Name: Karan kumar Roll No: 20ES062

Score: _____ Signature of the Lab Tutor: _____ Date: _____

OBJECTIVES

#	Topic	#. Of Lectures	CLO	Taxonomy level
10	**Design** the network and **apply** the knowledge of routing protocol to **configure** the RIP protocol in network	3	1,2	C3, P3

OUTCOME(S)

a. An ability to apply knowledge of math, science, and engineering	**PLO1**: Engineering Knowledge:

RUBRICS:

Performance Metric	Exceeds expectation (4-5)	Meets expectations (2-3)	Does not meet expectations (0-1)	Score
Knowledge and application [PLO1]	Applies the appropriate knowledge and concepts to the problem with accuracy and proficiency; shows precise understanding of these knowledge and concepts.	Applies the relevant knowledge and concept to the problem, possibly in a roundabout way; understands the major points of the knowledge, with possible misunderstanding or failure to recall minor points;	Fails to apply relevant knowledge and concepts to the problem; misunderstands or fails to recall critical points.	
			Total Score	

DEPARTMENT OF TELECOMMUNICATION ENGINEERING
MEHRAN UNIVERSITY OF ENGINEERING & TECHNOLOGY, JAMSHORO
COMPUTER COMMUNICATION & NETWORKING

(6th Semester, 3rd Year) LAB EXPERIMENT # 11

PERFORMANCE OBJECTIVE

Upon successful completion of this experiment, the student will be able to learn:

(i) To configure the RIP dynamic routing protocol on routers.

EQUIPMENT

- Three PC
- Three Routers with console
- Three RJ-45 TO DB-9 adapter
- Three RJ-45 TO RJ 45 rollover cable

DISCUSSION & CONFIGURATION

Dynamic routing makes it possible to avoid the configuration of static routes. Dynamic routing makes it possible to avoid the time-consuming and exacting process of configuring static routes. Dynamic routing also makes it possible for routers to react to changes in the network and to adjust their routing tables accordingly, without the intervention of the network administrator.

RIP is a distance vector routing protocol that is used in thousands of networks throughout the world. The fact that RIP is based on open standards and is easy to implement makes it attractive to some network administrators. However, RIP lacks the power and features of

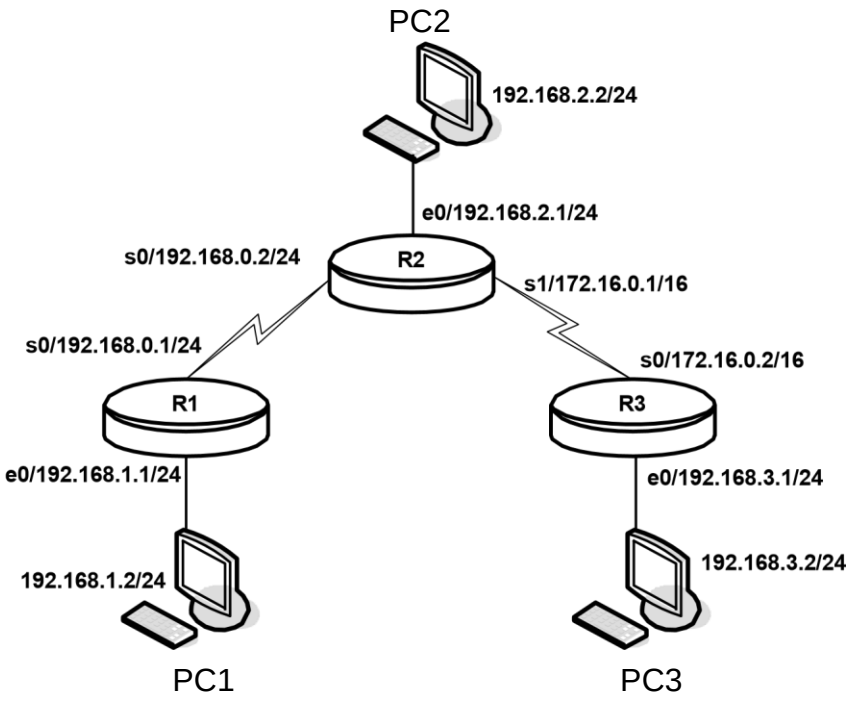


Fig: Network Diagrm

more advanced routing protocols. Because of its simplicity, RIP is a good basic protocol for networking students.

Its key characteristics include the following:

It is a distance vector routing protocol.
Hop count is used as the metric for path selection. If the hop count is greater than 15, the packet is

discarded. Routing updates are broadcast every 30 seconds, by default.

Setup a network similar to the one in the diagram. Any router that meets the interface requirements may be used. And follow the steps required to achieve this lab activity.

