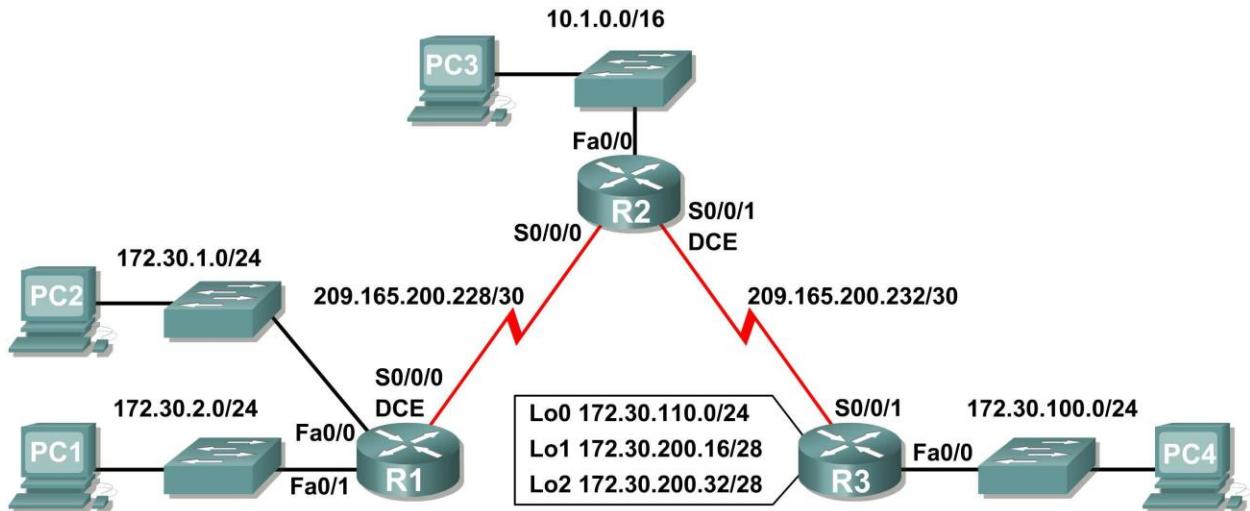


CEL 51, DCCN, Monsoon 2020

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.

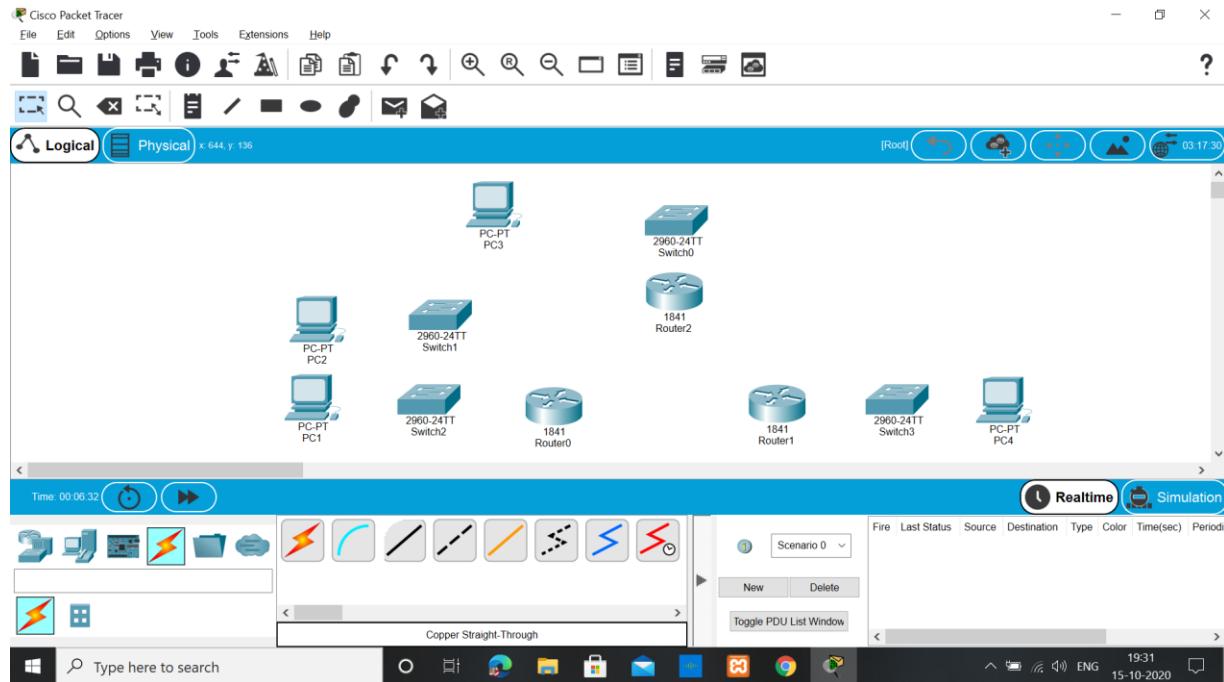
Scenario

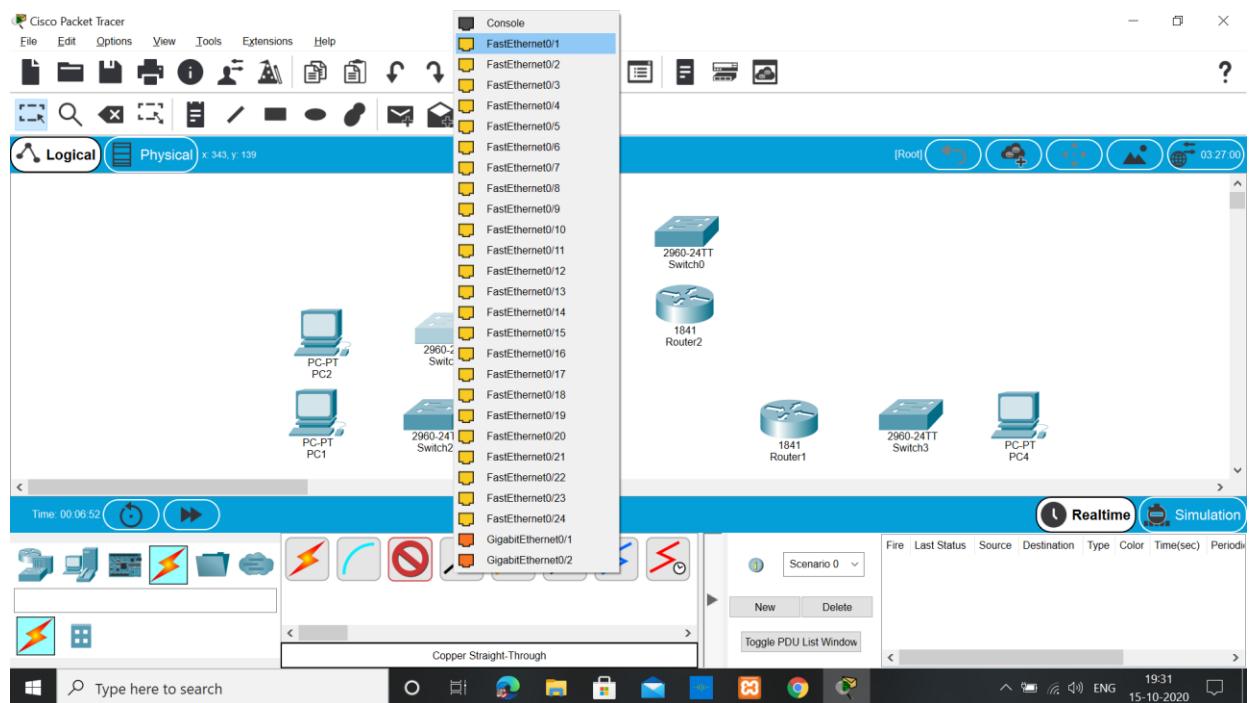
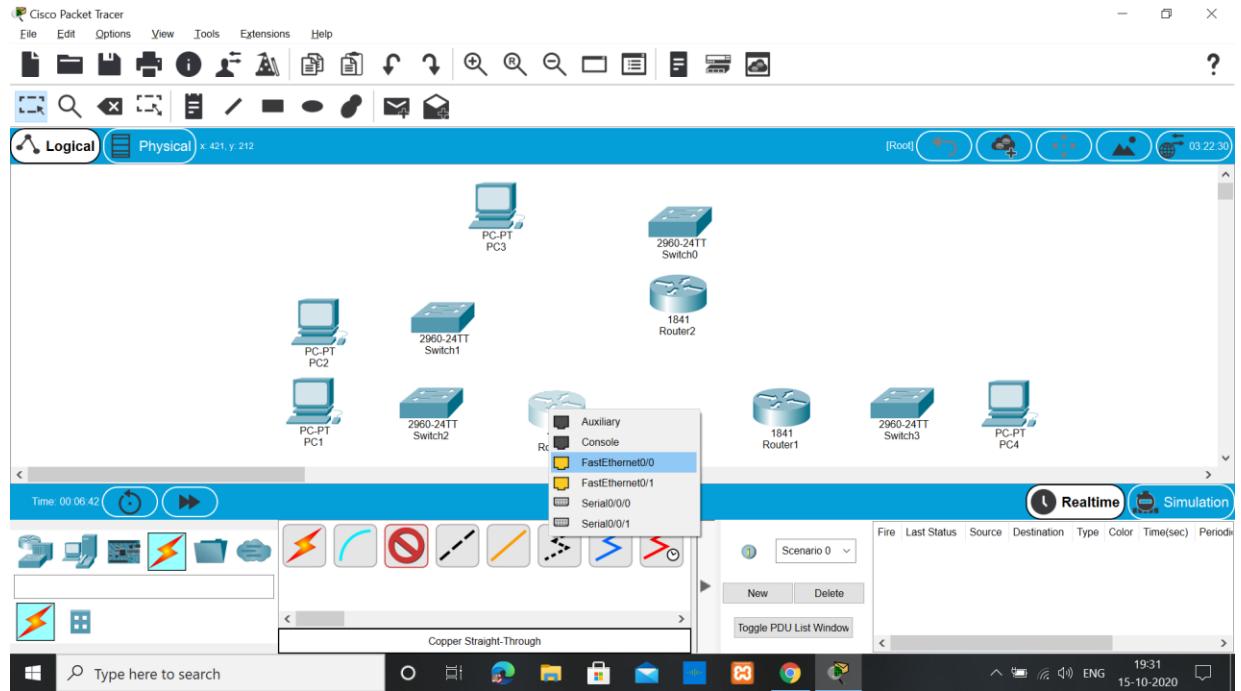
The network shown in the Topology Diagram contains a discontiguous network, 172.30.0.0. This network has been subnetted using VLSM. The 172.30.0.0 subnets are physically and logically divided by at least one other classful or major network, in this case the two serial networks 209.165.200.228/30 and 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.

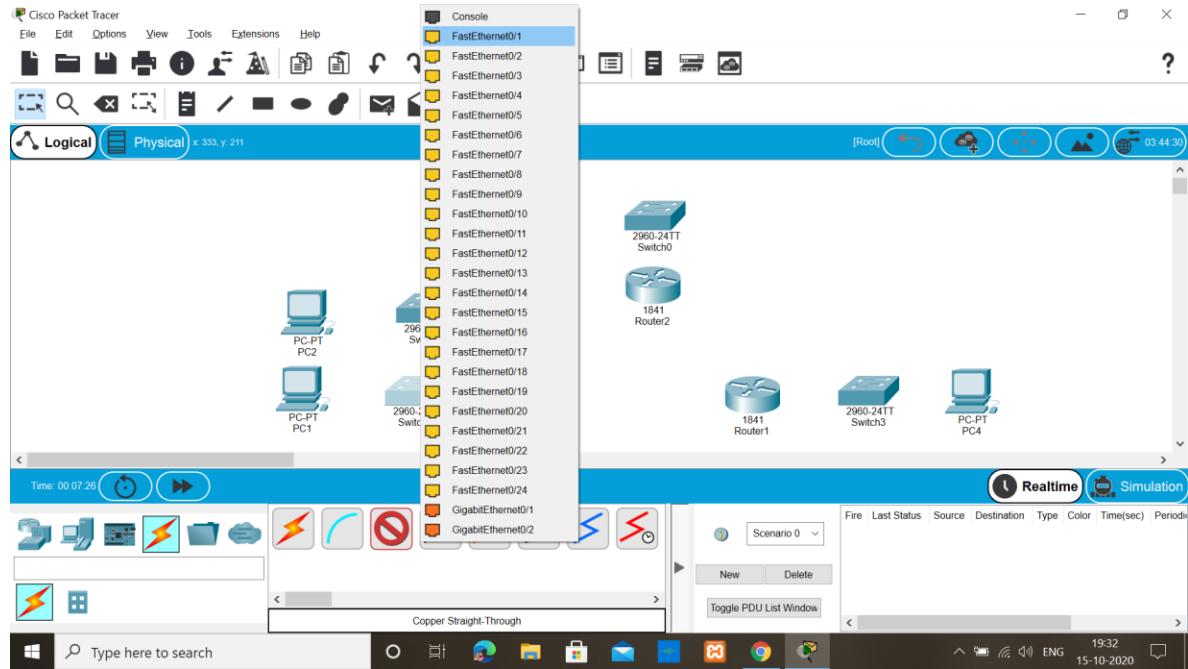
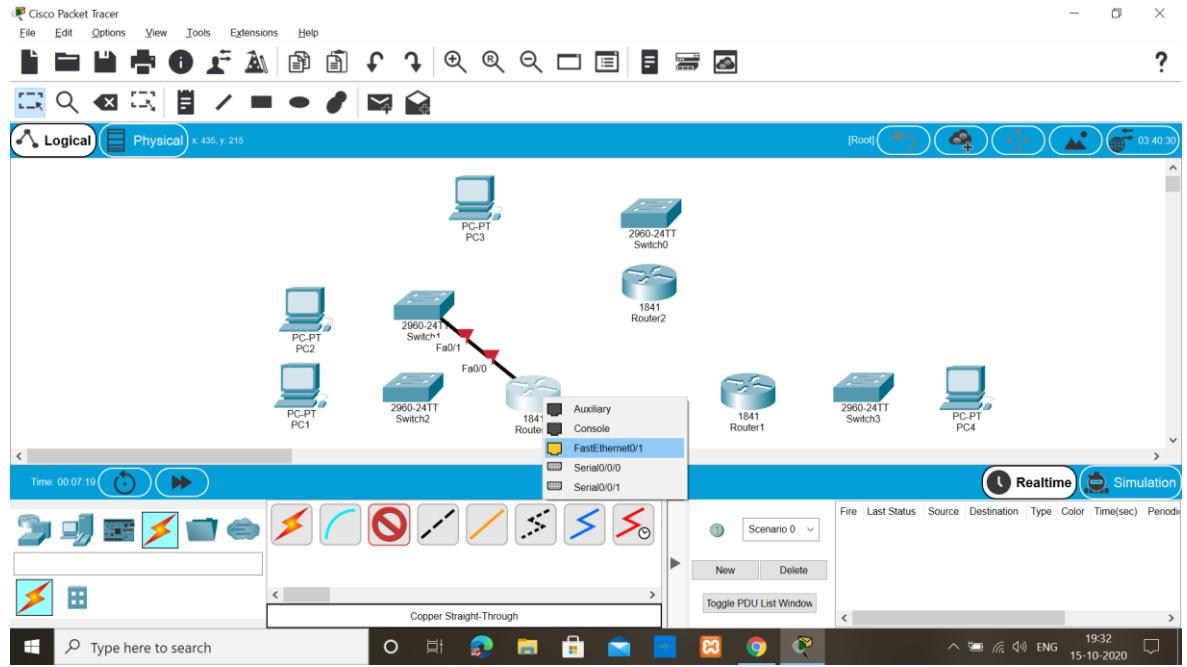
Task 1: Cable, Erase, and Reload the Routers.

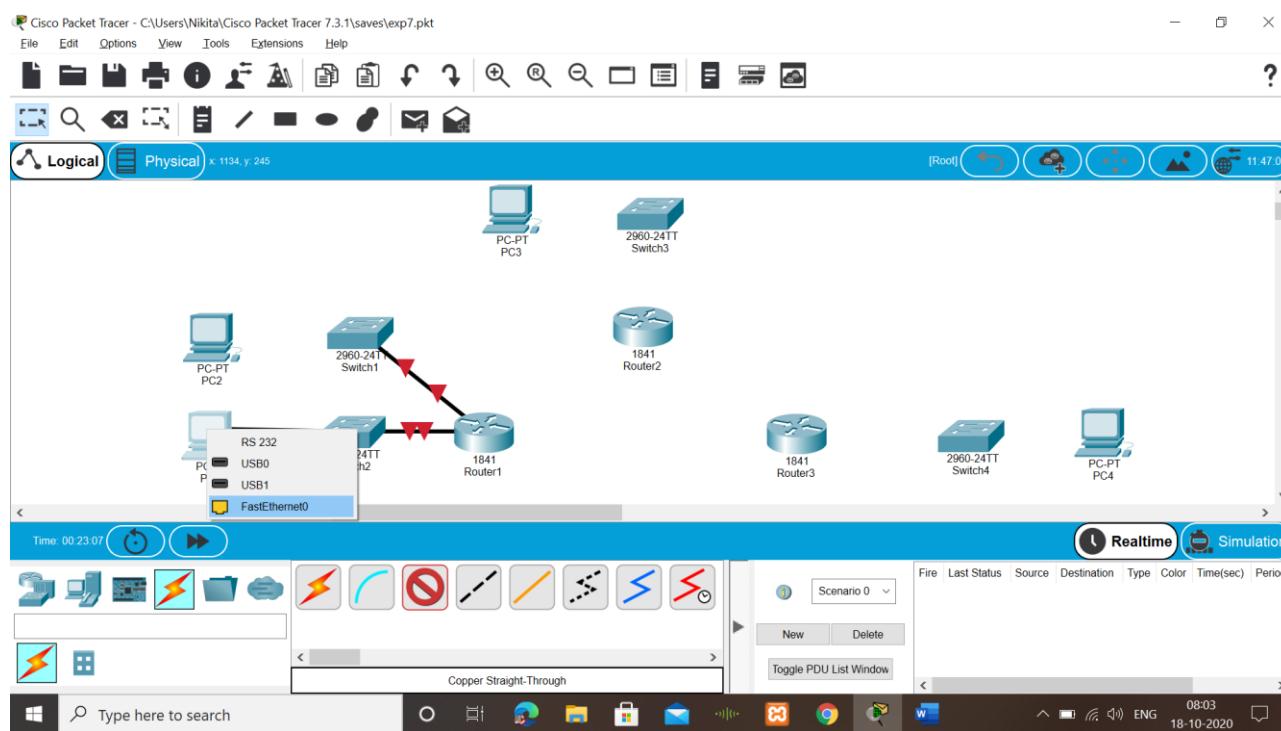
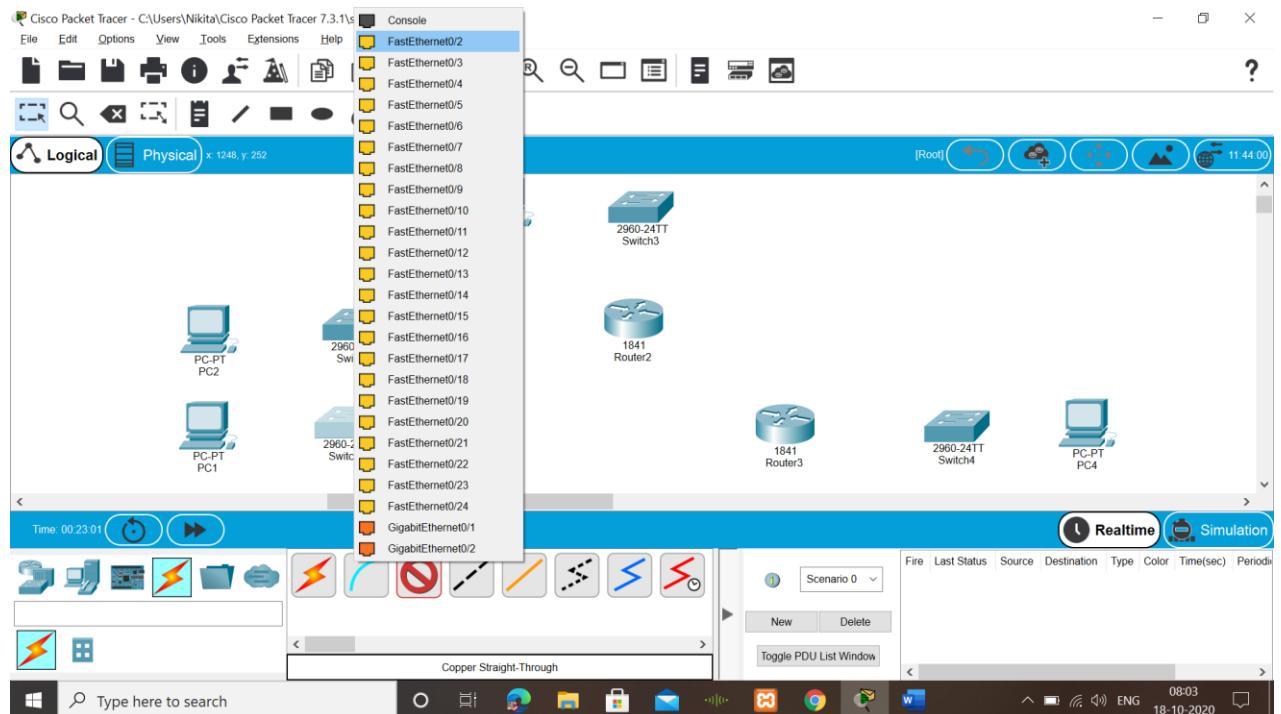
Step 1: Cable a network.

