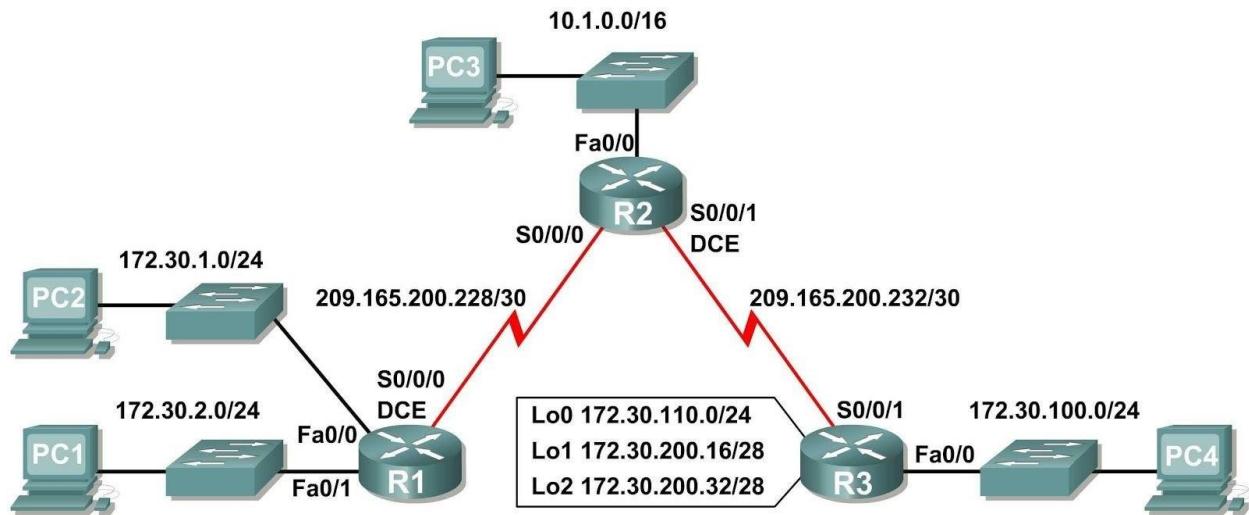


Name: Jahnvi Shah  
UID: 2018130047

## CEL 51, DCCN, Monsoon 2020 Lab 7: RIPv2 Router Configuration

### Topology Diagram



**Addressing Table**

Device Gateway	Interface	IP Address	Subnet Mask	Default
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

	<b>Lo0</b>	172.30.110.1	255.255.255.0	N/A
	<b>Lo1</b>	172.30.200.17	255.255.255.240	N/A
	<b>Lo2</b>	172.30.200.33	255.255.255.240	N/A
<b>PC1</b>	<b>NIC</b>	172.30.2.10	255.255.255.0	172.30.2.1
<b>PC2</b>	<b>NIC</b>	172.30.1.10	255.255.255.0	172.30.1.1
<b>PC3</b>	<b>NIC</b>	10.1.0.10	255.255.0.0	10.1.0.1
<b>PC4</b>	<b>NIC</b>	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.

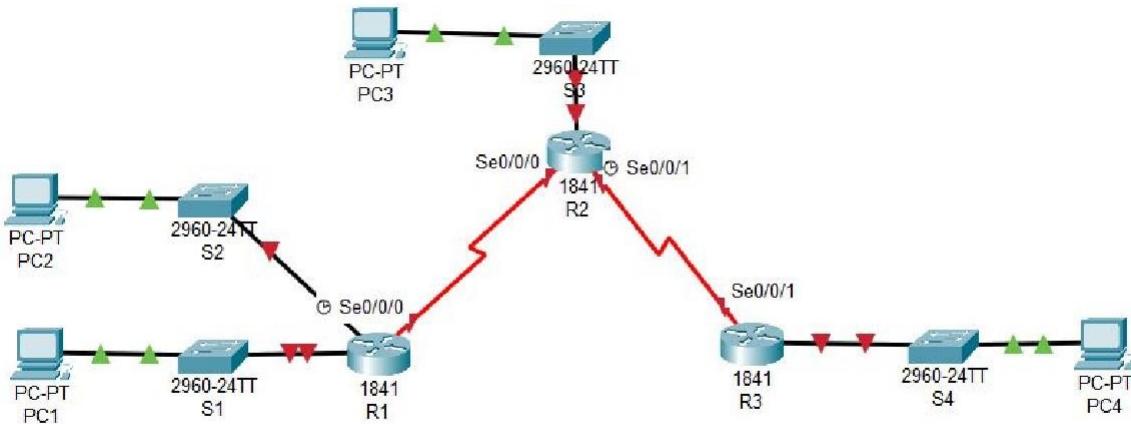
## Scenario

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.

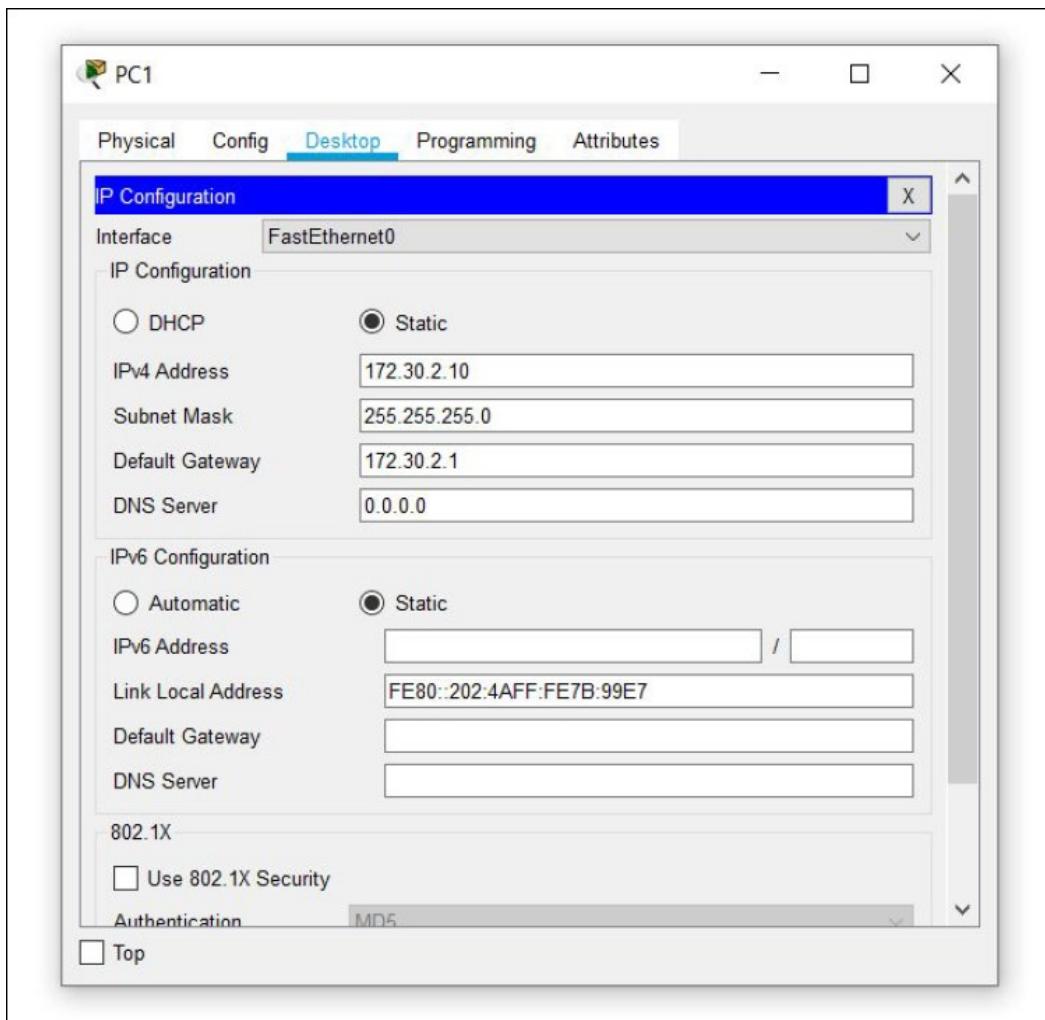
### Task 1: Cable, Erase, and Reload the Routers.

#### Step 1: Cable a network.

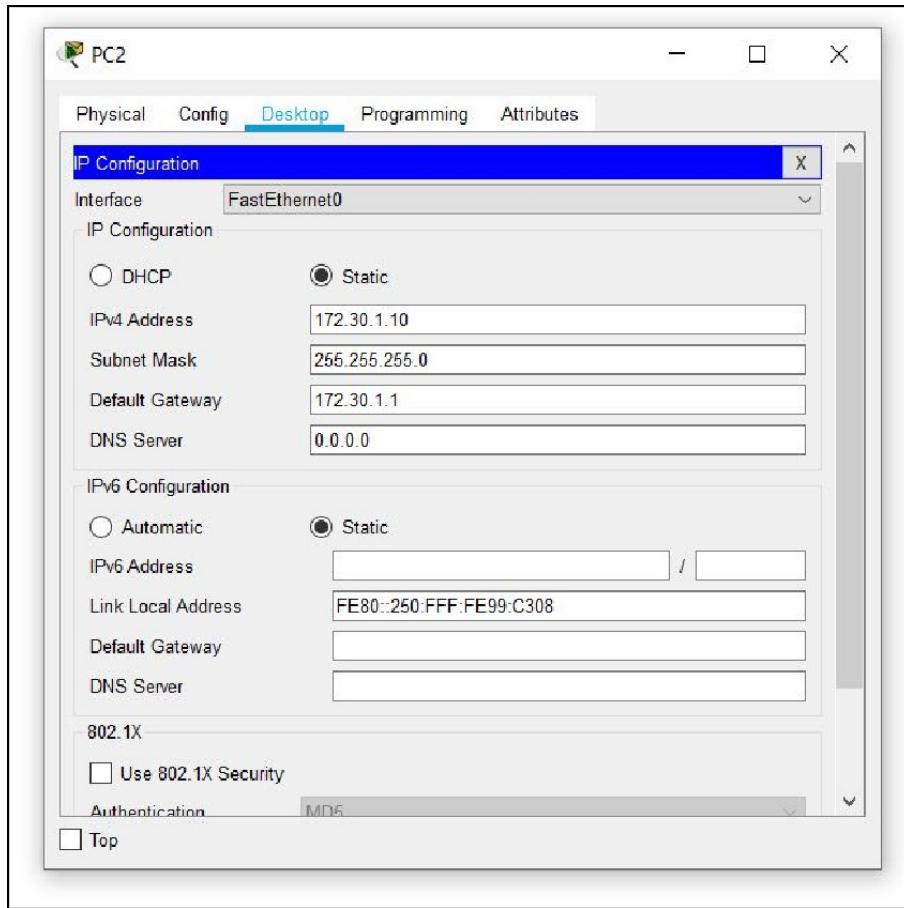
Cable a network that is similar to the one in the Topology Diagram.



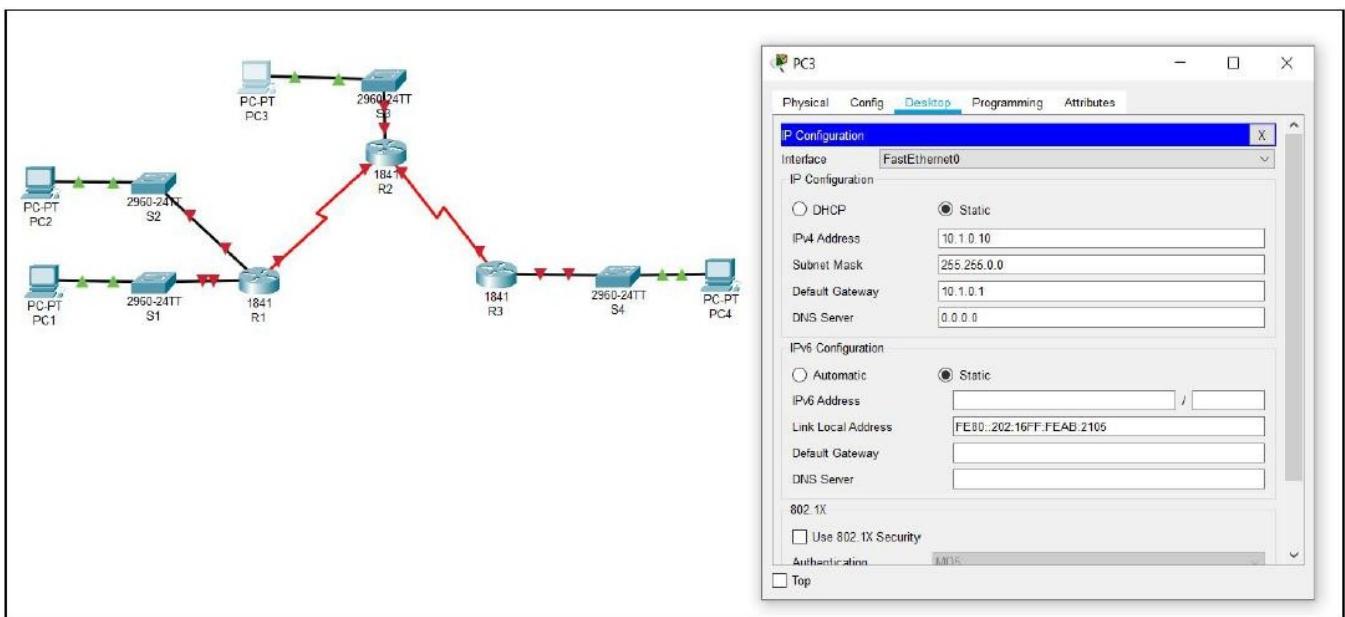
Configuration of PC1



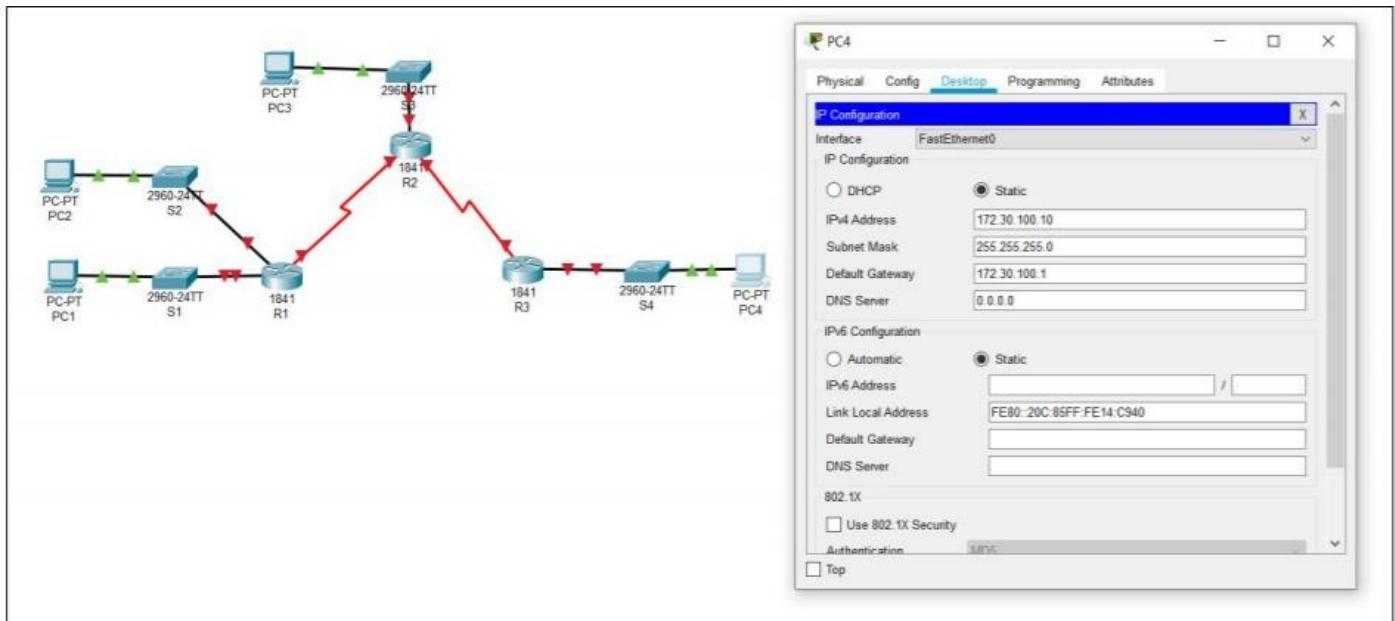
## Configuration of PC2



## Configuration of PC3



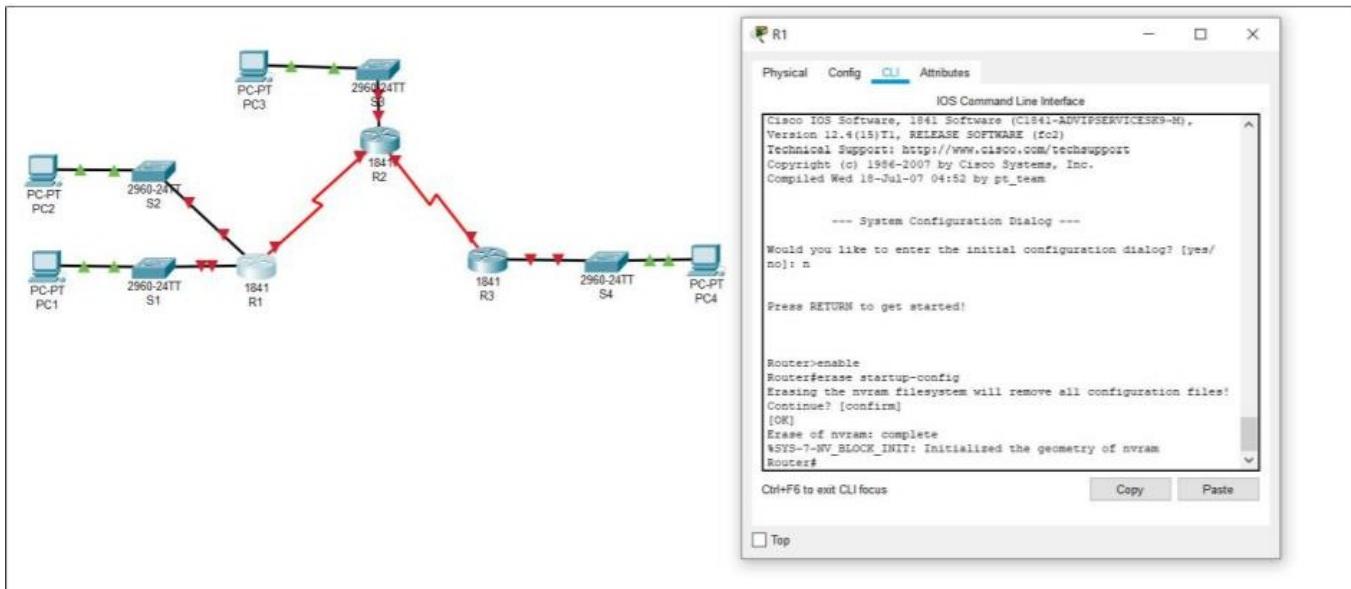
## Configuration of PC4



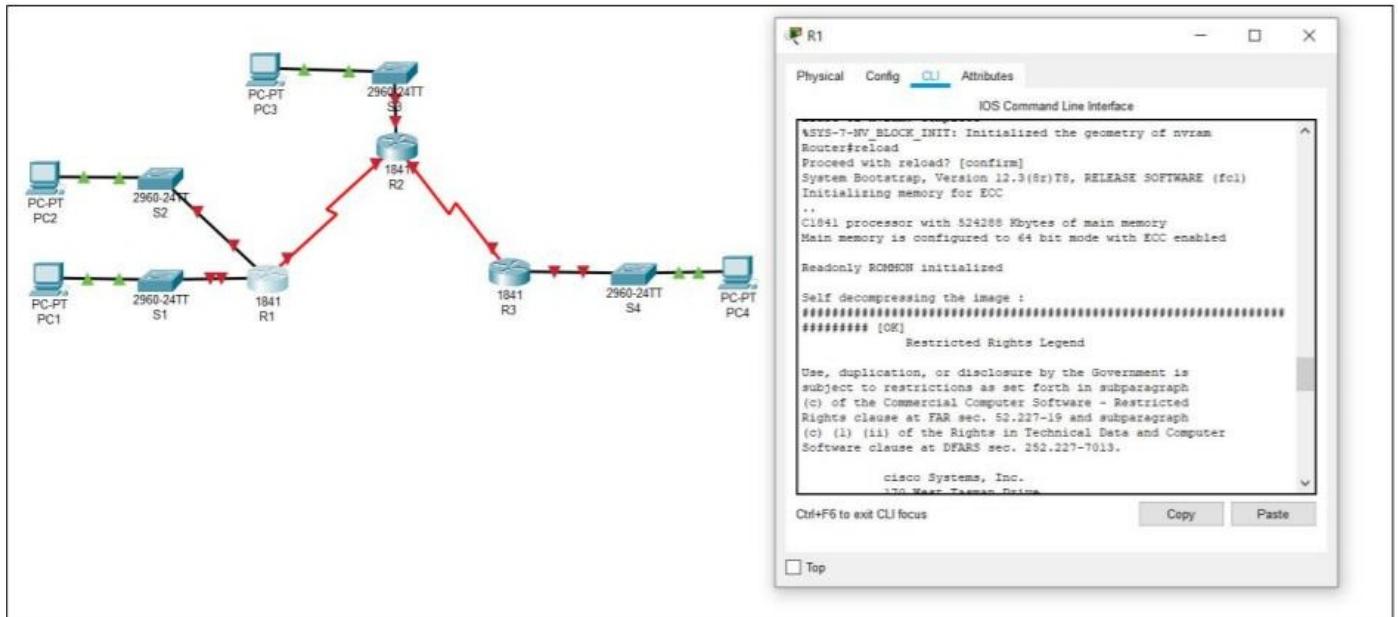
## Step 2: Clear the configuration on each router.

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.