Step 1: **Configuring both Routers**

For Router1

Press Enter to Start

```
Router>
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Router1
Router1(config)#^Z
%SYS-5-CONFIG_I: Configured from console by console
Router1(config)#int s0
Router1(config-if)#ip address 192.168.0.1 255.255.255.0
Router1(config-if)#clock rate 64000
Router1(config-if)#no shut
%LINK-3-UPDOWN: Interface Serial0, changed state to up
%LINK-3-UPDOWN: Interface Serial0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0, changed state to down
Router1(config-if)#exit
Router1(config)#int e0
Router1(config-if)#ip address 192.168.1.1 255.255.255.0
```

```
Router1(config-if)#no shut
%LINK-3-UPDOWN: Interface Ethernet0, changed state to up
Router1(config-if)#^Z
%SYS-5-CONFIG_I: Configured from console by console
%LINK-3-UPDOWN: Interface Serial0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0, changed state to up
```

a. Why is the interface Serial0 changed state to down? Give reason

_____

___

For Router2

Press Enter to Start
Router>
Router>**en**
Router#**config t**
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#**hostname Router2**
Router2(config)#**int s0**
Router2(config-if)#**ip address 192.168.0.2 255.255.255.0**
Router2(config-if)#**no shut**
%LINK-3-UPDOWN: Interface Serial0, changed state to up Router2(config-if)#**exit**

Router2(config)#**int s1**
Router2(config-if)#**ip address 172.16.0.1 255.255.0.0**
Router2(config-if)#**clock rate 64000**
Router2(config-if)#**no shut**
%LINK-3-UPDOWN: Interface Serial1, changed state to up
%LINK-3-UPDOWN: Interface Serial1, changed state to down %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1, changed state to down
Router2(config-if)#^**Z**
%SYS-5-CONFIG_I: Configured from console by

console Router2#**config t**

Enter configuration commands, one per line. End with CNTL/Z.
Router2(config)#**int e0**
Router2(config-if)#**ip address 192.168.2.1**
255.255.255.0 Router2(config-if)#**no shut**
%LINK-3-UPDOWN: Interface Ethernet0, changed state to up
Router2(config-if)#^**Z**
%SYS-5-CONFIG_I: Configured from console by console
%LINK-3-UPDOWN: Interface Serial1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1, changed state to up

---

For Router3

Router>**en**
Router#**config t**
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#**hostname Router3**
Router3(config)#**int s0**
Router3(config-if)#**ip address 172.16.0.2**
255.255.0.0 Router3(config-if)#**no shut**

%LINK-3-UPDOWN: Interface Serial0, changed state
to up Router3(config-if)#**exit**

Router3(config)#**int e0**
Router3(config-if)#**ip address 192.168.3.1 255.255.255.0**
Router3(config-if)#**no shut**

%LINK-3-UPDOWN: Interface Ethernet0, changed state to up
Router3(config-if)#^**Z**
%SYS-5-CONFIG_I: Configured from console by console

Step 2: Configuring the work stations

Configure the workstations1 with the proper IP address, subnet mask, and default gateway.
a. The configuration for the host connected to the Router1 is:
IP Address: **192.168.1.2**
IP subnet mask: **255.255.255.0**
Default gateway: **192.168.1.1**

Configure the workstations2 with the proper IP address, subnet mask, and default gateway.
a. The configuration for the host connected to the Router2 is:
IP Address: **192.168.2.2**
IP subnet mask: **255.255.255.0**
Default gateway: **192.168.2.1**

Configure the workstations3 with the proper IP address, subnet mask, and default gateway.
a. The configuration for the host connected to the Router3 is:
IP Address: **192.168.3.2**
IP subnet mask: **255.255.255.0**
Default gateway: **192.168.3.1**

Step 3: Check the interface status

Router1#sh ip int brief

Interface	IP-Address	OK? Method Status	Protocol
Serial0	**192.168.0.1**	**YES unset up**	**up**
Ethernet0	**192.168.1.1**	**YES unset up**	**up**

Router2#sh ip int brief

Interface	IP-Address	OK? Method Status	Protocol
Serial0	**192.168.0.2**	**YES unset up**	**up**

Serial1	**172.16.0.1**	**YES unset up**	**down**
Ethernet0	**192.168.2.1**	**YES unset up**	**up**

Router3#sh ip int brief

Interface	IP-Address	OK? Method Status	Protocol
Serial0	**172.16.0.2**	**YES unset up**	**up**
Ethernet0	**192.168.3.1**	**YES unset up**	**up**

a. Check the interfaces on both routers with the commands **show ip interface brief** or **show interface.**

b. Are all the necessary interfaces up?