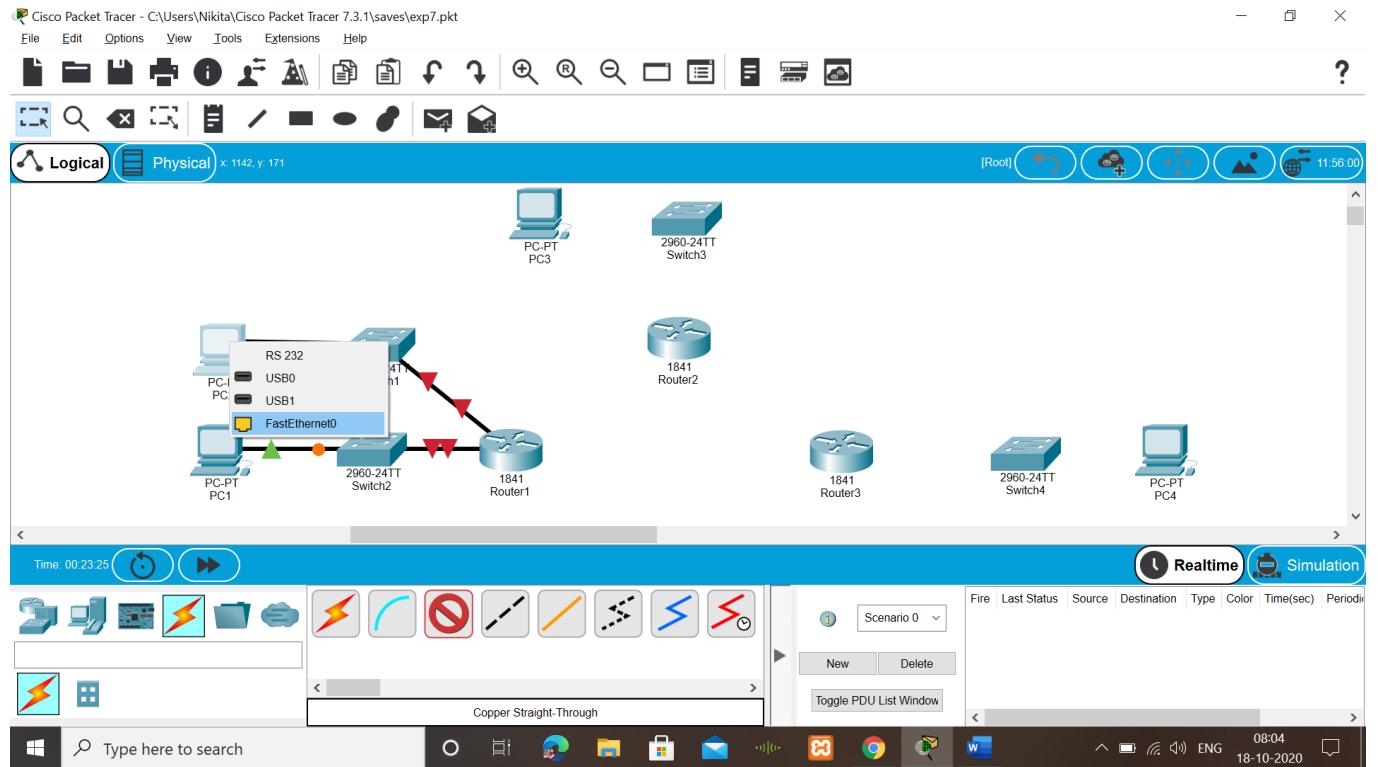
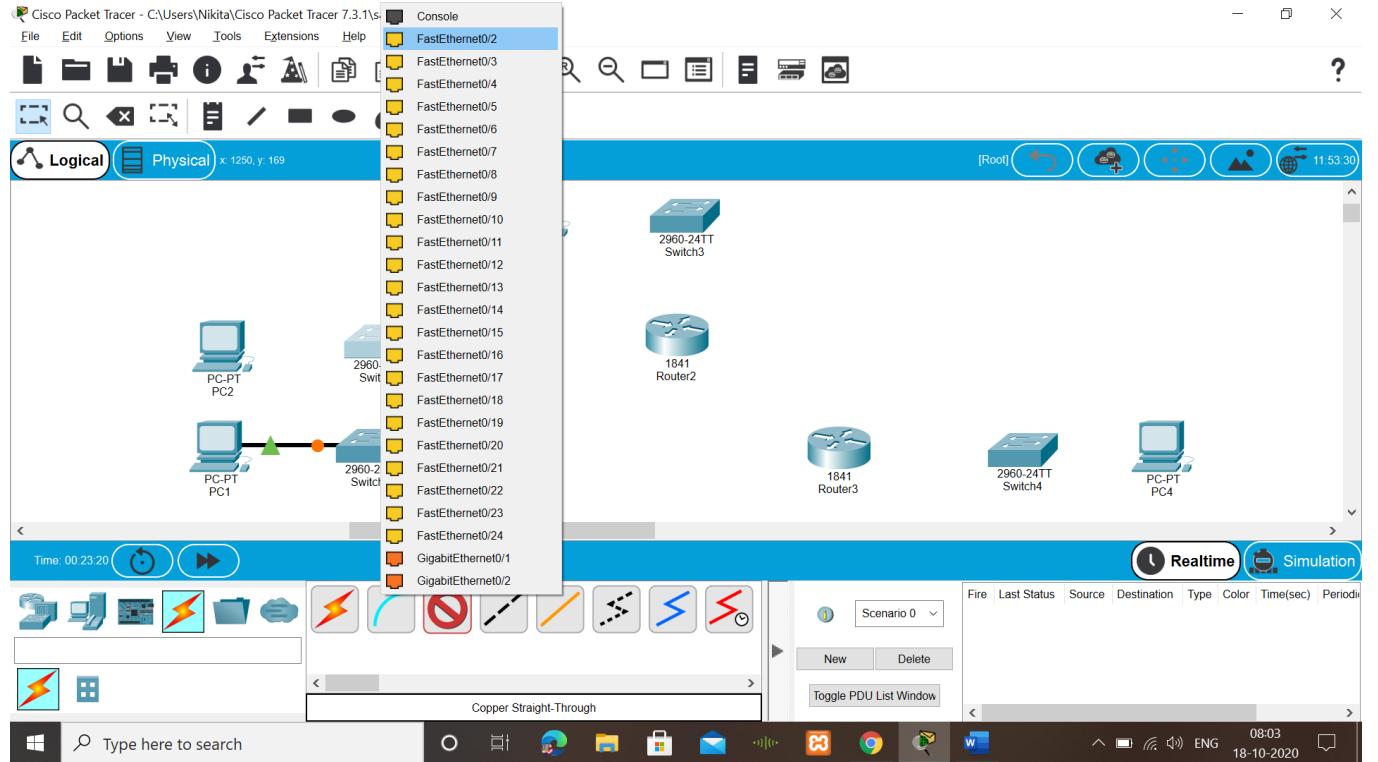
Cable a network that is similar to the one in the Topology Diagram.

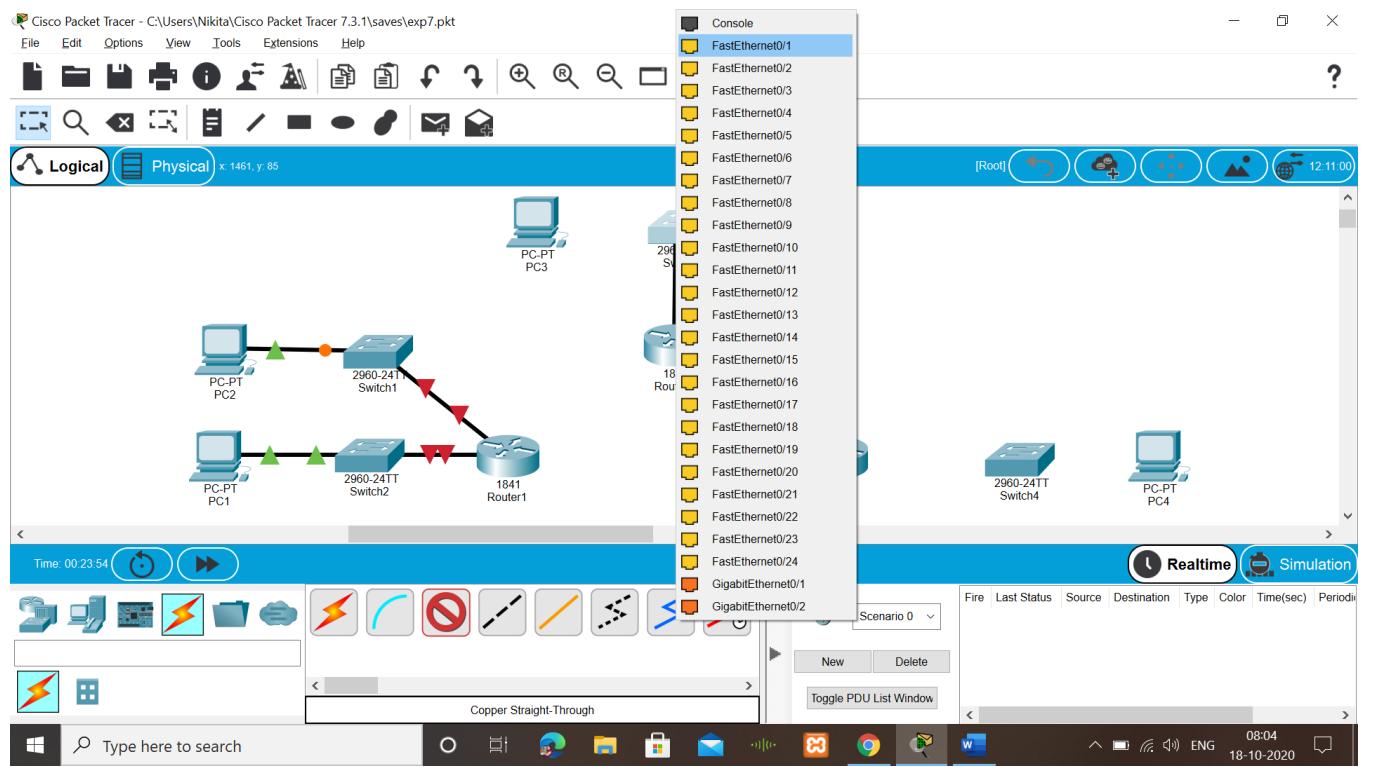
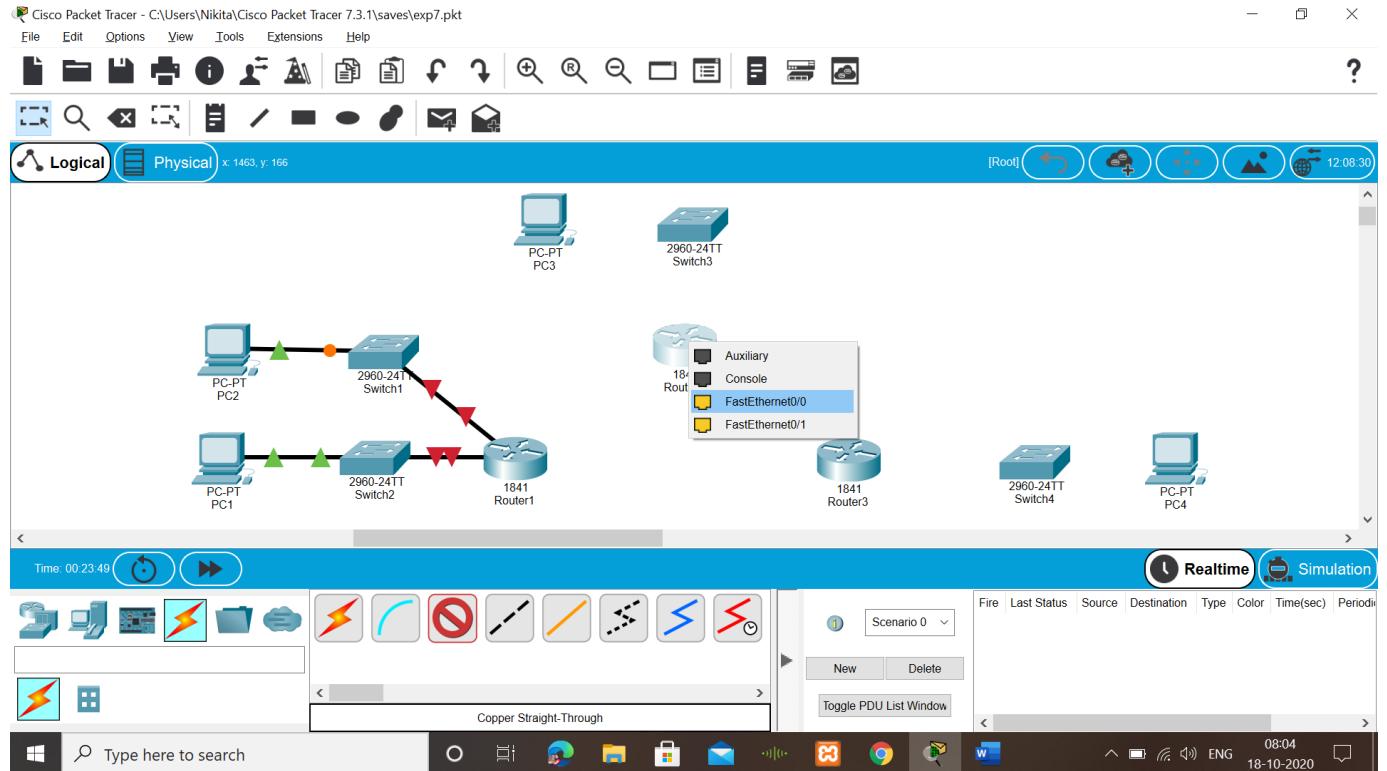


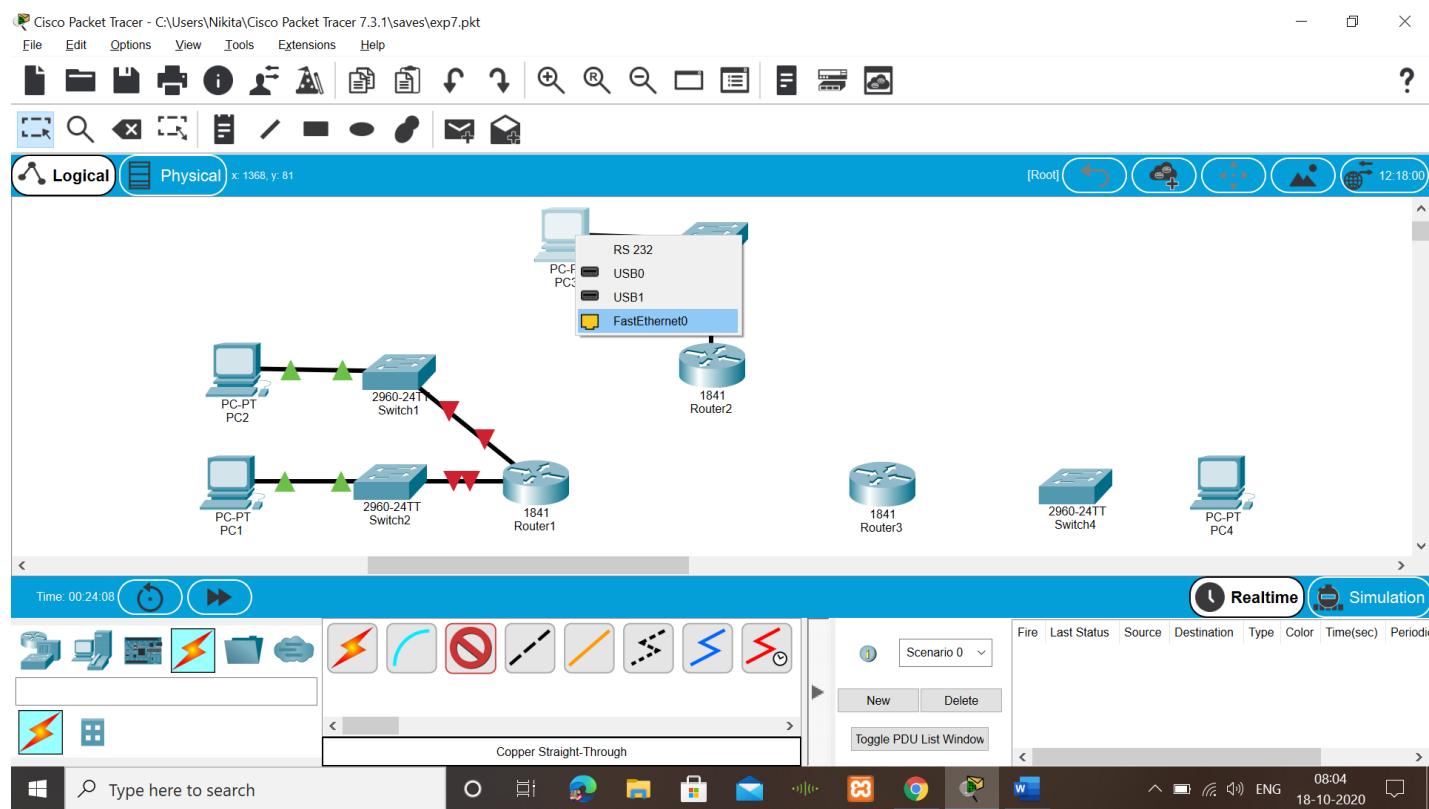
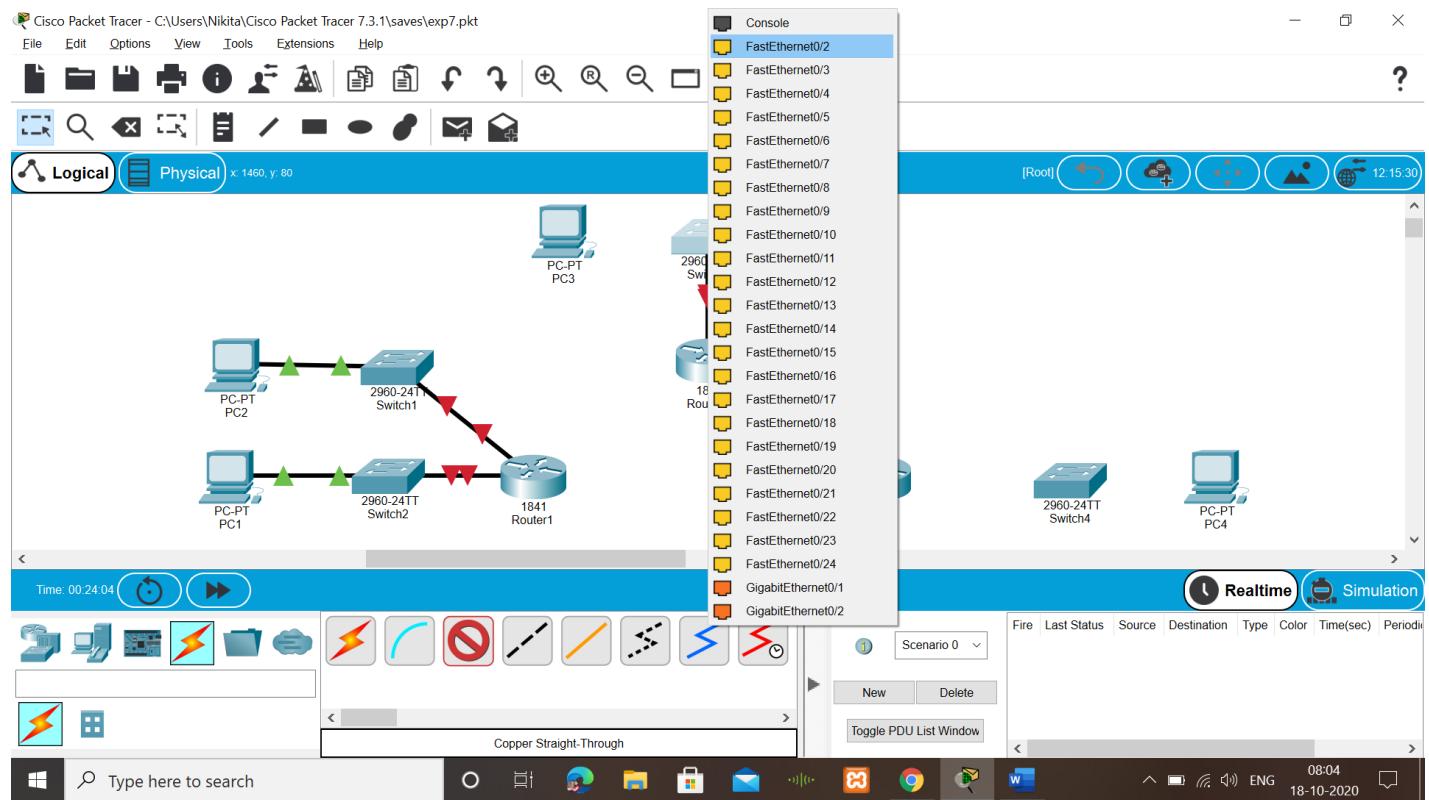


