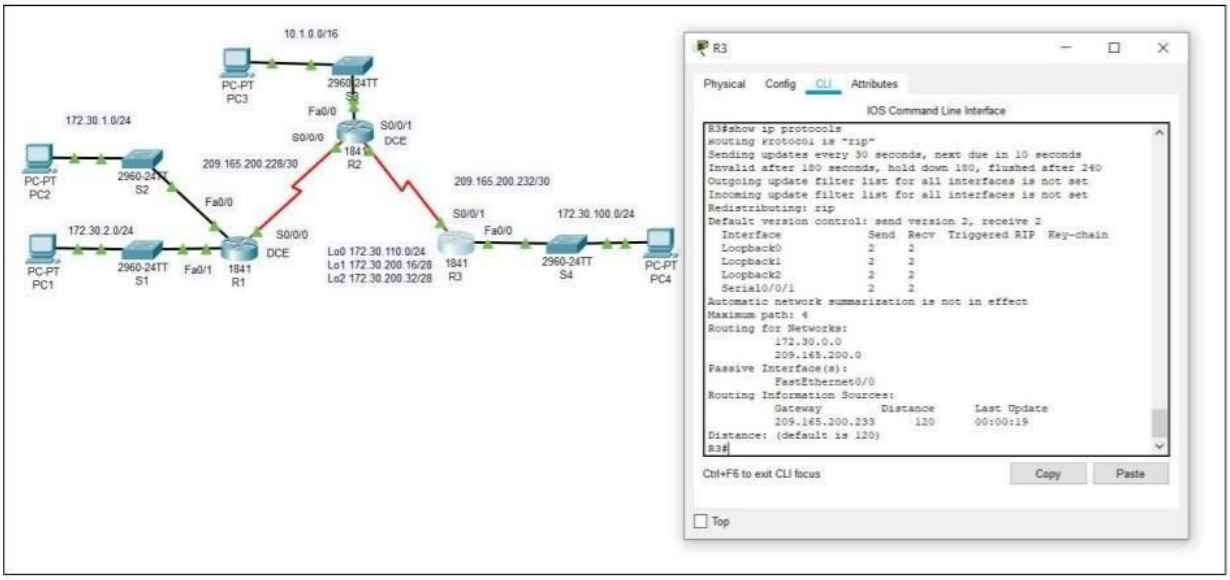
R1



R2



R3

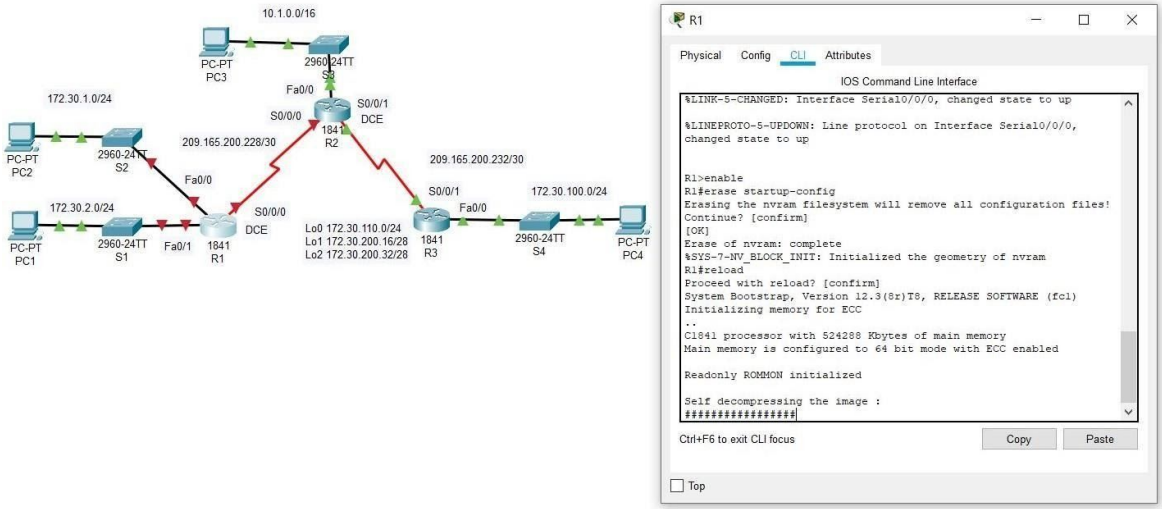


If you need to review the procedures for capturing command output, refer to Lab 1.5.1.