_____

___

Step 4: Check the routing table entries

Router1#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 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, * - candidate default U - per-user static route

Gateway of last resort is not set

192.168.0.0/24 is subnetted, 1 subnets
C 192.168.0.0 is directly connected, Serial0
192.168.1.0/24 is subnetted, 1 subnets
C 192.168.1.0 is directly connected, Ethernet0 192.168.2.0/24 is subnetted, 1 subnets

Router2#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 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, * - candidate default U - per-user static route

Gateway of last resort is not set

192.168.0.0/24 is subnetted, 1 subnets

C 192.168.0.0 is directly connected, Serial0
C 172.16.0.0 is directly connected, Serial1
192.168.2.0/24 is subnetted, 1 subnets
C 192.168.2.0 is directly connected, Ethernet0 192.168.1.0/24 is subnetted, 1 subnets

Router3#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 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, * - candidate default U - per-user static route

Gateway of last resort is not set
C 172.16.0.0 is directly connected, Serial0 192.168.3.0/24 is subnetted, 1 subnets
C 192.168.3.0 is directly connected, Ethernet0
192.168.2.0/24 is subnetted, 1 subnets

a. What networks are displayed on Router3?

_____

___

b. Which network is directly connected to Ethernet port?

_____

Step 5: Configuring the routing protocol on all

Routers From the global configuration mode, enter the

following:

Router1(config)#**router rip**
Router1(config-router)#**network 192.168.0.0**
Router1(config-router)#**network 192.168.1.0**
Router1(config-router)#^**Z**

Router2(config)#**router rip**
Router2(config-router)#**network 192.168.0.0**
Router2(config-router)#**network 192.168.2.0**
Router2(config-router)#**network 172.16.0.0**
Router2(config-router)#^**Z**

Router3(config)#**router rip**
Router3(config-router)#**network 192.168.3.0**
Router3(config-router)#**network 172.16.0.0**
Router3(config-router)#^**Z**

a. Why there are three network entries on Router2?

___

___

Step 6: Verify the new route

Router1#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 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, * - candidate default U - per-user static route

Gateway of last resort is not set

192.168.0.0/24 is subnetted, 1 subnets
C 192.168.0.0 is directly connected, Serial0
192.168.1.0/24 is subnetted, 1 subnets
C 192.168.1.0 is directly connected, Ethernet0 192.168.2.0/24 is subnetted, 1 subnets
R **192.168.2.0 [120/1] via 192.168.0.2, 00:06:22, Serial0**
R **172.16.0.0 [120/1] via 192.168.0.2, 00:06:33, Serial0 192.168.3.0/24 is subnetted, 1 subnets**
R **192.168.3.0 [120/2] via 192.168.0.2, 00:04:36, Serial0**

Router2#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 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, * - candidate default U - per-user static route

Gateway of last resort is not set

192.168.0.0/24 is subnetted, 1 subnets
C 192.168.0.0 is directly connected, Serial0
C 172.16.0.0 is directly connected, Serial1
C 1921.9126.81.628.0.2/2.04 iiss dsuirbencteltytecdo,
n1nseucbtende,tsEthernet0

192.168.1.0/24 is subnetted, 1 subnets
R **192.168.1.0 [120/1] via 192.168.0.1, 00:09:40,**
Serial0 192.168.3.0/24 is subnetted, 1 subnets
R **192.168.3.0 [120/1] via 172.16.0.2, 00:05:31, Serial1**

Router3#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 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, * - candidate
default U - per-user static route Gateway
of last resort is not set

C 172.16.0.0 is directly connected,
Serial0 192.168.3.0/24 is subnetted, 1
subnets
C 192.168.3.0 is directly connected, Ethernet0
192.168.0.0/24 is subnetted, 1 subnets
R **192.168.0.0 [120/1] via 172.16.0.1, 00:09:29,**
Serial0 192.168.2.0/24 is subnetted, 1 subnets
R **192.168.2.0 [120/1] via 172.16.0.1, 00:02:34, Serial0**
192.168.1.0/24 is subnetted, 1 subnets
R **192.168.1.0 [120/2] via 172.16.0.1, 00:05:41,**
Serial0 a. List the shortest listed route in the routing table
of R2?

b. What is the administrative distance and which protocol is used?