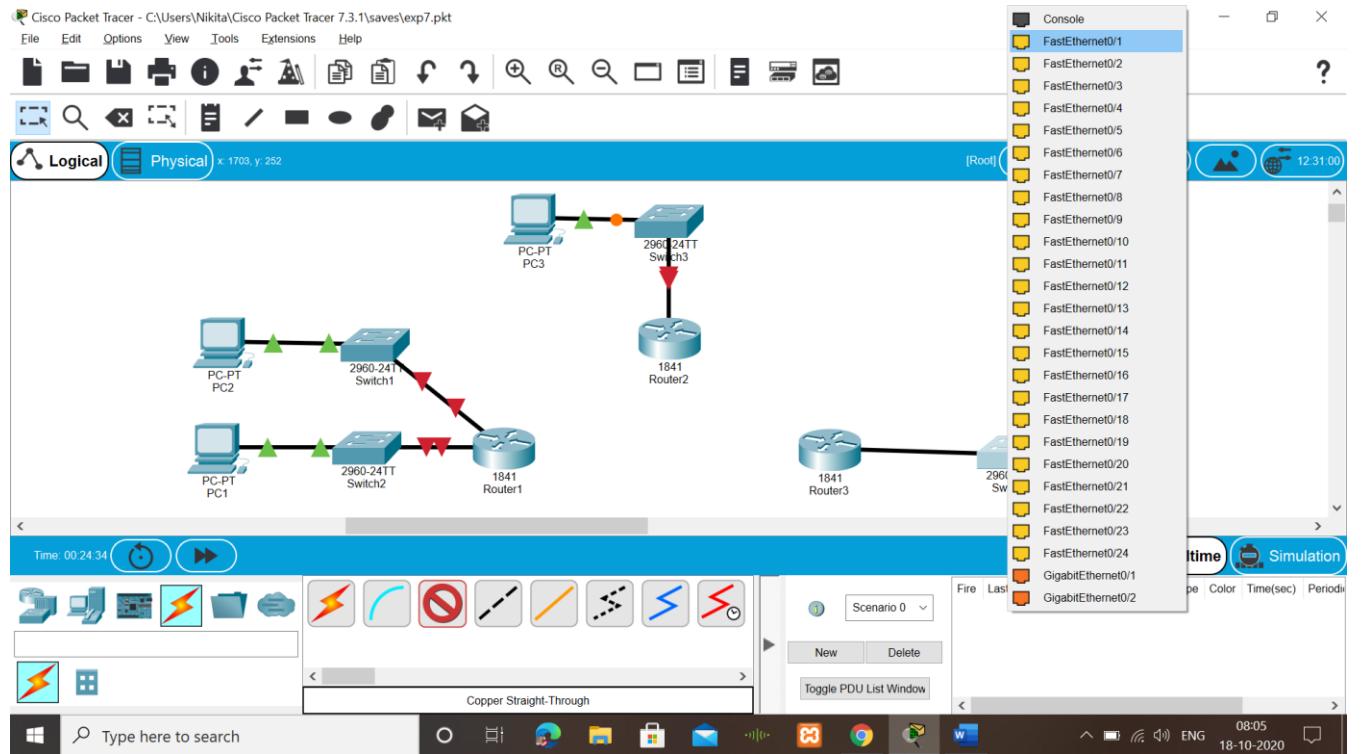
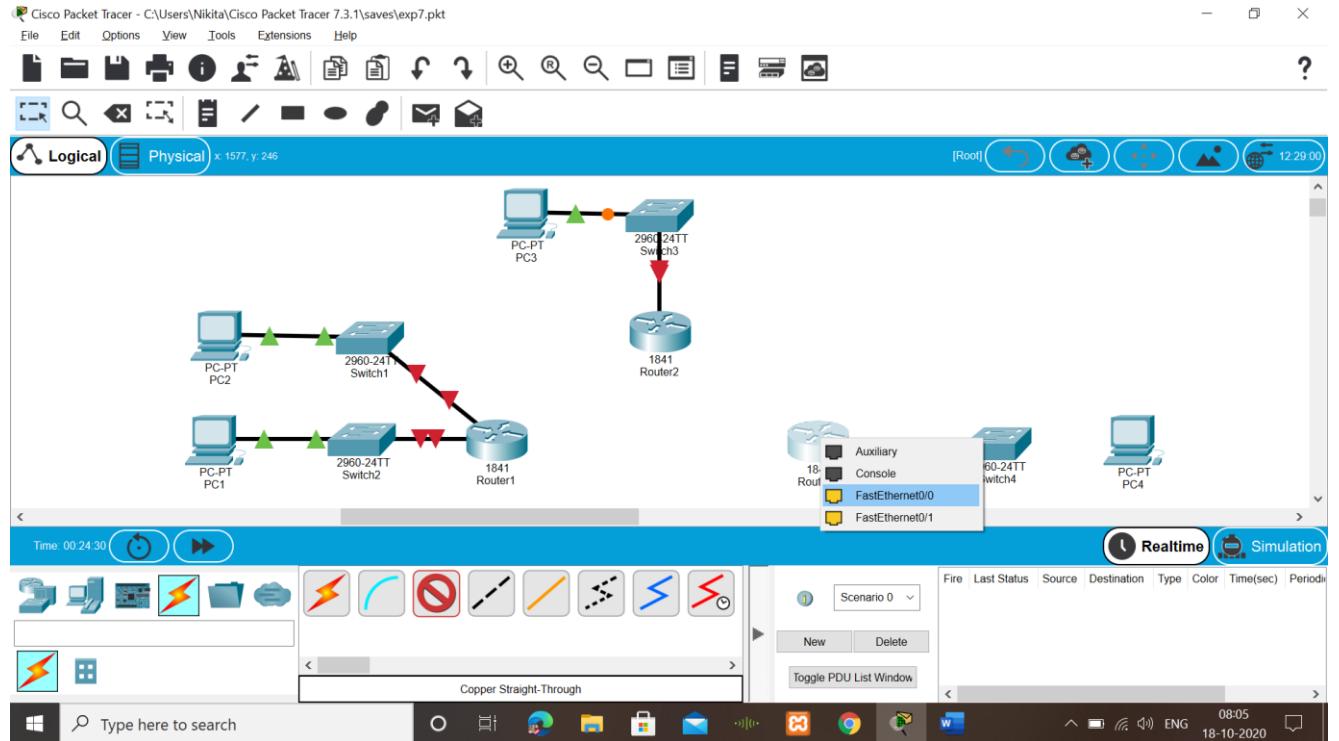


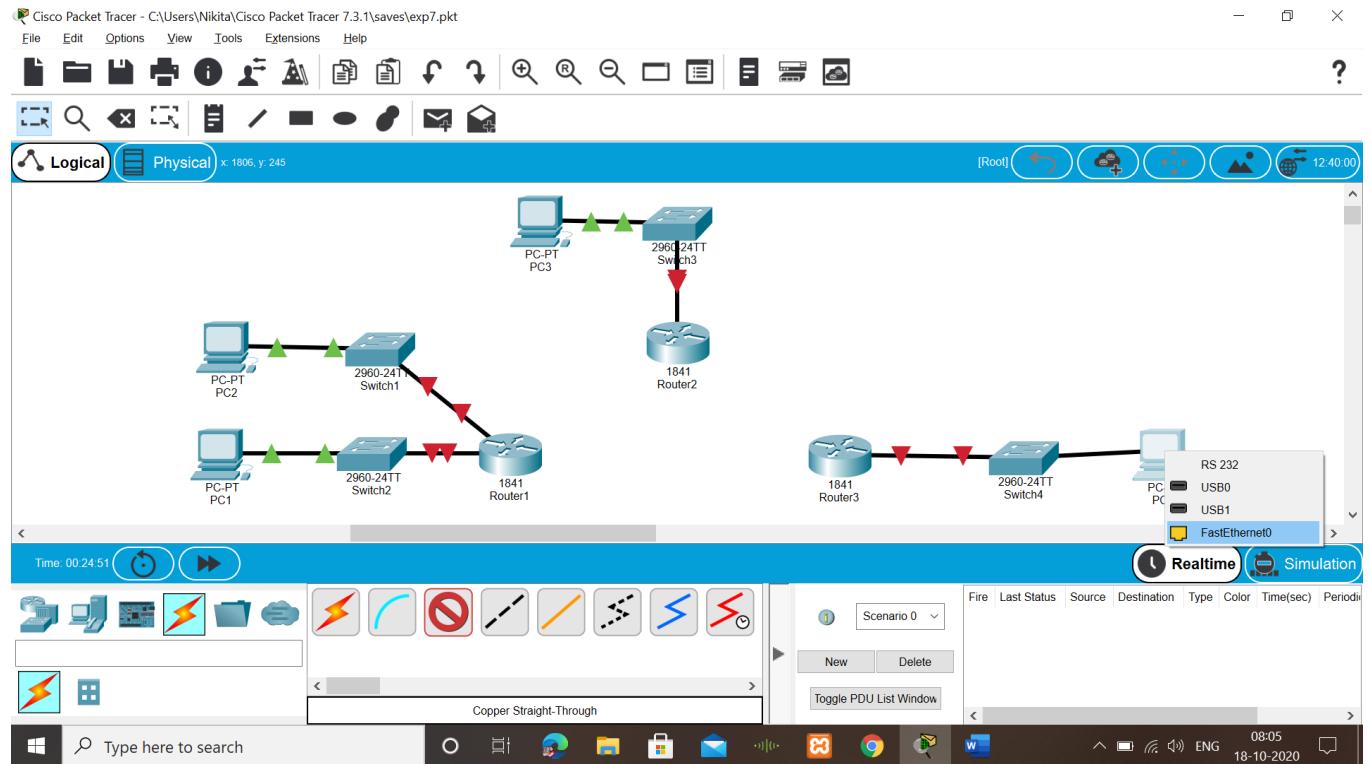
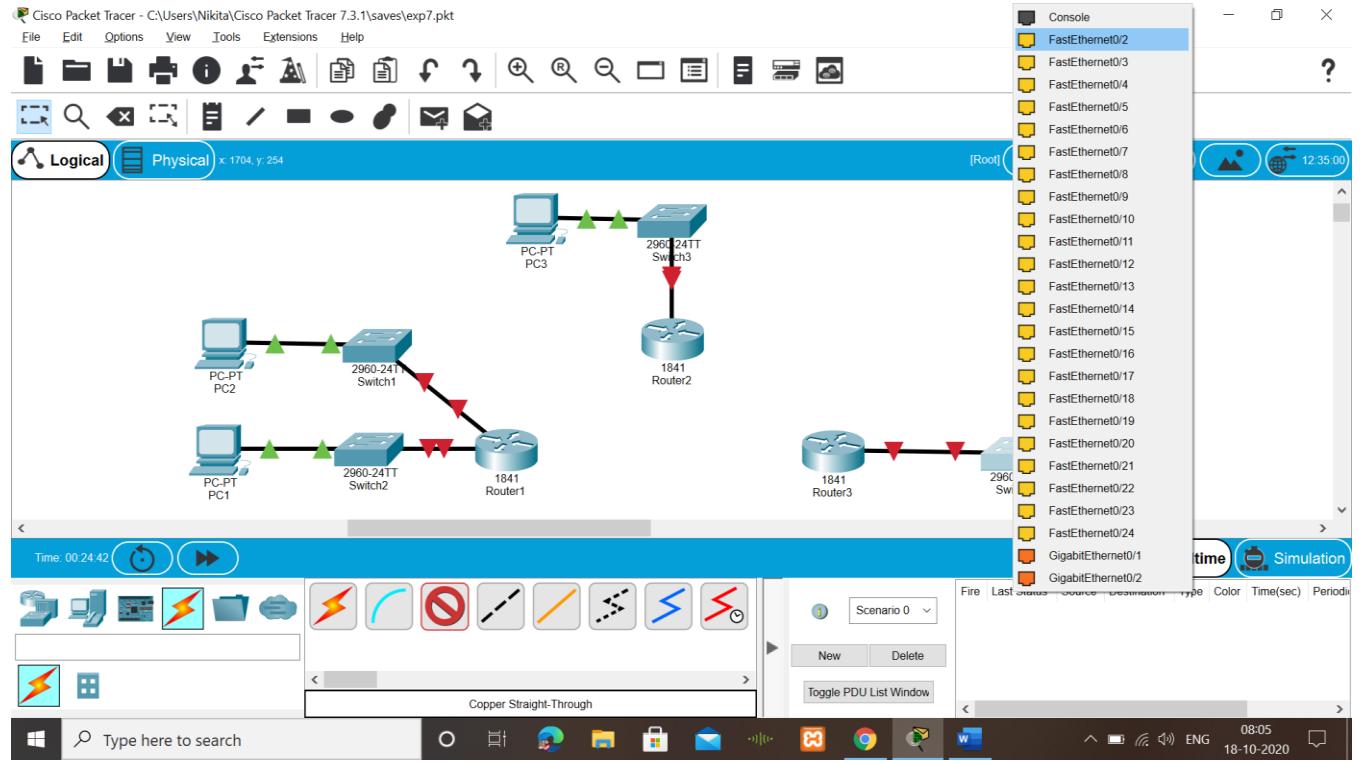


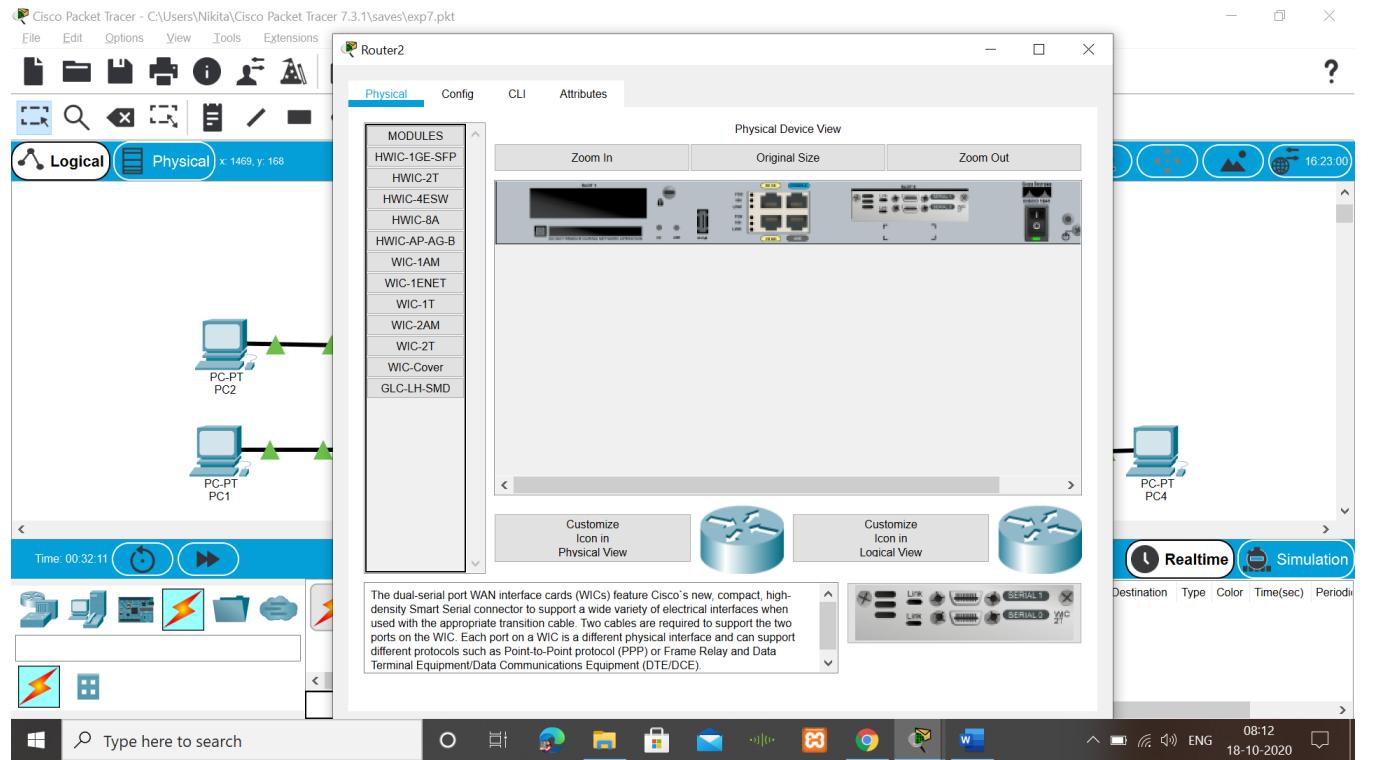
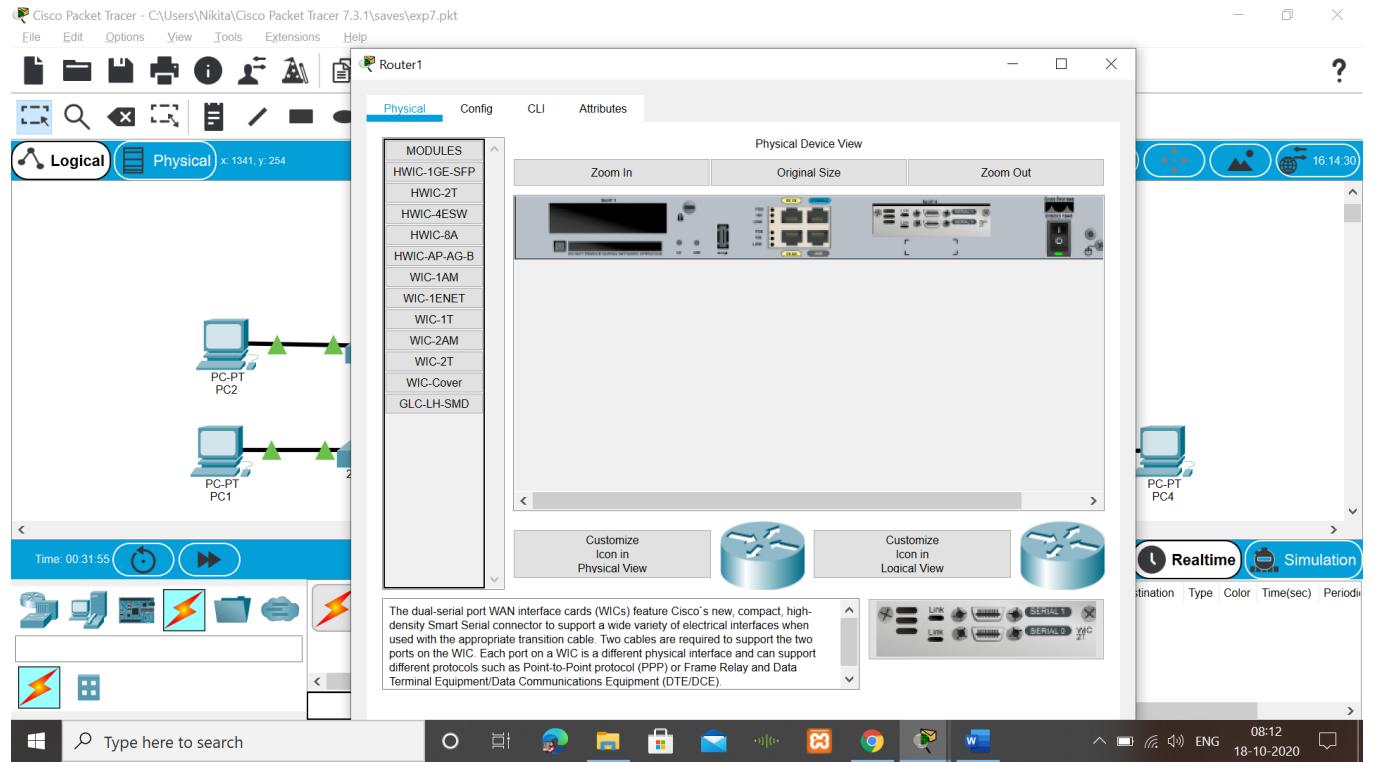