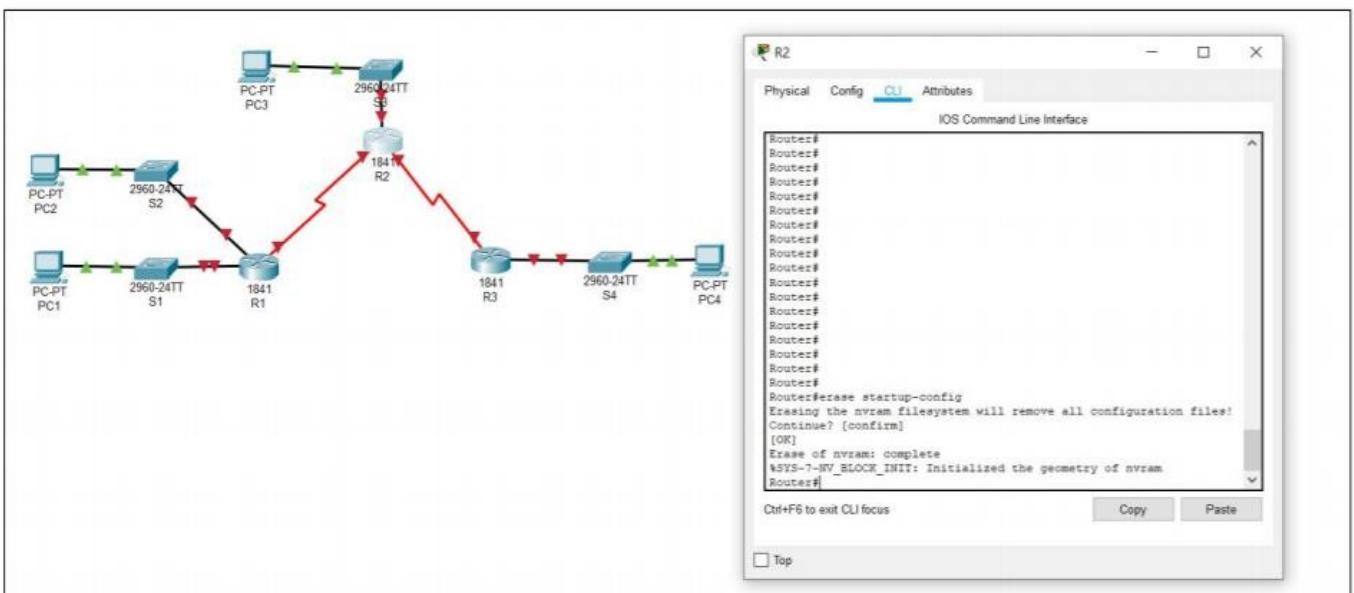
Clearing configuration of R1



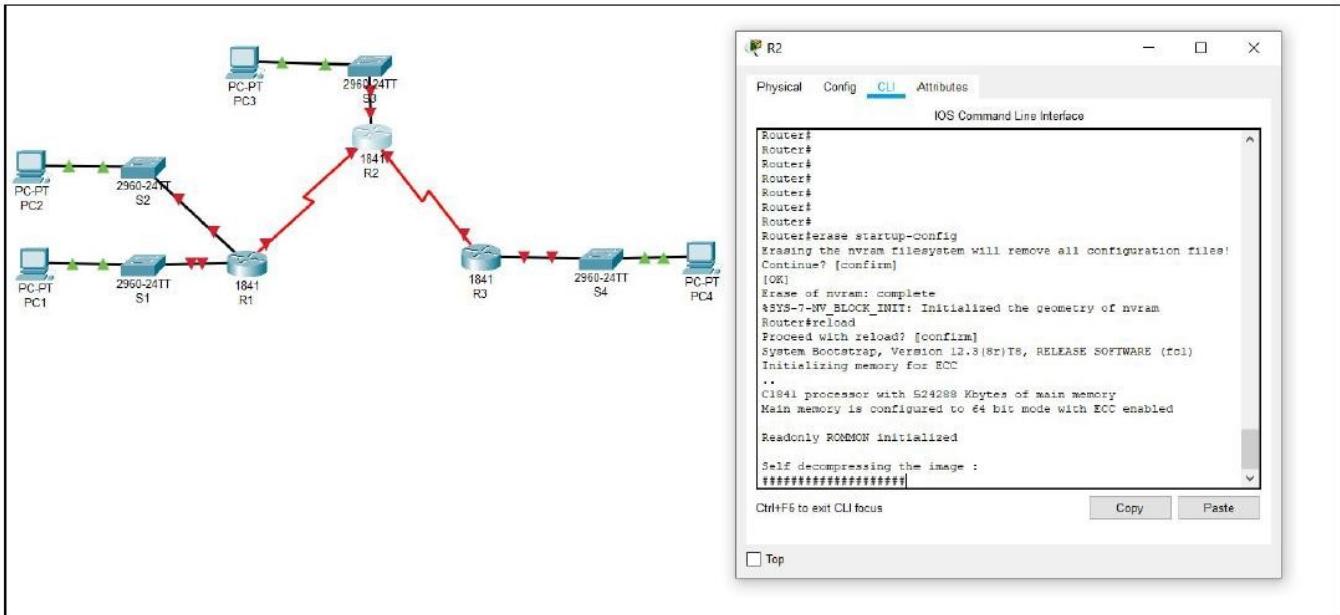
Reloading R1 using reload command



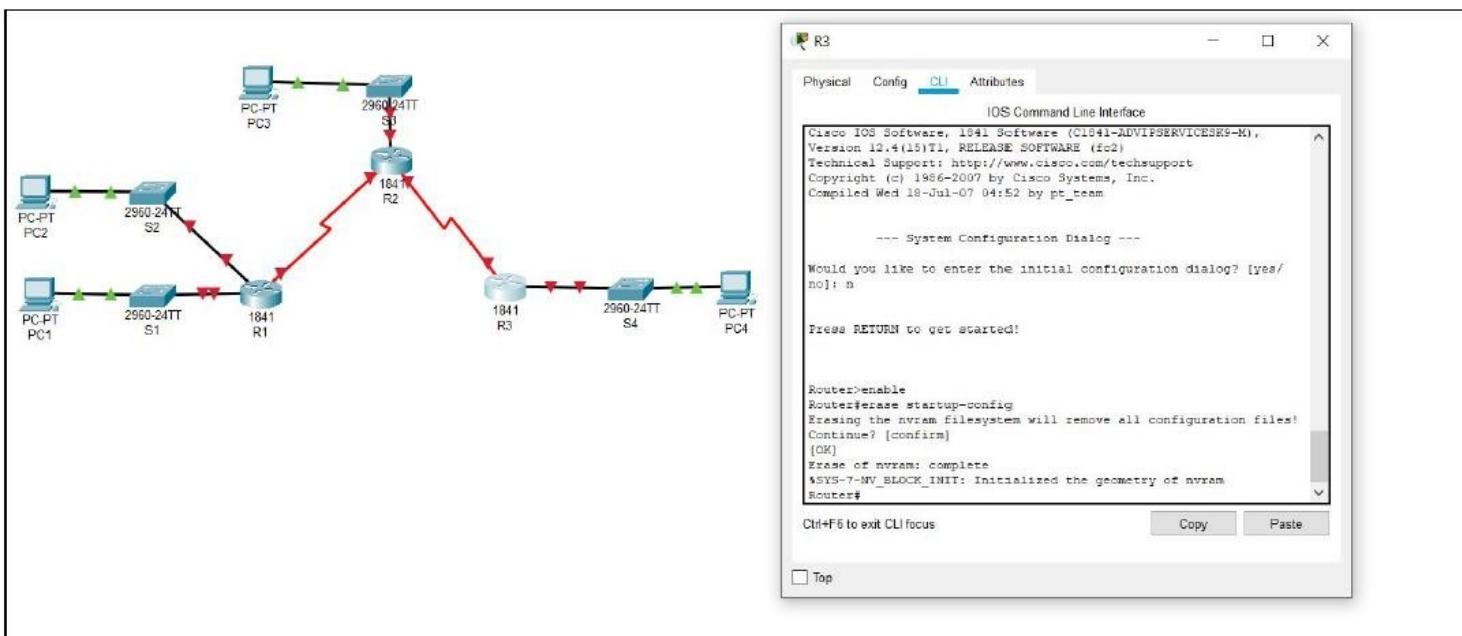
## Clearing configuration of R2



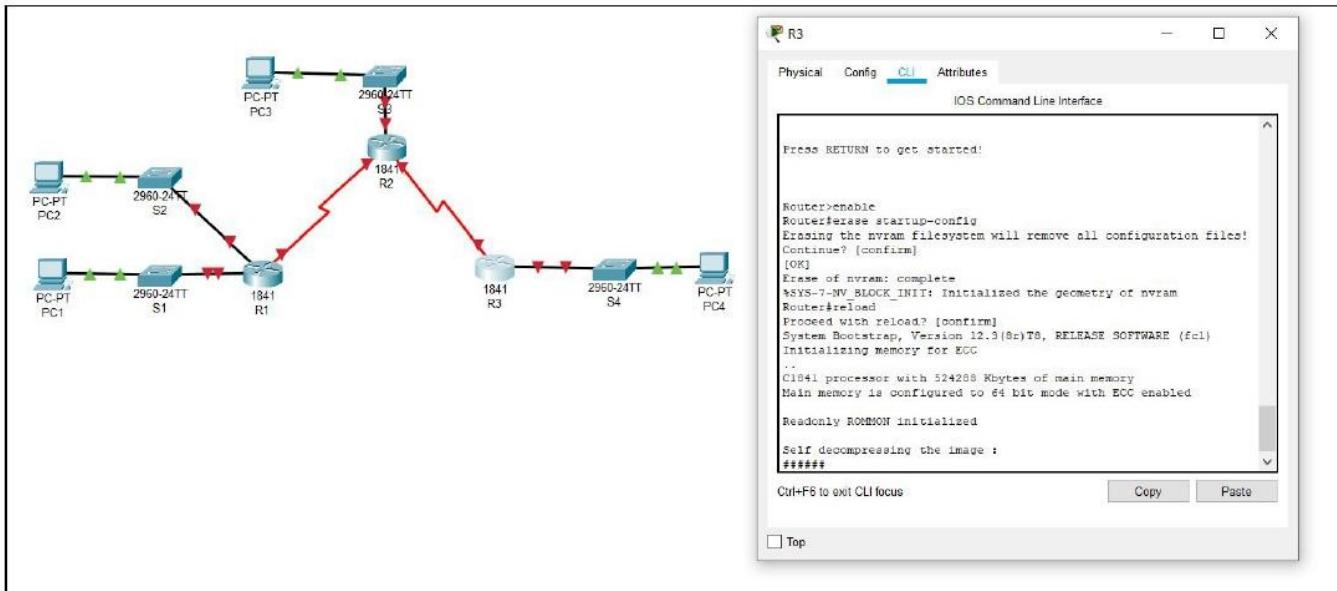
## Reloading R2 using reload command



## Clearing configuration of R3



## Reloading R3



## Task 2: Load Routers with the Supplied Scripts.

### Step 1: Load the following script onto R1.

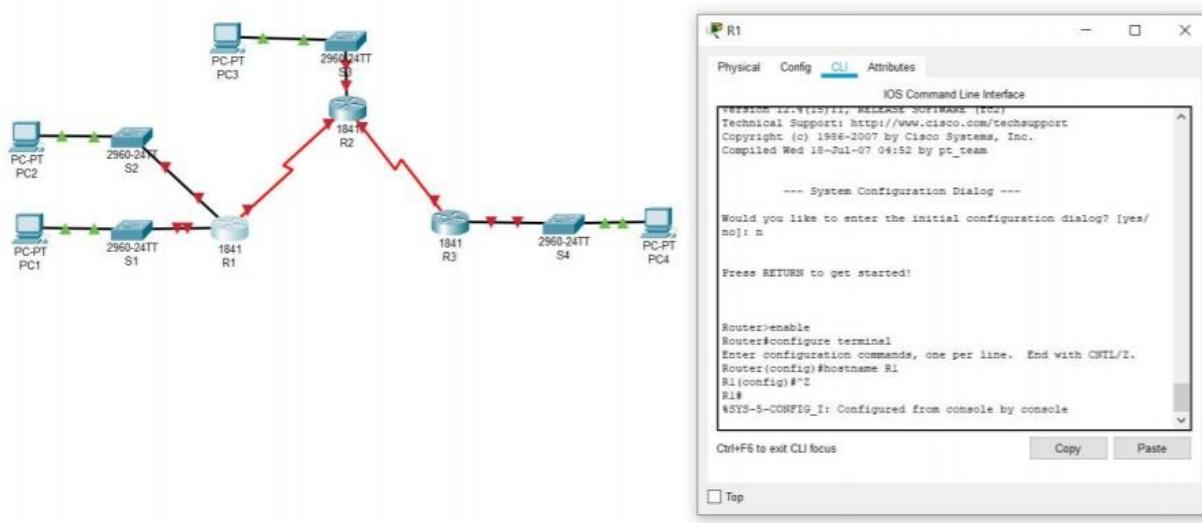
```
!
hostname R1
!
!
!
interface FastEthernet0/0
ip address 172.30.1.1 255.255.255.0
duplex auto
speed auto
no shutdown
!
interface FastEthernet0/1
ip address 172.30.2.1 255.255.255.0
duplex auto
speed auto
no shutdown
!
interface Serial0/0/0
ip address 209.165.200.230 255.255.255.252
clock rate 64000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

```

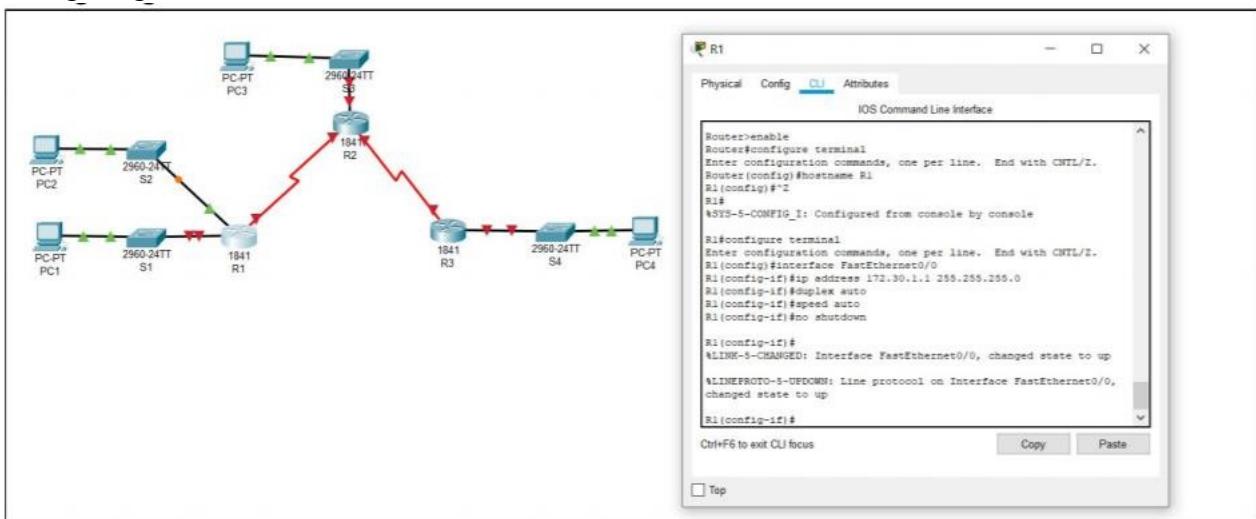
line con 0
line vty 0 4
login
!
end

```

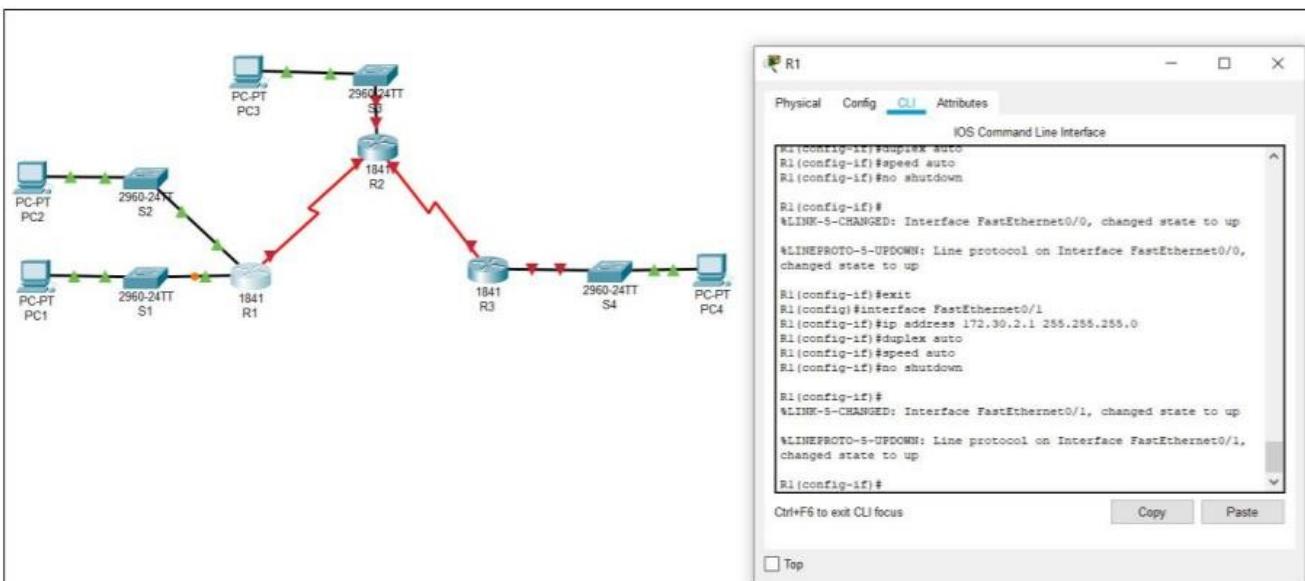
### Assigning hostname as R1



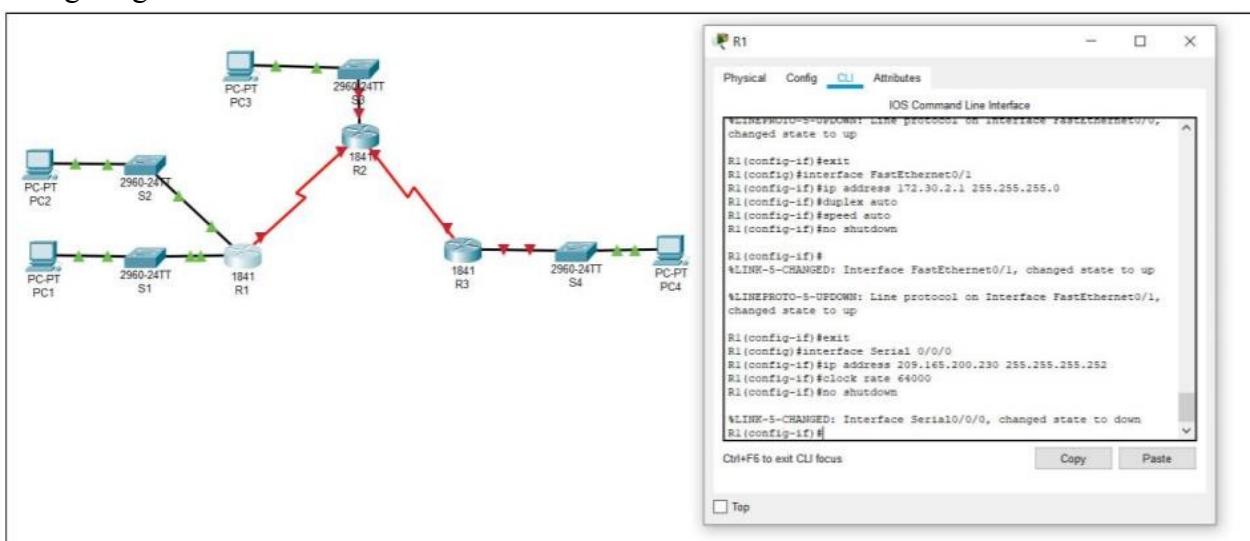
### Configuring FastEthernet0/0



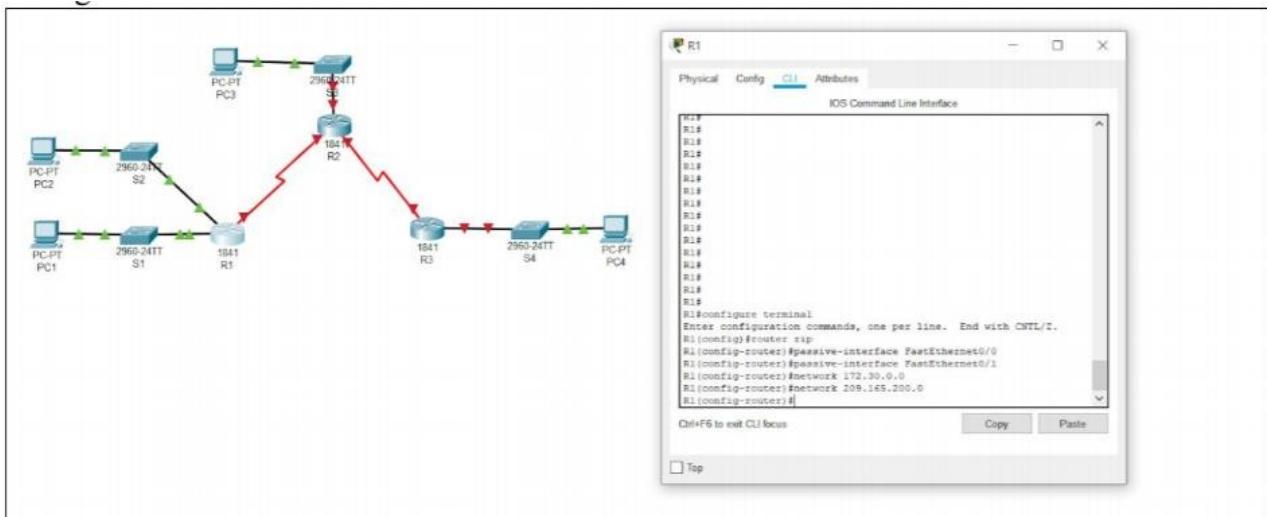
## Configuring FastEthernet0/1



## Configuring Serial0/0/0



## Configuration of RIP



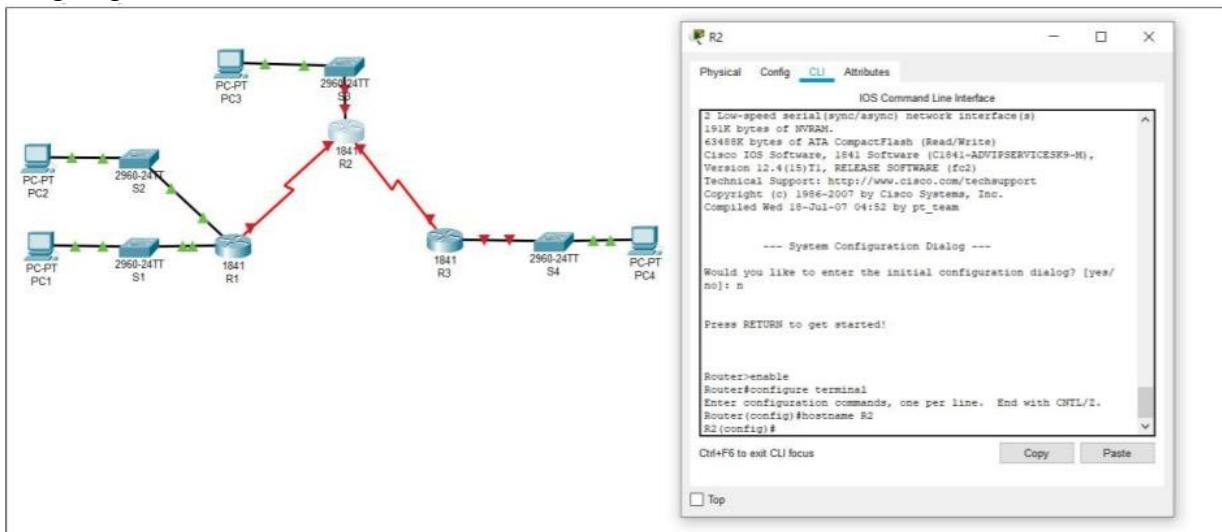
## Running Configuration



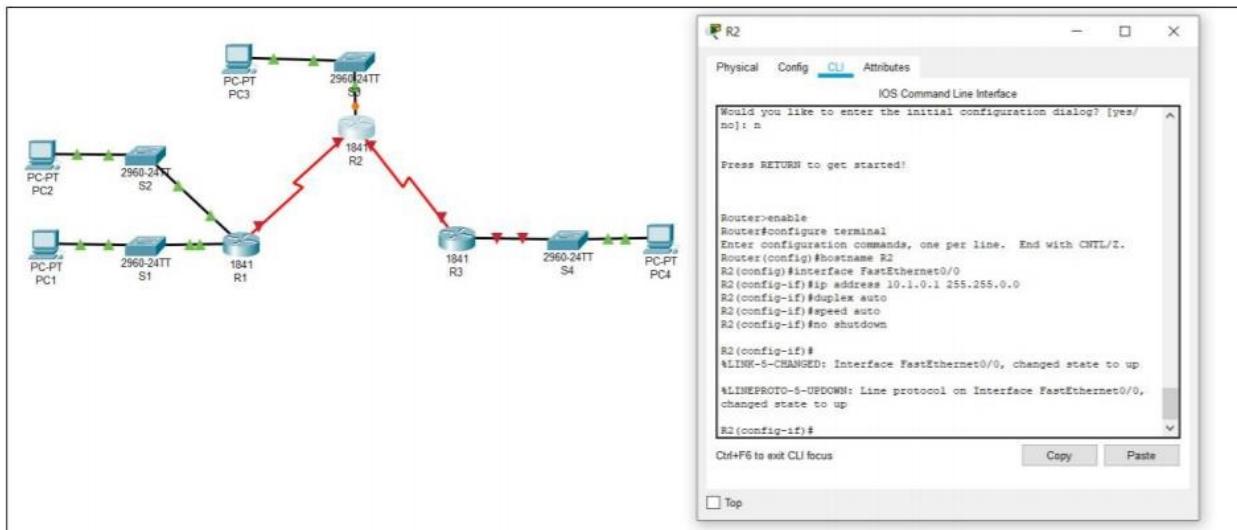
**Step 2: Load the following script onto R2.**