Step 7: Check connectivity from host to host

Ping host1 to host2

C:>ping 192.168.2.2
Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=60ms TTL=241

```
Reply from 192.168.2.2: bytes=32 time=60ms TTL=241
Reply from 192.168.2.2: bytes=32 time=60ms TTL=241
Reply from 192.168.2.2: bytes=32 time=60ms TTL=241
Reply from 192.168.2.2: bytes=32 time=60ms TTL=241

Ping statistics for 192.168.2.2: Packets: Sent = 5, Received = 5, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 50ms, Maximum = 60ms, Average = 55ms
```

Ping host1 to host3

C:>ping 192.168.3.2
Pinging 192.168.3.2 with 32 bytes of data:

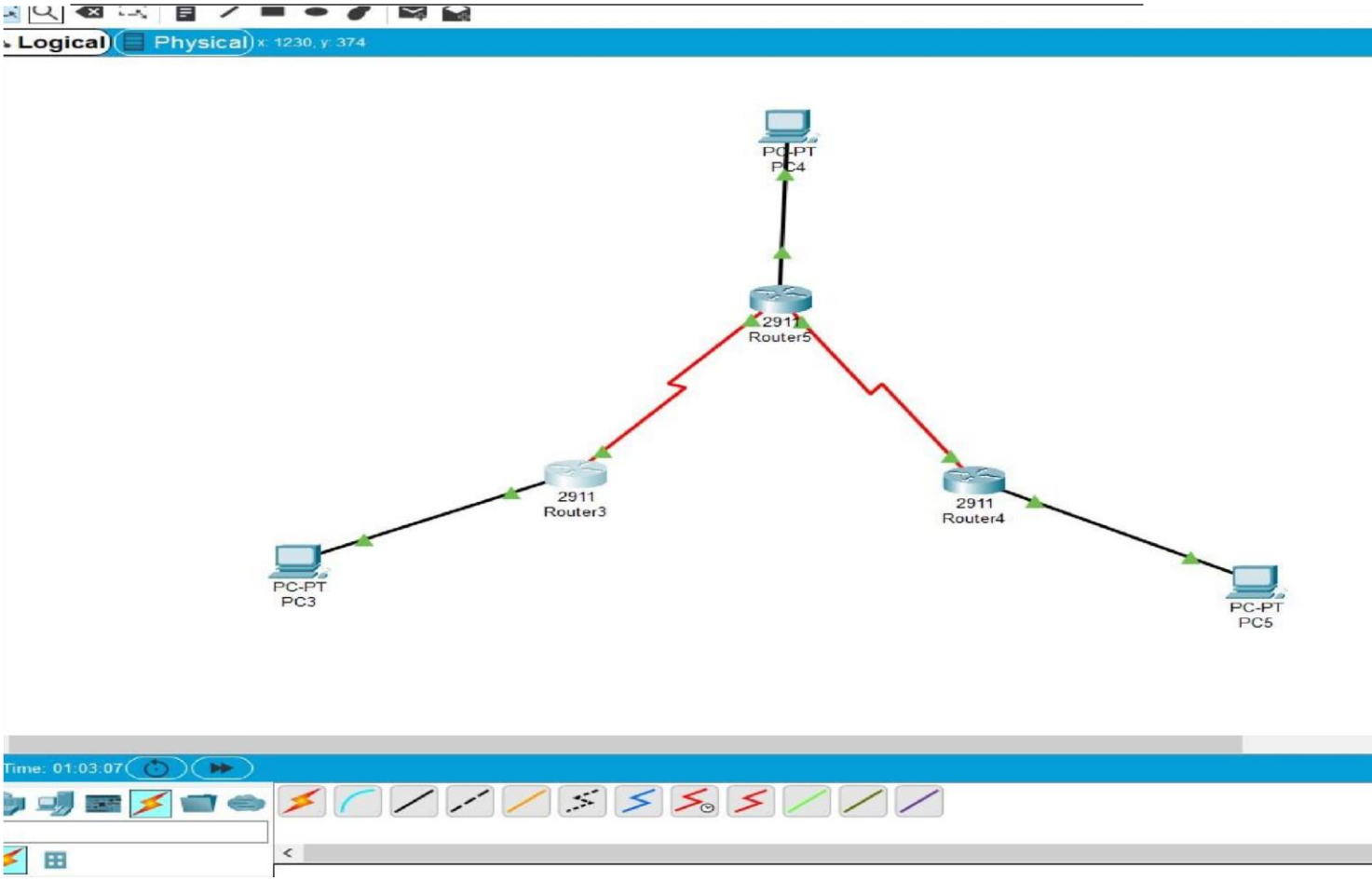
Reply from 192.168.3.2: bytes=32 time=60ms TTL=241 Reply
from 192.168.3.2: bytes=32 time=60ms TTL=241 Reply from
192.168.3.2: bytes=32 time=60ms TTL=241
Reply from 192.168.3.2: bytes=32 time=60ms TTL=241
Reply from 192.168.3.2: bytes=32 time=60ms TTL=241