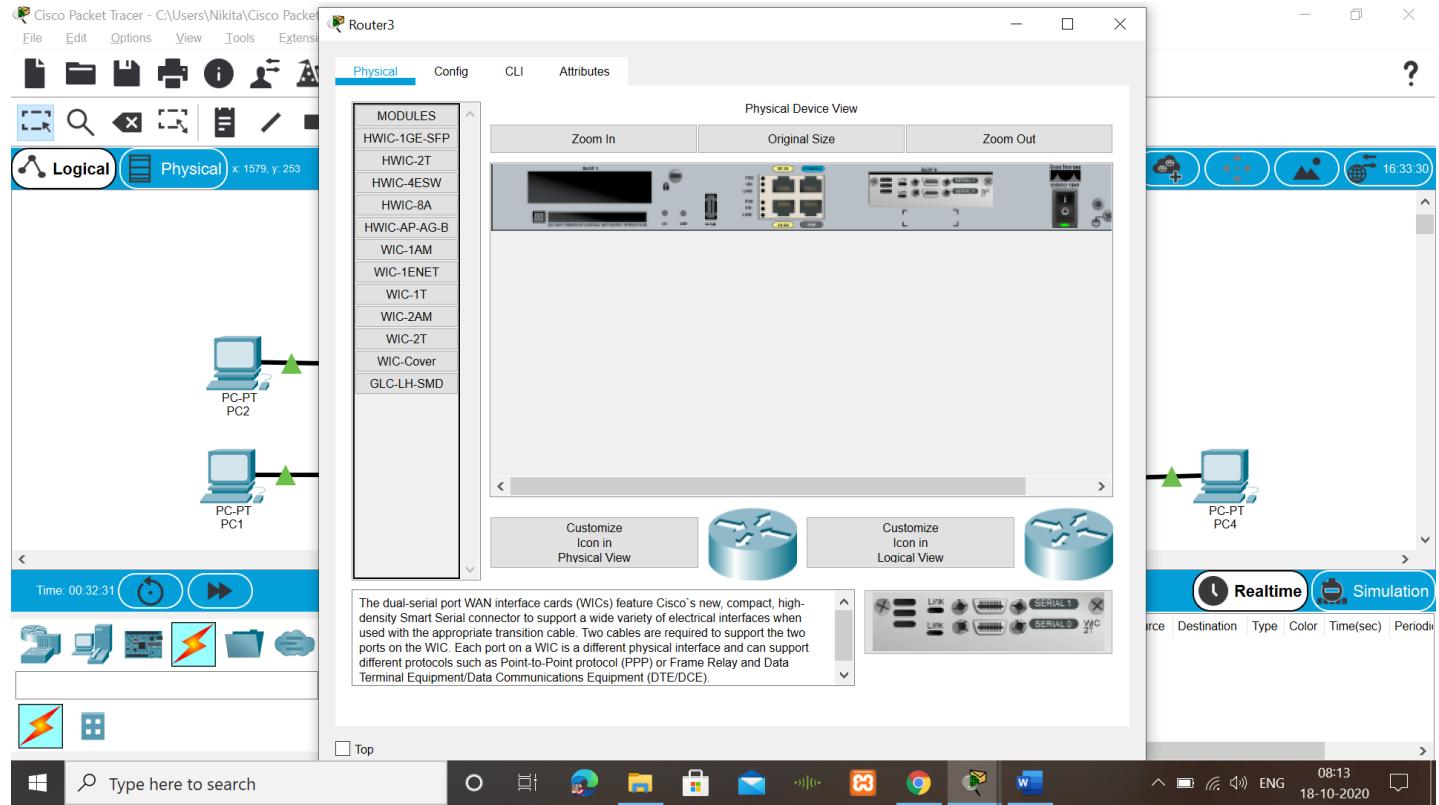


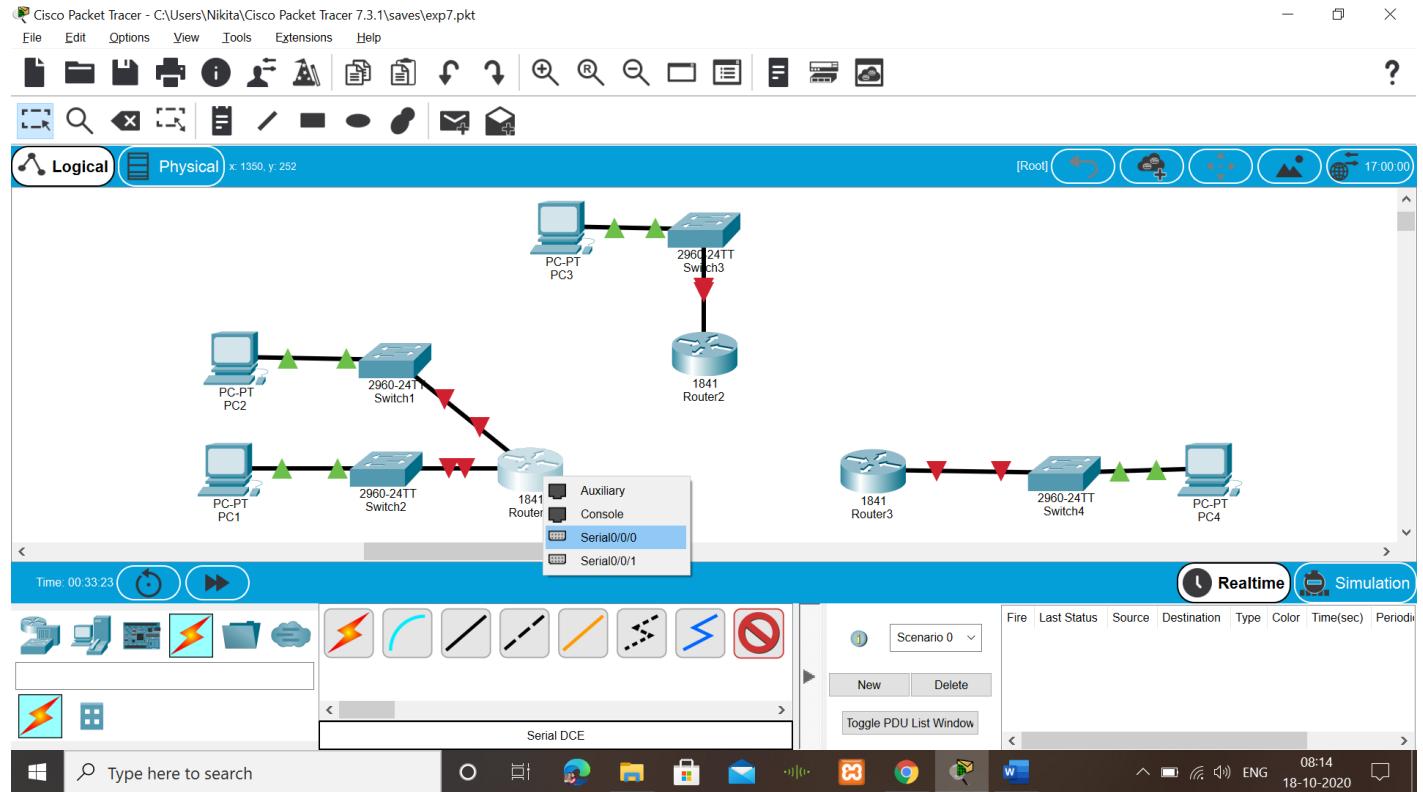


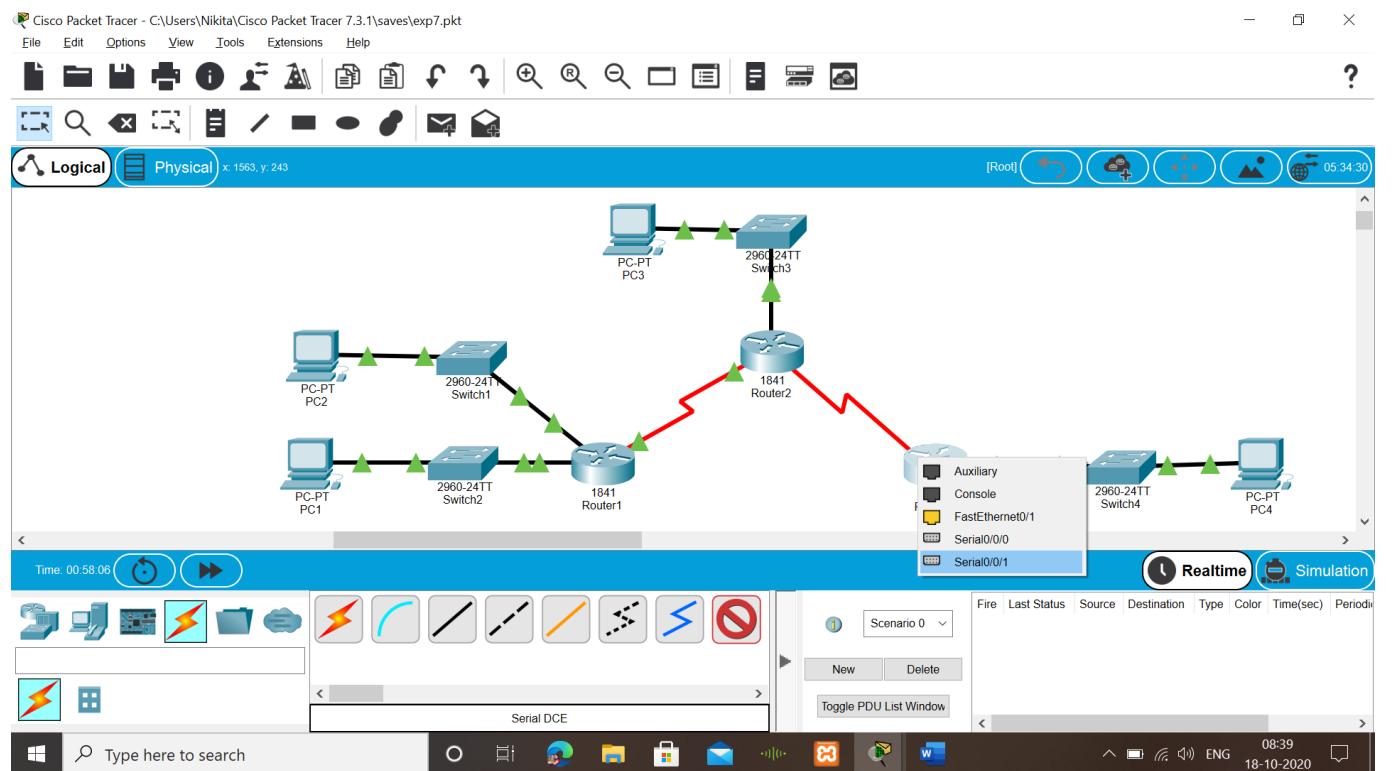
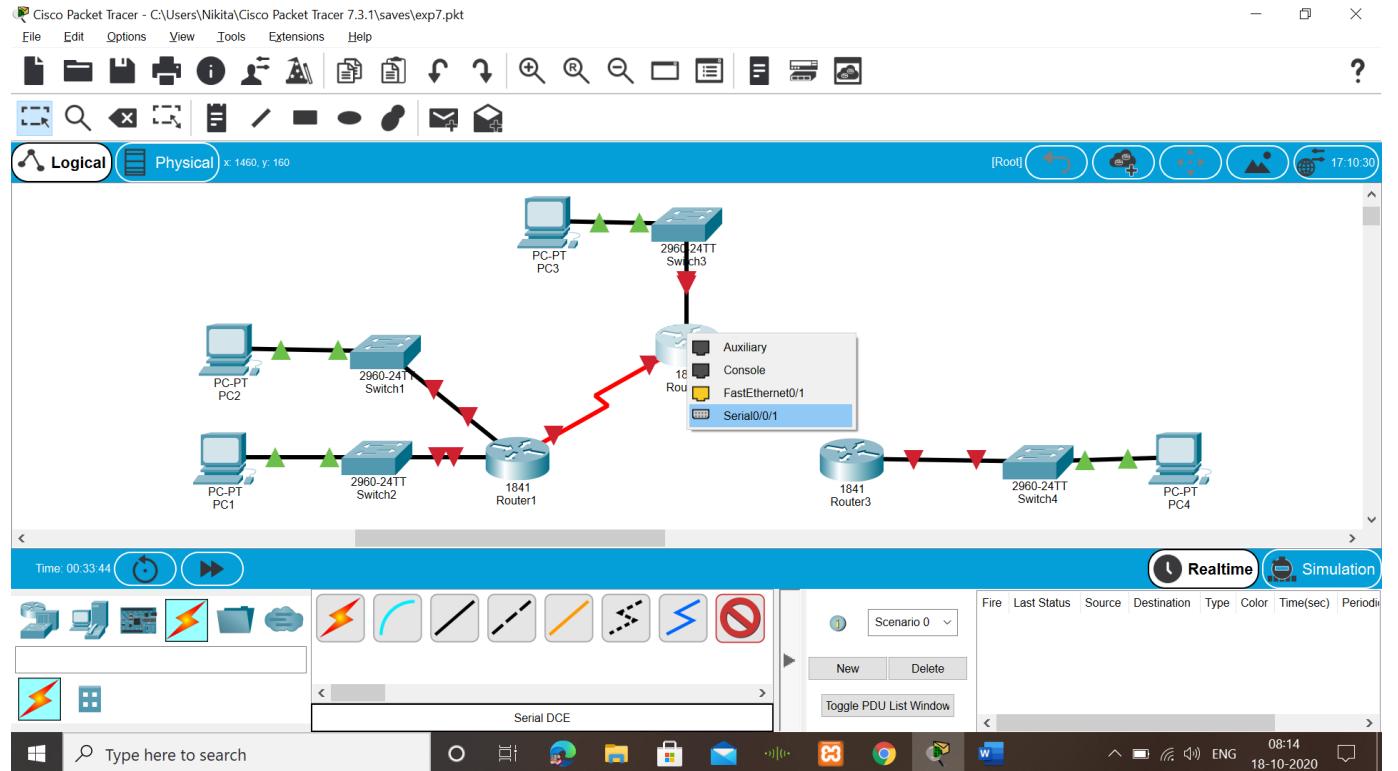






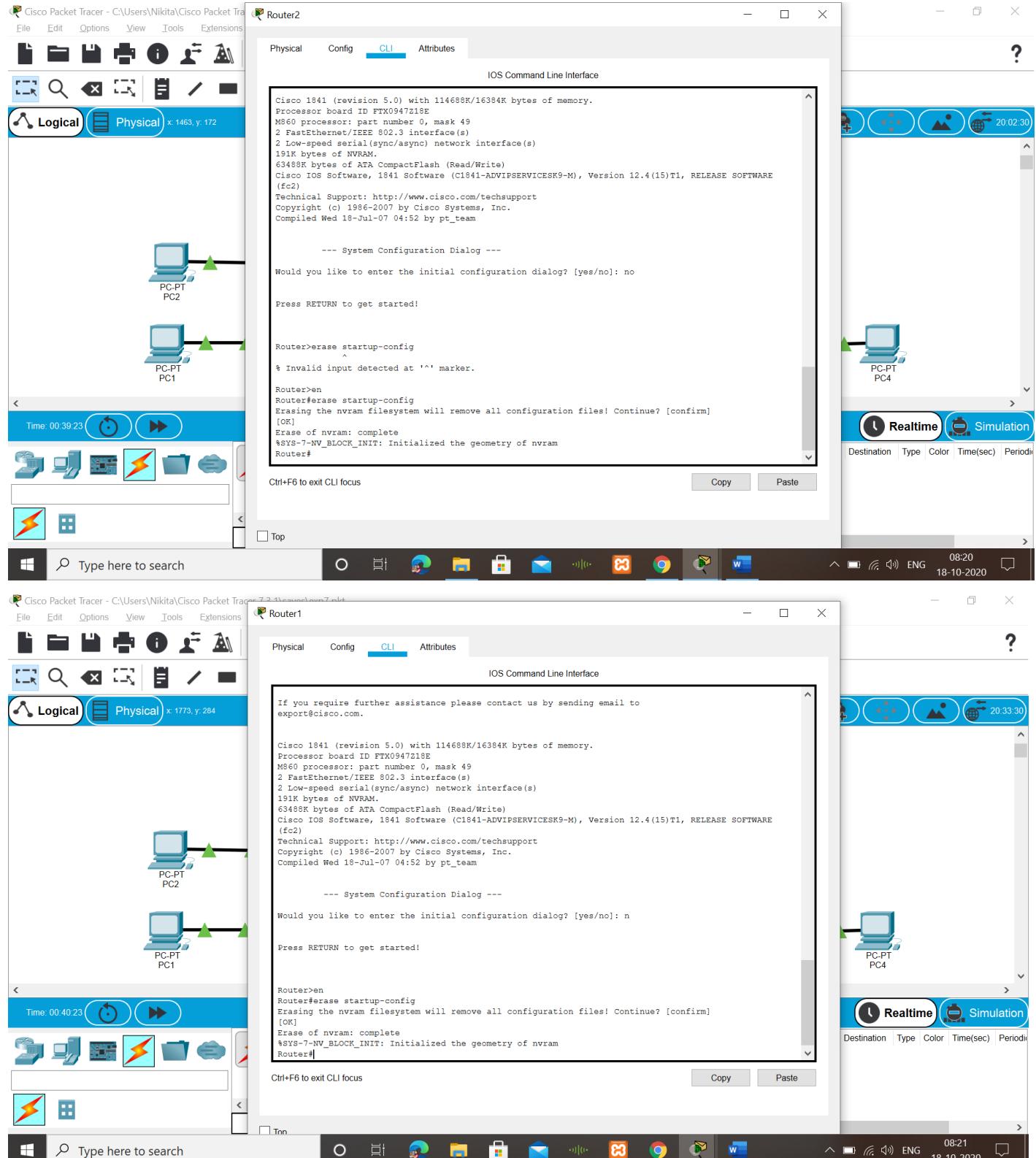


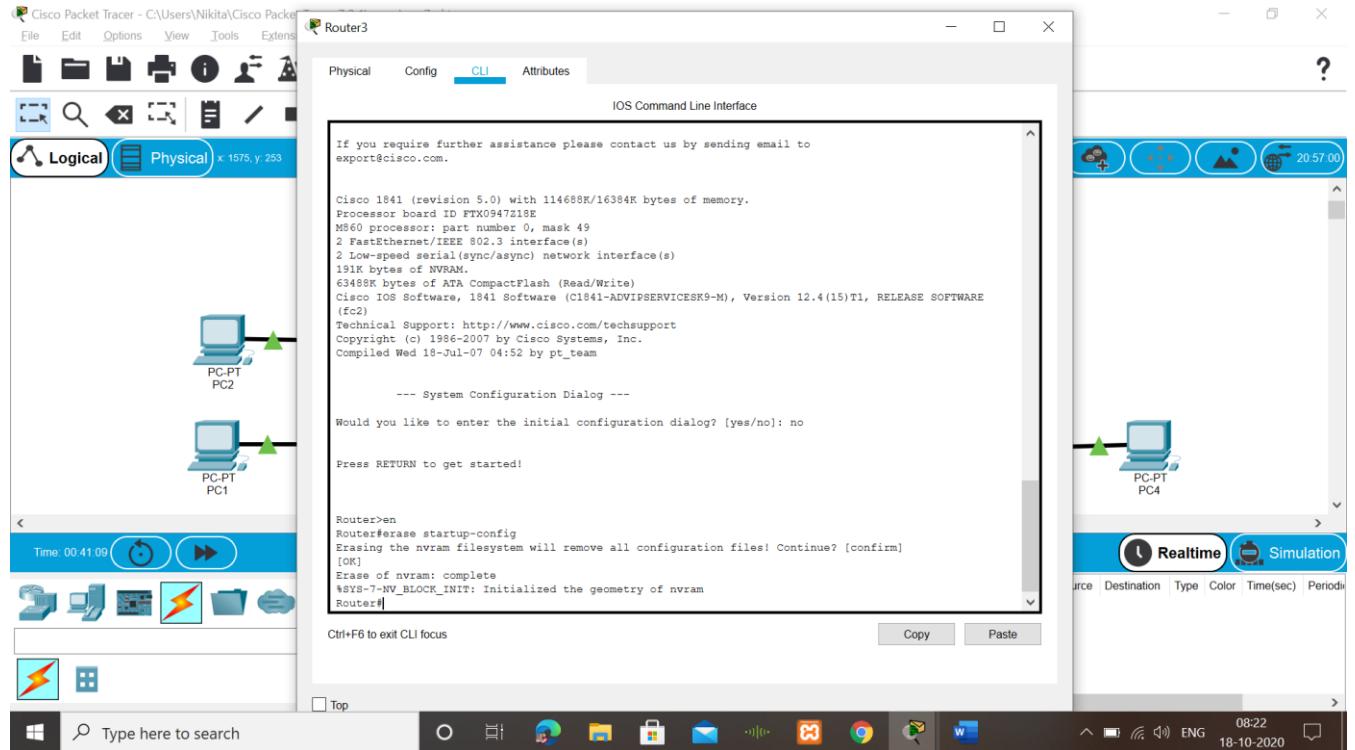




Step 2: Clear the configuration on each router.