```
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
```

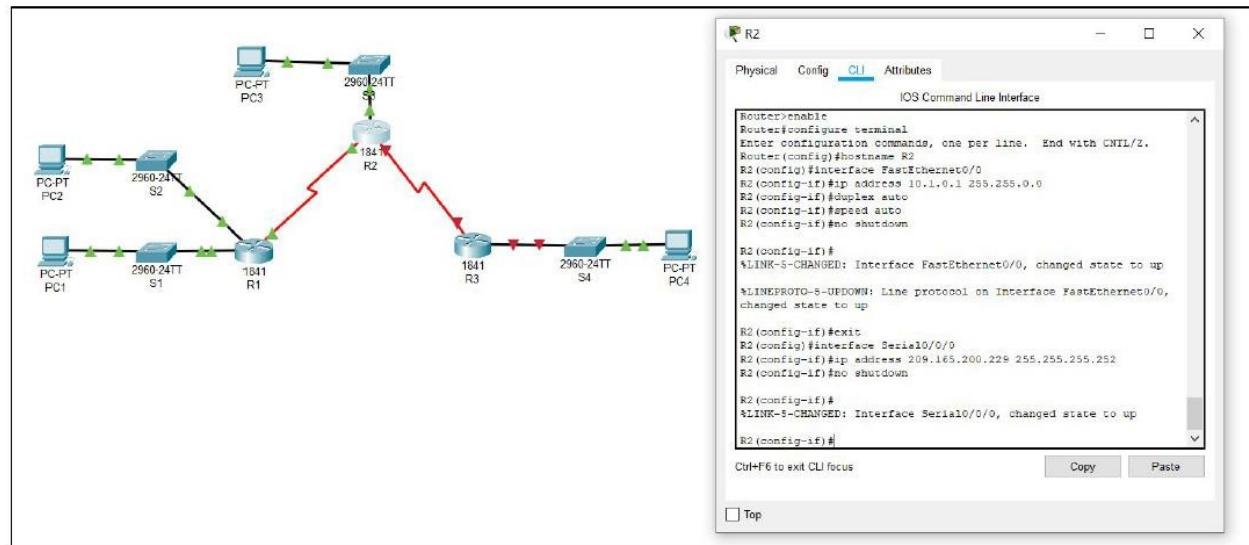
Assigning hostname as R2



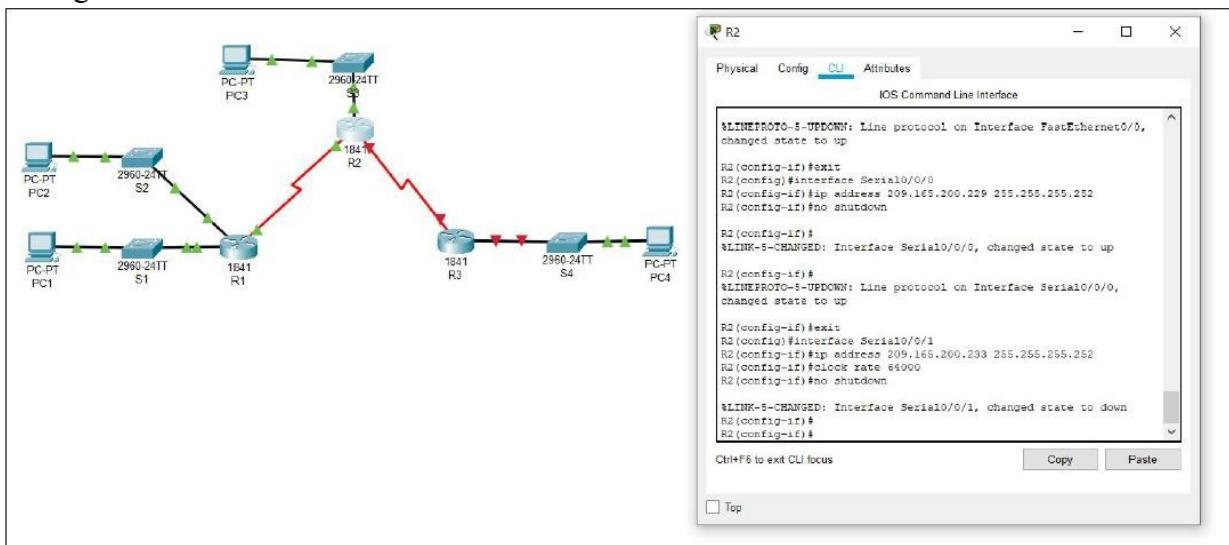
## Configuration of FastEthernet0/0



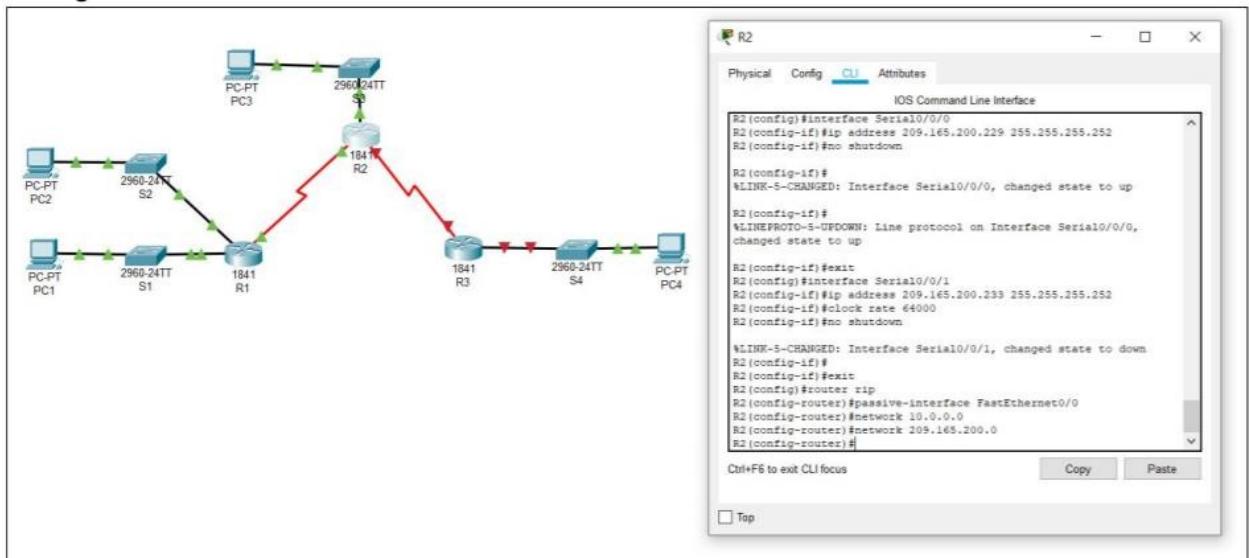
## Configuration of Serial0/0/0



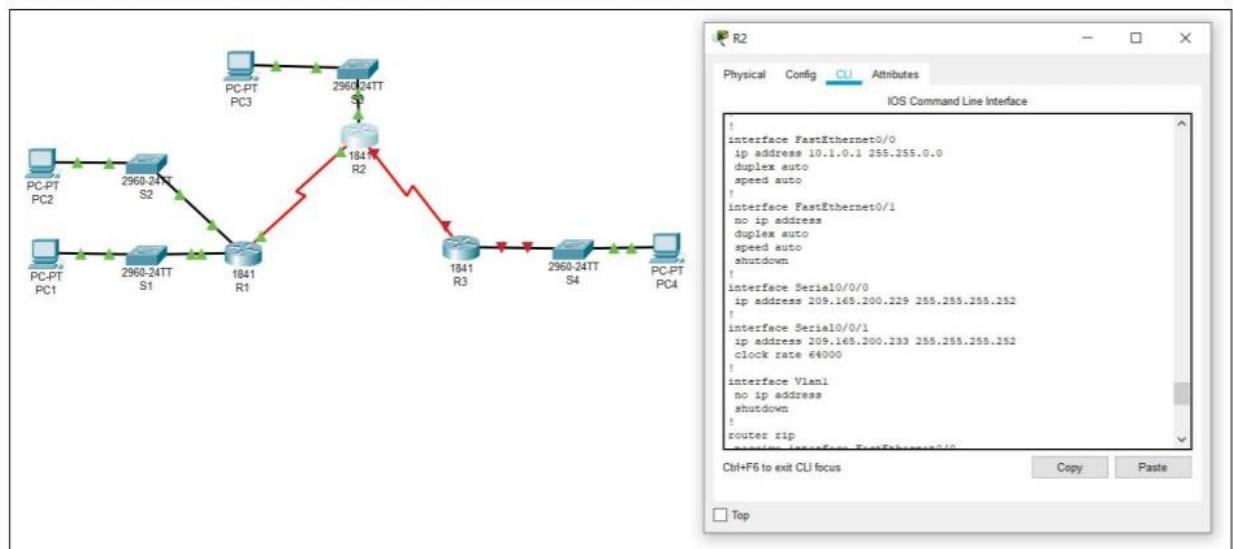
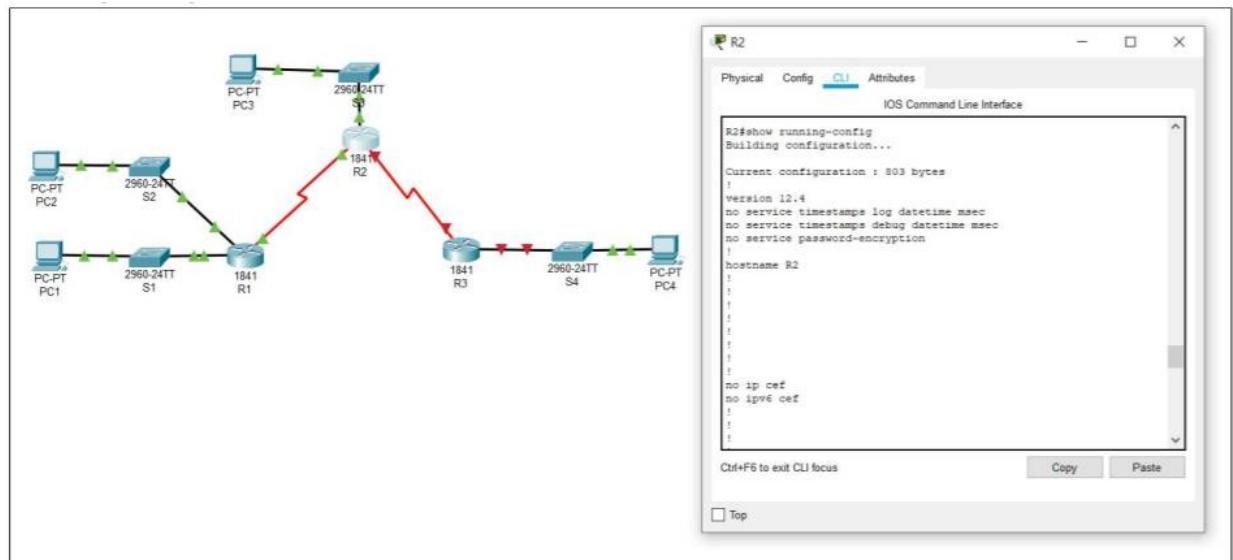
## Configuration of Serial0/0/1

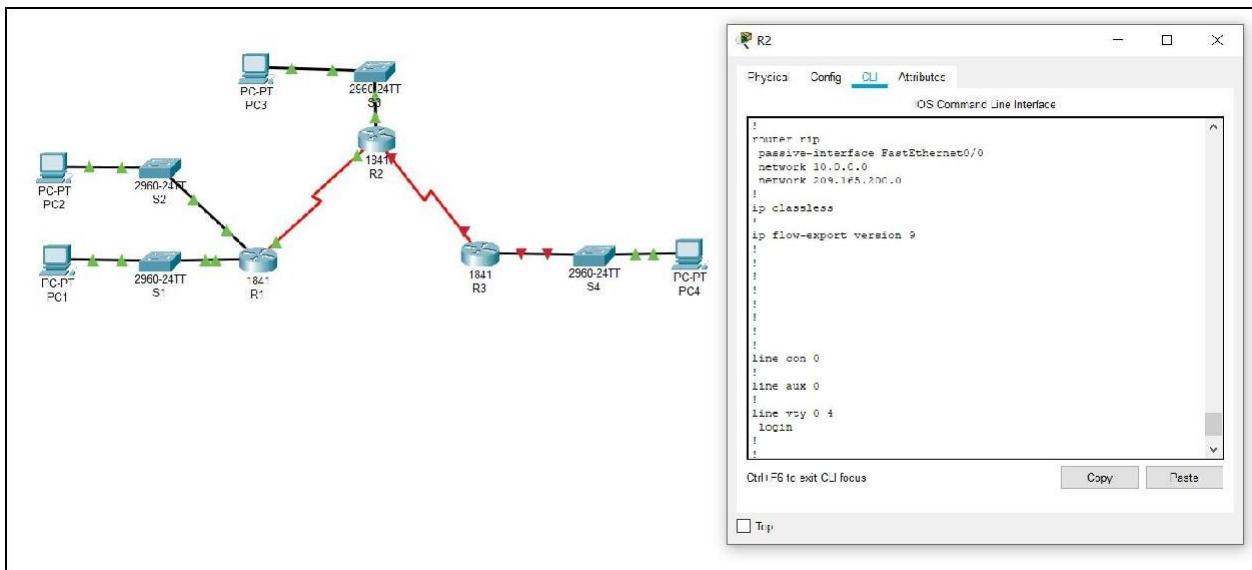


## Configuration of RIP



Running configuration of R2





### Step 3: Load the following script onto R3.

```

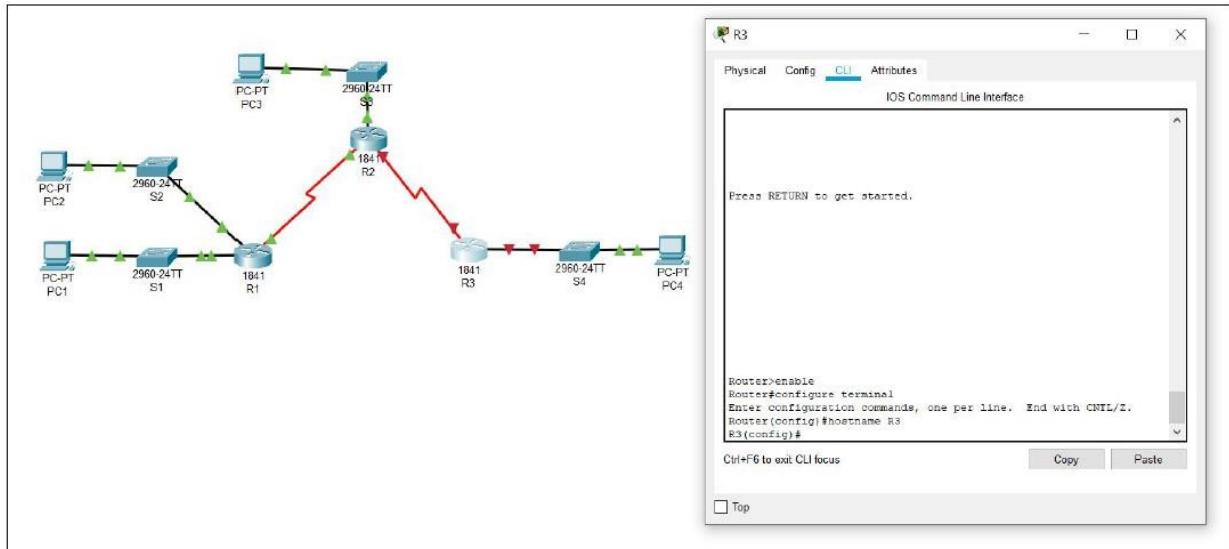
hostname R3
!
!
!
interface FastEthernet0/0
ip address 172.30.100.1 255.255.255.0
duplex auto
speed auto
no shutdown
!
interface Serial0/0/1
ip address 209.165.200.234 255.255.255.252
no shutdown
!
interface Loopback0
ip address 172.30.110.1 255.255.255.0
!
interface Loopback1
ip address 172.30.200.17 255.255.255.240
!
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

```

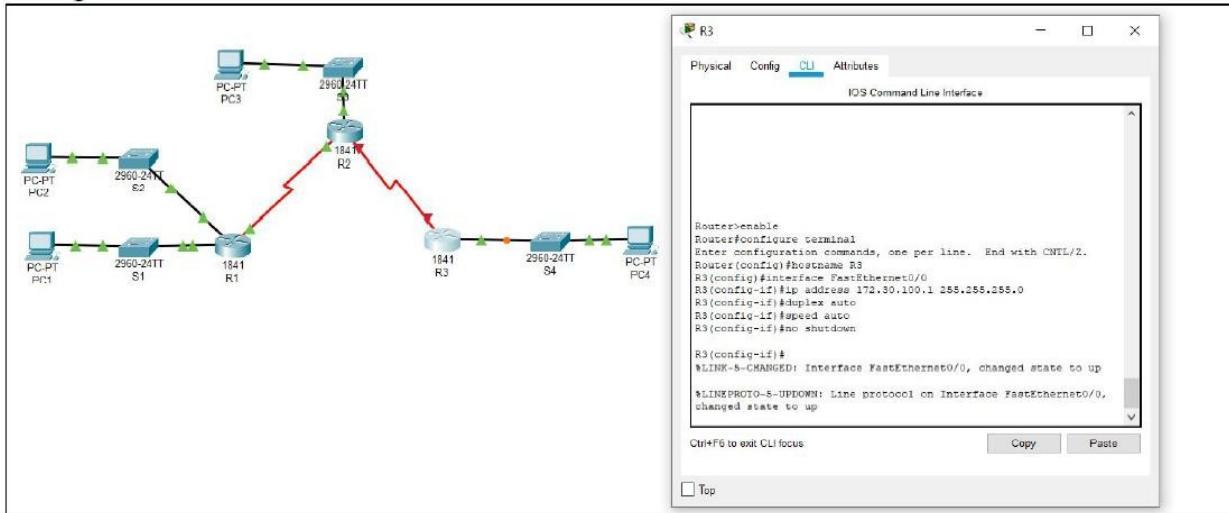
```

login
!
end
Assigning hostname as R3

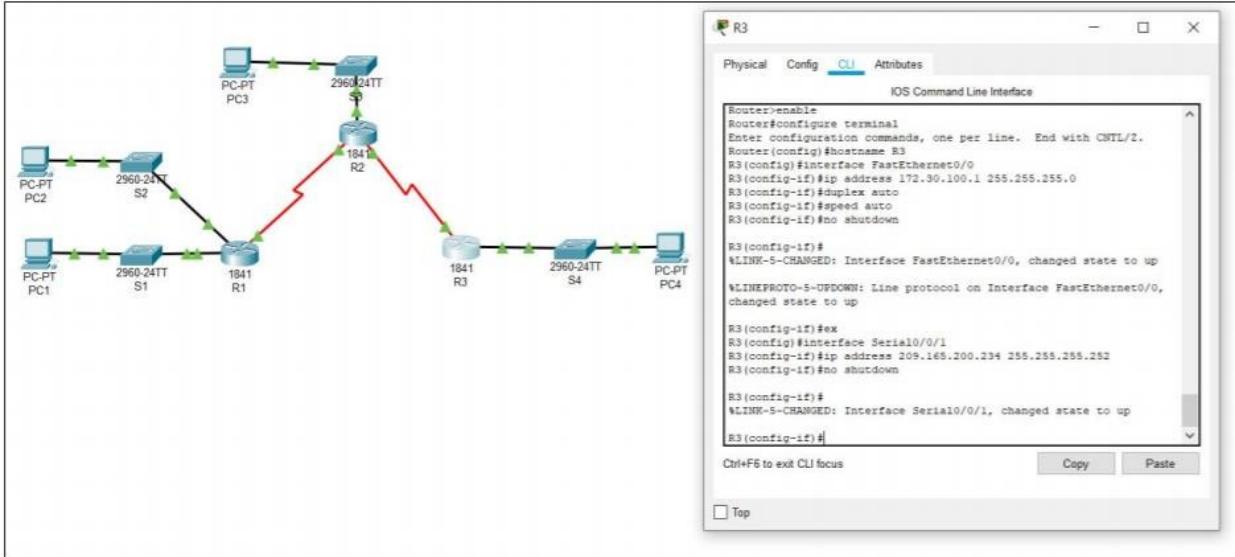
```



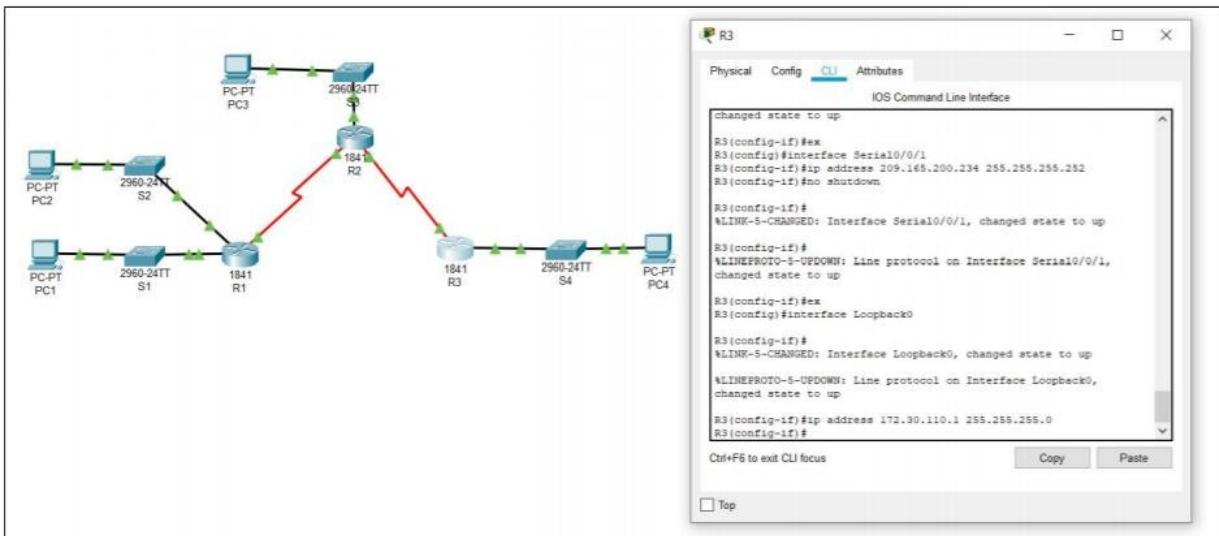
### Configuration of FastEthernet0/0



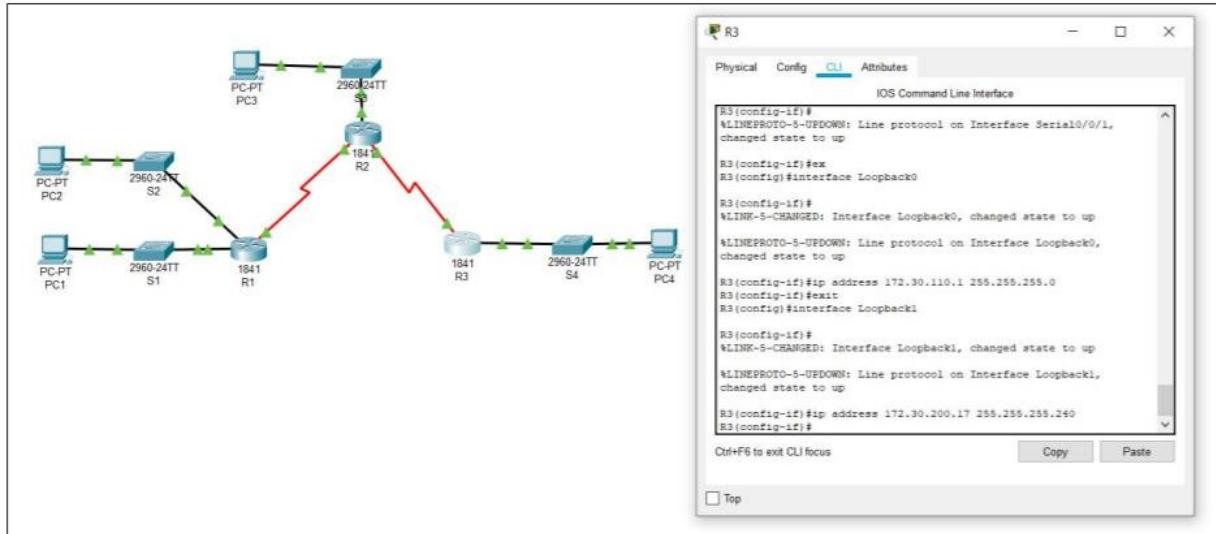
## Configuration of Serial0/0/0



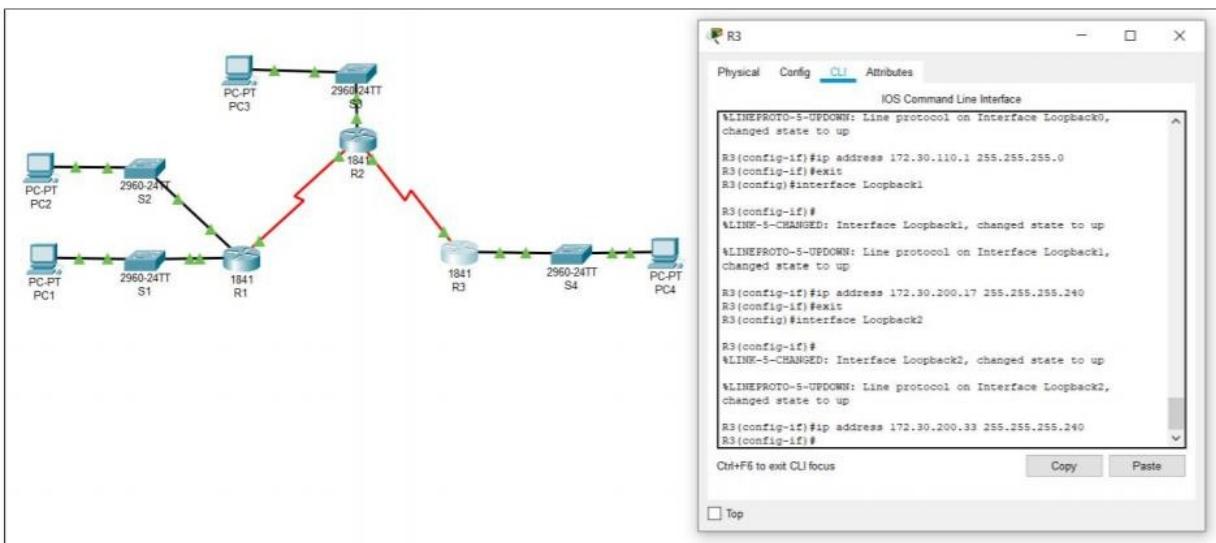
## Configuration of Loopback0



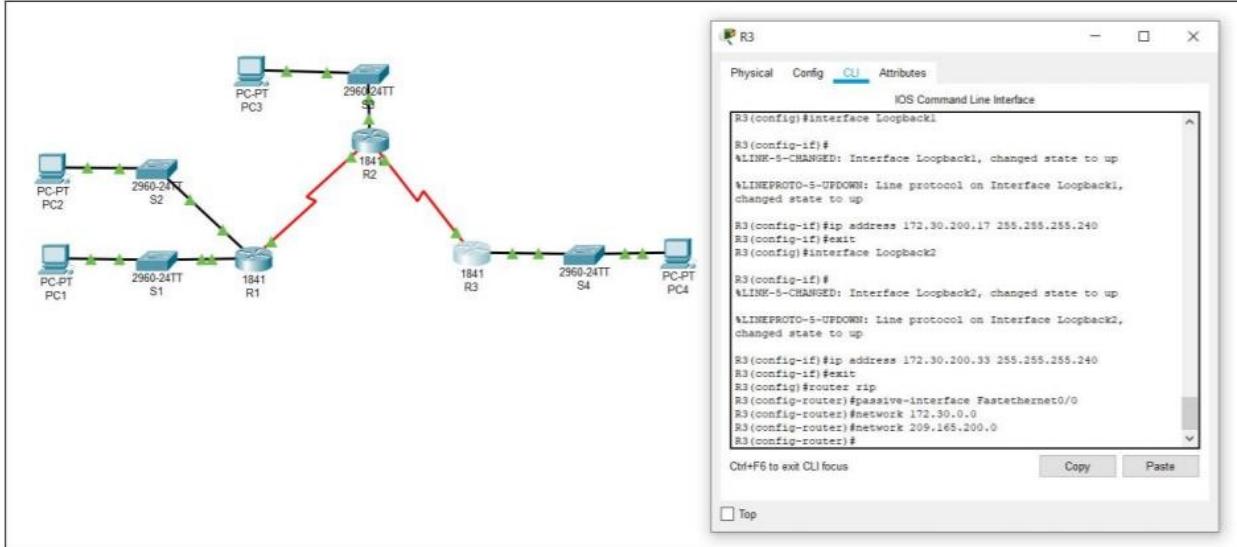
## Configuration of Loopback1



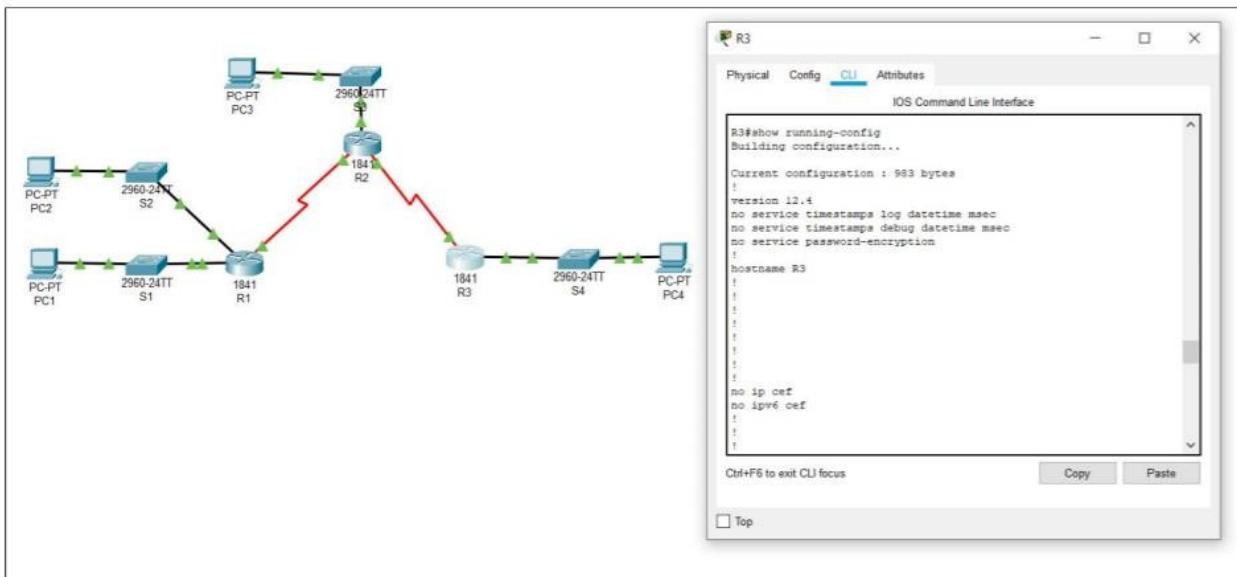
## Configuration of Loopback2

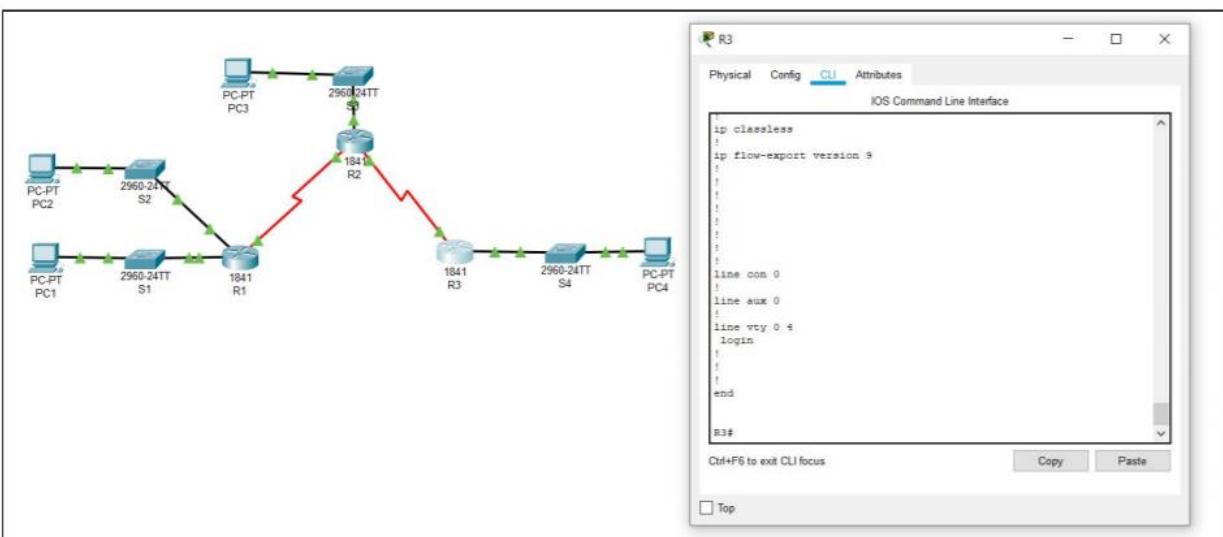
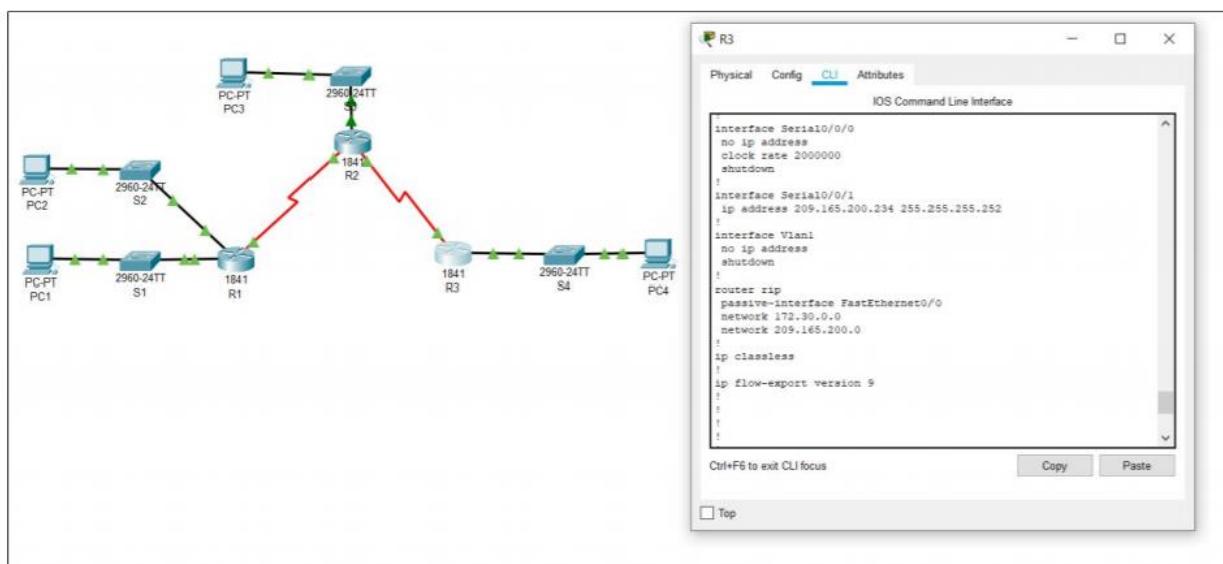
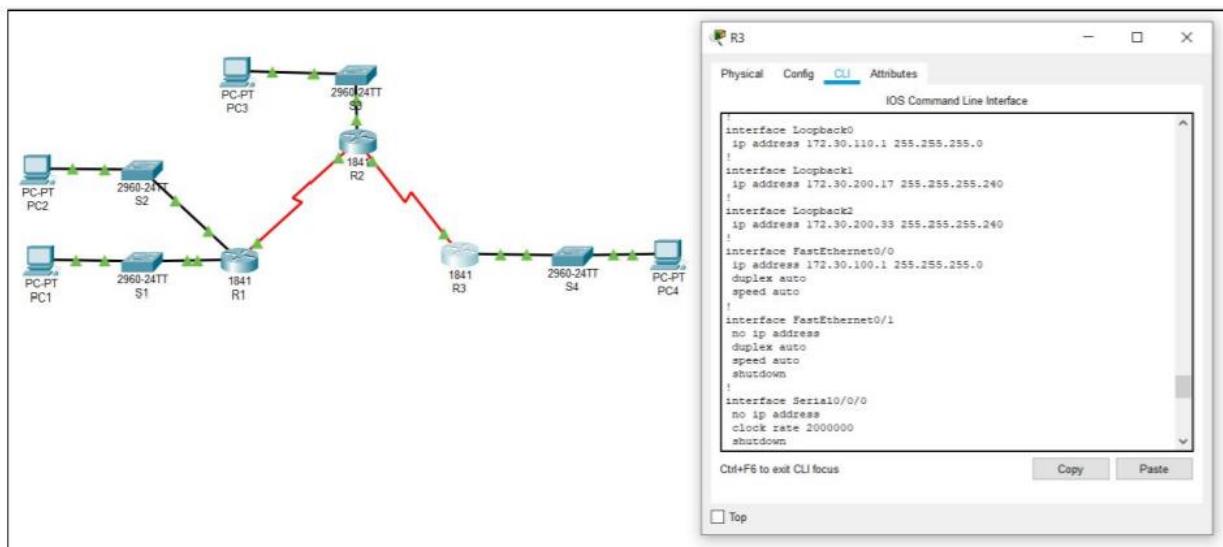


## Configuration of RIP

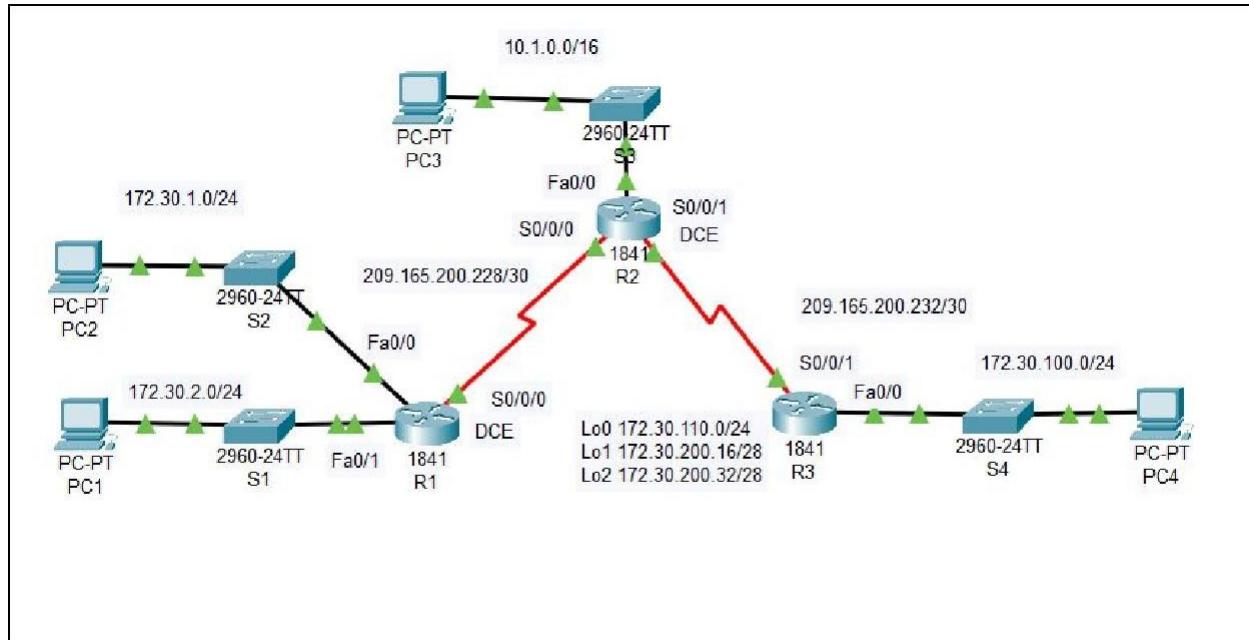


## Running configuration





## 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**

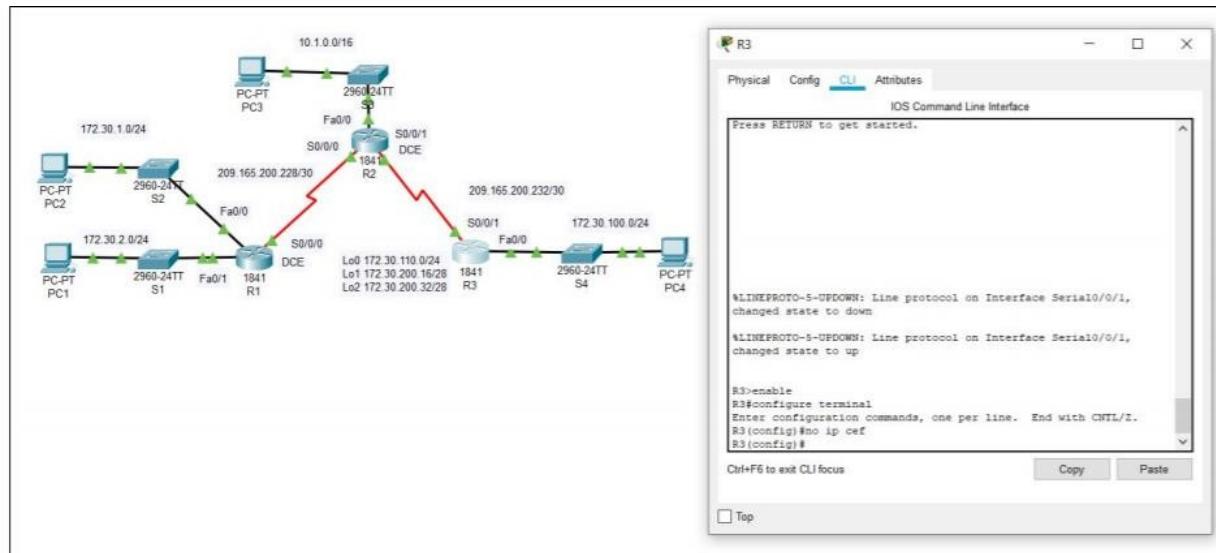
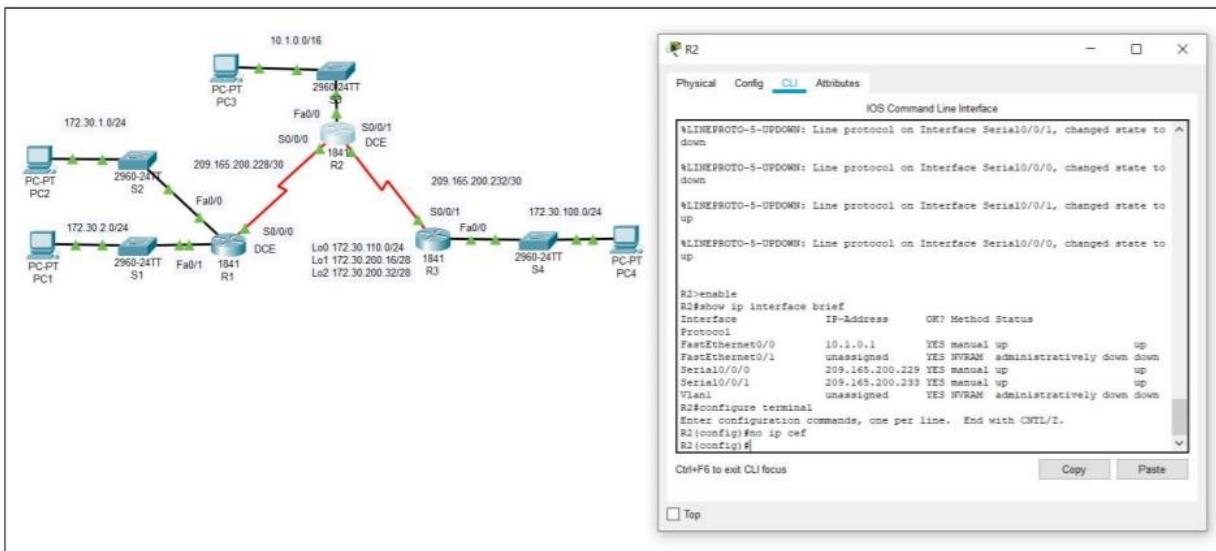
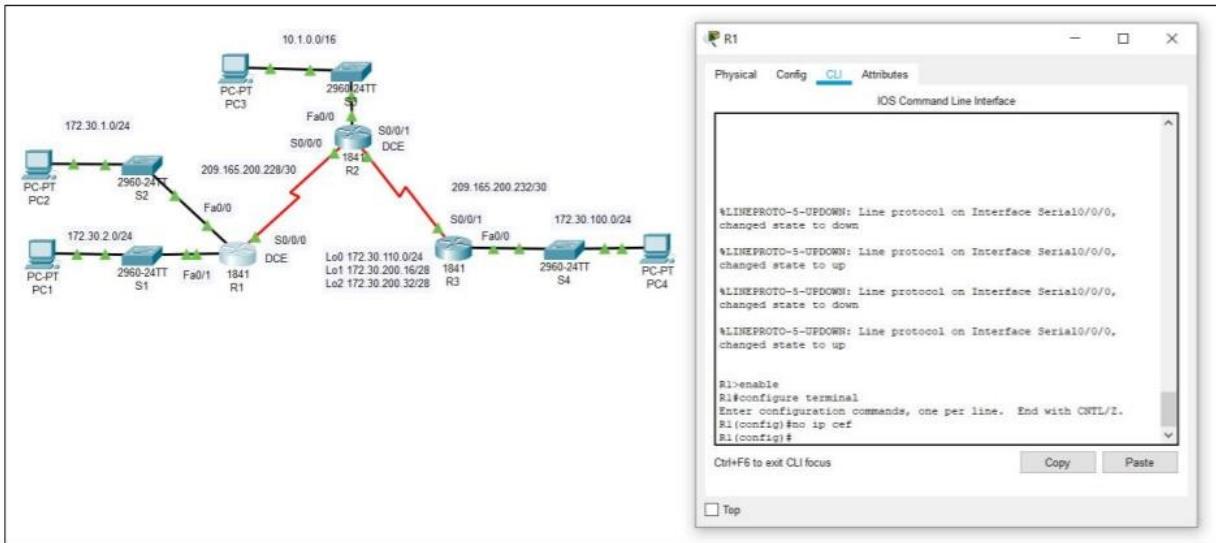
```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial10/0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial10/0/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial10/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial10/0/0, changed state to up