Ping statistics for 192.168.3.2: Packets: Sent = 5, Received = 5, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 50ms, Maximum = 60ms, Average = 55ms

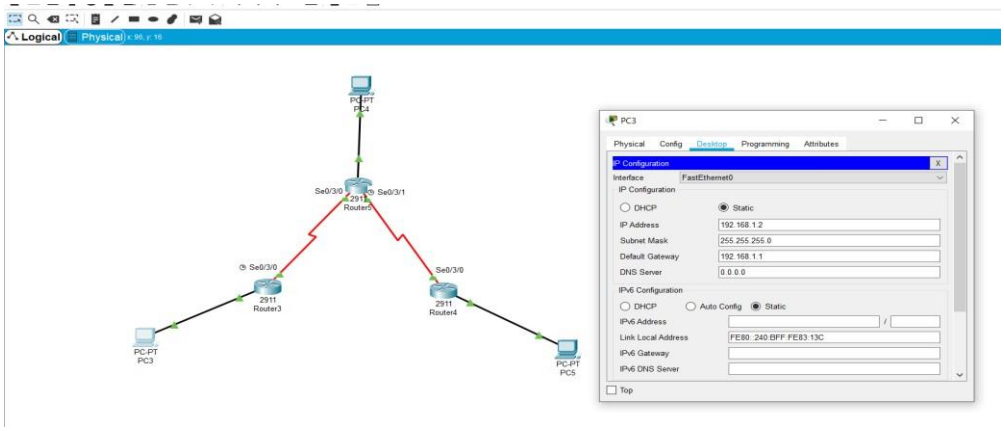
If the **ping** was not successful, check routing table to make sure routes are entered correctly

FINAL CHECK LIST

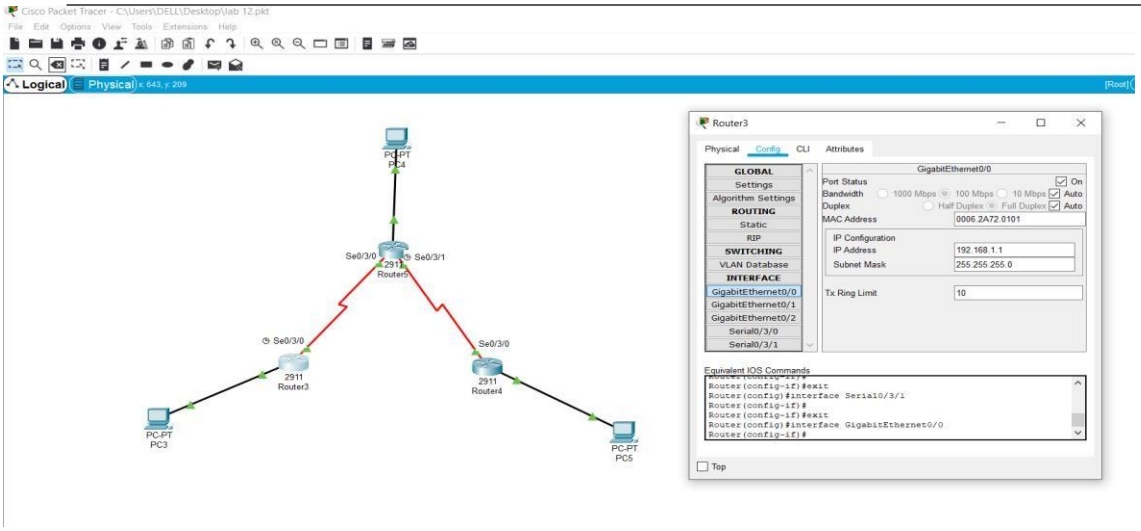
1. Return all equipment and materials to their proper storage area.