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.





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
```

The screenshot shows a Cisco Packet Tracer simulation window titled "Router". The interface is divided into several sections: a toolbar at the top with icons for file operations, a navigation bar with "Logical" and "Physical" tabs, a main canvas with two computer icons connected to a "2960-2 Switch", a log window displaying configuration commands and system events, and a bottom toolbar with various icons and status indicators.

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface FastEthernet0/0
R1(config-if)# ip address 172.30.1.1 255.255.255.0
R1(config-if)# duplex auto
R1(config-if)# speed auto
R1(config-if)# no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-0-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R1(config-if)#exit
R1(config)#interface FastEthernet0/1
R1(config-if)# ip address 172.30.2.1 255.255.255.0
R1(config-if)# duplex auto
R1(config-if)# speed auto
R1(config-if)# no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-0-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

R1(config-if)#exit
R1(config)#interface Serial0/0/0
R1(config-if)# ip address 209.165.200.230 255.255.255.252
R1(config-if)# clock rate 64000
R1(config-if)# no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#exit

The screenshot shows a Cisco Packet Tracer simulation window. On the left, there's a toolbar with icons for file operations, a search bar, and a 'Type here to search' input field. The main area displays a network diagram with two hosts (PC1 and PC2) connected to two switches (2960-24 and 2960-2). A router (Router1) is connected to both switches. The Router1 interface configuration is shown in the central CLI window:

```
R1(config-if)# duplex auto
R1(config-if)# speed auto
R1(config-if)# no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

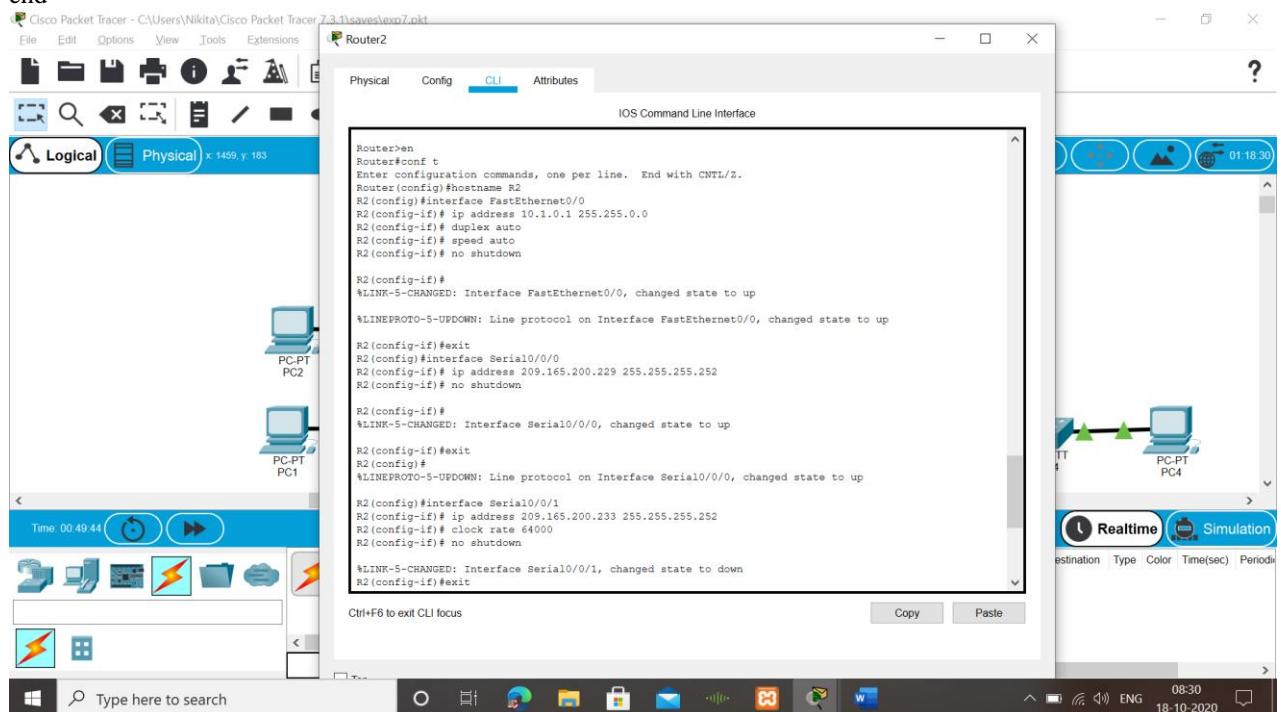
R1(config-if)#exit
R1(config)interface Serial0/0
R1(config-if)# ip address 209.165.200.230 255.255.255.252
R1(config-if)# clock rate 64000
R1(config-if)# no shutdown

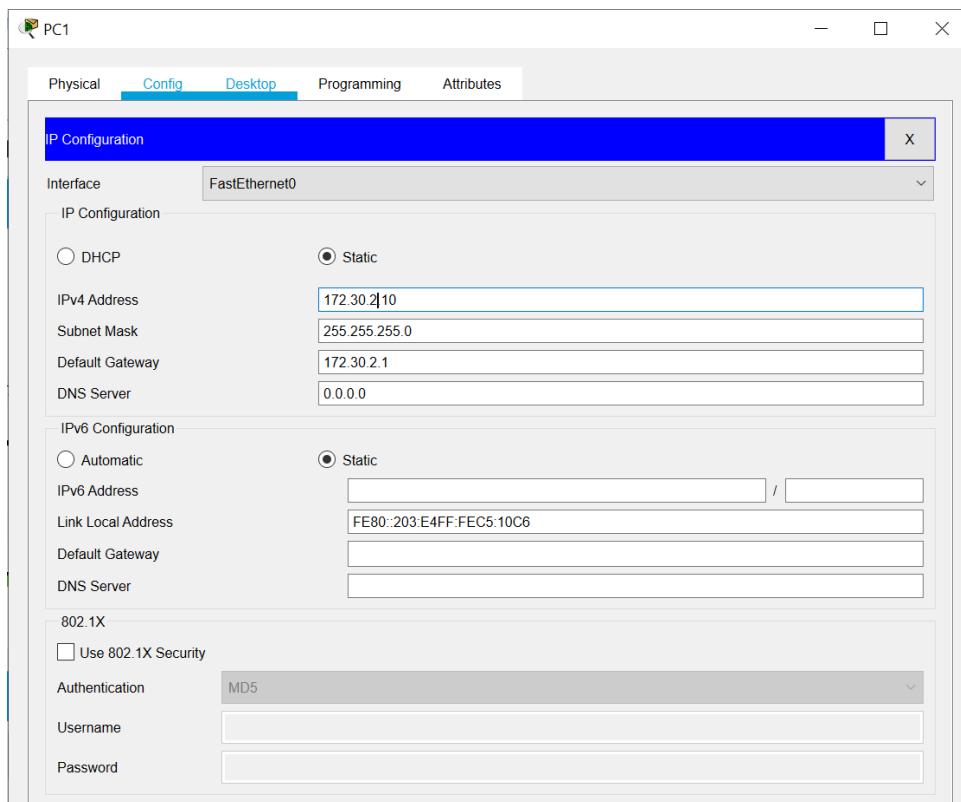
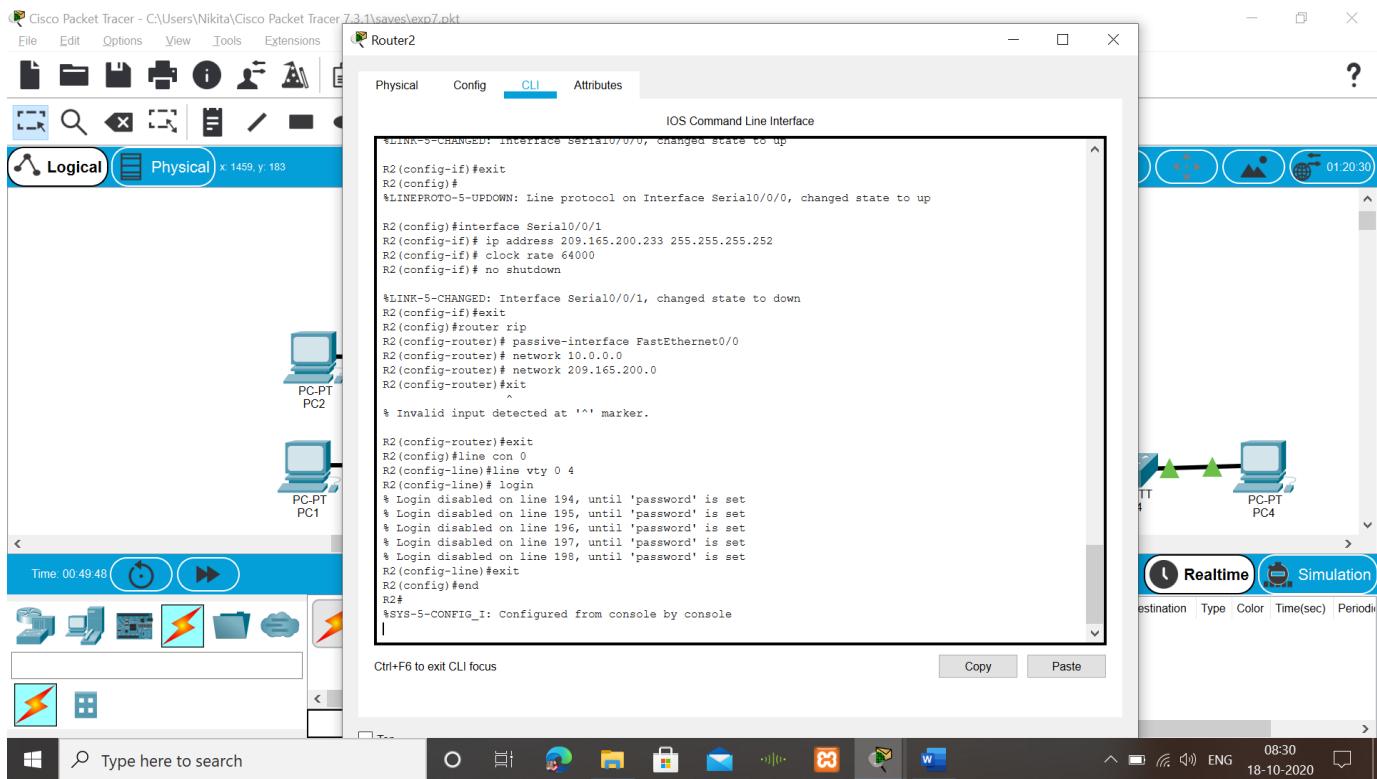
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#exit
R1(config)#router rip
R1(config-router)# passive-interface FastEthernet0/0
R1(config-router)# passive-interface FastEthernet0/1
R1(config-router)# network 172.30.0.0
R1(config-router)# network 209.165.200.0
R1(config-router)#exit
R1(config-line)#line vty 0 4
R1(config-line)#login
R1(config-line)#
% Login disabled on line 194, until 'password' is set
% Login disabled on line 195, until 'password' is set
% Login disabled on line 196, until 'password' is set
% Login disabled on line 197, until 'password' is set
% Login disabled on line 198, until 'password' is set
R1(config-line)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

The bottom status bar shows the time as 08:26, date as 18-10-2020, and language as ENG.

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
```





PC2

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

DHCP Static

IPv4 Address: 172.30.1|10

Subnet Mask: 255.255.255.0

Default Gateway: 172.30.1.1

DNS Server: 0.0.0.0

IPv6 Configuration

Automatic Static

IPv6 Address: [] / []

Link Local Address: FE80::200:CFE:FE49:7A02

Default Gateway: []

DNS Server: []

802.1X

Use 802.1X Security

Authentication: MD5

Username: []

Password: []

PC3

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

DHCP Static

IPv4 Address: 10.1.0.10

Subnet Mask: 255.255.0.0

Default Gateway: 10.1.0.1|

DNS Server: 0.0.0.0

IPv6 Configuration

Automatic Static

IPv6 Address: [] / []

Link Local Address: FE80::2E0:B0FF:FE49:350C

Default Gateway: []

DNS Server: []

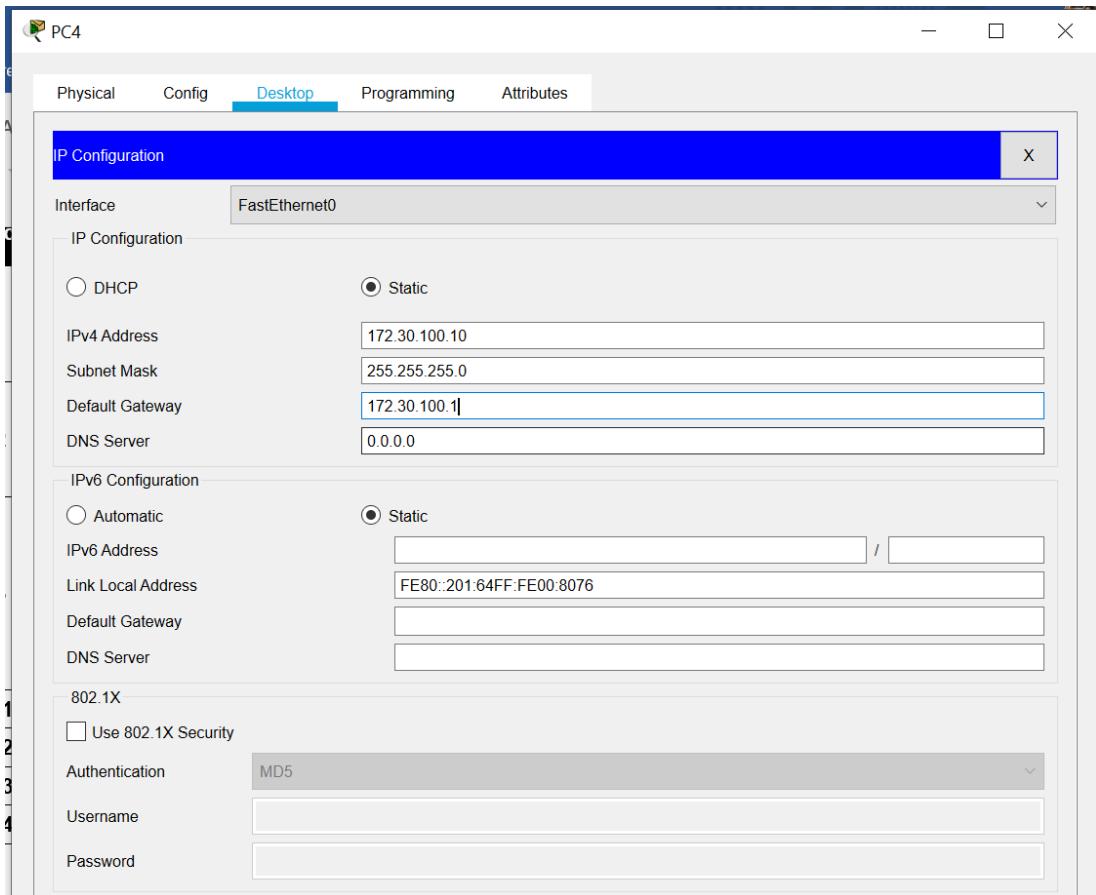
802.1X

Use 802.1X Security

Authentication: MD5

Username: []

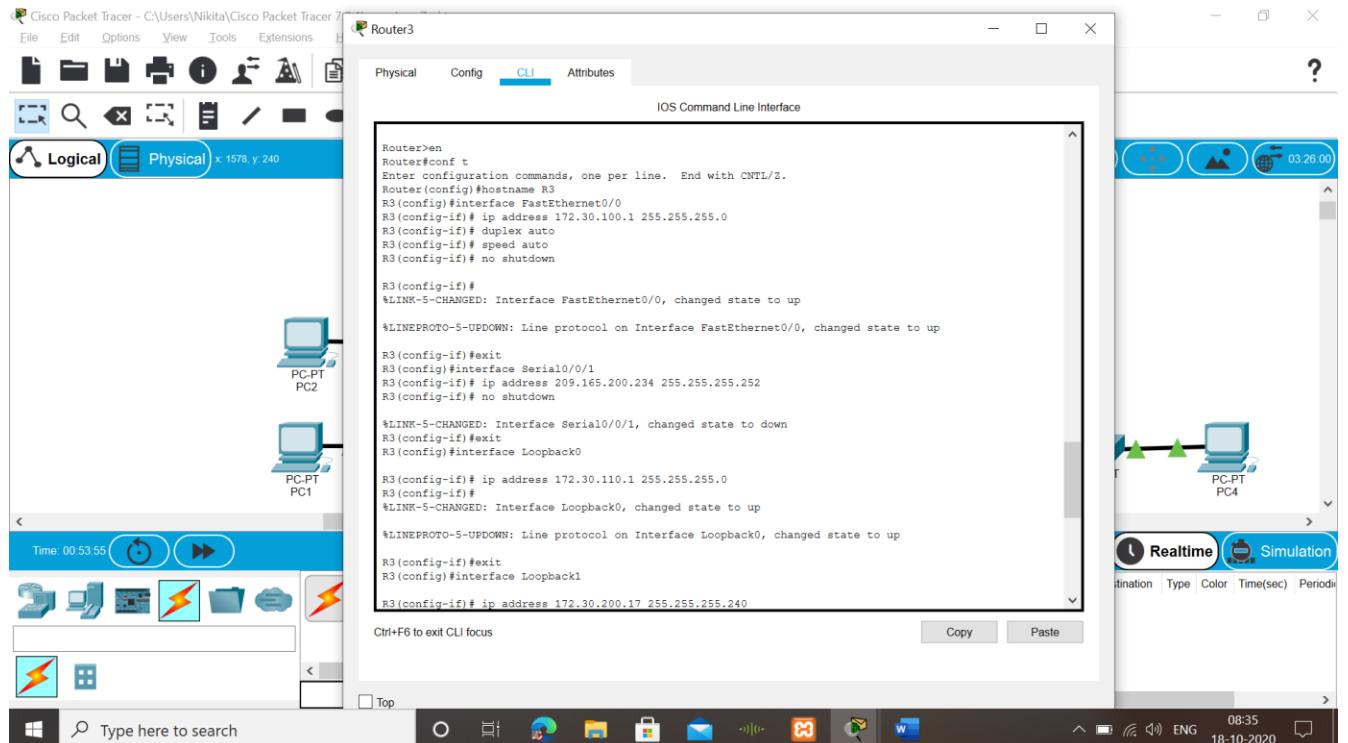
Password: []

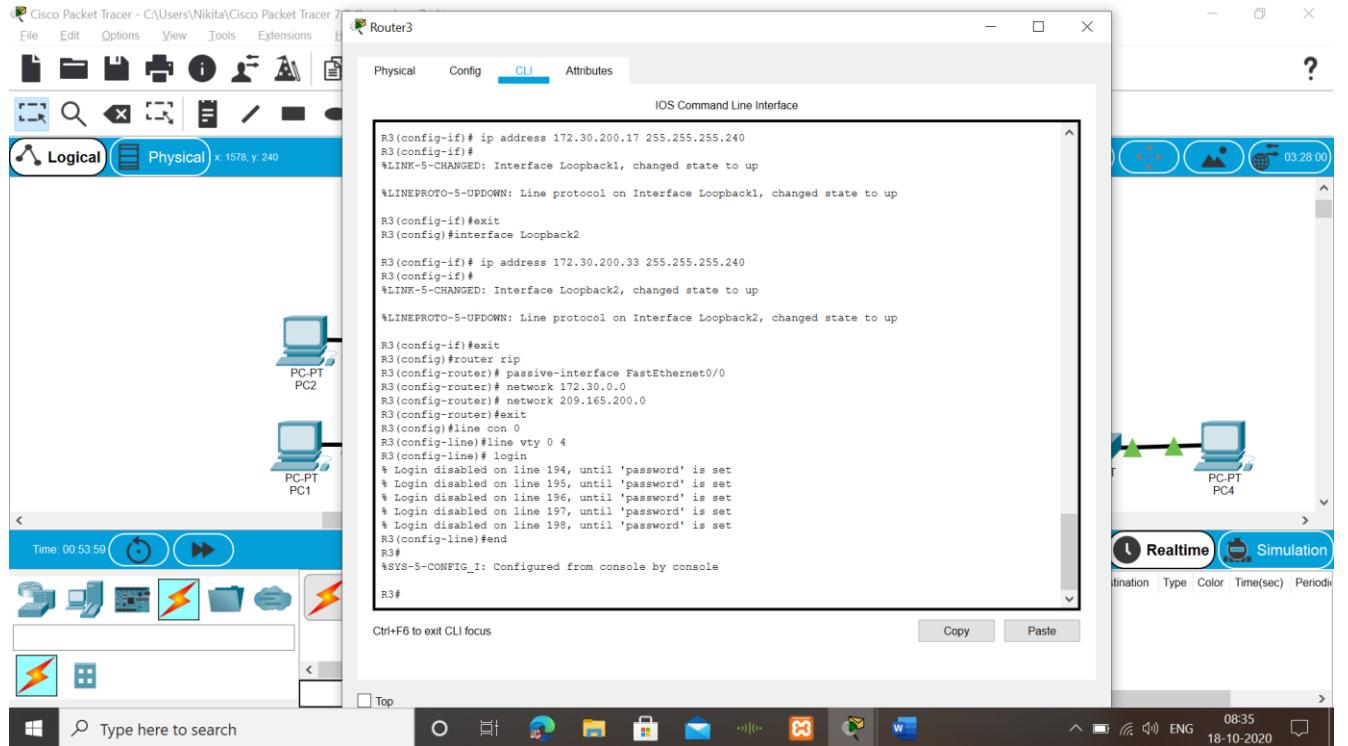


Step 3: Load the following script onto R3.