R2>enable
R2#show ip interface brief
Interface          IP-Address      MTU     Metric  Status      Protocol
FastEthernet0/0    unassigned      1500         1      up        dynamic
FastEthernet0/1    unassigned      1500         1      administratively down
Serial0/0/0        209.165.200.228  65535       64      down      dynamic
Serial0/0/1        209.165.200.232  65535       64      up        dynamic
Serial10/0/0       209.165.200.228  65535       64      down      dynamic
Serial10/0/1       209.165.200.232  65535       64      up        dynamic
Serial10/0/2       209.165.200.232  65535       64      up        dynamic
Vlan1              unassigned      1500         1      administratively down
down
```

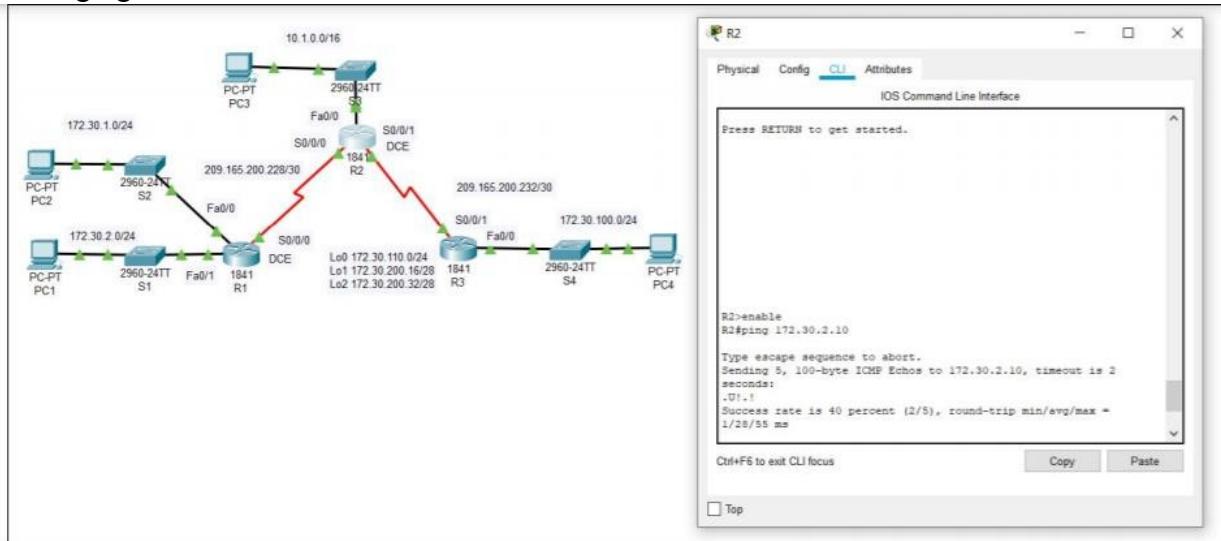
#### Step 2: Check the connectivity from R2 to the hosts on the R1 and R3 LANs.

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



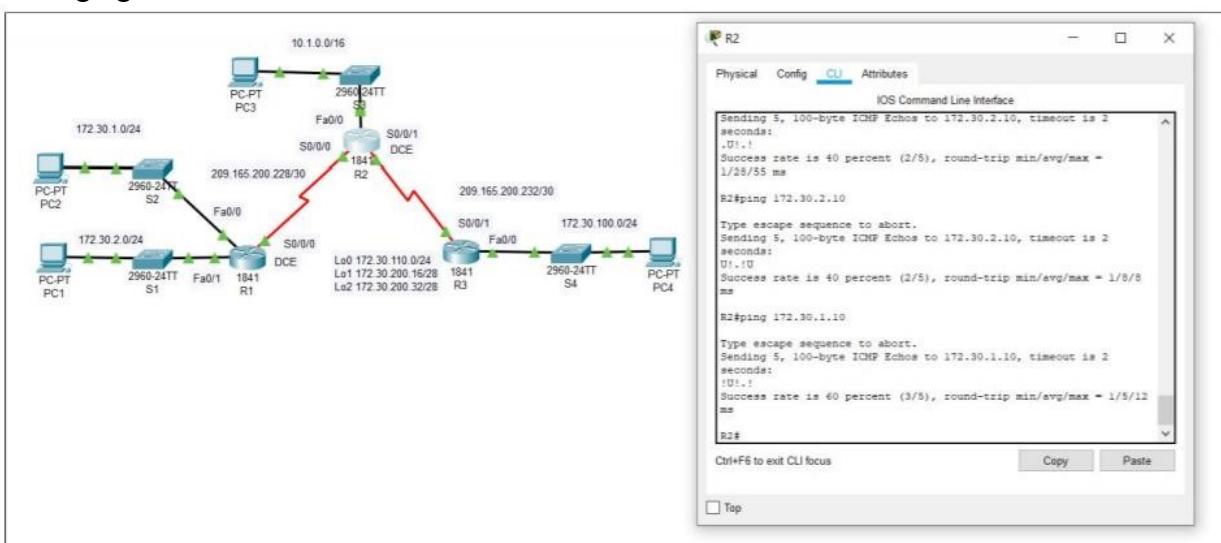
## Pinging PC1 from R2



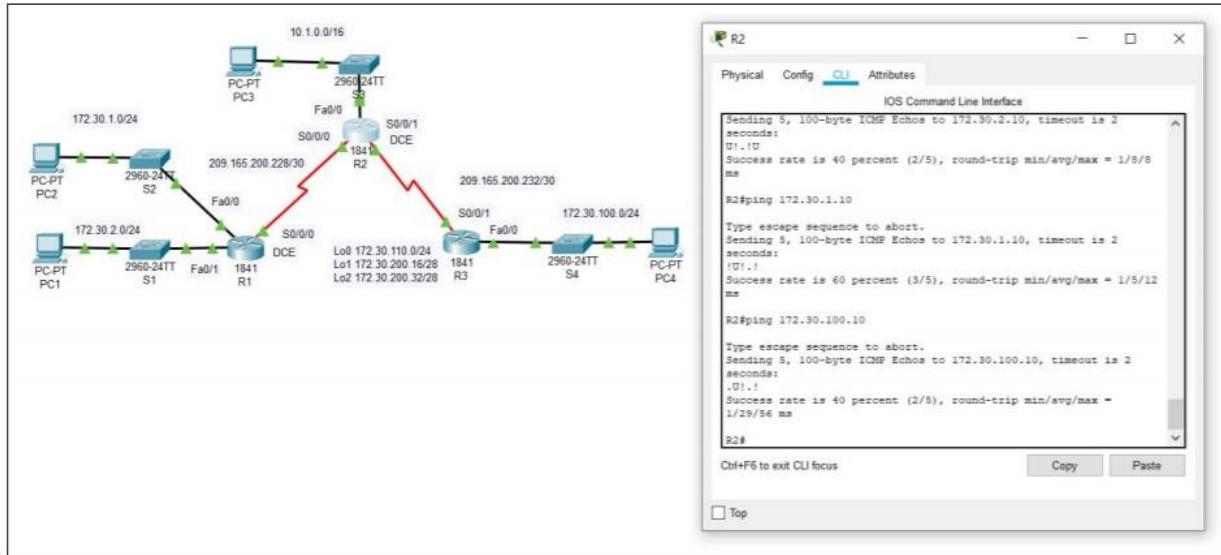
From the R2 router, how many ICMP messages are successful when pinging PC1?

Ans: 2 ICMP messages are successful

## Pinging PC2 from R2



## Pinging PC4 from R2

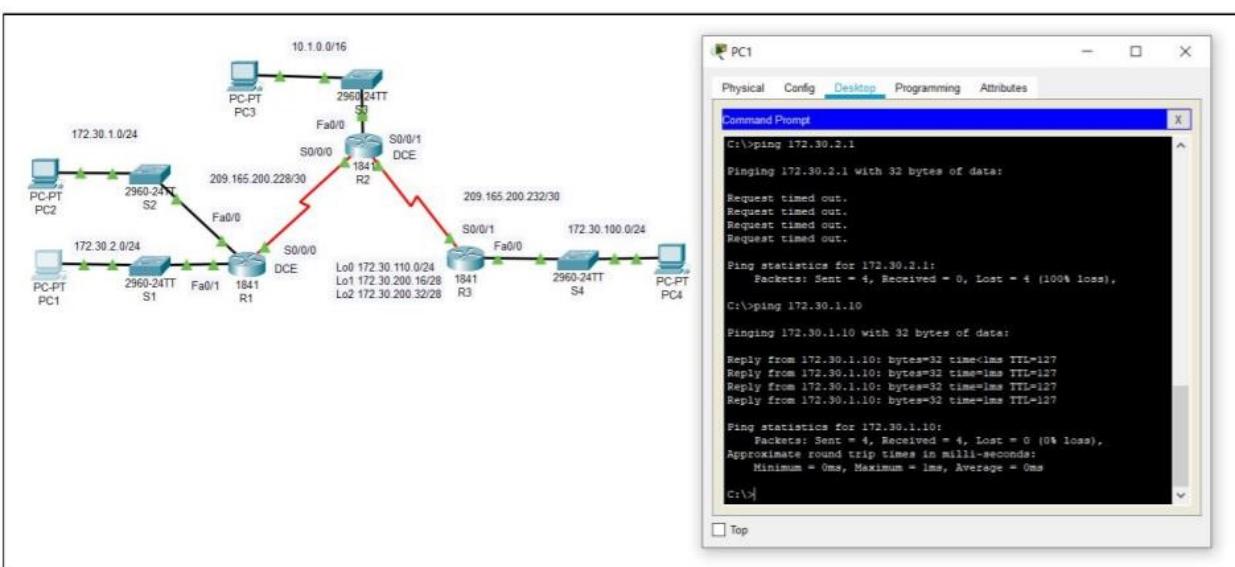


From the R2 router, how many ICMP messages are successful when pinging PC4?

Ans: 2 ICMP messages are successful

## Step 3: Check the connectivity between the PCs.

### Pinging PC2 from PC1



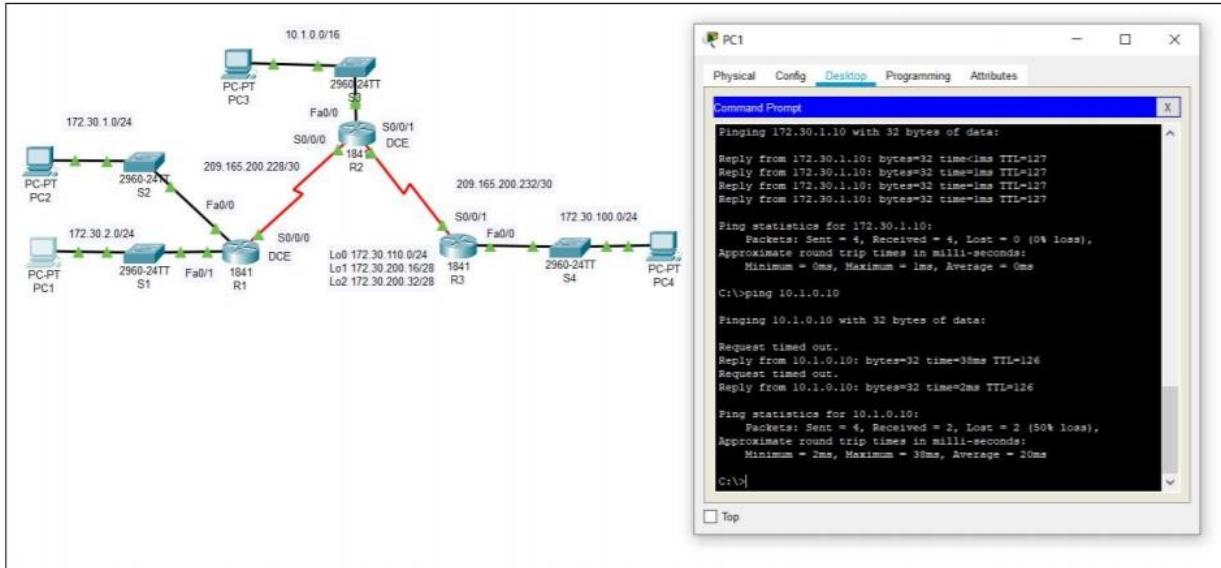
From the PC1, is it possible to ping PC2?

Ans: Yes

What is the success rate?

Ans: 100%

## Pinging PC3 from PC1



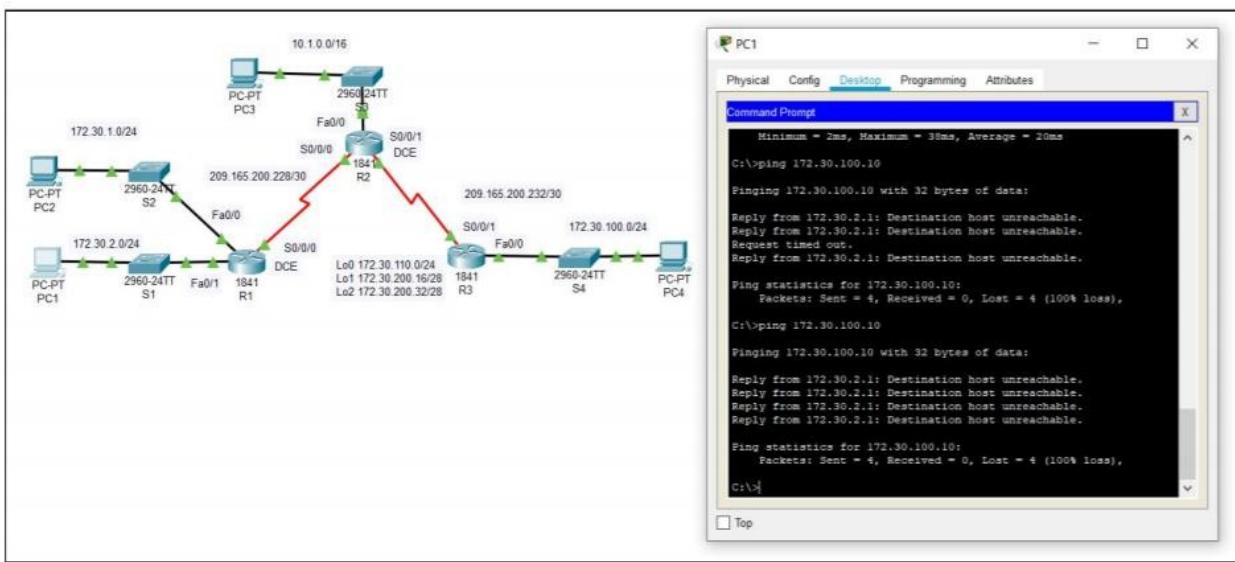
From the PC1, is it possible to ping PC3?

Ans: Yes

What is the success rate?

Ans: 50%

## Pinging PC4 from PC1



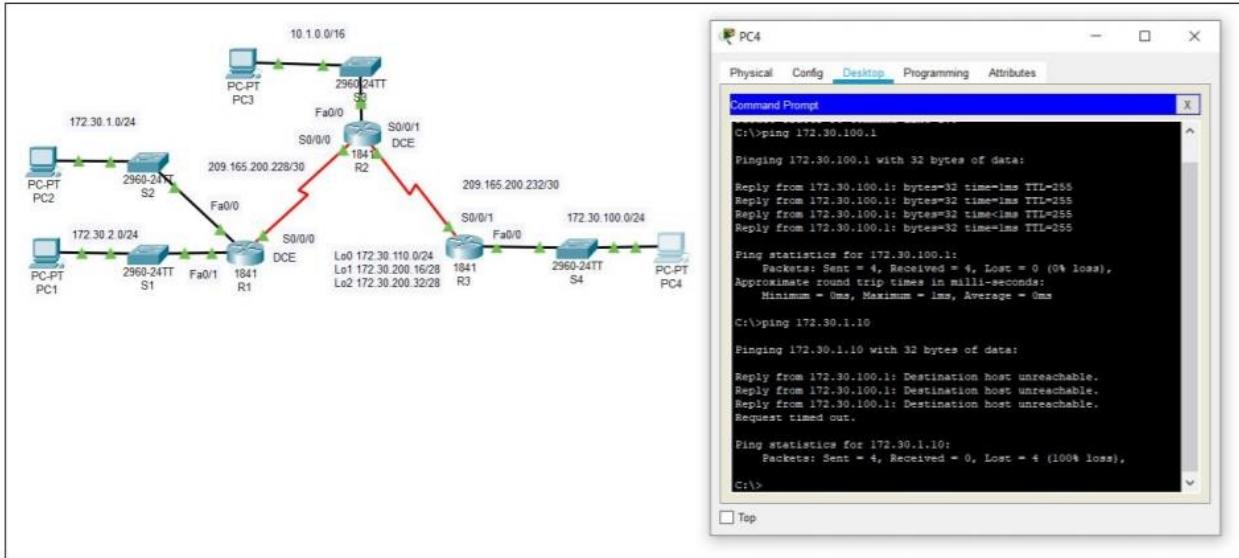
From the PC1, is it possible to ping PC4?

Ans: No

What is the success rate?

Ans: 0%

## Pinging PC2 from PC4



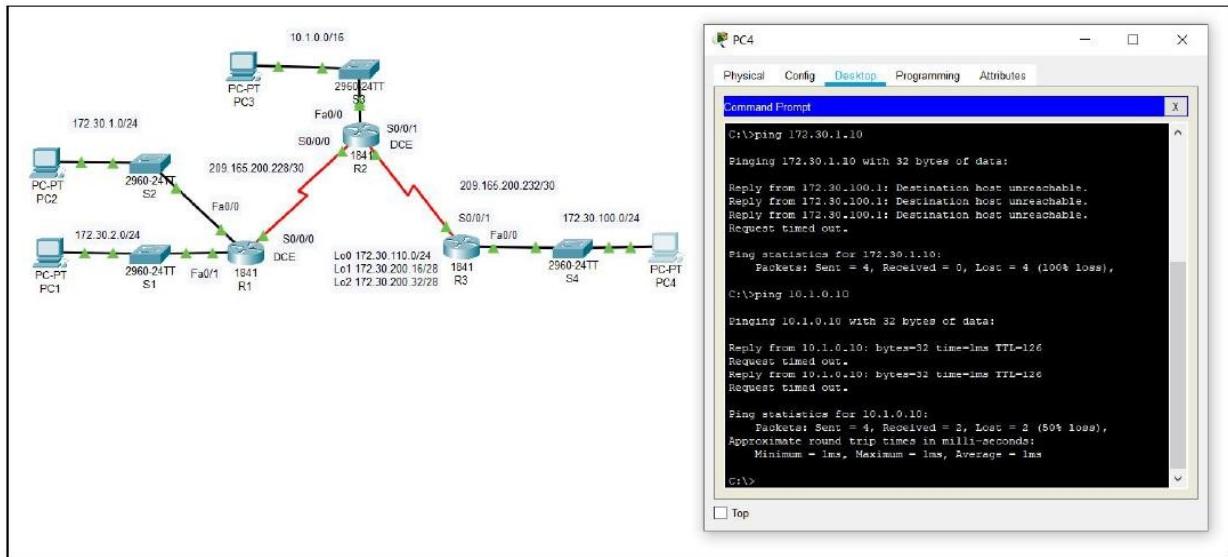
From the PC4, is it possible to ping PC2?

