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

LAB EXPERIMENT #12

Name: Karan kumar Roll No: 20ES062

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

OBJECTIVES

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

OUTCOME(S)

a. An ability to apply knowledge of math, science, and engineering	PLO1: Engineering Knowledge:
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	**PLO5:** Modern Tool Usage

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.	
Modern Tool Usage [PLO5]	Computer and software are extensively used in the course	Computer and software are somewhat utilized, effort was put into learning new software	Computer and software are not utilized, no attempt was made at learning new software	

Total Score	

EQUIPMENT

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

DISCUSSION & CONFIGURATION

The Enhanced Interior Gateway Routing Protocol (EIGRP) represents an evolution from its predecessor IGRP ("Interior Gateway Routing Protocol"). This evolution resulted from changes in networking and the demands of diverse, large-scale internet works. EIGRP integrates the capabilities of link-state protocols into distance vector protocols. Additionally, EIGRP contains several important protocols that greatly increase its operational efficiency relative to other routing protocols. One of these protocols is the *Diffusing update algorithm (DUAL)*. DUAL enables EIGRP routers to determine whether a path advertised by a neighbor is looped or loop-free, and allows a router running EIGRP to find alternate paths without waiting on updates from other routers.

EIGRP provides compatibility and seamless interoperation with IGRP routers. An automatic-redistribution mechanism allows IGRP routes to be imported into EIGRP, and vice versa, so it is possible to add EIGRP gradually into an existing IGRP network. Because the metrics for both protocols are directly translatable, they are as easily comparable as if they were routes that originated in their own autonomous systems (ASs). In addition, EIGRP treats IGRP routes as external routes and provides a way for the network administrator to customize them.

Key capabilities that distinguish EIGRP from other routing protocols include fast convergence, support for variable-length subnet mask, support for partial updates, and support for multiple network layer protocols.

A router running EIGRP stores all its neighbors' routing tables so that it can quickly adapt to alternate routes. If no appropriate route exists, EIGRP queries its neighbors to discover an alternate route. These queries propagate until an alternate route is found.

Its support for variable-length subnet masks permits routes to be automatically summarized on a network number boundary. In addition, EIGRP can be configured to summarize on any bit boundary at any interface.

EIGRP does not make periodic updates. Instead, it sends partial updates only when the metric for a route changes. Propagation of partial updates is automatically bounded so that only those routers that need the information are updated. As a result of these two capabilities, EIGRP consumes significantly less bandwidth than IGRP.

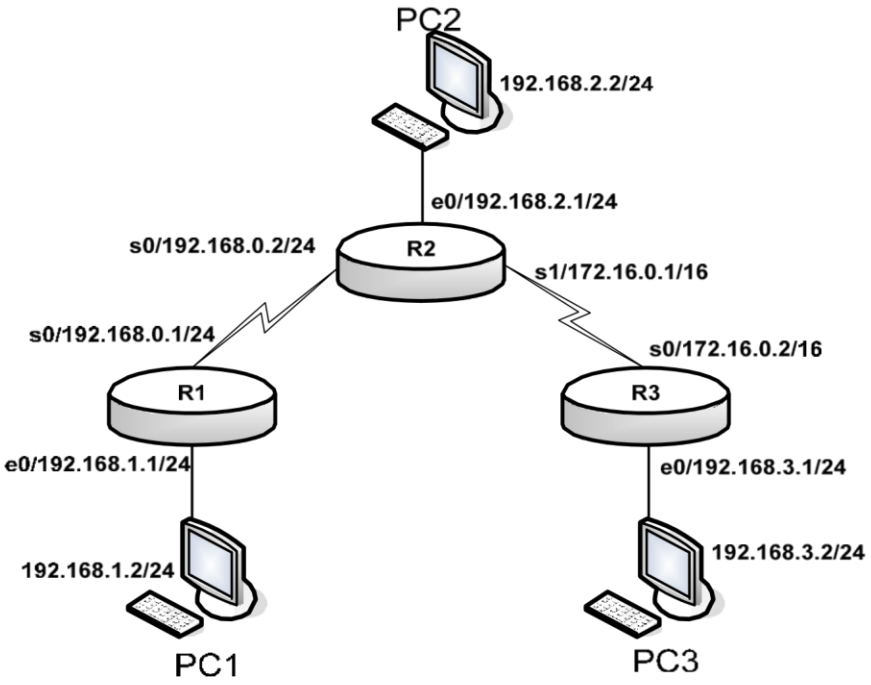
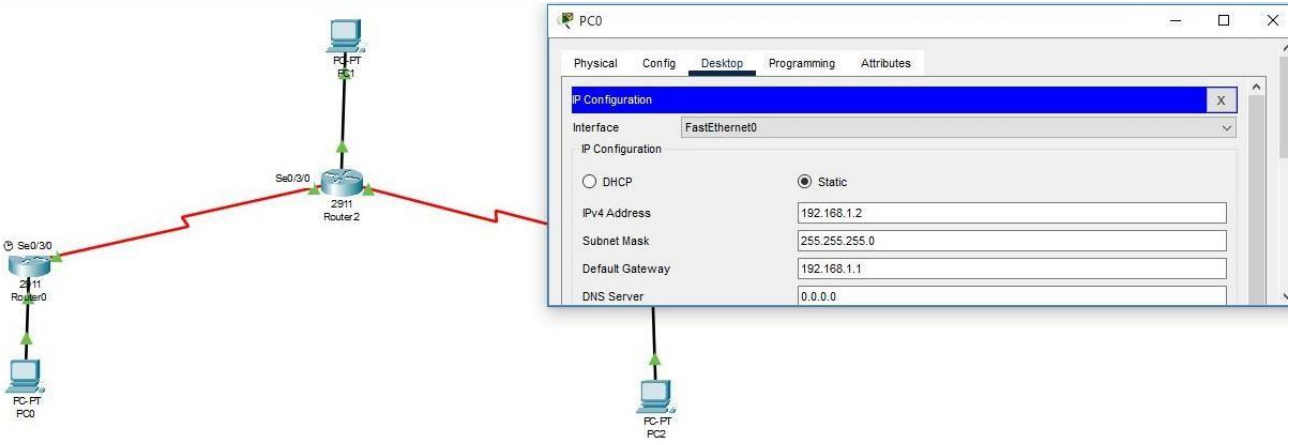