```
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
```



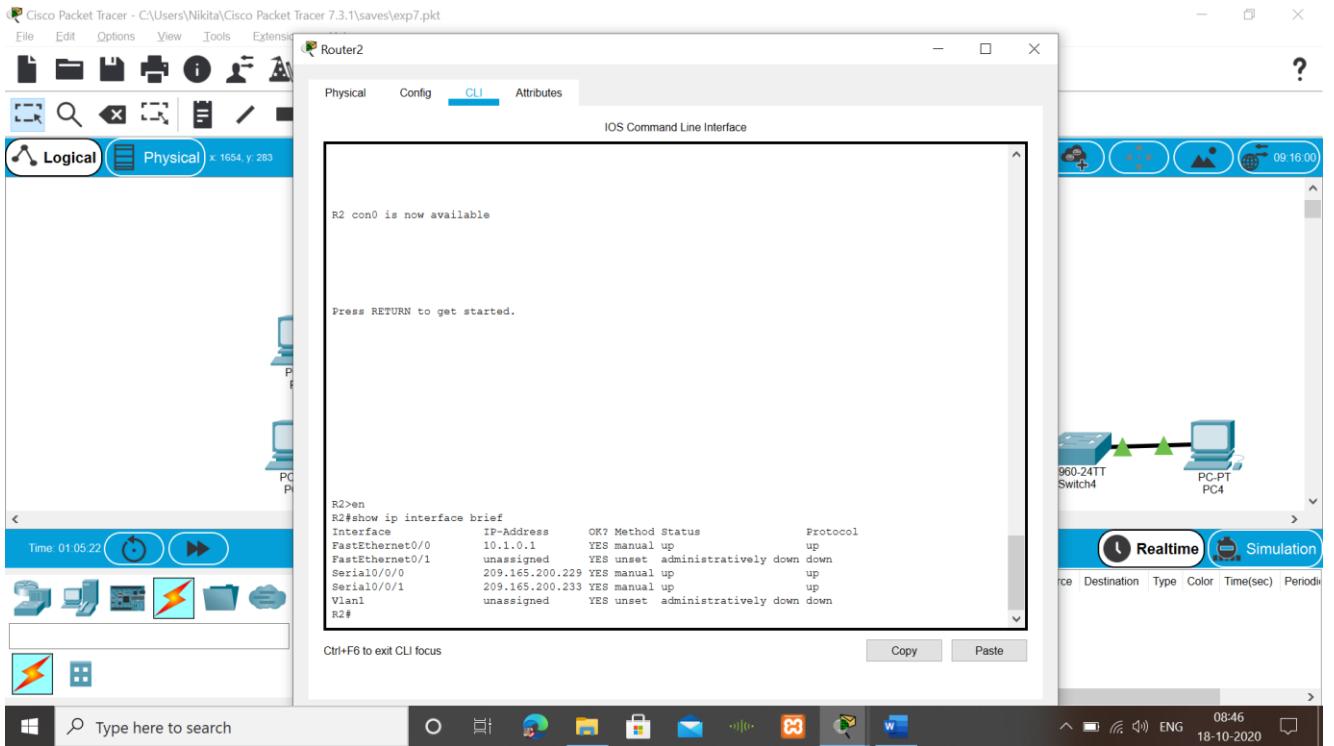


Task 3: Examine the Current Status of the Network.

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.

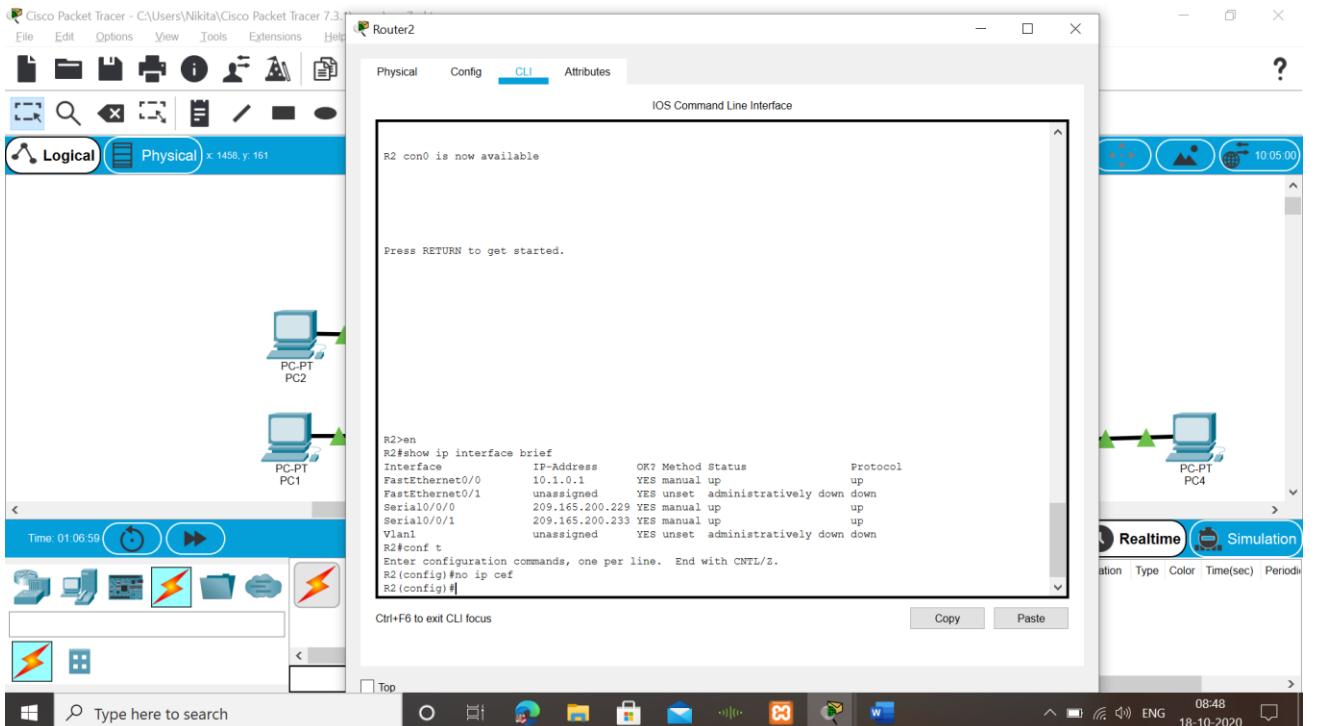
R2#show ip interface brief



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
```



R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Press RETURN to get started.

R1>enable
R1#configure terminal
^
% Invalid input detected at '^' marker.

R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#no ip cef
R1(config)#[
```

Ctrl+F6 to exit CLI focus Copy Paste

Top

R3

Physical Config **CLI** Attributes

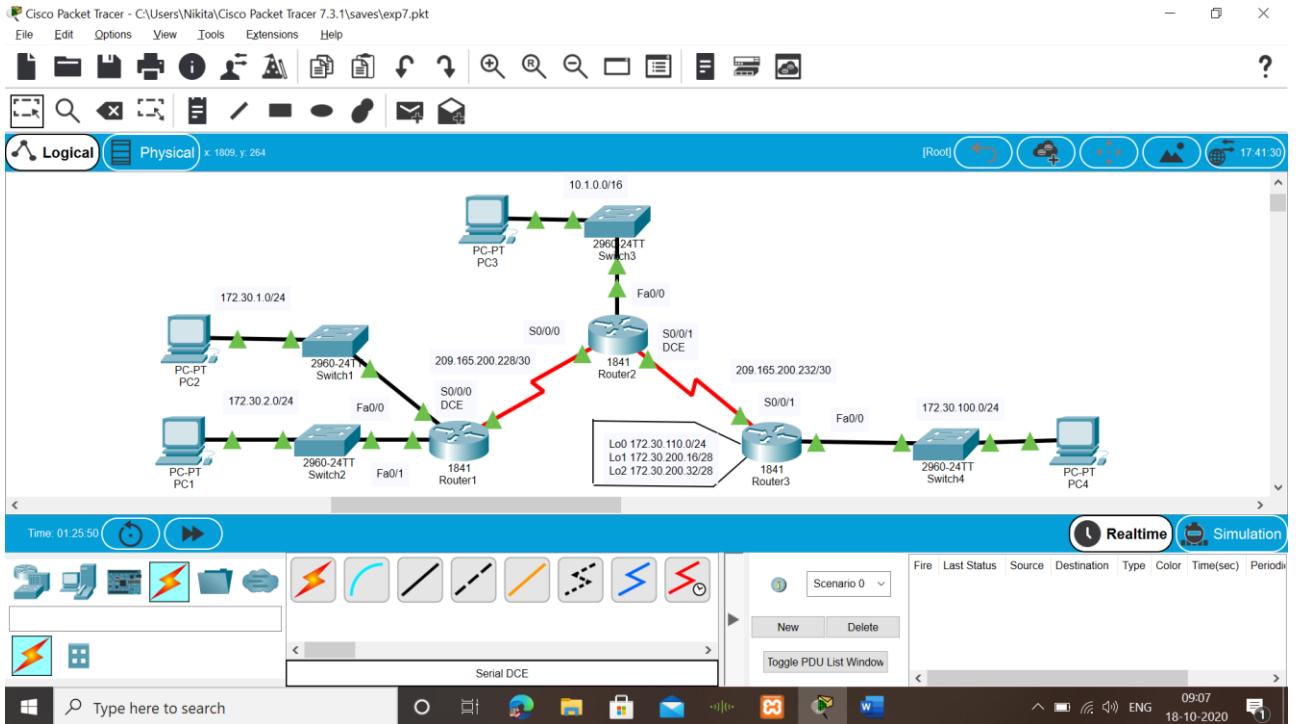
IOS Command Line Interface

```
Press RETURN to get started.

R3>enable
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#no ip cef
R3(config)#[
```

Ctrl+F6 to exit CLI focus Copy Paste

Top



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

The terminal session on Router2 shows the following command and its output:

```

R2#ping 172.30.2.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.2.10, timeout is 2 seconds:
..!!.
Success rate is 40 percent (2/5), round-trip min/avg/max = 1/9/17 ms
R2#

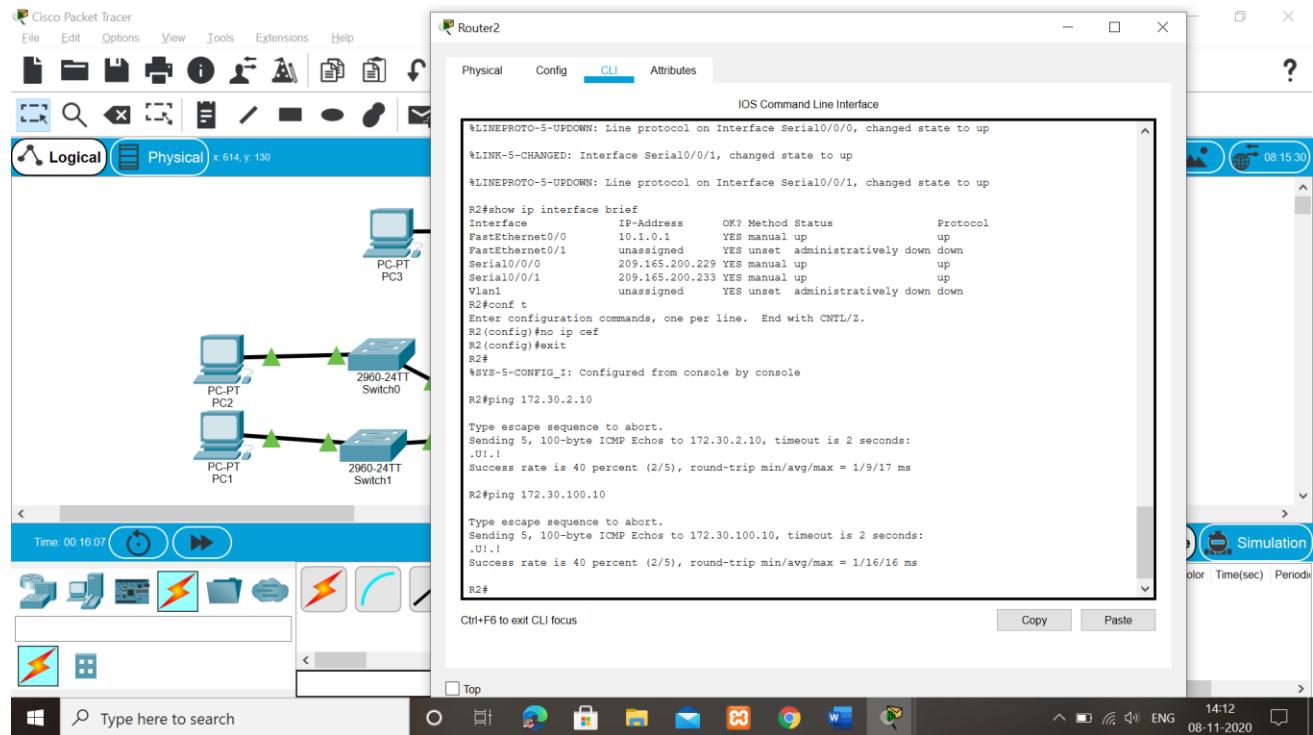
```

The output indicates a success rate of 40 percent (2/5) for the ping test.

2/5 (40%) success rate

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

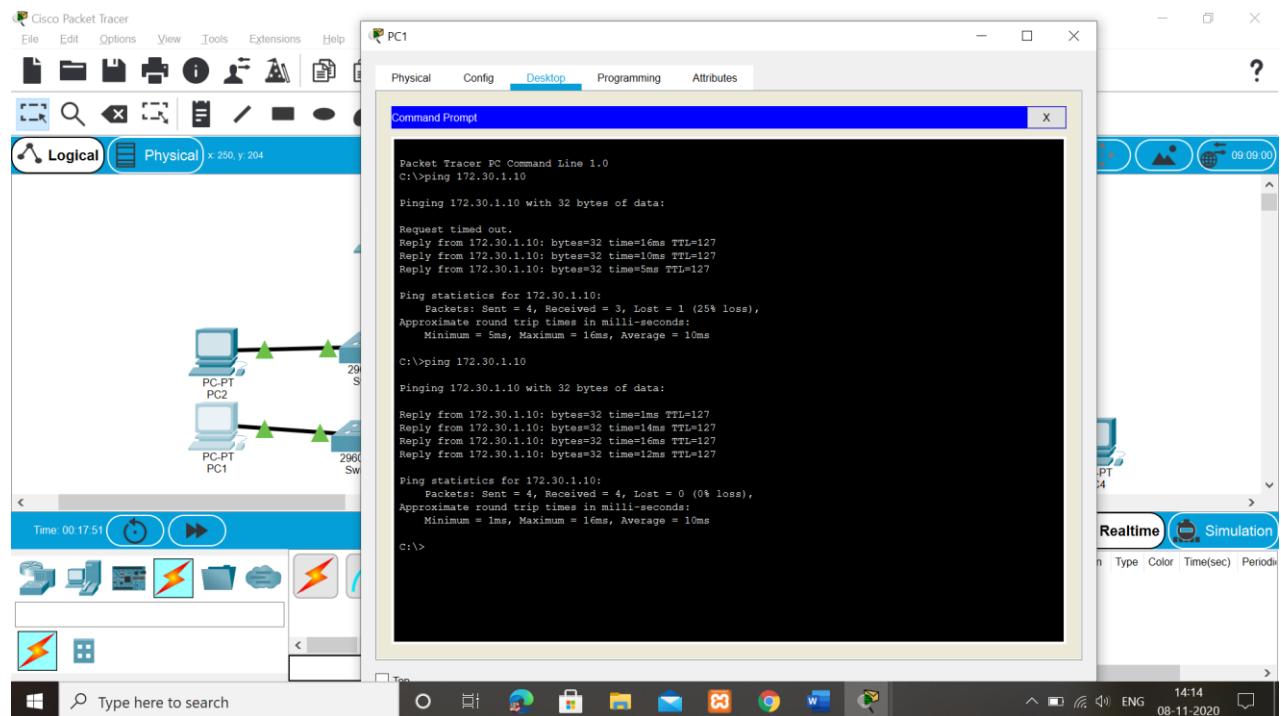
2/5(40%) success rate



Step 3: Check the connectivity between the PCs.

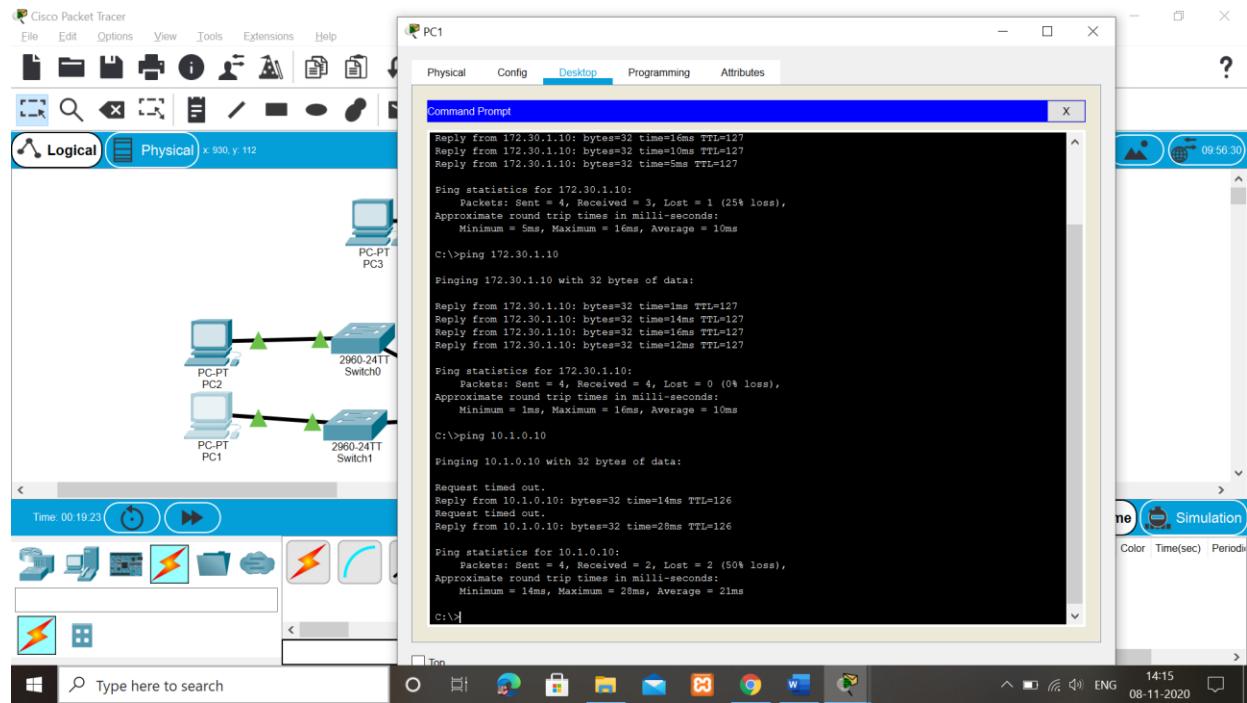
From the PC1, is it possible to ping PC2? Yes _____

What is the success rate? 100% _____



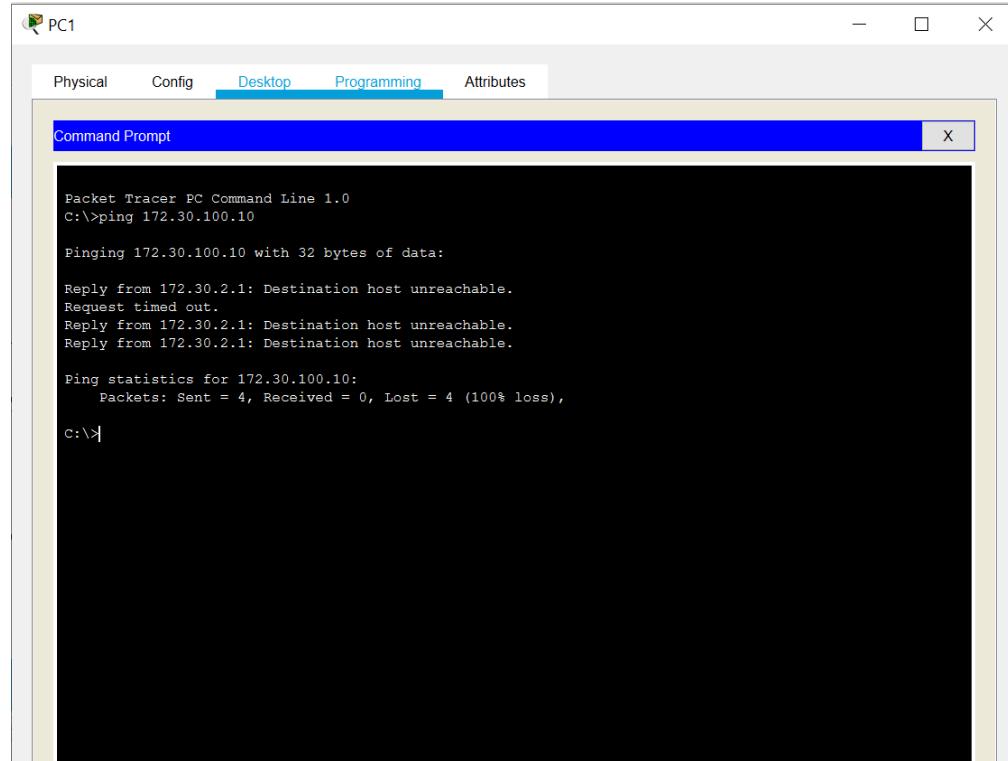
From the PC1, is it possible to ping PC3? Yes

What is the success rate? 50%



From the PC1, is it possible to ping PC4? No

What is the success rate? 0%



From the PC4, is it possible to ping PC2? No

What is the success rate? ___0%___



PC4

Physical Config Desktop Programming Attributes

Command Prompt X

```
Packet Tracer PC Command Line 1.0
C:>ping 172.20.1.10

Pinging 172.20.1.10 with 32 bytes of data:

Reply from 172.30.100.1: Destination host unreachable.
Reply from 172.30.100.1: Destination host unreachable.
Request timed out.
Reply from 172.30.100.1: Destination host unreachable.