Ans: No

What is the success rate?

Ans: 0%

## Pinging PC3 from PC4



From the PC4, is it possible to ping PC3?

Ans: Yes

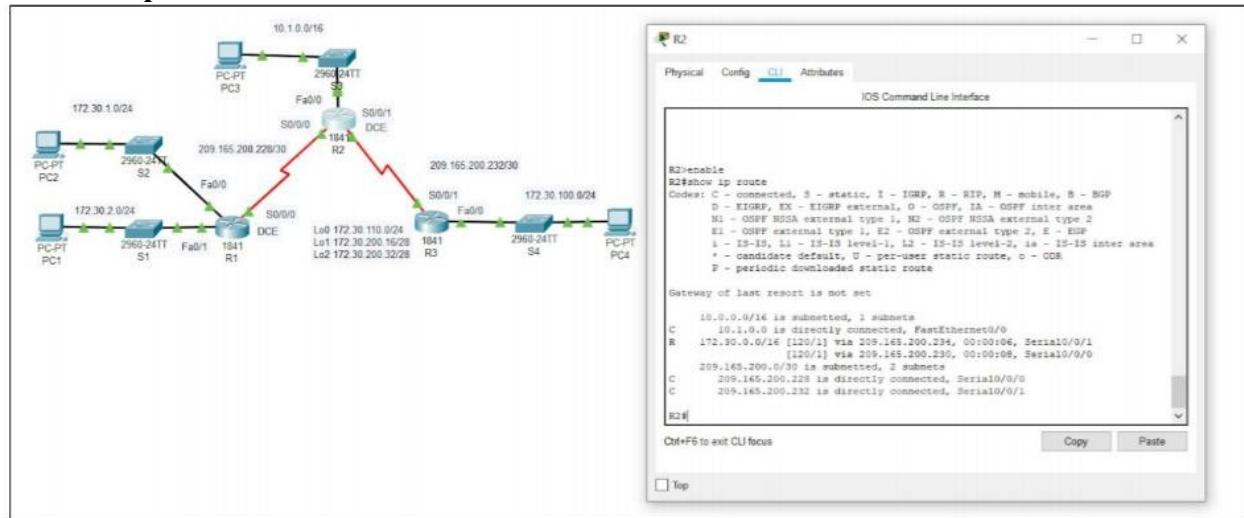
What is the success rate?

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.

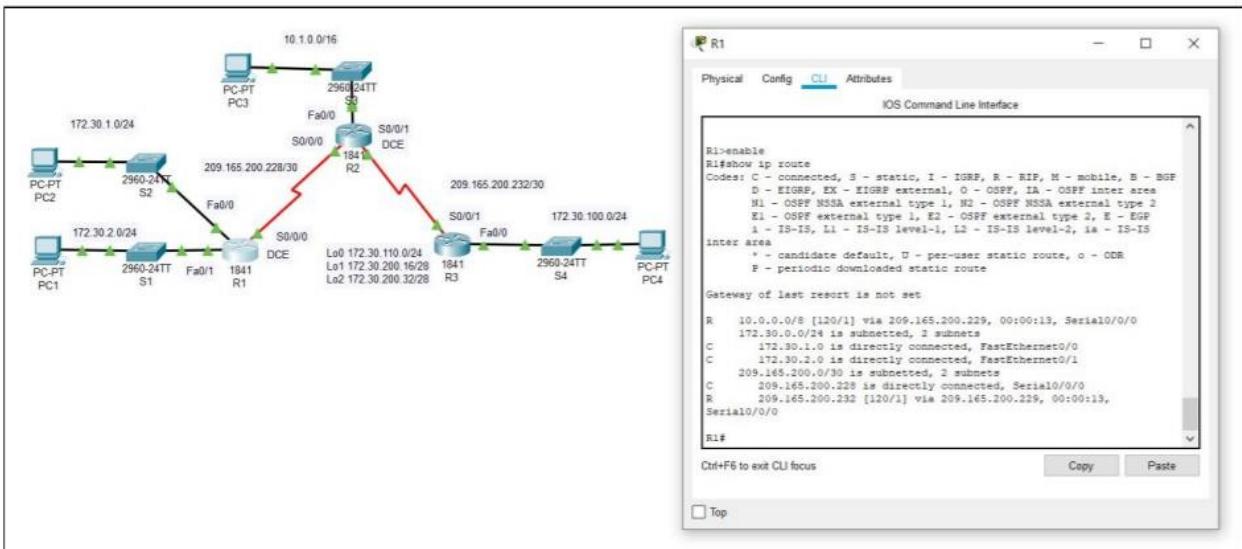
R2#show ip route



#### 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 1. subnets on R3, packets destined for the R3 LANs will not be forwarded properly.

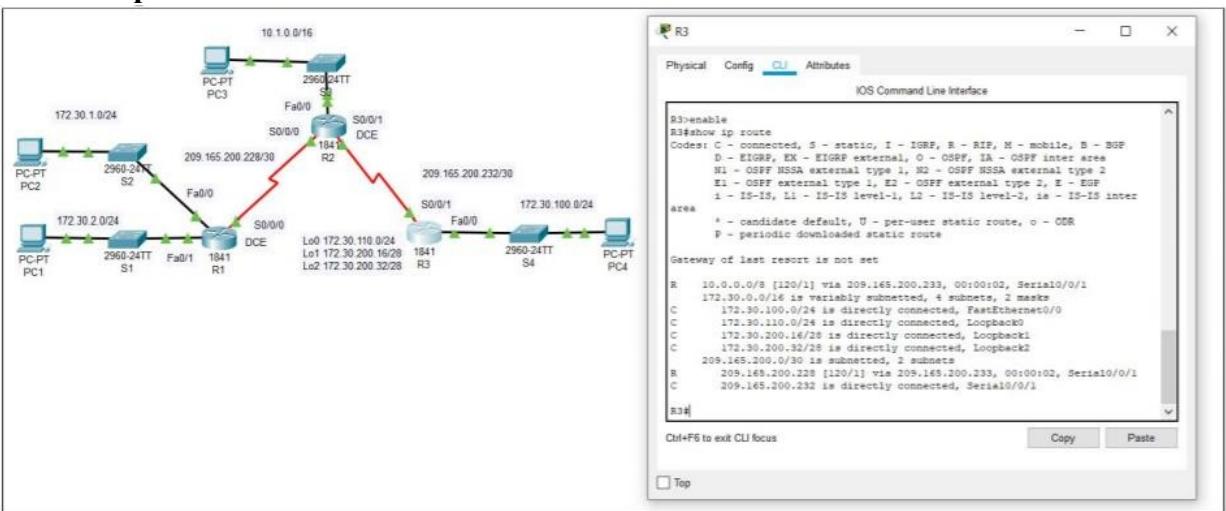
R1#show ip route



### 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

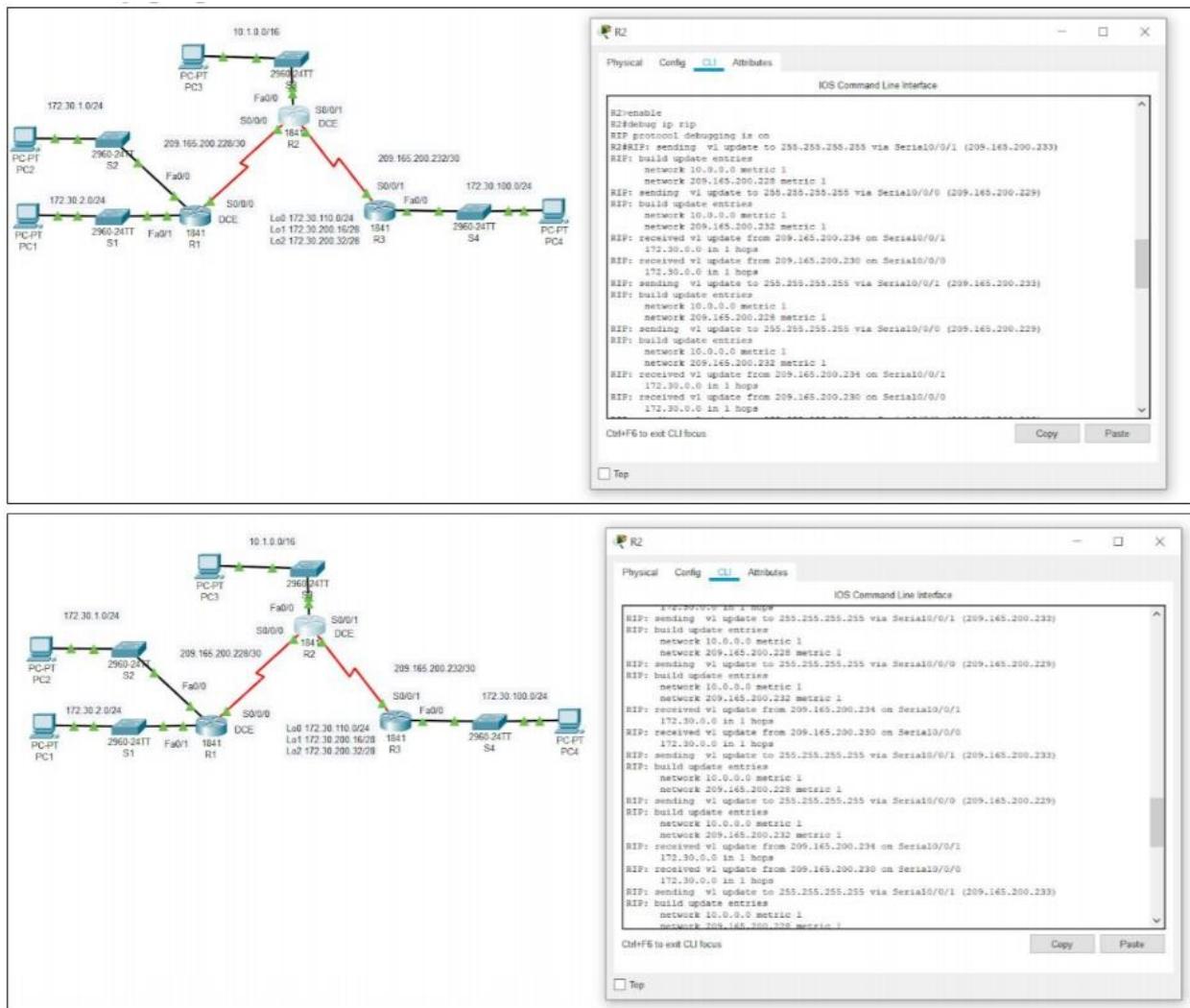


### Step 7: Examine the RIPv1 packets that are being received by R2.

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.

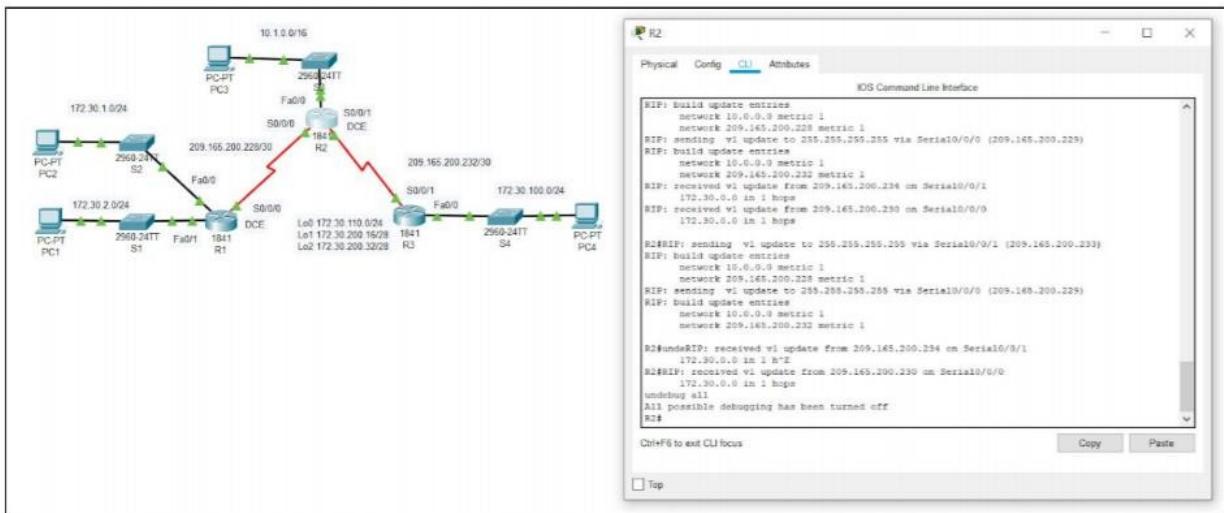
R2#debug ip rip



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.

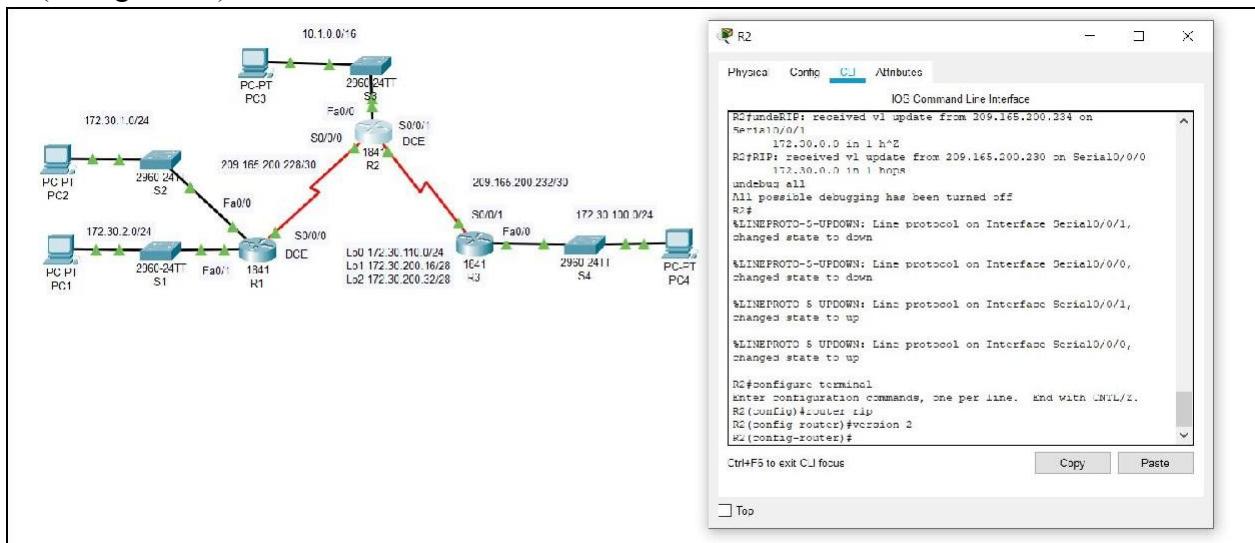
R2#undebug all

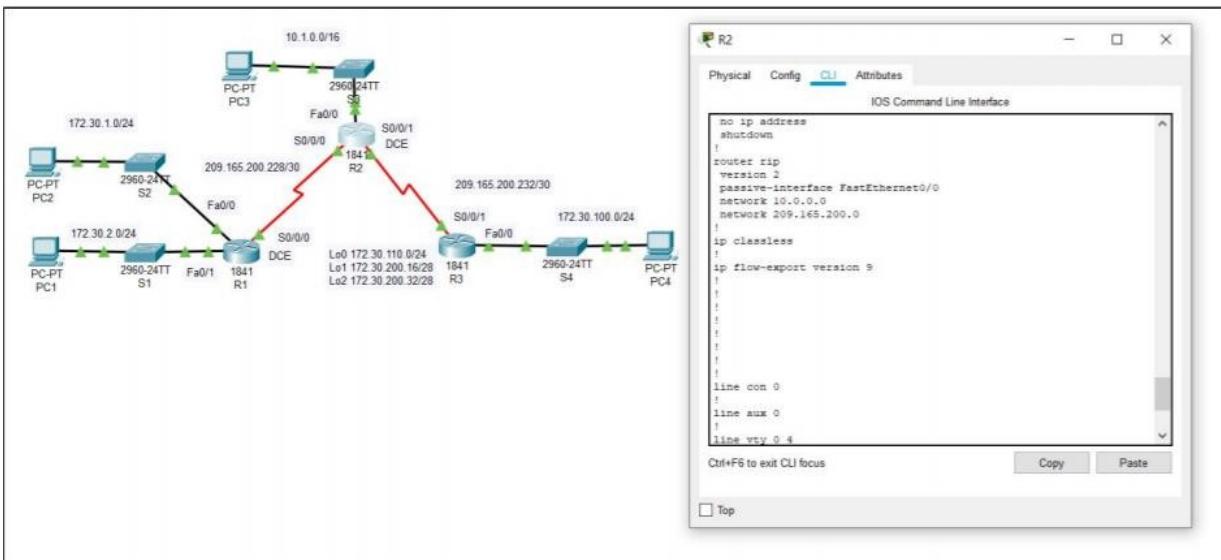


## Task 4: Configure RIP Version 2.

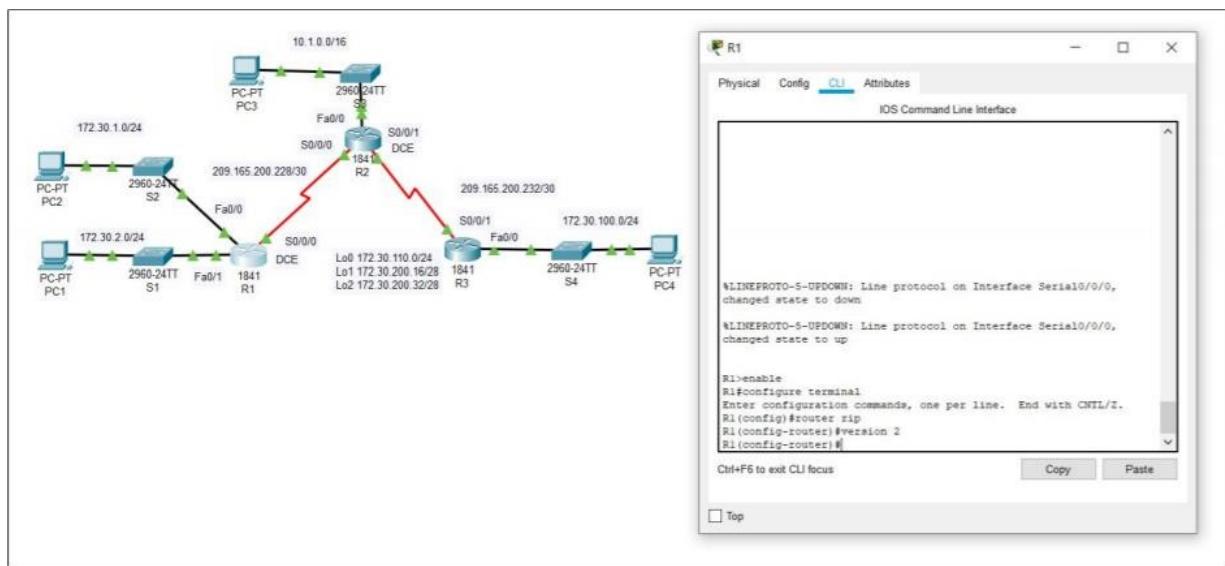
**Step 1: Use the version 2 command to enable RIP version 2 on each of the routers.**

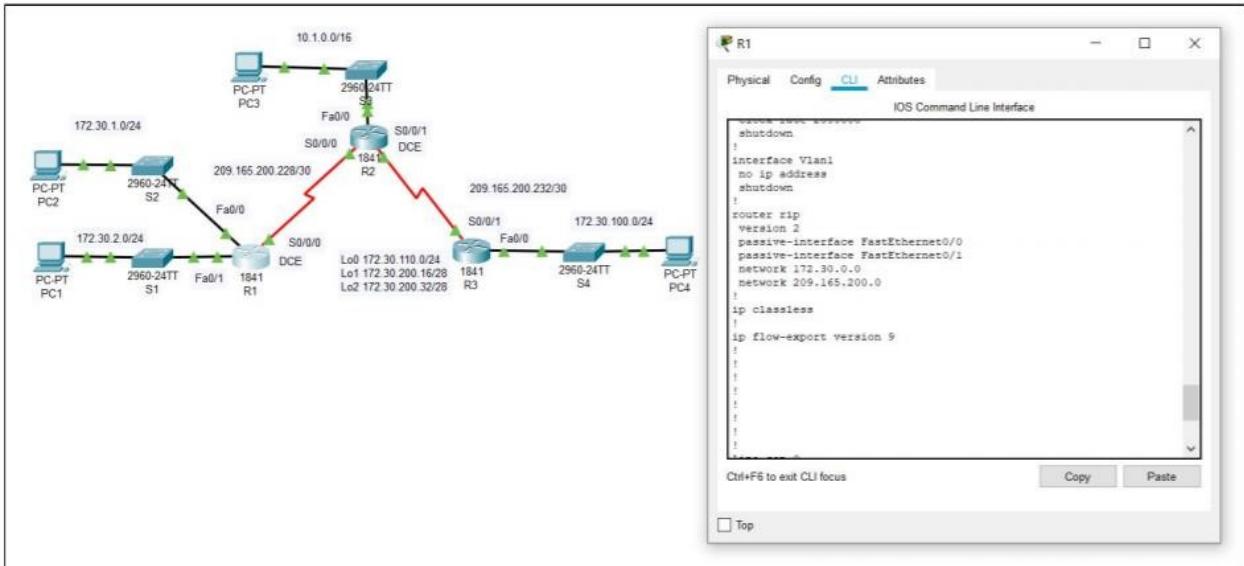
R2(config)#router rip  
R2(config-router)#version 2





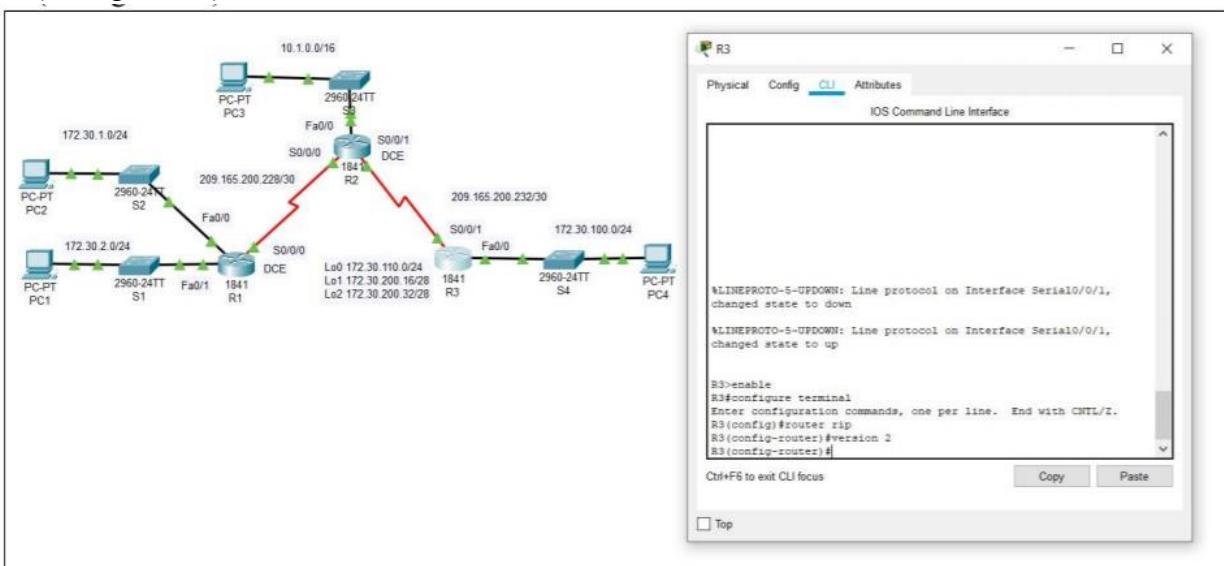
R1(config)#**router rip**  
R1(config-router)#**version 2**

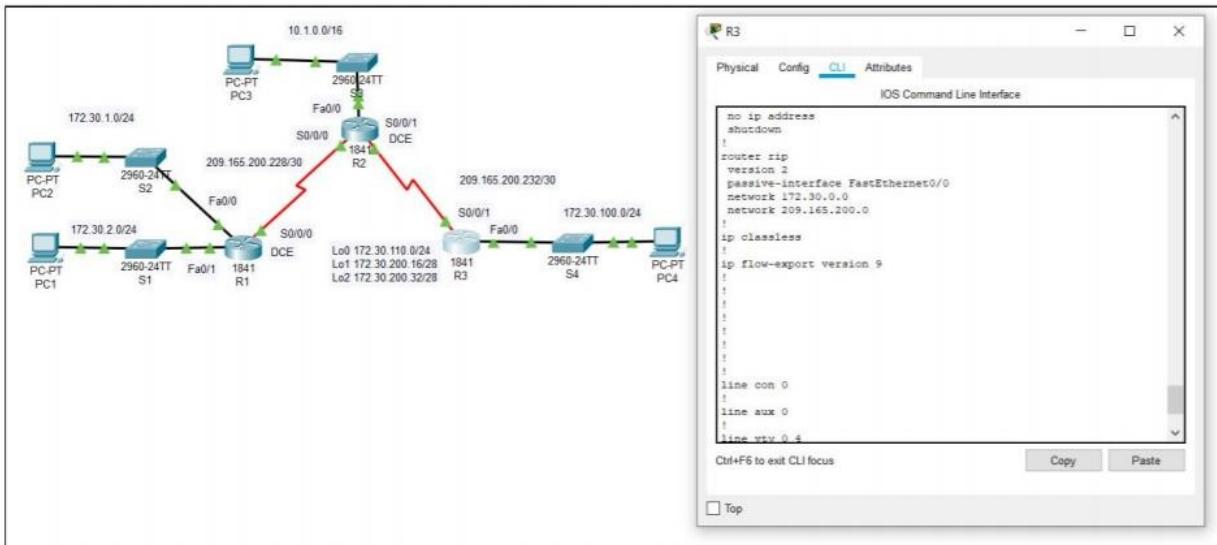




R3(config)#**router rip**

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



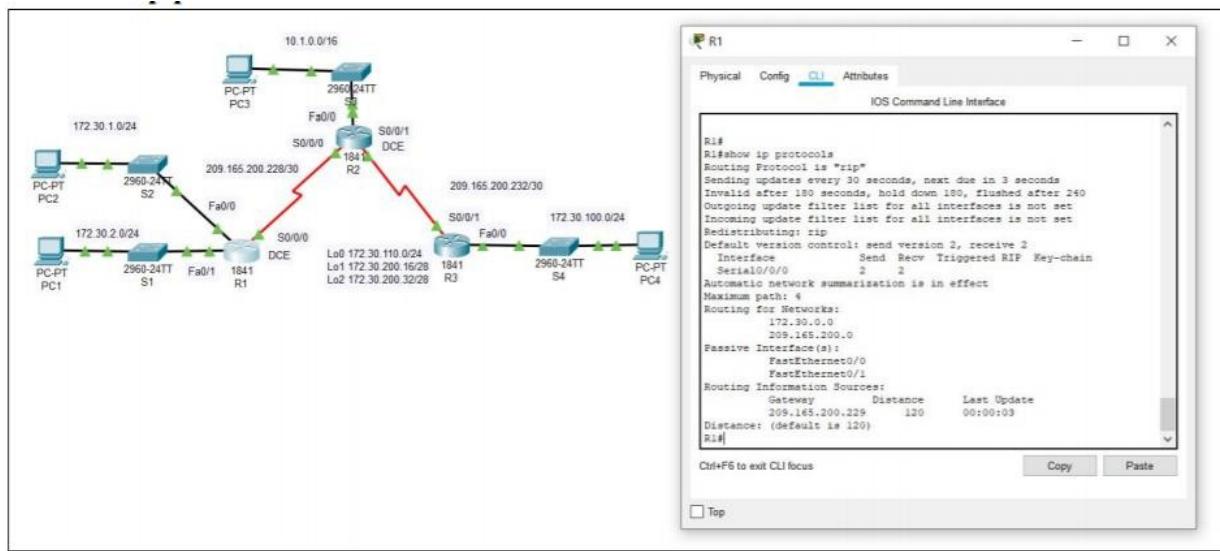


RIPv2 messages include the subnet mask in a field in the routing updates. This allows subnets and their masks to be included in the routing updates. However, by default RIPv2 summarizes networks at major network boundaries, just like RIPv1, except that the subnet mask is included in the update.

### 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.

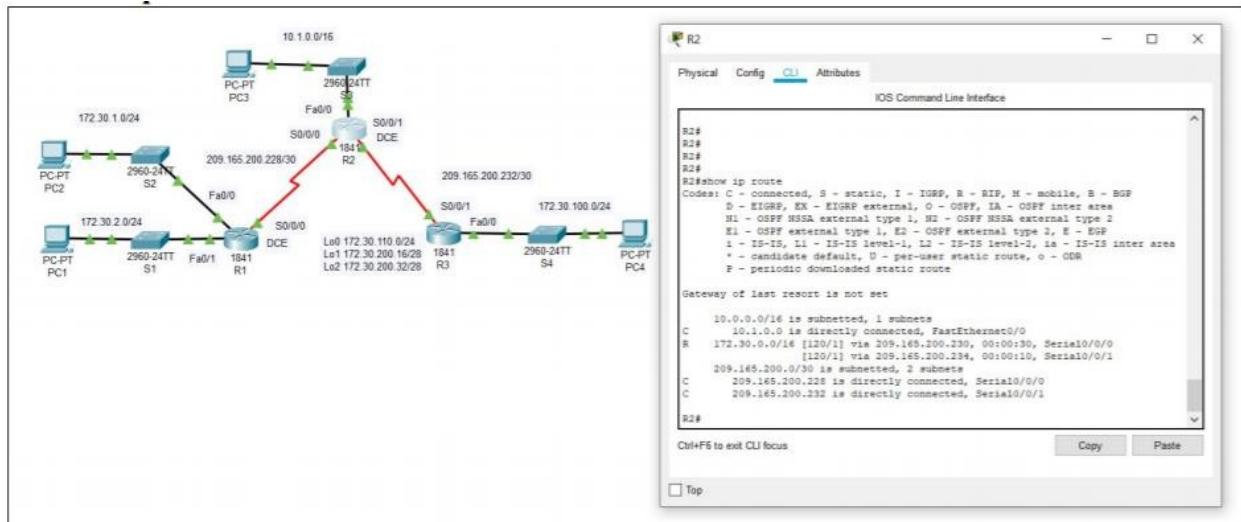