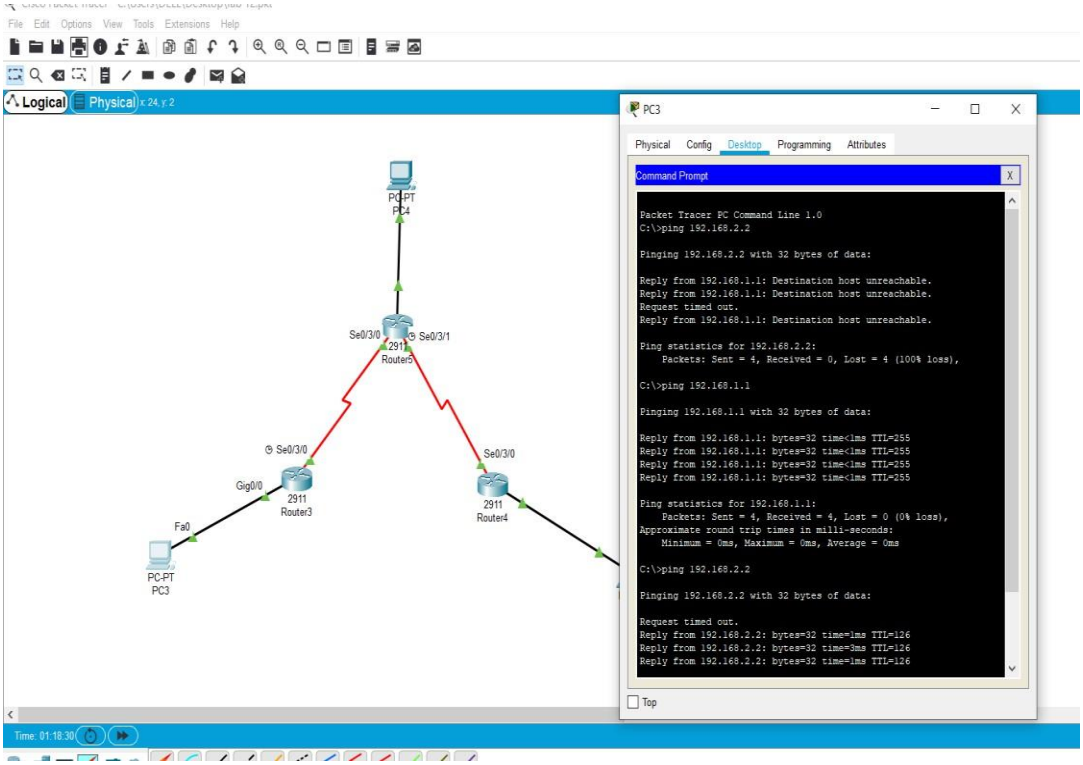

Logical
Physical
x: 1230, y: 374
PC-PT
PC4
2911
Router5
2911
Router3
2911
Router4
PC-PT
PC3
PC-PT
PC5

Time: 01:03:07


Logical
Physical
PC-PT
PC4
Se0/3/0
Se0/3/1
2911
Router5
Se0/3/0
2911
Router3
Se0/3/0
2911
Router4
PC-PT
PC3
PC-PT
PC5

PC3
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
192.168.1.2
Subnet Mask
255.255.255.0
Default Gateway
192.168.1.1
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::240:BFF:FE83:13C
IPv6 Gateway
IPv6 DNS Server
Top


Logical
Physical
PC-PT PC4
2911 Router5
Se0/3/0
Se0/3/1
2911 Router3
2911 Router4
PC-PT PC3
PC-PT PC5
Router3
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
Serial0/3/0
Serial0/3/1
GigabitEthernet0/0
Port Status
Bandwidth
Duplex
MAC Address
0006.2A72.0101
IP Configuration
IP Address
192.168.1.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Router(config-if)#exit
Router(config)#interface Serial0/3/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Top


Logical
Physical
PC-PT PC4
2911 Router5
Se0/3/0
Se0/3/1
2911 Router3
2911 Router4
Gig0/0
Fa0
PC-PT PC3
PC3
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.2
Pinging 192.168.2.2 with 32 bytes of data:
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Request timed out.
Reply from 192.168.1.1: Destination host unreachable.
Ping statistics for 192.168.2.2:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.168.1.1
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Ping statistics for 192.168.1.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.168.2.2
Pinging 192.168.2.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=3ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Top
Time: 01:18:30