Ping statistics for 172.20.1.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:>ping 172.30.1.10

Pinging 172.30.1.10 with 32 bytes of data:

Reply from 172.30.100.1: Destination host unreachable.

Ping statistics for 172.30.1.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:>
```

From the PC4, is it possible to ping PC3? _____ Yes _____

What is the success rate? ____ 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

The screenshot shows the Router2 CLI interface with the 'CLI' tab selected. The command 'R2#show ip route' is entered, followed by several ping commands to 172.30.100.10. The output includes a legend for route codes and a list of routes:

```
R2>ping 172.30.100.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.100.10, timeout is 2 seconds:
!U!.U
Success rate is 40 percent (2/5), round-trip min/avg/max = 1/25/24 ms

R2>ping 172.30.100.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.100.10, timeout is 2 seconds:
!U!.!
Success rate is 60 percent (3/5), round-trip min/avg/max = 1/16/20 ms

R2>en
R2#show 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
R        172.30.0.0/16 [120/1] via 209.165.200.230, 00:00:08, Serial0/0/0
                  [120/1] via 209.165.200.234, 00:00:05, 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

R2#
```

Ctrl+F6 to exit CLI focus Copy Paste

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

The screenshot shows the Router1 CLI interface. The title bar says "Router1". Below it are tabs: Physical, Config, **CLI**, and Attributes. The main window is titled "IOS Command Line Interface" and contains the following text:

```
Press RETURN to get started.

R1>en
R1#show 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

R    10.0.0.0/8 [120/1] via 209.165.200.229, 00:00:12, Serial0/0/0
      172.30.0.0/24 is subnetted, 2 subnets
C      172.30.1.0 is directly connected, FastEthernet0/0
C      172.30.2.0 is directly connected, FastEthernet0/1
      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, 00:00:12, Serial0/0/0

R1#
```

At the bottom left is the text "Ctrl+F6 to exit CLI focus". At the bottom right are "Copy" and "Paste" buttons.

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

The screenshot shows the Router3 CLI interface with the 'CLI' tab selected. The main window displays the output of the 'show ip route' command. The output includes route codes and descriptions, followed by a list of routes. At the bottom, there are 'Copy' and 'Paste' buttons.

```
R3>en
R3#show 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

R    10.0.0.0/8 [120/1] via 209.165.200.233, 00:00:01, Serial0/0/1
      172.30.0.0/16 is variably subnetted, 4 subnets, 2 masks
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, 00:00:01, Serial0/0/1
C      209.165.200.232 is directly connected, Serial0/0/1

R3#
```

Ctrl+F6 to exit CLI focus Copy Paste

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.

```
Router2
Physical Config CLI Attributes
IOS Command Line Interface
network 10.0.0.0 metric 1
network 209.165.200.228 metric 1
RIP: received v1 update from 209.165.200.234 on Serial0/0/1
172.30.0.0 in 1 hops
RIP: received v1 update from 209.165.200.230 on Serial0/0/0
172.30.0.0 in 1 hops
RIP: sending v1 update to 255.255.255.255 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
network 10.0.0.0 metric 1
network 209.165.200.232 metric 1
RIP: sending v1 update to 255.255.255.255 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
network 10.0.0.0 metric 1
network 209.165.200.228 metric 1
RIP: received v1 update from 209.165.200.234 on Serial0/0/1
172.30.0.0 in 1 hops

R2#RIP: received v1 update from 209.165.200.230 on Serial0/0/0
172.30.0.0 in 1 hops
RIP: sending v1 update to 255.255.255.255 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
network 10.0.0.0 metric 1
network 209.165.200.232 metric 1
RIP: sending v1 update to 255.255.255.255 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
network 10.0.0.0 metric 1
network 209.165.200.228 metric 1

R2#undebugIP: received v1 update from 209.165.200.234 on Serial0/0/1
172.30.0.0 in 1 hops
g
% Incomplete command.
R2#undebug all
All possible debugging has been turned off
R2#
```

Ctrl+F6 to exit CLI focus Copy Paste

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
```

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R2#Received v1 update from 209.165.200.230 on Serial0/0/0
 172.30.0.0 in 1 hops
RIP: sending v1 update to 255.255.255.255 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
  network 10.0.0.0 metric 1
  network 172.30.0.0 metric 2
  network 209.165.200.232 metric 1
RIP: sending v1 update to 255.255.255.255 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
  network 10.0.0.0 metric 1
  network 172.30.0.0 metric 2
  network 209.165.200.228 metric 1

R2#undebug all
All possible debugging has been turned off
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#ping 172.30.2.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.2.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/8 ms

R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#

```

Ctrl+F6 to exit CLI focus Copy Paste

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

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1(config-route1)# passive-interface FastEthernet0/1
R1(config-router)# network 172.30.0.0
R1(config-router)# network 209.165.200.0
R1(config-router)#
R1(config-router)#line con 0
R1(config-line)#line vty 0 4
R1(config-line)#
R1(config-line)#
% Login disabled on line 194, until 'password' is set
% Login disabled on line 195, until 'password' is set
% Login disabled on line 196, until 'password' is set
% Login disabled on line 197, until 'password' is set
% Login disabled on line 198, until 'password' is set
R1(config-line)#
R1(config-line)#
R1#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%SYS-5-CONFIG_I: Configured from console by console

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

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

R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#no ip cef
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#

```

Ctrl+F6 to exit CLI focus Copy Paste

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

The screenshot shows a Windows-style application window titled "Router3". The tab bar at the top has "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following text:

```
% Login disabled on line 196, until 'password' is set  
% Login disabled on line 197, until 'password' is set  
% Login disabled on line 198, until 'password' is set  
R3(config-line)#!  
R3(config-line)#end  
R3#  
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up  
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up  
%LINK-5-CHANGED: Interface Loopback0, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up  
%LINK-5-CHANGED: Interface Loopback1, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up  
%LINK-5-CHANGED: Interface Loopback2, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2, changed state to up  
%SYS-5-CONFIG_I: Configured from console by console  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up  
R3>conf  
Configuring from terminal, memory, or network [terminal]?  
Enter configuration commands, one per line. End with CNTL/Z.  
R3(config)#no ip cef  
R3(config)#router rip  
R3(config-router)#version 2  
R3(config-router)#!
```

At the bottom of the window, there are "Copy" and "Paste" buttons, and a status bar with "Ctrl+F6 to exit CLI focus".

IPv2 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
```

The screenshot shows a Windows-style application window titled "Router1". The tab bar at the top has "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following text:

```
C      209.165.200.228 is directly connected, Serial0/0/0  
R      209.165.200.232 [120/1] via 209.165.200.229, 00:00:09, Serial0/0/0  
  
R1#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R1(config)#router rip  
R1(config-router)#version 2  
R1(config-router)#exit  
R1(config)#exit  
R1#  
%SYS-5-CONFIG_I: Configured from console by console  
  
R1#show ip protocols  
Routing Protocol is "rip"  
  Sending updates every 30 seconds, next due in 4 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      00:01:47  
Distance: (default is 120)  
R1#
```

At the bottom of the window, there are "Copy" and "Paste" buttons, and a status bar with "Ctrl+F6 to exit CLI focus".

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

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R2#undebugRIP: received v1 update from 209.165.200.234 on Serial0/0/1
    172.30.0.0 in 1 hops
g
% Incomplete command.
R2#undebug all
All possible debugging has been turned off
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#show 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
R   172.30.0.0/16 [120/1] via 209.165.200.230, 00:00:11, Serial0/0/0
      [120/1] via 209.165.200.234, 00:00:02, 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

R2#
```

Ctrl+F6 to exit CLI focus Copy Paste

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

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Default version control: send version 2, receive 2
Interface          Send Recv Triggered RIP Key-chain
Serial0/0/0          2      2
Automatic network summarization is 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        00:00:26
Distance: (default is 120)
R1#show 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

  R  10.0.0.0/8 [120/1] via 209.165.200.229, 00:00:12, Serial0/0/0
  172.30.0.0/24 is subnetted, 2 subnets
C     172.30.1.0 is directly connected, FastEthernet0/0
C     172.30.2.0 is directly connected, FastEthernet0/1
  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, 00:00:12, Serial0/0/0

R1#
```

Ctrl+F6 to exit CLI focus Copy Paste

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

```
Router3

Physical Config CLI Attributes

IOS Command Line Interface

209.165.200.0/30 is subnetted, 2 subnets
R     209.165.200.228 [120/1] via 209.165.200.233, 00:00:01, Serial0/0/1
C     209.165.200.232 is directly connected, Serial0/0/1

R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#exit
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#show 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

R     10.0.0.0/8 [120/1] via 209.165.200.233, 00:00:23, Serial0/0/1
      172.30.0.0/16 is variably subnetted, 4 subnets, 2 masks
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
R     209.165.200.0/30 is subnetted, 2 subnets
R       209.165.200.228 [120/1] via 209.165.200.233, 00:00:23, Serial0/0/1
C       209.165.200.232 is directly connected, Serial0/0/1

R3#
```

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

The screenshot shows a terminal window titled "Router3". The tab bar at the top has "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tab bar is the text "IOS Command Line Interface". The main area of the window contains the output of the "debug ip rip" command. The output shows RIP protocol debugging is on, and it lists various RIP updates sent from R3. These updates include routes to 209.165.200.0/30, 10.0.0.0/8, 172.30.100.0/24, 172.30.110.0/24, 172.30.200.16/28, and 209.165.200.16/28. The output also shows entries being built for loopback interfaces and serial ports. At the bottom of the output, "R3#undebbug ip rip" is typed. Below the terminal window, there are two buttons: "Copy" and "Paste".

```
209.165.200.0/30 is subnetted, 2 subnets
R    209.165.200.228 [120/1] via 209.165.200.233, 00:00:23, Serial0/0/1
C    209.165.200.232 is directly connected, Serial0/0/1

R3#debug ip rip
RIP protocol debugging is on
R3#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
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

R3#undebbug ip rip
```

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

_____10.0.0.0/8_____

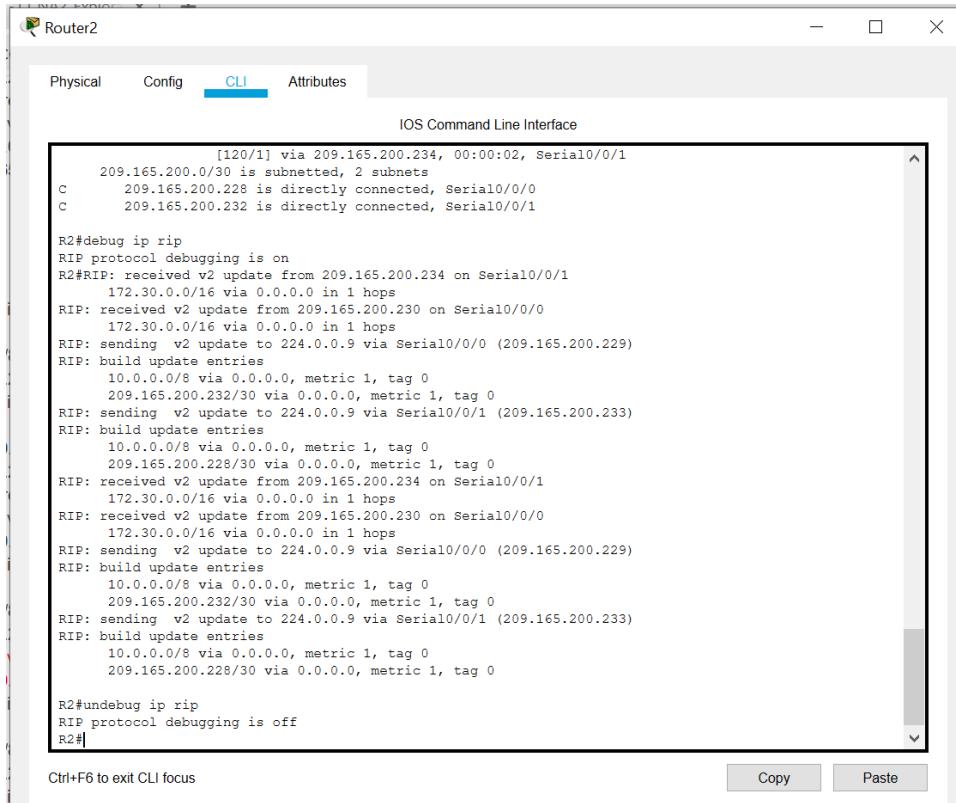
_____172.30.100.0/24_____

_____172.30.110.0/24_____

_____172.30.200.16/28_____

_____209.165.200.16/28_____

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



The screenshot shows a Windows-style application window titled "Router2". The tab bar at the top has "Physical", "Config", "CLI" (which is selected and highlighted in blue), and "Attributes". The main area is labeled "IOS Command Line Interface". A scrollable text box displays the following output:

```
[120/1] via 209.165.200.234, 00:00:02, 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

R2#debug ip rip
RIP protocol debugging is on
R2#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: 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: 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: 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: 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: 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: 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: 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
R2#undebug ip rip
RIP protocol debugging is off
R2#
```

At the bottom left is the text "Ctrl+F6 to exit CLI focus". At the bottom right are "Copy" and "Paste" buttons.

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
```

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R2#debug ip rip
RIP protocol debugging is on
R2#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: 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: 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: 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: 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 209.165.200.230 on Serial0/0/0
    172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (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: 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
R2#undebug ip rip
RIP protocol debugging is off
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#no auto-summary
R2(config-router)#exit
R2(config)#[
```

Ctrl+F6 to exit CLI focus Copy Paste

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

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

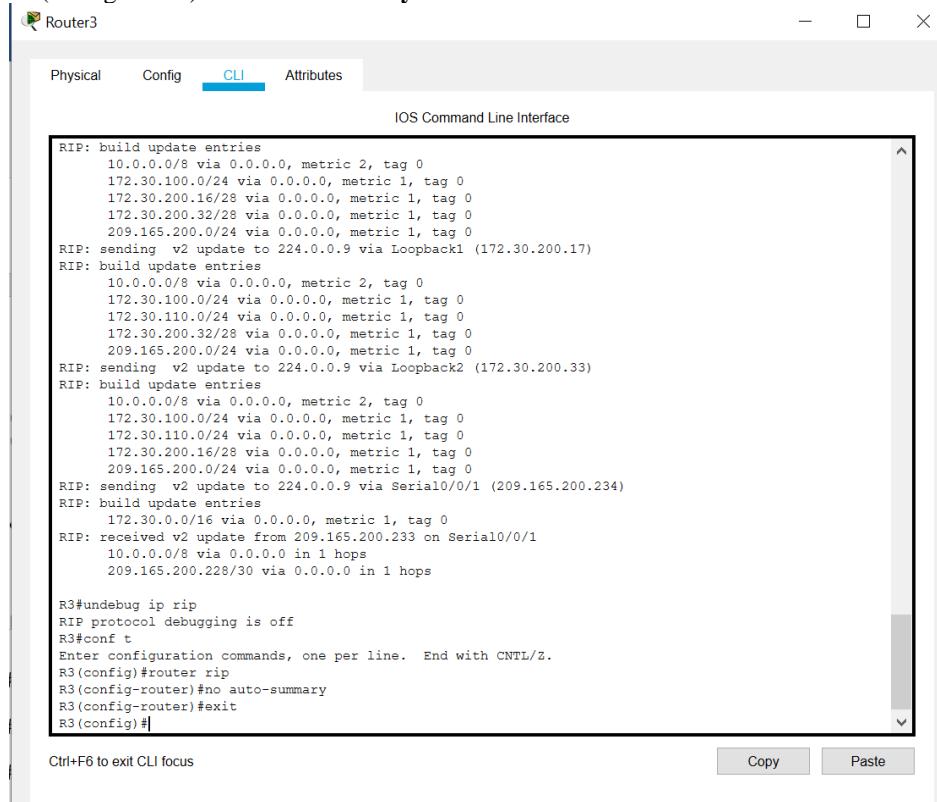
```
R1 con0 is now available

Press RETURN to get started.