**R1# show ip protocols**



### Task 5: Examine the Automatic Summarization of Routes.

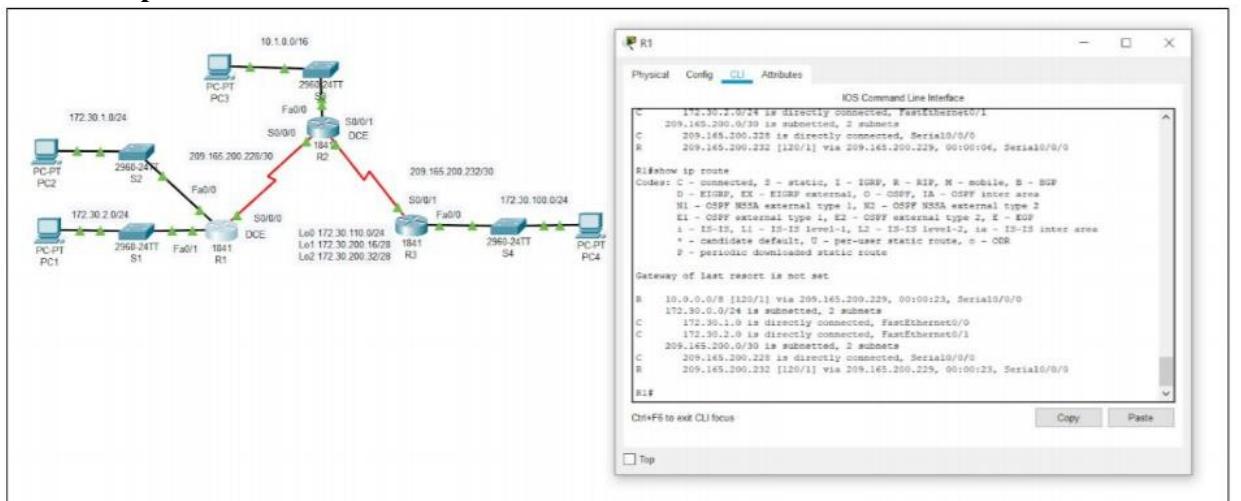
The LANs connected to R1 and R3 are still composed of discontiguous networks. R2 still shows two equal cost paths to the 172.30.0.0/16 network in the routing table. R2 still shows only the major classful network address of 172.30.0.0 and does not show any of the subnets for this network.

## R2#show ip route



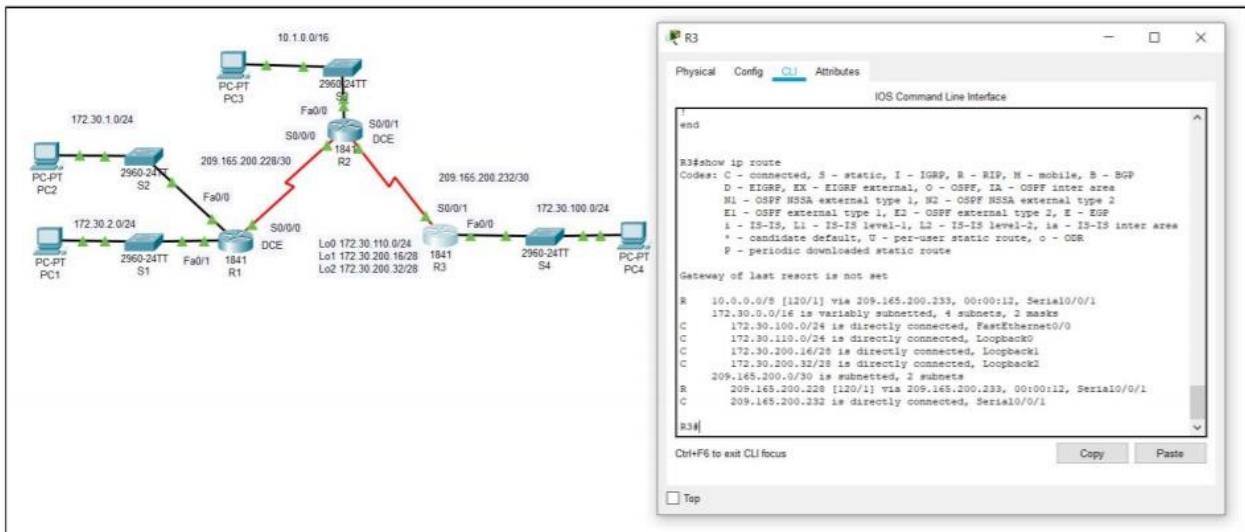
R1 still shows only its own subnets for the 172.30.0.0 network. R1 still does not have any routes for the 172.30.0.0 subnets on R3.

## R1#show ip route



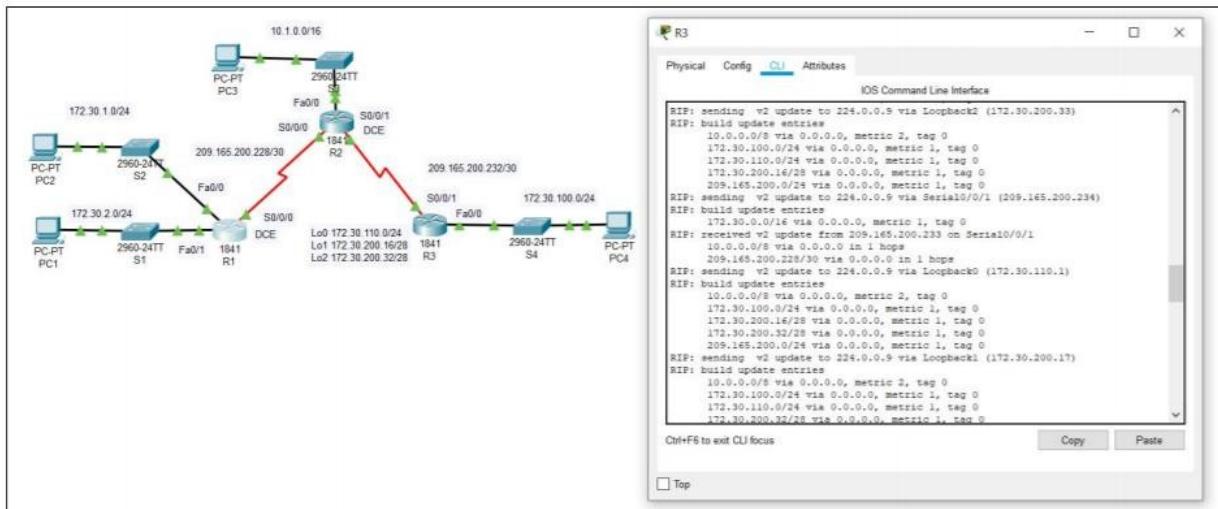
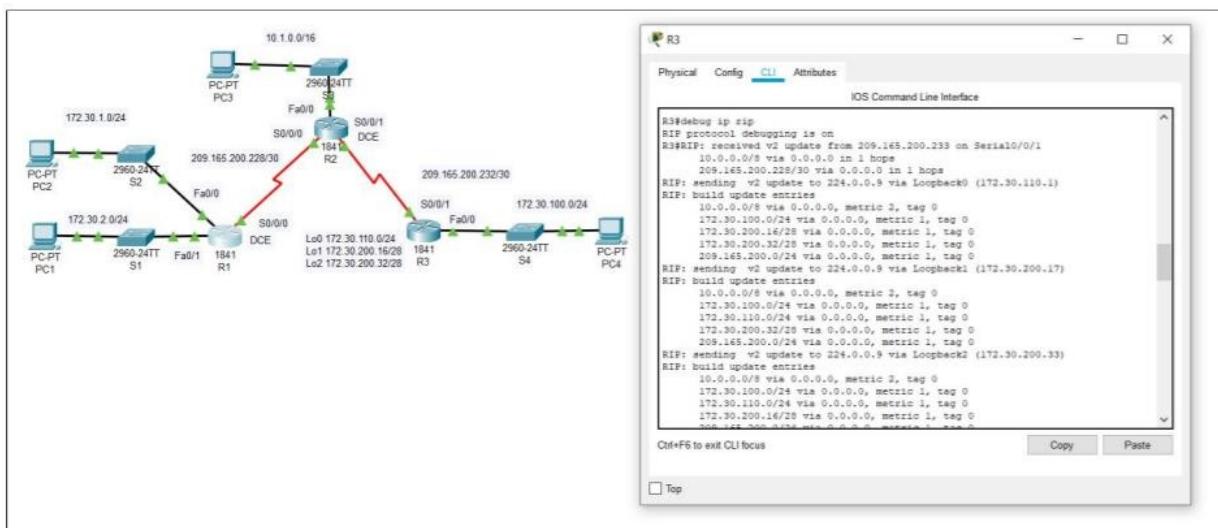
R3 still only shows its own subnets for the 172.30.0.0 network. R3 still does not have any routes for the 172.30.0.0 subnets on R1.

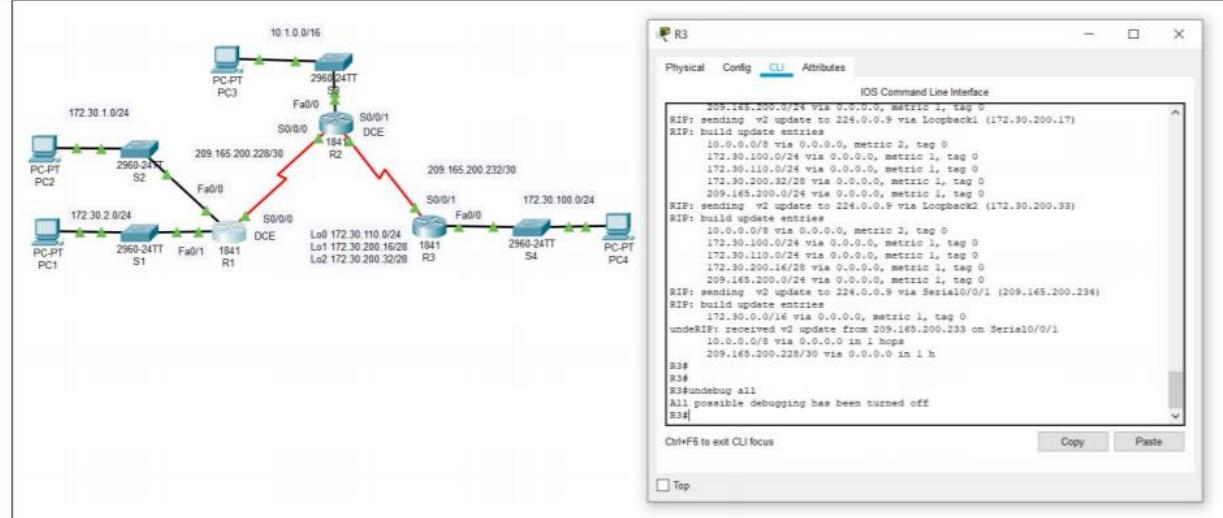
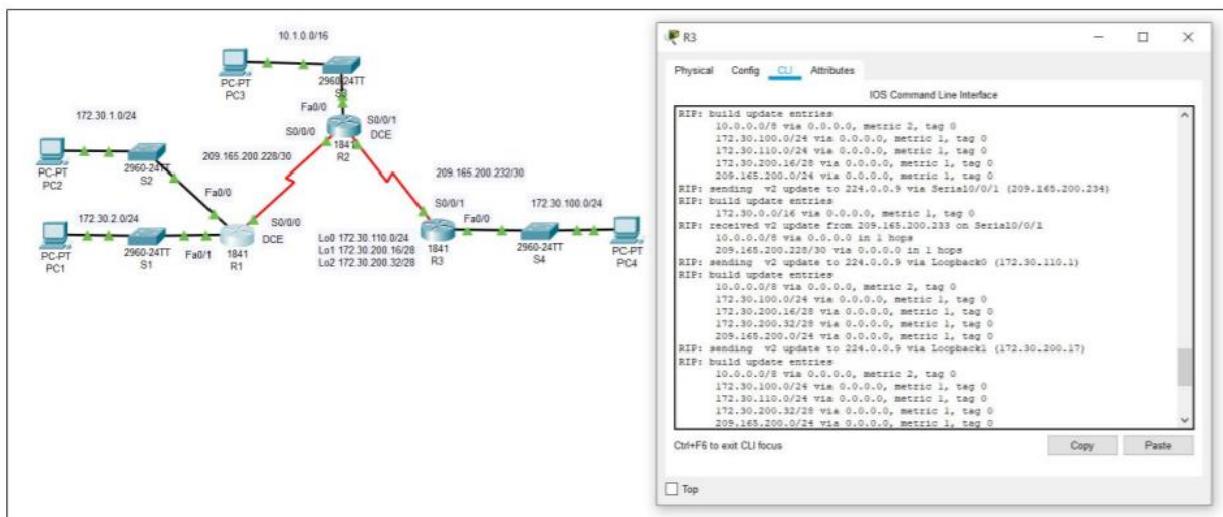
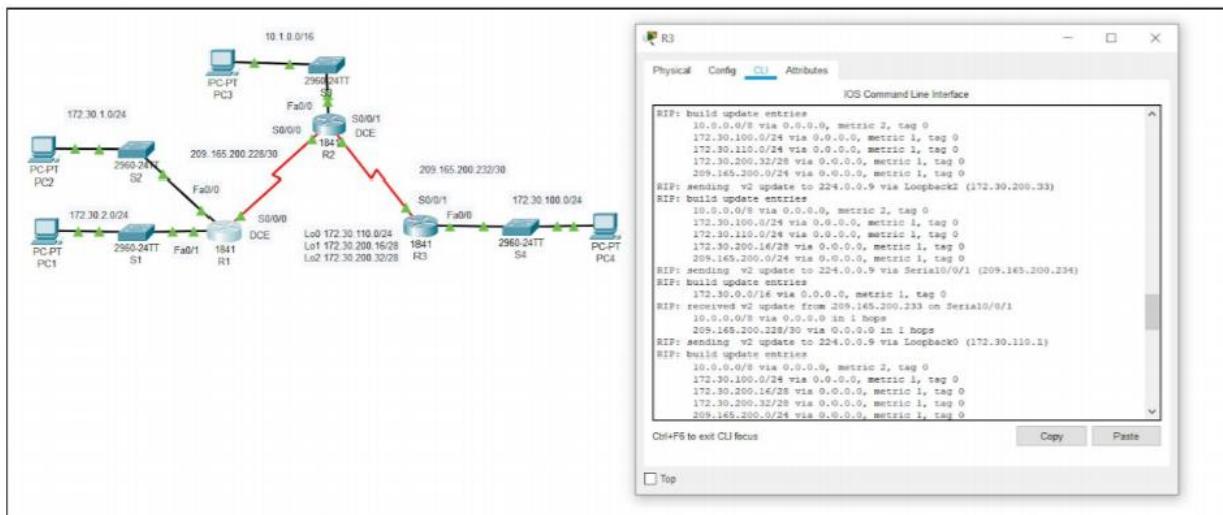
## R3#show ip route



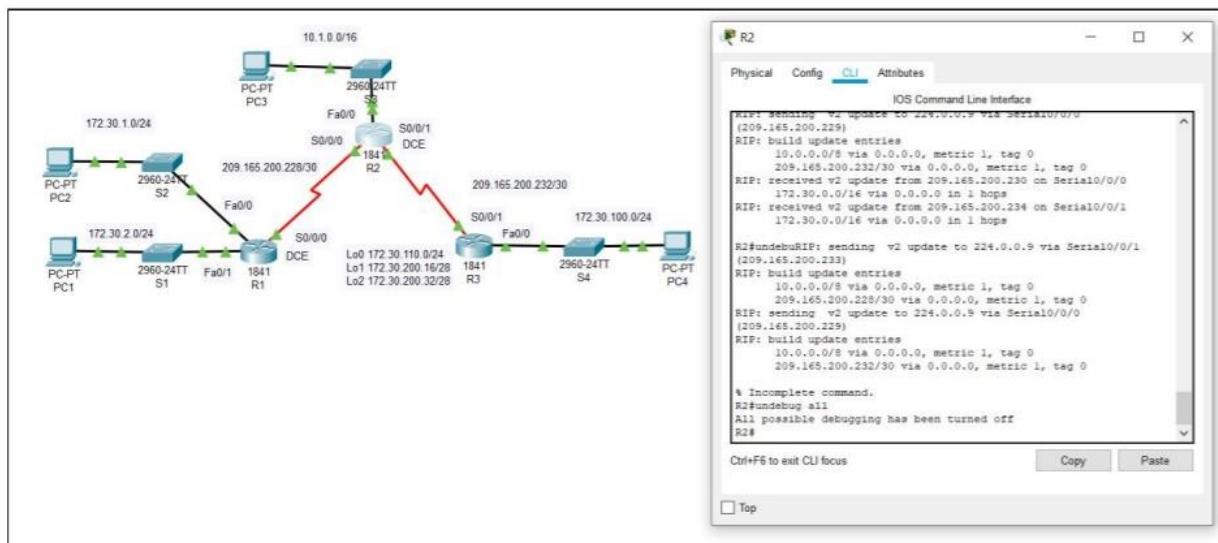
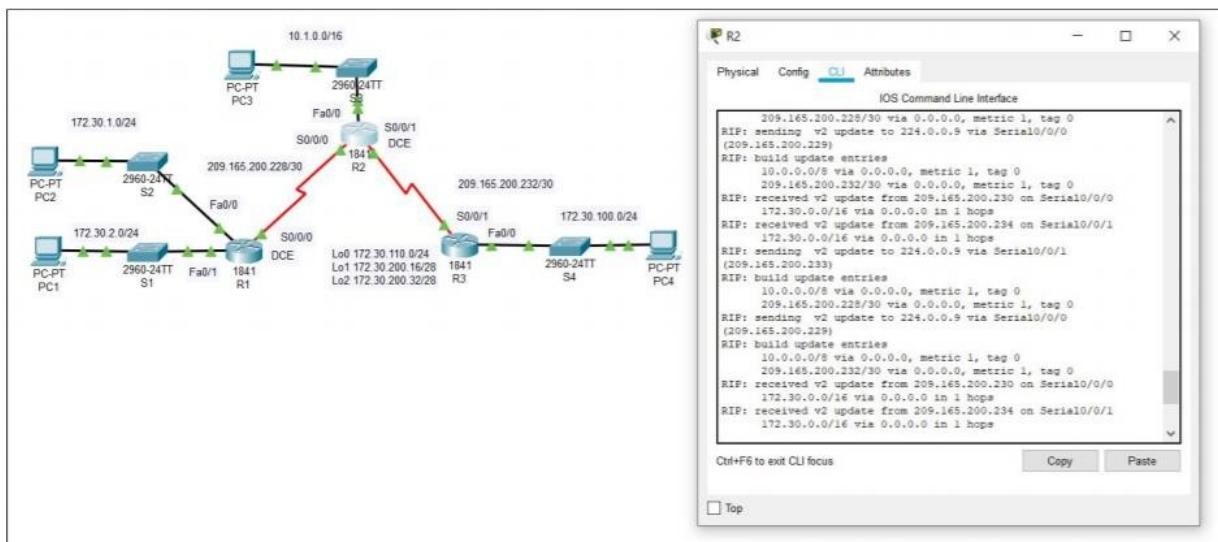
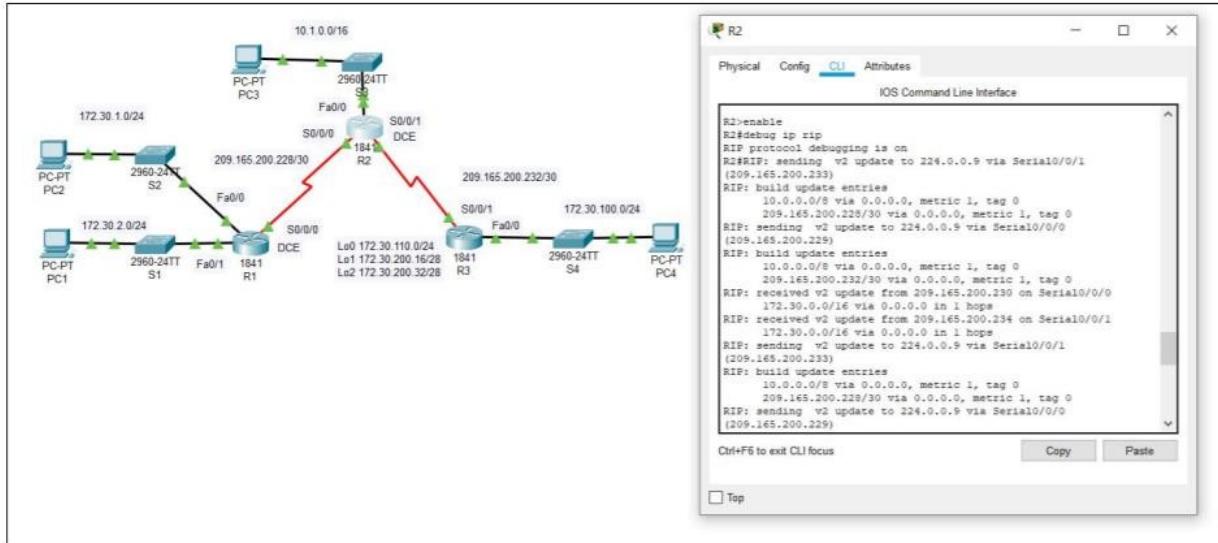
Use the output of the **debug ip rip** command to answer the following questions:

On R3

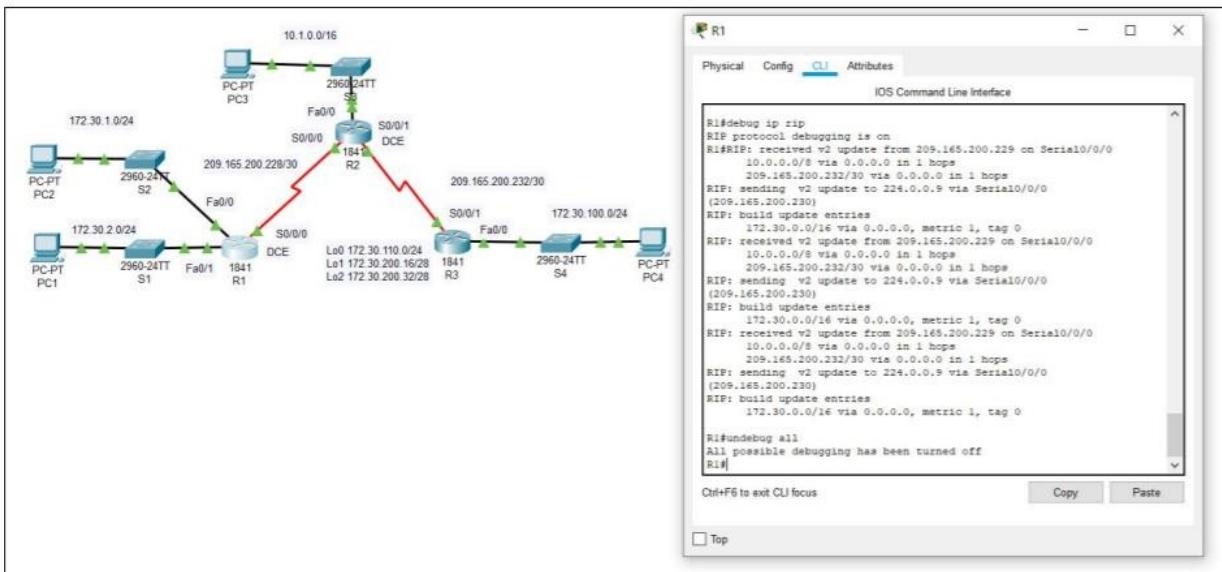




## On R2



## 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?

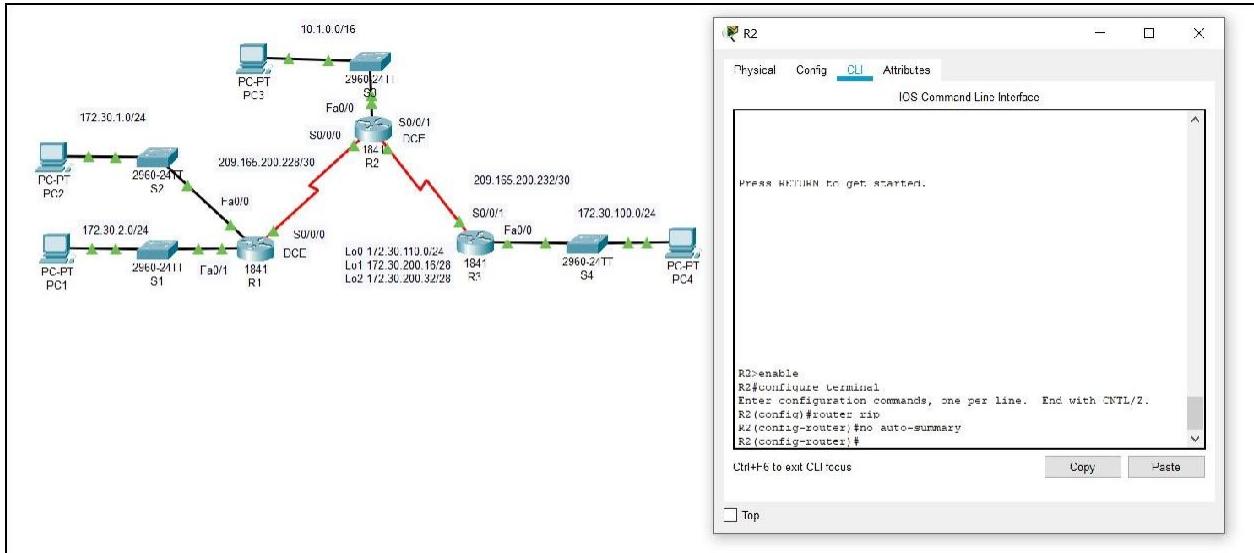
Ans: 172.30.0.0/16

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.

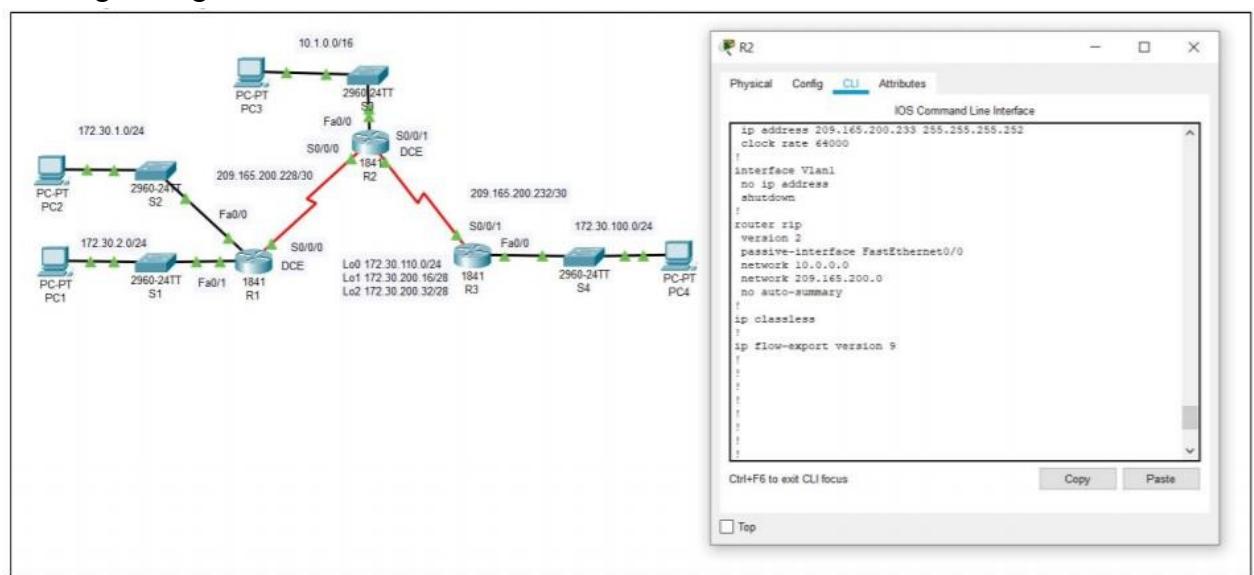
## Task 6: Disable Automatic Summarization.

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.

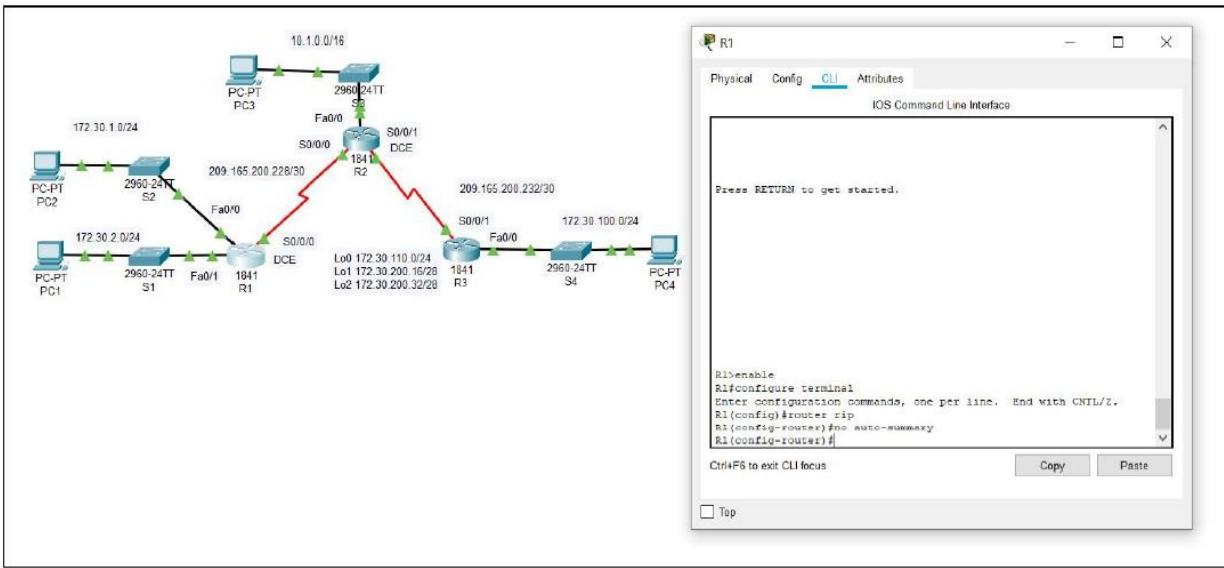
```
R2(config)#router rip
R2(config-router)#no auto-summary
```



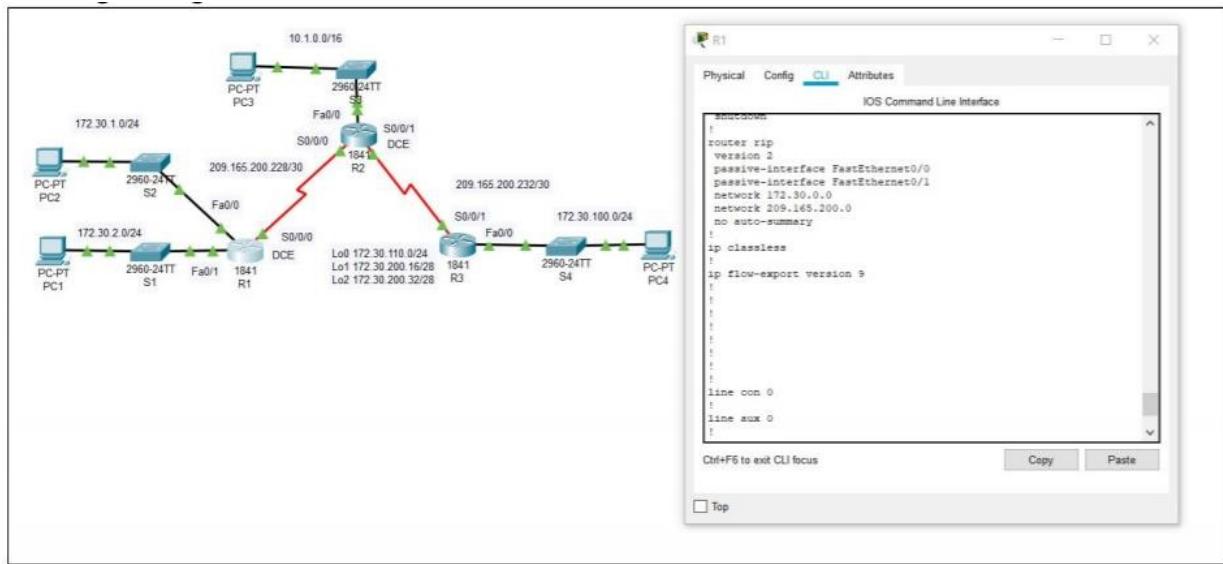
## Running Configuration



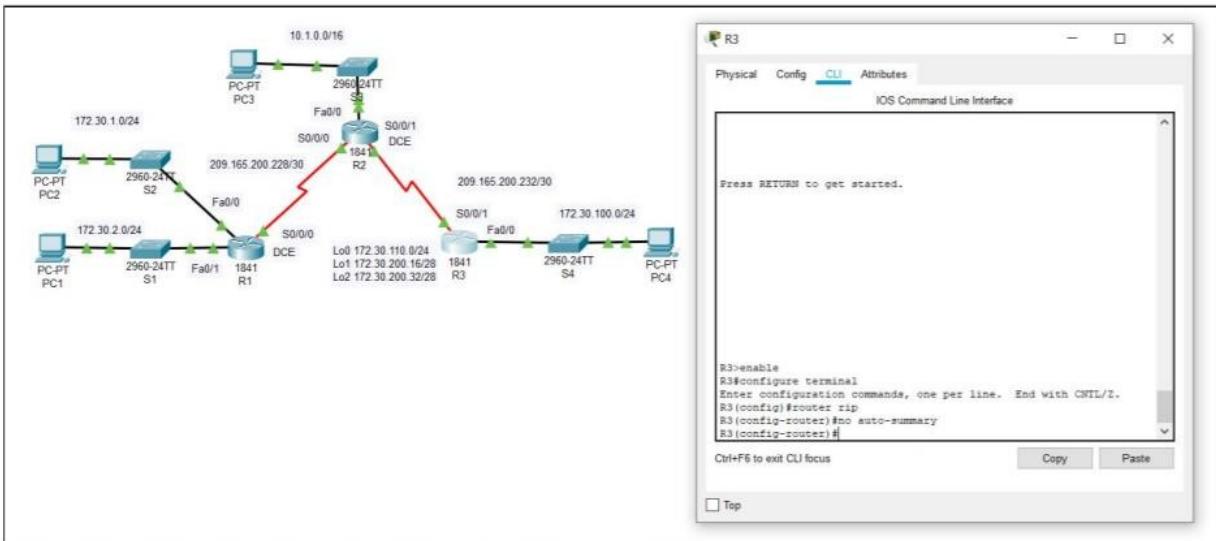
**R1(config)#router rip**  
**R1(config-router)#no auto-summary**



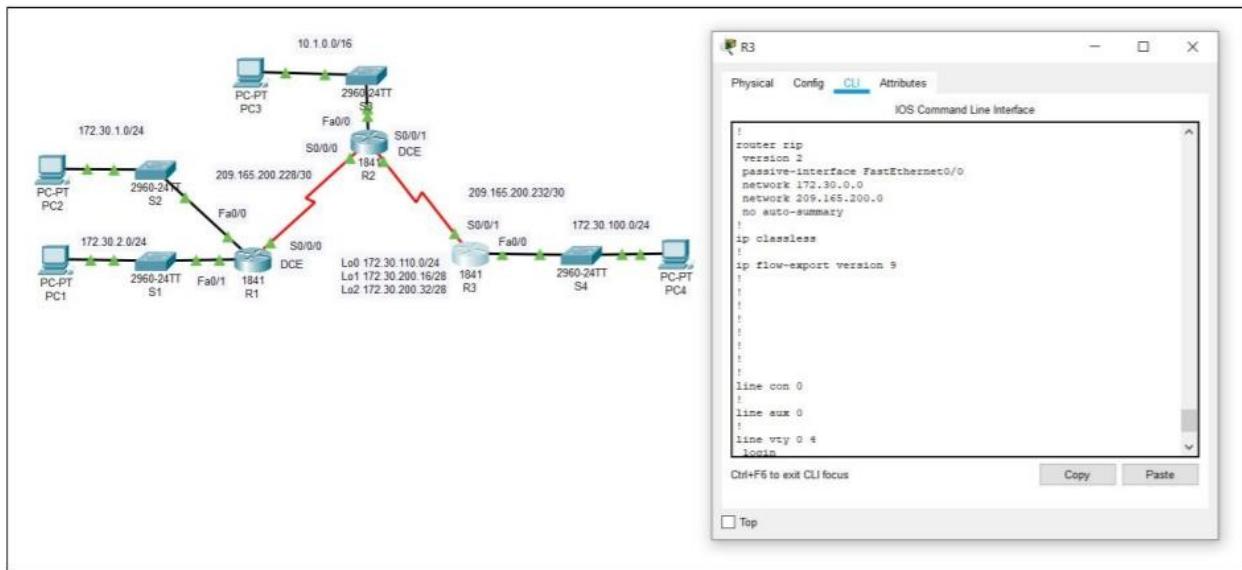
## Running Configuration



**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