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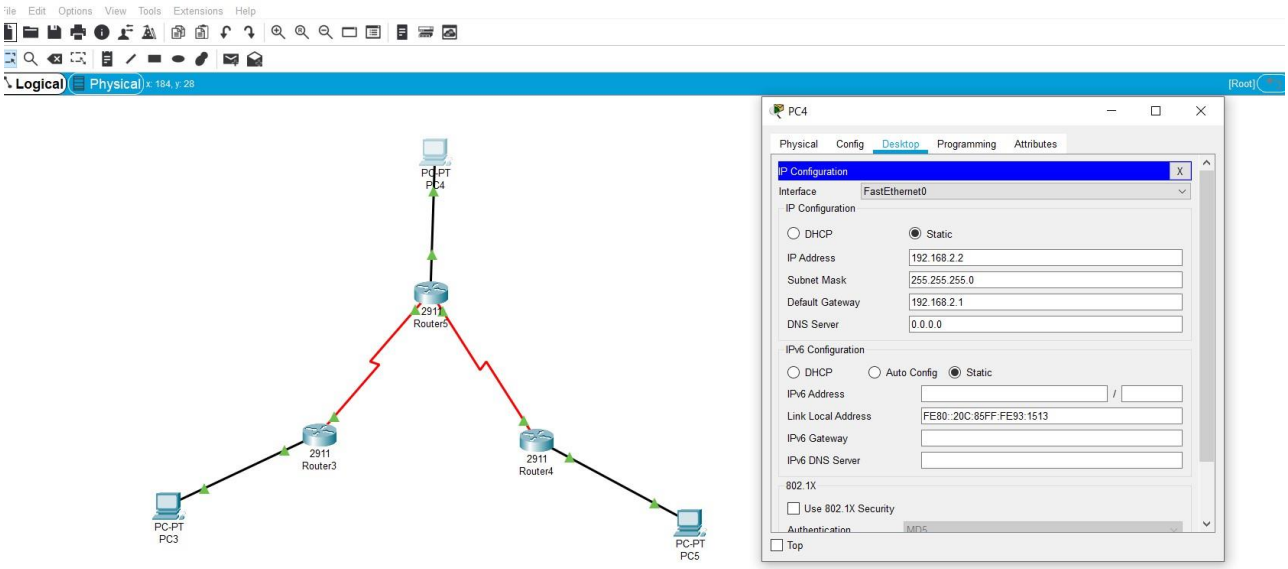