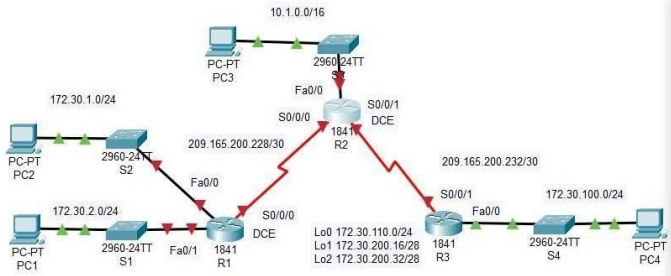
Task 10: Clean Up

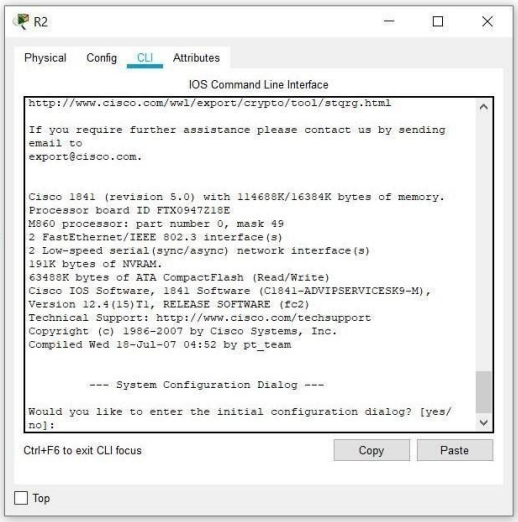
Erase the configurations and reload the routers. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.

Erasing configuration for R1 and reloading

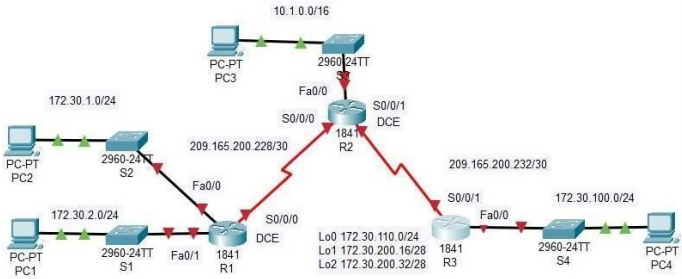


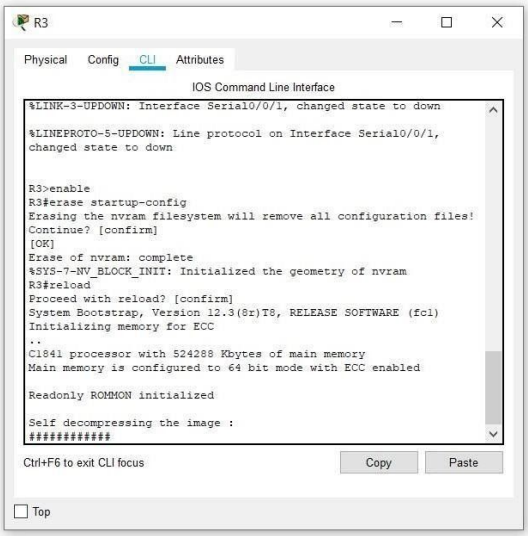
Erasing configuration for R2 and reloading





Erasing configuration for R3 and reloading





Conclusion:

1. In this experiment, I learned about the routing protocols
2. I implemented RIPv2 on the given topology and documented the results.