```

R2# show ip route
Codes: C - connected, S - static, I - ISGRP, 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

C 10.0.0.0/16 is subnetted, 1 subnets
   C 10.1.0.0/16 [120/1] via 209.165.200.234, 00:00:10, Serial0/0/0
R 172.30.1.0/24 [120/1] via 209.165.200.230, 00:00:10, Serial0/0/0
R 172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:10, Serial0/0/0
R 172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:04, Serial0/0/1
R 172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:04, Serial0/0/1
R 172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:04, Serial0/0/1
R 172.30.100.0/24 [120/1] via 209.165.200.232, 00:00:04, Serial0/0/1
C 209.165.200.232 is directly connected, Serial0/0/1
C 209.165.200.234 is directly connected, Serial0/0/0

```

R1#show ip route

```

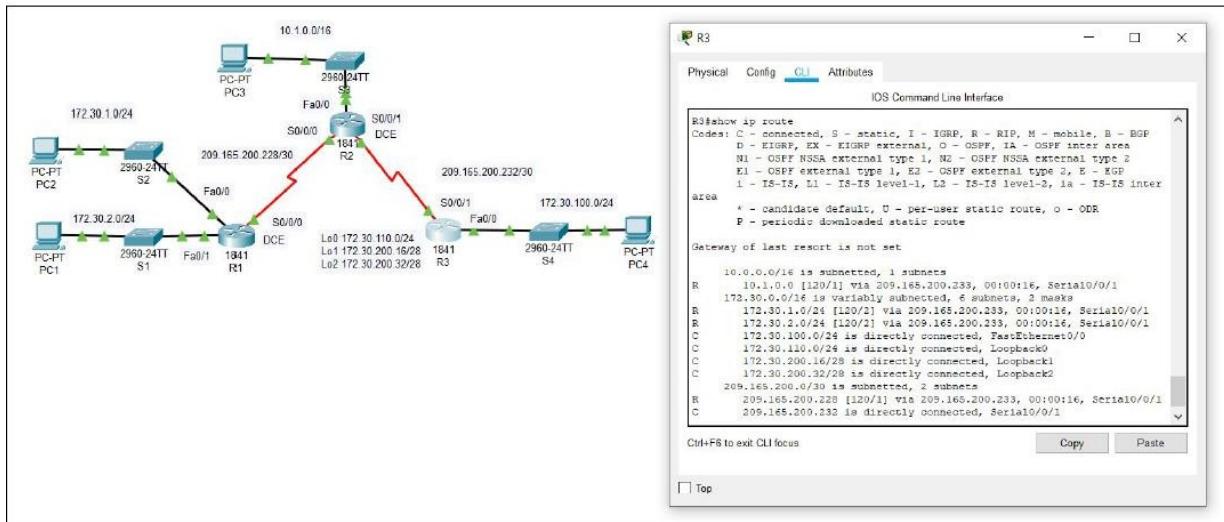
R1# show ip route
Codes: C - connected, S - static, I - ISGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       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

C 10.0.0.0/16 is subnetted, 1 subnets
   C 10.1.0.0/16 [120/1] via 209.165.200.228, 00:00:03, Serial0/0/0
R 172.30.1.0/24 [120/1] via 209.165.200.228, 00:00:03, Serial0/0/0
R 172.30.2.0/24 [120/1] via 209.165.200.228, 00:00:03, Serial0/0/0
R 172.30.110.0/24 [120/1] via 209.165.200.228, 00:00:03, Serial0/0/1
R 172.30.200.16/28 [120/1] via 209.165.200.228, 00:00:03, Serial0/0/1
R 172.30.200.32/28 [120/1] via 209.165.200.228, 00:00:03, Serial0/0/1
R 172.30.100.0/24 [120/1] via 209.165.200.228, 00:00:03, Serial0/0/1
C 209.165.200.228 is directly connected, Serial0/0/0
C 209.165.200.229 is directly connected, Serial0/0/1