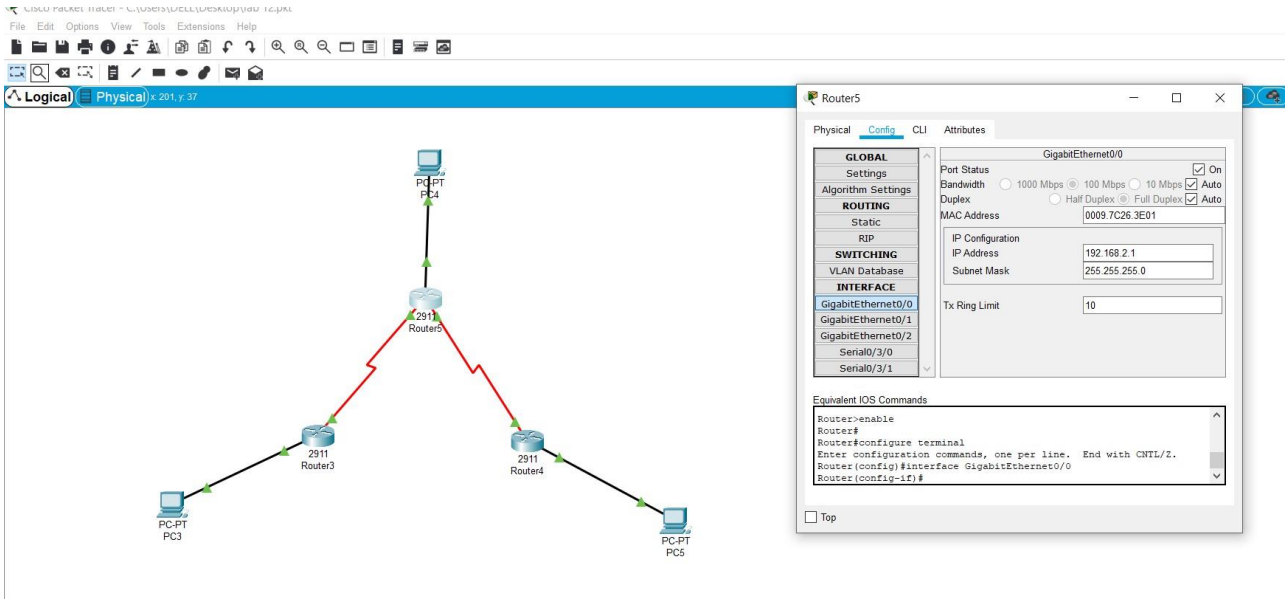

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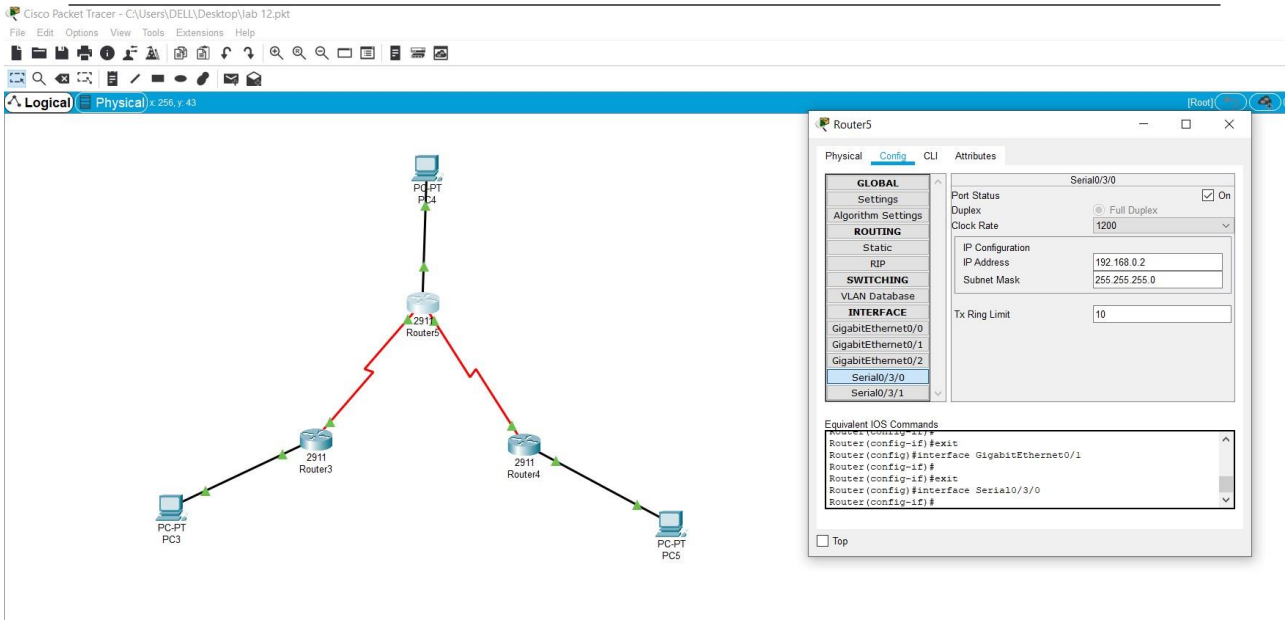

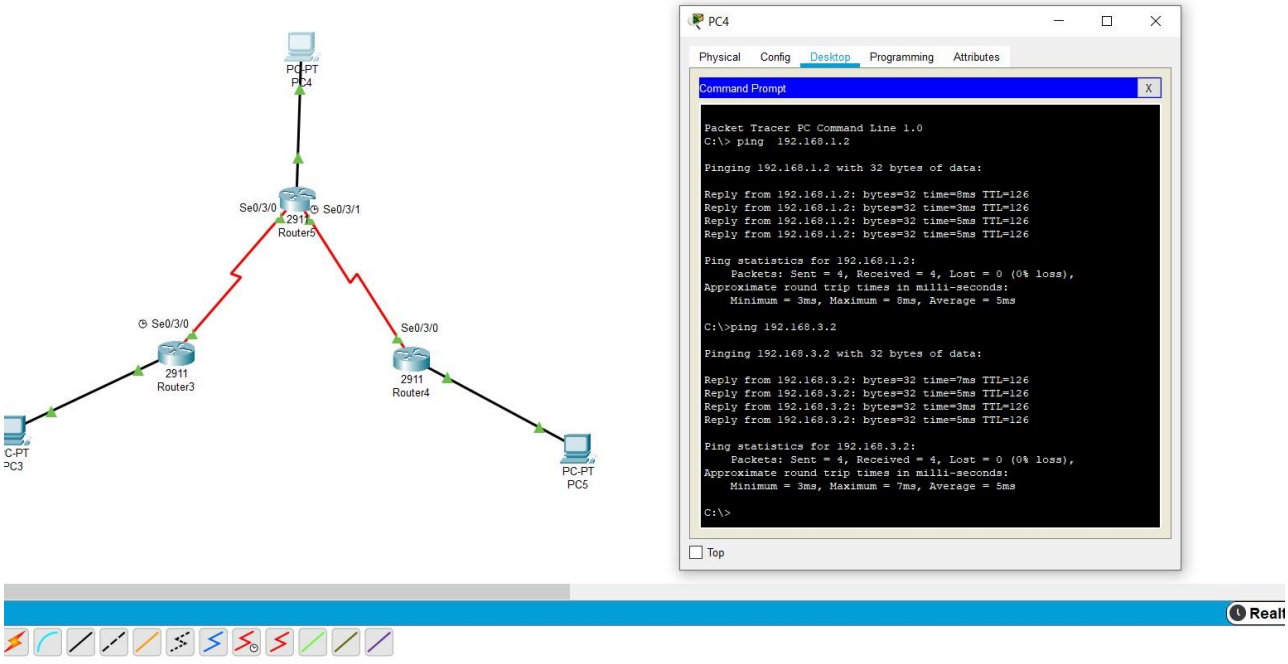

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