R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#no auto-summary
R1(config-router)#exit
R1(config)#[
```

Ctrl+F6 to exit CLI focus Copy Paste

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



Router3

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
 172.30.200.16/28 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
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

R3#undebug ip rip
RIP protocol debugging is off
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#no auto-summary
R3(config-router)#exit
R3(config)#|
```

Ctrl+F6 to exit CLI focus Copy Paste

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
```

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R2#show ip route
R2(config)#router rip
R2(config-router)#no auto-summary
R2(config-router)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#show 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 [120/1] via 209.165.200.230, 00:02:01, Serial0/0/0
      [120/1] via 209.165.200.234, 00:00:43, Serial0/0/1
R   172.30.1.0/24 [120/1] via 209.165.200.230, 00:00:13, Serial0/0/0
R   172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:13, Serial0/0/0
R   172.30.100.0/24 [120/1] via 209.165.200.234, 00:00:14, Serial0/0/1
R   172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:14, Serial0/0/1
R   172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:14, Serial0/0/1
R   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

R2#
```

Ctrl+F6 to exit CLI focus **Copy** **Paste**

R1#show ip route

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#no auto-summary
R1(config-router)#exit
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#show 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

  10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
R     10.0.0.0/8 is possibly down, routing via 209.165.200.229, Serial0/0/0
R     10.1.0.0/16 [120/1] via 209.165.200.229, 00:00:23, 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, 00:00:23, Serial0/0/0
R     172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:23, Serial0/0/0
R     172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:23, Serial0/0/0
R     172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:23, 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, 00:00:23, Serial0/0/0

R1#
```

Ctrl+F6 to exit CLI focus **Copy** **Paste**

R3#show ip route

```

R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#no auto-summary
R3(config-router)#exit
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#show 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

  10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
R    10.0.0.0/8 is possibly down, routing via 209.165.200.233, Serial0/0/1
R    10.1.0.0/16 [120/1] via 209.165.200.233, 00:00:16, 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, 00:00:16, Serial0/0/1
R    172.30.2.0/24 [120/2] via 209.165.200.233, 00:00:16, 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
C    209.165.200.0/30 is subnetted, 2 subnets
R    209.165.200.228 [120/1] via 209.165.200.233, 00:00:16, Serial0/0/1
C    209.165.200.232 is directly connected, Serial0/0/1

R3#

```

Ctrl+F6 to exit CLI focus Copy Paste

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

```

R1# 172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:23, Serial0/0/0
R1# 172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:23, Serial0/0/0
  209.165.200.0/30 is subnetted, 2 subnets
C   209.165.200.228 is directly connected, Serial0/0/0
R1# 209.165.200.232 [120/1] via 209.165.200.229, 00:00:23, Serial0/0/0

R1#debug ip rip
RIP protocol debugging is on
R1#RIP: received v2 update from 209.165.200.229 on Serial0/0/0
  10.1.0.0/16 via 0.0.0.0 in 1 hops
  172.30.100.0/24 via 0.0.0.0 in 2 hops
  172.30.110.0/24 via 0.0.0.0 in 2 hops
  172.30.200.16/28 via 0.0.0.0 in 2 hops
  172.30.200.32/28 via 0.0.0.0 in 2 hops
  209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.230)
RIP: build update entries
  172.30.1.0/24 via 0.0.0.0, metric 1, tag 0
  172.30.2.0/24 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.229 on Serial0/0/0
  10.1.0.0/16 via 0.0.0.0 in 1 hops
  172.30.100.0/24 via 0.0.0.0 in 2 hops
  172.30.110.0/24 via 0.0.0.0 in 2 hops
  172.30.200.16/28 via 0.0.0.0 in 2 hops
  172.30.200.32/28 via 0.0.0.0 in 2 hops
  209.165.200.232/30 via 0.0.0.0 in 1 hops

R1#undebugRIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.230)
RIP: build update entries
  172.30.1.0/24 via 0.0.0.0, metric 1, tag 0
  172.30.2.0/24 via 0.0.0.0, metric 1, tag 0
% Incomplete command.
R1#undebug ip rip
RIP protocol debugging is off
R1#

```

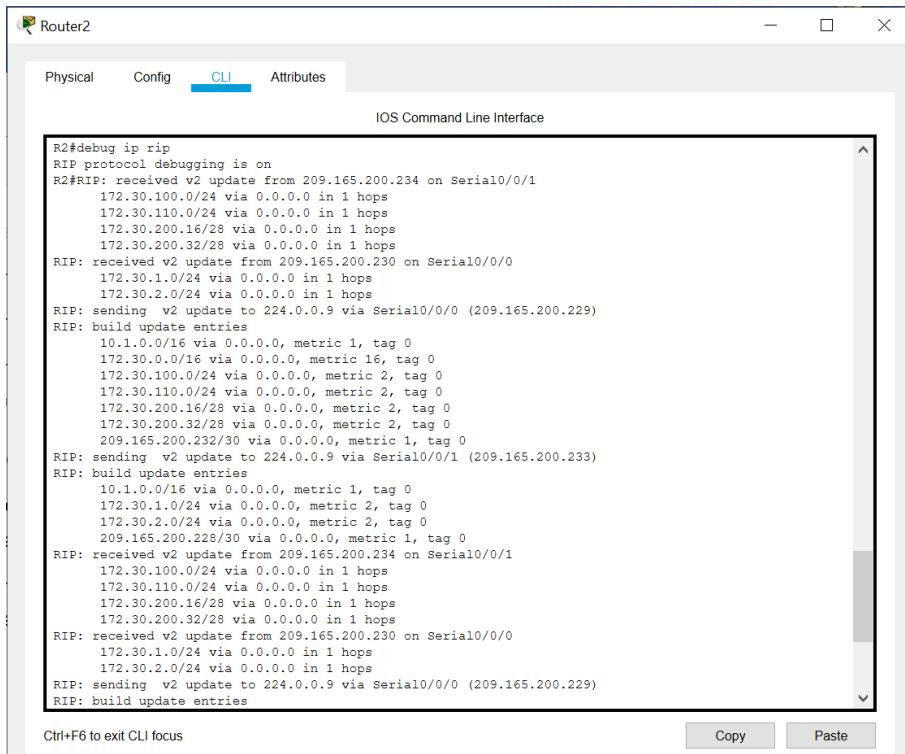
Ctrl+F6 to exit CLI focus Copy Paste

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

_____172.30.1.0/24_____

_____172.30.2.0/24_____

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



The screenshot shows a Windows application window titled "Router2". The tab bar at the top has "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following text output:

```
R2#debug ip rip
RIP protocol debugging is on
R2#RIP: received v2 update from 209.165.200.234 on Serial0/0/1
  172.30.100.0/24 via 0.0.0.0 in 1 hops
  172.30.110.0/24 via 0.0.0.0 in 1 hops
  172.30.200.16/28 via 0.0.0.0 in 1 hops
  172.30.200.32/28 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
  172.30.1.0/24 via 0.0.0.0 in 1 hops
  172.30.2.0/24 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
  10.1.0.0/16 via 0.0.0.0, metric 1, tag 0
  172.30.0.0/16 via 0.0.0.0, metric 16, tag 0
  172.30.100.0/24 via 0.0.0.0, metric 2, tag 0
  172.30.110.0/24 via 0.0.0.0, metric 2, tag 0
  172.30.200.16/28 via 0.0.0.0, metric 2, tag 0
  172.30.200.32/28 via 0.0.0.0, metric 2, tag 0
  209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
  10.1.0.0/16 via 0.0.0.0, metric 1, tag 0
  172.30.1.0/24 via 0.0.0.0, metric 2, tag 0
  172.30.2.0/24 via 0.0.0.0, metric 2, tag 0
  209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.234 on Serial0/0/1
  172.30.100.0/24 via 0.0.0.0 in 1 hops
  172.30.110.0/24 via 0.0.0.0 in 1 hops
  172.30.200.16/28 via 0.0.0.0 in 1 hops
  172.30.200.32/28 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
  172.30.1.0/24 via 0.0.0.0 in 1 hops
  172.30.2.0/24 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
```

At the bottom of the window, there are "Copy" and "Paste" buttons.

_____172.30.1.0/24_____

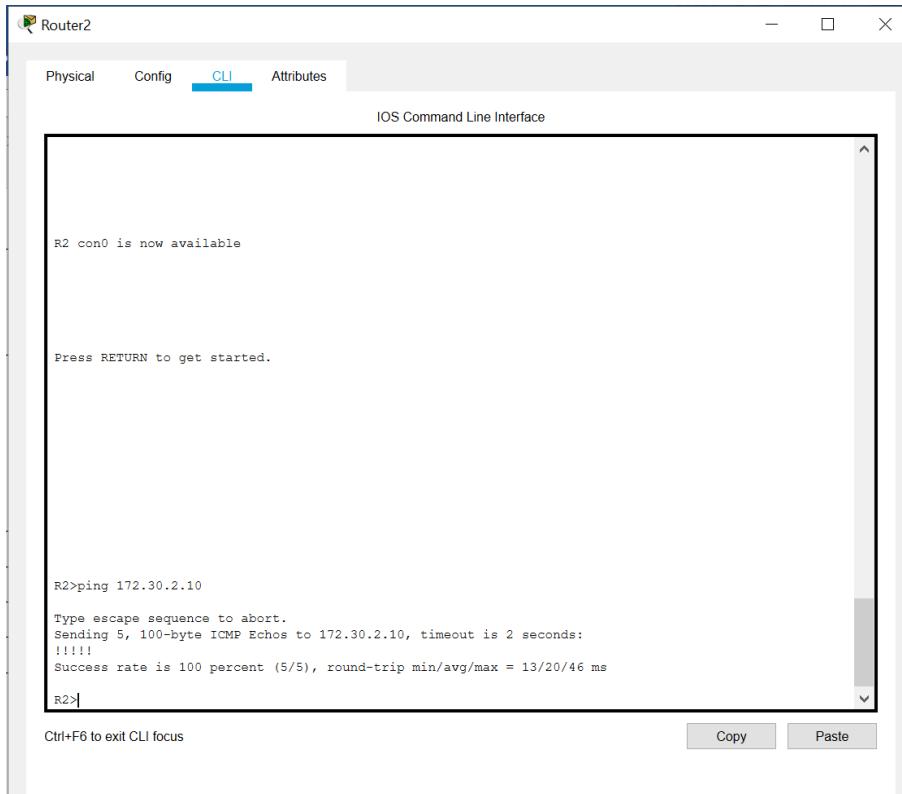
_____172.30.2.0/24_____

Are the subnet masks now included in the routing updates? ___Yes___

Task 8: Verify Network Connectivity.

Step 1: Check connectivity between R2 router and PCs.

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



The screenshot shows the Router2 CLI interface. The title bar says "Router2". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main window title is "IOS Command Line Interface". The terminal window displays the following output:

```
R2 con0 is now available

Press RETURN to get started.

R2>ping 172.30.2.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.2.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 13/20/46 ms
R2>
```

At the bottom left, it says "Ctrl+F6 to exit CLI focus". At the bottom right, there are "Copy" and "Paste" buttons.

100% _____

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

The screenshot shows a Windows application window titled "Router2". 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 of the window contains the following text:

```
Press RETURN to get started.

R2>ping 172.30.2.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.2.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 13/20/46 ms

R2>ping 172.30.100.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.100.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/11/19 ms

R2>
```

At the bottom left of the window, there is a status message: "Ctrl+F6 to exit CLI focus". At the bottom right, there are two buttons: "Copy" and "Paste".

_____ 100% _____

Step 2: Check the connectivity between the PCs.

From PC1, is it possible to ping PC2? __Yes_____

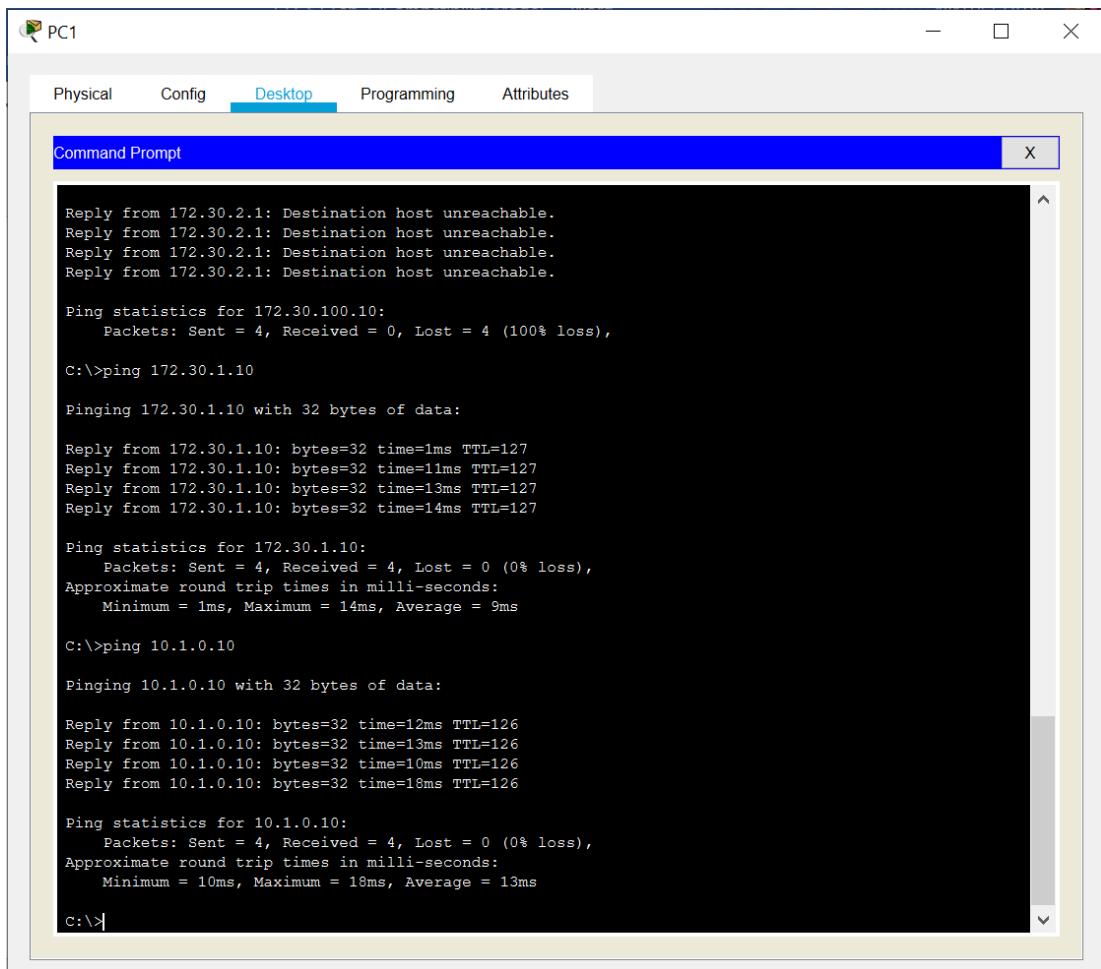
What is the success rate? __100%_____

The screenshot shows a software interface titled "PC1" with a tab bar at the top. The "Desktop" tab is currently selected. Below the tabs, there is a "Command Prompt" window with the following text output:

```
Request timed out.  
Reply from 10.1.0.10: bytes=32 time=12ms TTL=126  
Request timed out.  
Reply from 10.1.0.10: bytes=32 time=13ms TTL=126  
  
Ping statistics for 10.1.0.10:  
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 12ms, Maximum = 13ms, Average = 12ms  
  
C:\>ping 172.30.100.10  
  
Pinging 172.30.100.10 with 32 bytes of data:  
  
Reply from 172.30.2.1: Destination host unreachable.  
  
Ping statistics for 172.30.100.10:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 1ms, Maximum = 14ms, Average = 9ms  
  
C:\>ping 172.30.1.10  
  
Pinging 172.30.1.10 with 32 bytes of data:  
  
Reply from 172.30.1.10: bytes=32 time=1ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=11ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=13ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=14ms TTL=127  
  
Ping statistics for 172.30.1.10:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 1ms, Maximum = 14ms, Average = 9ms  
  
C:\>
```

From PC1, is it possible to ping PC3? ____yes____

What is the success rate? ____100%_____



The screenshot shows a Windows desktop environment with a window titled "PC1". Inside the window, there is a tab bar with "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". Below the tab bar is a "Command Prompt" window. The command prompt output is as follows:

```
Reply from 172.30.2.1: Destination host unreachable.  
  
Ping statistics for 172.30.100.10:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
  
C:\>ping 172.30.1.10  
  
Pinging 172.30.1.10 with 32 bytes of data:  
  
Reply from 172.30.1.10: bytes=32 time=1ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=11ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=13ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=14ms TTL=127  
  
Ping statistics for 172.30.1.10:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 1ms, Maximum = 14ms, Average = 9ms  
  
C:\>ping 10.1.0.10  
  
Pinging 10.1.0.10 with 32 bytes of data:  
  
Reply from 10.1.0.10: bytes=32 time=12ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=13ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=10ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=18ms TTL=126  
  
Ping statistics for 10.1.0.10:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 10ms, Maximum = 18ms, Average = 13ms  
  
C:\>
```

From PC1, is it possible to ping PC4? ____yes____

What is the success rate?__100%__

```
Reply from 172.30.1.10: bytes=32 time=11ms TTL=127
Reply from 172.30.1.10: bytes=32 time=13ms TTL=127
Reply from 172.30.1.10: bytes=32 time=14ms TTL=127

Ping statistics for 172.30.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 14ms, Average = 9ms

C:\>ping 10.1.0.10

Pinging 10.1.0.10 with 32 bytes of data:

Reply from 10.1.0.10: bytes=32 time=12ms TTL=126
Reply from 10.1.0.10: bytes=32 time=13ms TTL=126
Reply from 10.1.0.10: bytes=32 time=10ms TTL=126
Reply from 10.1.0.10: bytes=32 time=18ms TTL=126

Ping statistics for 10.1.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 18ms, Average = 13ms

C:\>ping 172.30.100.10

Pinging 172.30.100.10 with 32 bytes of data:

Reply from 172.30.100.10: bytes=32 time=26ms TTL=125
Reply from 172.30.100.10: bytes=32 time=21ms TTL=125
Reply from 172.30.100.10: bytes=32 time=28ms TTL=125
Reply from 172.30.100.10: bytes=32 time=41ms TTL=125

Ping statistics for 172.30.100.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 21ms, Maximum = 41ms, Average = 29ms

C:\>
```

From PC4, is it possible to ping PC2? ____yes_____

What is the success rate? ____100%_____

PC4

Physical Config Desktop Programming Attributes

Command Prompt

```
Reply from 172.30.100.1: Destination host unreachable.  
Reply from 172.30.100.1: Destination host unreachable.  
Request timed out.  
Reply from 172.30.100.1: Destination host unreachable.  
  
Ping statistics for 172.30.1.10:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
  
C:\>ping 10.1.0.10  
  
Pinging 10.1.0.10 with 32 bytes of data:  
  
Reply from 10.1.0.10: bytes=32 time=12ms TTL=126  
Request timed out.  
Reply from 10.1.0.10: bytes=32 time=14ms TTL=126  
Request timed out.  
  
Ping statistics for 10.1.0.10:  
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 12ms, Maximum = 14ms, Average = 13ms  
  
C:\>ping 172.30.1.10  
  
Pinging 172.30.1.10 with 32 bytes of data:  
  
Reply from 172.30.1.10: bytes=32 time=12ms TTL=125  
Reply from 172.30.1.10: bytes=32 time=19ms TTL=125  
Reply from 172.30.1.10: bytes=32 time=23ms TTL=125  
Reply from 172.30.1.10: bytes=32 time=40ms TTL=125  
  
Ping statistics for 172.30.1.10:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 12ms, Maximum = 40ms, Average = 23ms  
  
C:\>
```

From PC4, is it possible to ping PC3? ____yes____

What is the success rate? ____100%____

The screenshot shows a Windows desktop environment with a window titled "PC4". Inside the window, there is a tab bar with "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". Below the tabs is a "Command Prompt" window with the following output:

```
Request timed out.  
Reply from 10.1.0.10: bytes=32 time=14ms TTL=126  
Request timed out.  
  
Ping statistics for 10.1.0.10:  
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 12ms, Maximum = 14ms, Average = 13ms  
  
C:\>ping 172.30.1.10  
  
Pinging 172.30.1.10 with 32 bytes of data:  
  
Reply from 172.30.1.10: bytes=32 time=12ms TTL=125  
Reply from 172.30.1.10: bytes=32 time=19ms TTL=125  
Reply from 172.30.1.10: bytes=32 time=23ms TTL=125  
Reply from 172.30.1.10: bytes=32 time=40ms TTL=125  
  
Ping statistics for 172.30.1.10:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 12ms, Maximum = 40ms, Average = 23ms  
  
C:\>ping 10.1.0.10  
  
Pinging 10.1.0.10 with 32 bytes of data:  
  
Reply from 10.1.0.10: bytes=32 time=23ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=13ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=19ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=14ms TTL=126  
  
Ping statistics for 10.1.0.10:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 13ms, Maximum = 23ms, Average = 17ms  
  
C:\>
```

Task 9: Documentation

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

- **show running-config**
- **show ip route**
- **show ip interface brief**
- **show ip protocols**

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

Txt file:

Show running-config

R1#

R1#show running-config

Building configuration...

Current configuration : 885 bytes

!

version 12.4

```
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R1
!
!
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
!
interface FastEthernet0/0
ip address 172.30.1.1 255.255.255.0
duplex auto
speed auto
!
```

```
interface FastEthernet0/1
    ip address 172.30.2.1 255.255.255.0
    duplex auto
    speed auto
!
interface Serial0/0/0
    ip address 209.165.200.230 255.255.255.252
    clock rate 64000
!
interface Serial0/0/1
    no ip address
    clock rate 2000000
    shutdown
!
interface Vlan1
    no ip address
    shutdown
!
router rip
    version 2
    passive-interface FastEthernet0/0
    passive-interface FastEthernet0/1
    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
```

```
login
```

```
!
```

```
!
```

```
!
```

```
end
```

```
R1#
```

```
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
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface FastEthernet0/0
ip address 10.1.0.1 255.255.0.0
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
!
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
login
!
!
!
end
R2#
```

```
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
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
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

login

!

!

!

end

R3#

Show ip route:

R1#show 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, 00:00:02, 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, 00:00:02, Serial0/0/0

R 172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:02, Serial0/0/0

R 172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:02, Serial0/0/0

R 172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:02, 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, 00:00:02, Serial0/0/0

R1#

R2#show 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, 00:00:05, Serial0/0/0

R 172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:05, Serial0/0/0

R 172.30.100.0/24 [120/1] via 209.165.200.234, 00:00:21, Serial0/0/1

R 172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:21, Serial0/0/1

R 172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:21, Serial0/0/1

R 172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:21, 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

R2#

R3#show 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, 00:00:01, 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, 00:00:01, Serial0/0/1

R 172.30.2.0/24 [120/2] via 209.165.200.233, 00:00:01, 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, 00:00:01, Serial0/0/1
C  209.165.200.232 is directly connected, Serial0/0/1

```

R3#

show ip interface brief

R1#

R1#show ip interface brief

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

R1#

R2#show ip interface brief

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

R2#

R3#show ip interface brief

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

R3#

Show ip protocols

R1#show ip protocols

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 20 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	00:00:04
-----------------	-----	----------

Distance: (default is 120)

R1#

R2#show ip protocols

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 22 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	00:00:22

Distance: (default is 120)

R2#

R3#show ip protocols

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 5 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	00:00:05

Distance: (default is 120)

R3#

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.

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Press RETURN to get started.

R2>ping 172.30.2.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.2.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 15/17/19 ms

R2>ping 172.30.100.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.100.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 7/16/22 ms

R2>en
R2#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
R2#
```

Ctrl+F6 to exit CLI focus Copy Paste

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1 con0 is now available

Press RETURN to get started.

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#
```

Ctrl+F6 to exit CLI focus Copy Paste