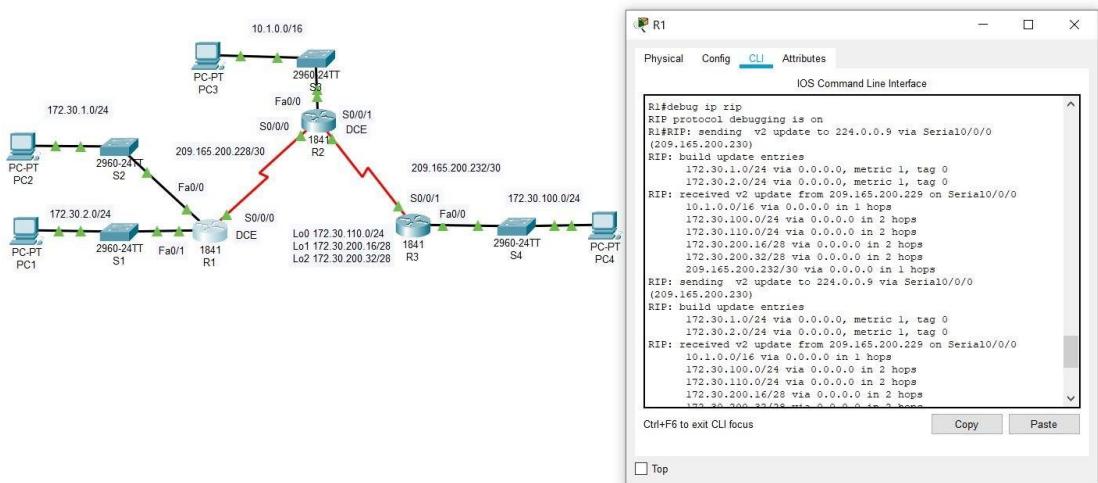
```

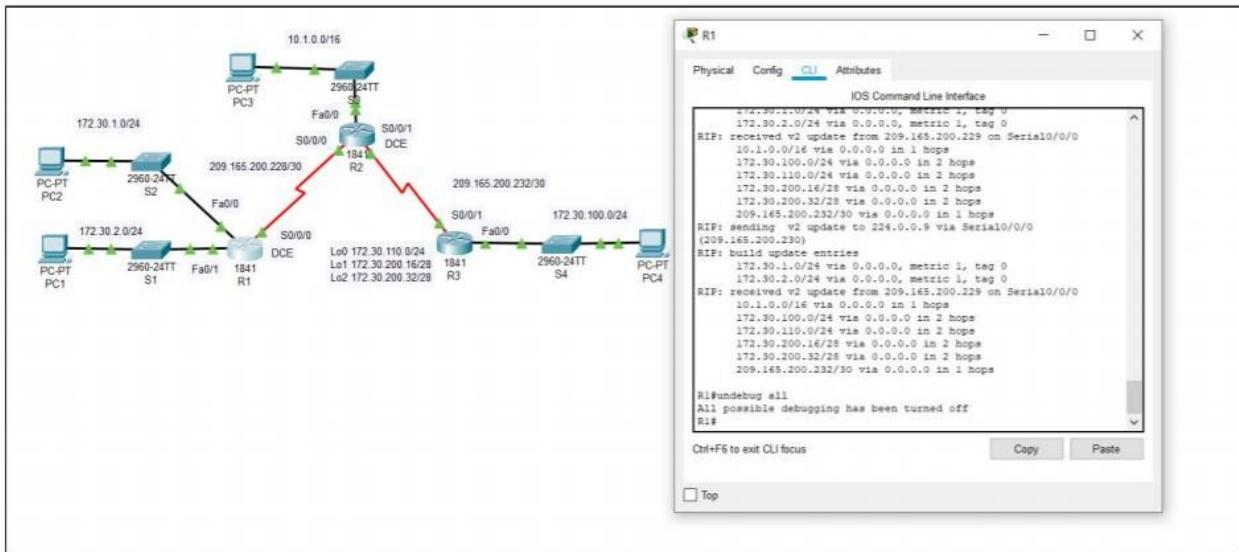
R3#show ip route



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

On R1



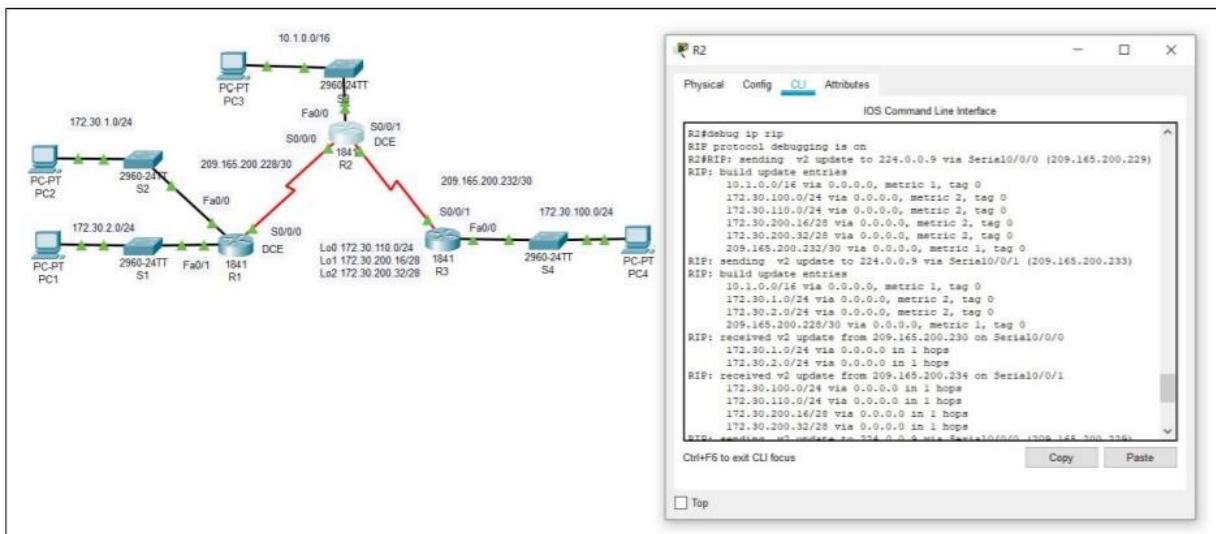


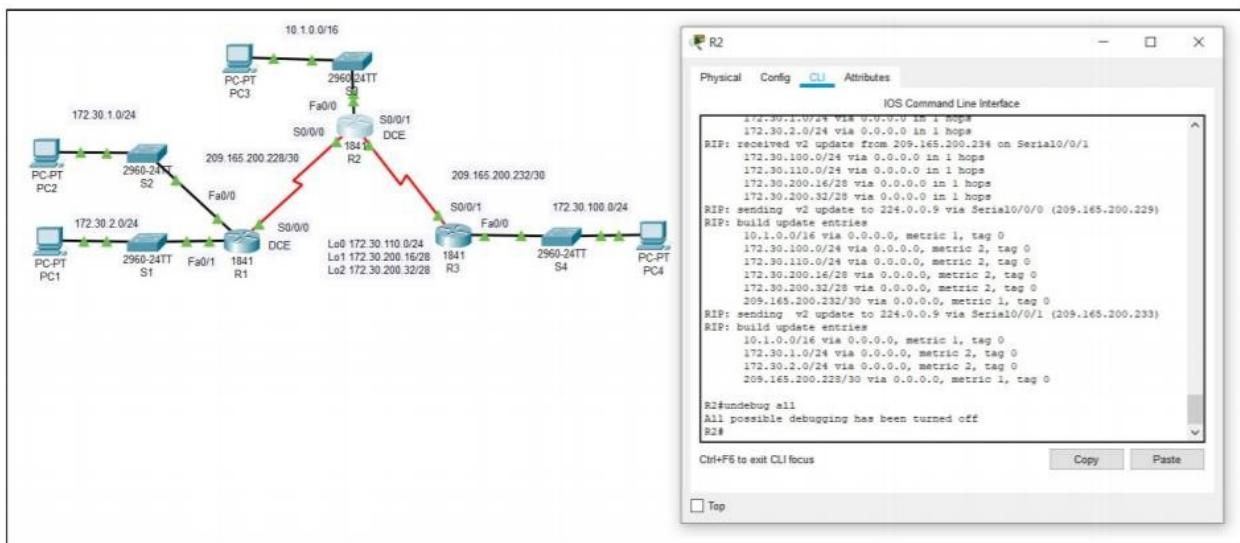
What entries are included in the RIP updates sent out from R1?

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

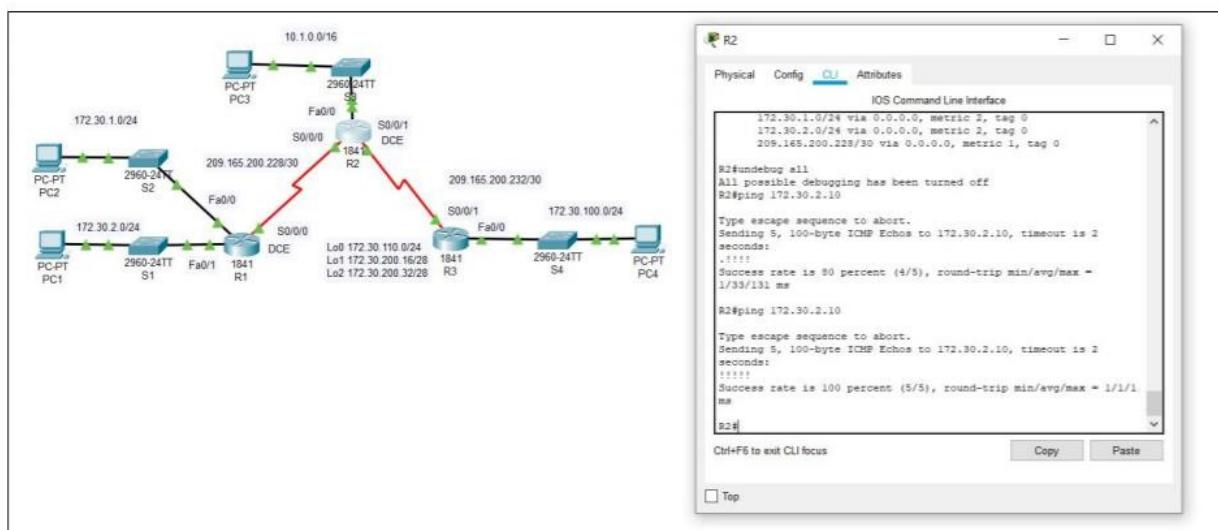
Are the subnet masks now included in the routing updates?

Ans: Yes

## Task 8: Verify Network Connectivity.

### Step 1: Check connectivity between R2 router and PCs.

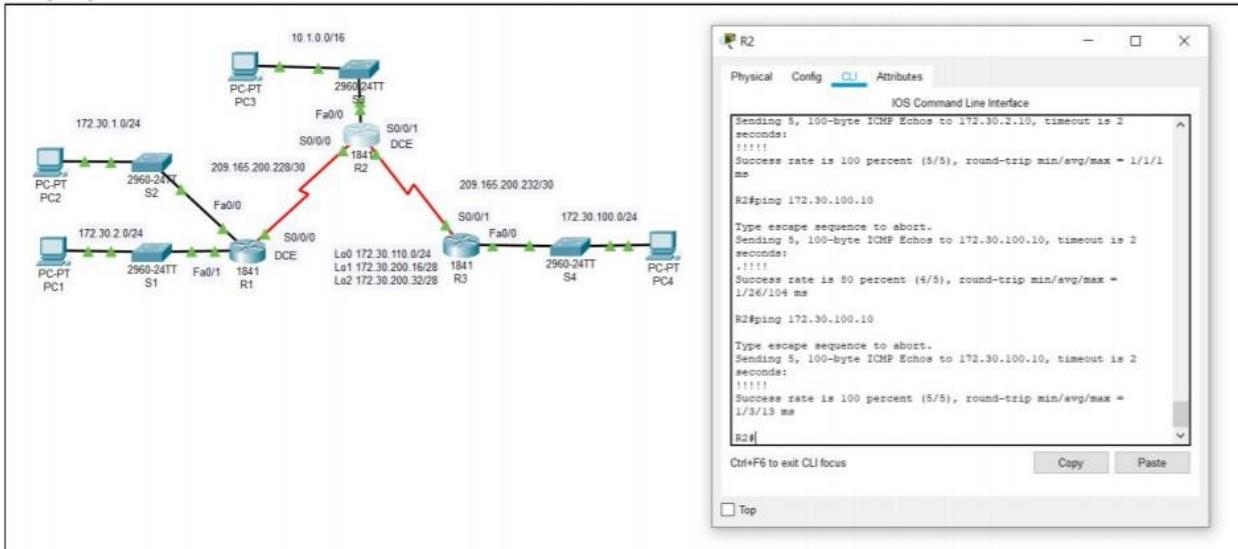
Pinging PC1 from R2



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

Ans: 5 ICMP messages are successful.

Pinging PC4 from R2

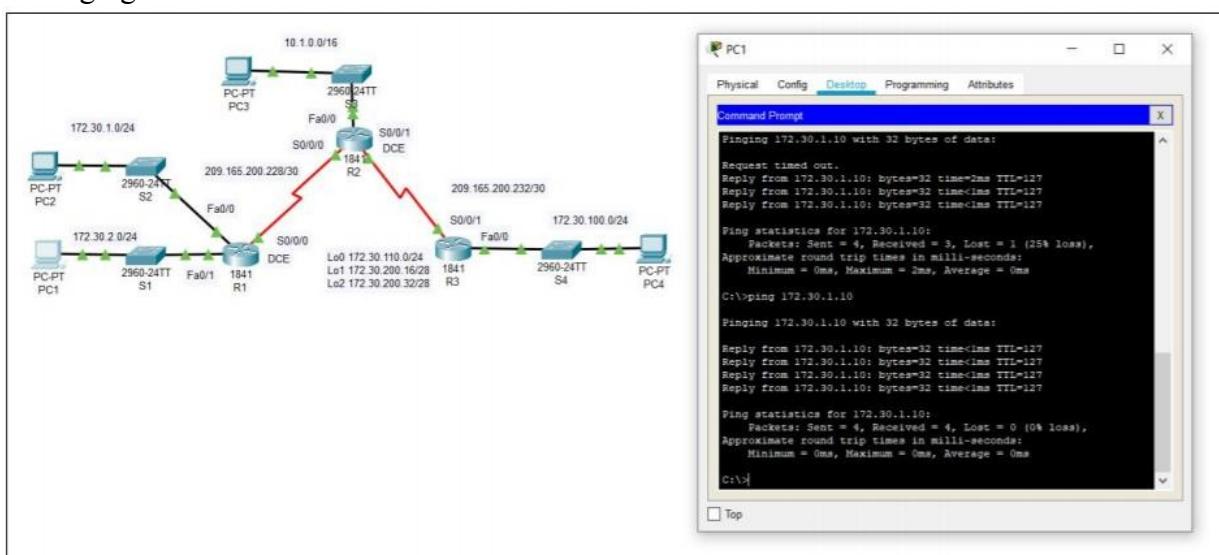


From R2, how many ICMP messages are successful when pinging PC4?

Ans: 5 ICMP messages are successful.

## Step 2: Check the connectivity between the PCs.

Pinging PC2 from PC1



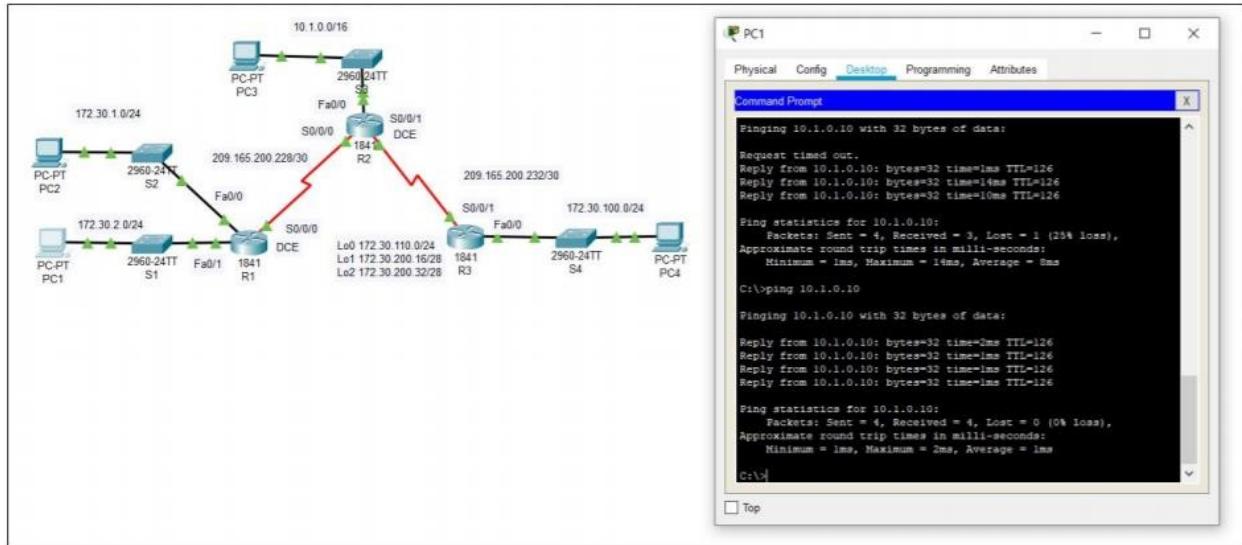
From PC1, is it possible to ping PC2?

Ans: Yes

What is the success rate?

Ans: 100%

Pinging PC3 from PC1



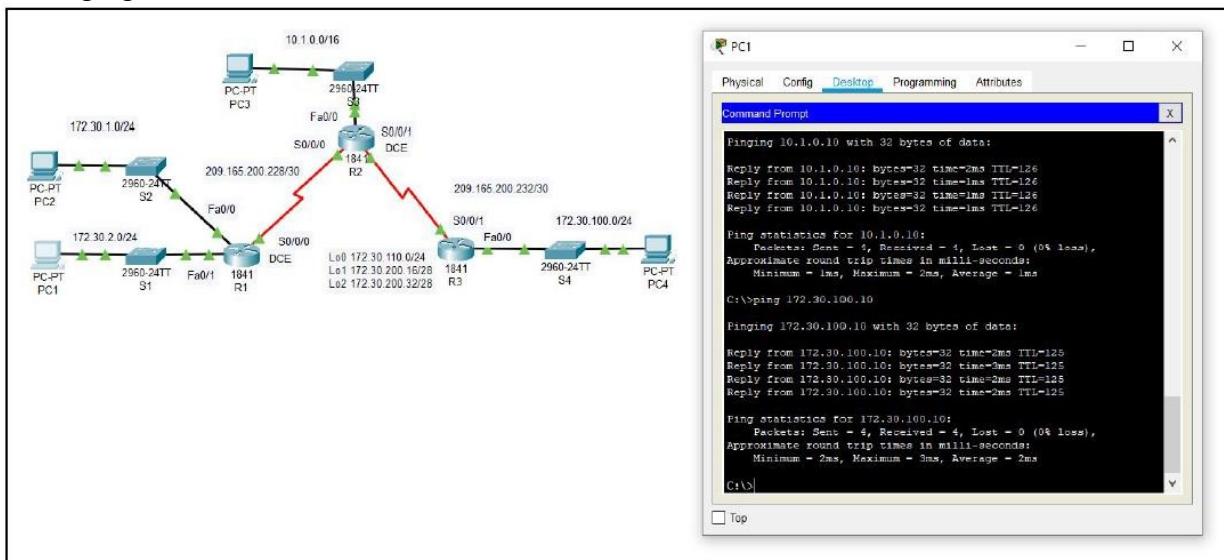
From PC1, is it possible to ping PC3?

Ans: Yes

What is the success rate?

Ans: 100%

Pinging PC4 from PC1



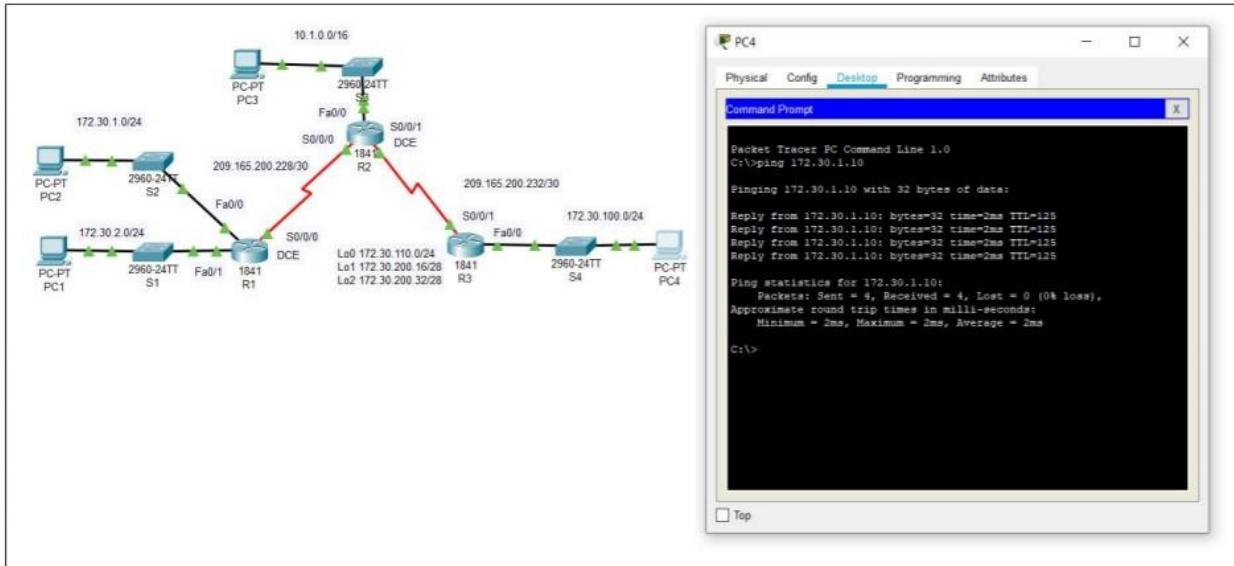
From PC1, is it possible to ping PC4?

Ans: Yes

What is the success rate?

Ans: 100%

Pinging PC2 from PC4



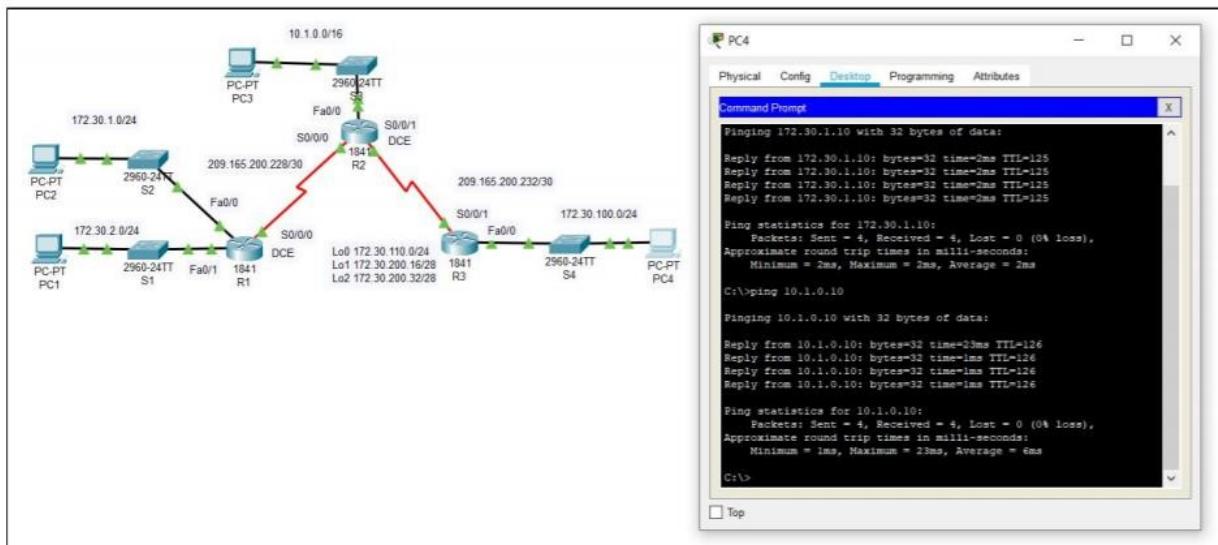
From PC4, is it possible to ping PC2?

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

- show running-config

```

ip flow-export version
9 !
!
!
!
!
!
line con
0 !
line aux 0
! line vty
0 4
password
cisco
login
!
!
!
```

end

**• show ip route**

```

R1#sh ip route
Codes: C - connected, S - static, I - IGRP, 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

```

10.0.0.0/16 is subnetted, 1 subnets
R 10.1.0.0 [120/1] via 209.165.200.229, 00:00:18, Serial0/0/0
172.30.0.0/16 is variably subnetted, 6 subnets, 2 masks
C 172.30.1.0/24 is directly connected, FastEthernet0/0
C 172.30.2.0/24 is directly connected, FastEthernet0/1
R 172.30.100.0/24 [120/2] via 209.165.200.229, 00:00:18, Serial0/0/0
R 172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:18, Serial0/0/0
R 172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:18, Serial0/0/0
R 172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:18, Serial0/0/0
209.165.200.0/30 is subnetted, 2 subnets
C 209.165.200.228 is directly connected, Serial0/0/0
R 209.165.200.232 [120/1] via 209.165.200.229, 00:00:18, Serial0/0/0
```

**• show ip interface brief**

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	172.30.1.1	YES	manual	up	
FastEthernet0/1	172.30.2.1	YES	manual	up	
Serial0/0/0	209.165.200.230	YES	manual	up	
Serial0/0/1	unassigned	YES	NVRAM	administratively down	down Vlan1
	unassigned	YES	unset	administratively	down down

**• show ip protocols**

```

R1#sh ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 24 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
```

```
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for
Networks:
172.30.0.0
209.165.200.0
Passive Interface(s):
FastEthernet0/0
FastEthernet0/1
Routing Information Sources:
Gateway Distance Last Update
209.165.200.229 120 00:00:03
Distance: (default is 120)
```

## **Router – R2**

```

255.255.0.0 duplex auto
speed auto !
interface
FastEthernet0/1 no ip
address duplex auto
speed auto shutdown !
interface Serial0/0/0 ip address
209.165.200.229 255.255.255.252 clock
rate 2000000 !
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 !
!
!
!
!
!
!
line con
0 !
line aux
0 !
line vty 0 4
password cisco
login
!
!
!
end

```

**• show ip route**

```

R2#sh ip route
Codes: C - connected, S - static, I - IGRP, 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

```

10.0.0.0/16 is subnetted, 1 subnets
C 10.1.0.0 is directly connected, FastEthernet0/0
172.30.0.0/16 is variably subnetted, 6 subnets, 2 masks
R 172.30.1.0/24 [120/1] via 209.165.200.230, 00:00:10, Serial0/0/0
R 172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:10, Serial0/0/0
R 172.30.100.0/24 [120/1] via 209.165.200.234, 00:00:19, Serial0/0/1
R 172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:19, Serial0/0/1
R 172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:19, Serial0/0/1
R 172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:19, Serial0/0/1
209.165.200.0/30 is subnetted, 2 subnets
C 209.165.200.228 is directly connected,
Serial0/0/0 C 209.165.200.232 is directly
connected, Serial0/0/1

```

**• show ip interface brief**

```
R2#sh ip int brief
```

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	10.1.0.1	YES	manual	up	
FastEthernet0/1	unassigned	YES	NVRAM	administratively down	down
Serial0/0/0	209.165.200.229	YES	manual	up	
Serial0/0/1	209.165.200.233	YES	manual	up	
Vlan1	unassigned	YES	unset	administratively down	down

- **show ip protocols**

```
R2#sh ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 18 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 2, receive 2
  Interface Send Recv Triggered RIP Key-chain
    Serial0/0/0 2 2
    Serial0/0/1 2 2
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for
  Networks:
    10.0.0.0
    209.165.200.0
    Passive
  Interface(s):
    FastEthernet0/0
  Routing Information Sources:
    Gateway Distance Last Update
    209.165.200.230 120 00:00:09
    209.165.200.234 120 00:00:13
  Distance: (default is 120)
```

## Router – R3

- **show running-config**

```
R3#sh running-config
Building configuration...

Current configuration : 1027
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 !
!
!
!
!
```

```

!
!
!
! !
spanning-tree mode
pvst !
!
!
!
! !
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
!
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
!
ip flow-export version
9 !
!
!
!
!
!
line con
0 !
line aux
0 !
line vty 0 4
password cisco
login
!
! !
end

```

#### • show ip route

```

R3#sh ip route
Codes: C - connected, S - static, I - IGRP, 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

```
10.0.0.0/16 is subnetted, 1 subnets
R 10.1.0.0 [120/1] via 209.165.200.233, 00:00:04, Serial0/0/1
172.30.0.0/16 is variably subnetted, 6 subnets, 2 masks
R 172.30.1.0/24 [120/2] via 209.165.200.233, 00:00:04, Serial0/0/1
R 172.30.2.0/24 [120/2] via 209.165.200.233, 00:00:04, Serial0/0/1
C 172.30.100.0/24 is directly connected, FastEthernet0/0
C 172.30.110.0/24 is directly connected, Loopback0
C 172.30.200.16/28 is directly connected, Loopback1
C 172.30.200.32/28 is directly connected, Loopback2
209.165.200.0/30 is subnetted, 2 subnets
R 209.165.200.228 [120/1] via 209.165.200.233, 00:00:04, Serial0/0/1
C 209.165.200.232 is directly connected, Serial0/0/1
```

• **show ip interface brief**

R3#sh ip interface brief

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	172.30.100.1	YES	manual	up	
FastEthernet0/1	unassigned	YES	NVRAM	administratively down	down
Serial0/0/0	unassigned	YES	NVRAM	administratively down	down
Serial0/0/1	209.165.200.234	YES	manual	up	
Loopback0	172.30.110.1	YES	manual	up	
Loopback1	172.30.200.17	YES	manual	up	
Loopback2	172.30.200.33	YES	manual	up	
Vlan1	unassigned	YES	unset	administratively down	down

• **show ip protocols**

```
R3#sh ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 13 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 2, receive 2
  Interface Send Recv Triggered RIP Key-chain
    Loopback0 2 2
    Loopback1 2 2
    Loopback2 2 2
    Serial0/0/1 2 2
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for
  Networks:
    172.30.0.0
    209.165.200.0
  Passive Interface(s):
    FastEthernet0/0
  Routing Information Sources:
    Gateway Distance Last Update
```

```
209.165.200.233 120
0 0 : 0 0 : 1 9  Distance :
(default is 120)
```

## 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.

Since there is no PC host which are connected to other networks, we disconnect cabling and reload the routers after erasing the configurations

The screenshot shows a Windows-style application window titled "R1". The tab bar at the top has four tabs: "Physical", "Config", "CLI" (which is selected and highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area is a scrollable terminal window displaying the following CLI session:

```
R1>
R1>
R1>en
R1#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
R1#reload
Proceed with reload? [confirm]
System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fcl)
Initializing memory for ECC
..
C1841 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

Readonly ROMMON initialized

Self decompressing the image :
#####
##### [OK]
      Restricted Rights Legend

Use duplication or disclosure by the Government is
```

At the bottom of the terminal window, there is a status message: "Use duplication or disclosure by the Government is". Below the terminal window, there are two buttons: "Copy" and "Paste". At the very bottom left, there is a checkbox labeled "Top" and a keybinding "Ctrl+F6 to exit CLI focus".

```

Router>en
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#reload
Proceed with reload? [confirm]
System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)
Initializing memory for ECC
..
C1841 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

Self decompressing the image :
#####
##### [OK]
##### Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(a) of the Commercial Computer Software - Restricted
Ctrl+F6 to exit CLI focus

```

Top

```

R3#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
R3#reload
System configuration has been modified. Save? [yes/no]:n
Proceed with reload? [confirm]
System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)
Initializing memory for ECC
..
C1841 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

Self decompressing the image :
#####
##### [OK]
##### Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(a) of the Commercial Computer Software - Restricted
Ctrl+F6 to exit CLI focus

```

Top

Hence, we have Erased all configurations and disconnected and stored the cables.

## Conclusion:

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