Fig: Network Diagrm

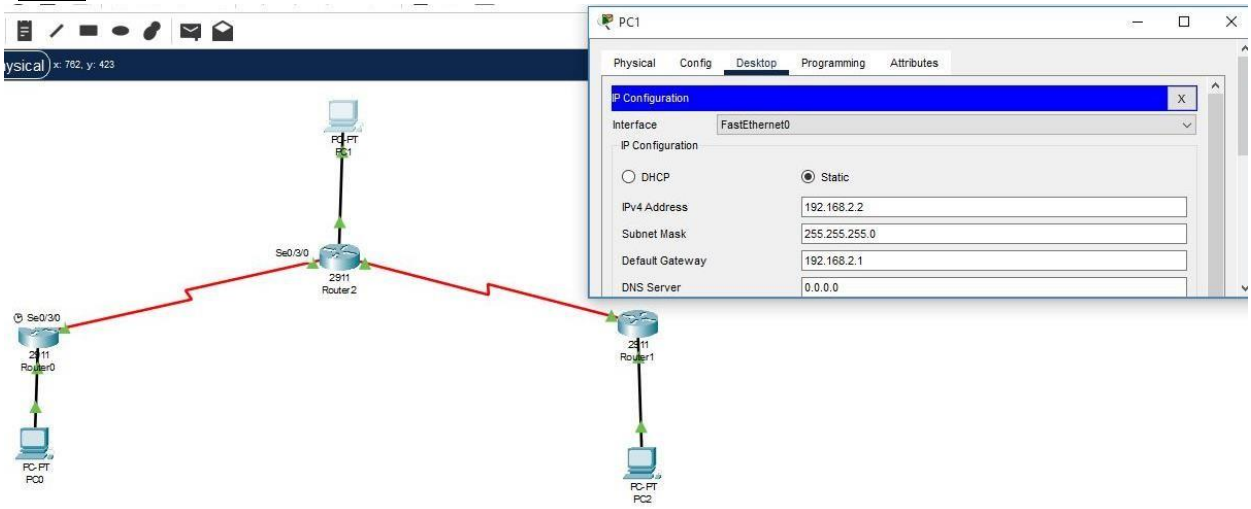
Setup a network similar to the one in the diagram. Any router that meets the interface requirements may be used. And follow the steps required to achieve this lab activity.

Configuration of PCs

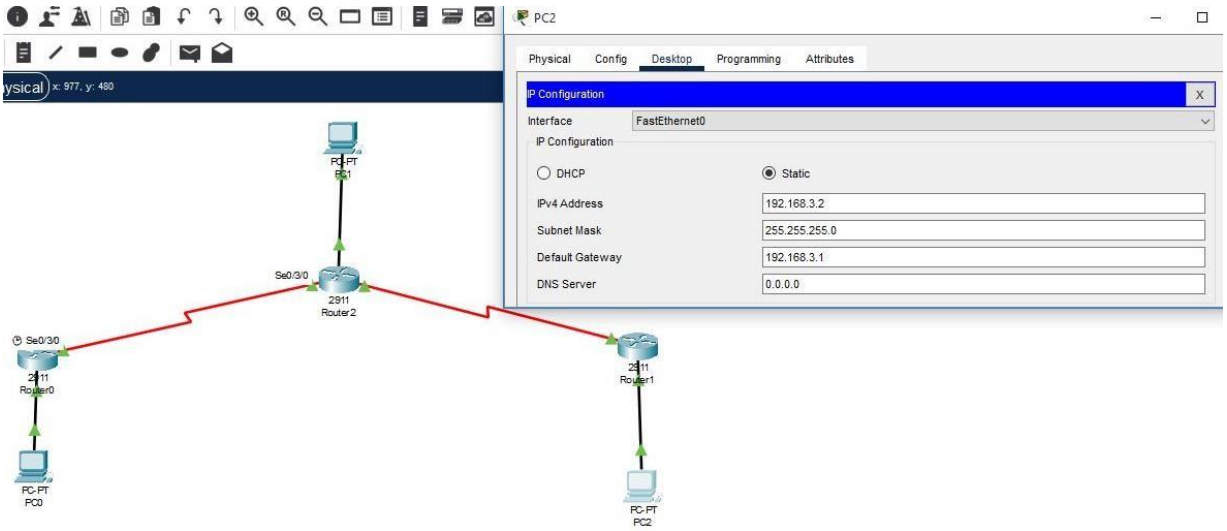
PC0:



PC1:

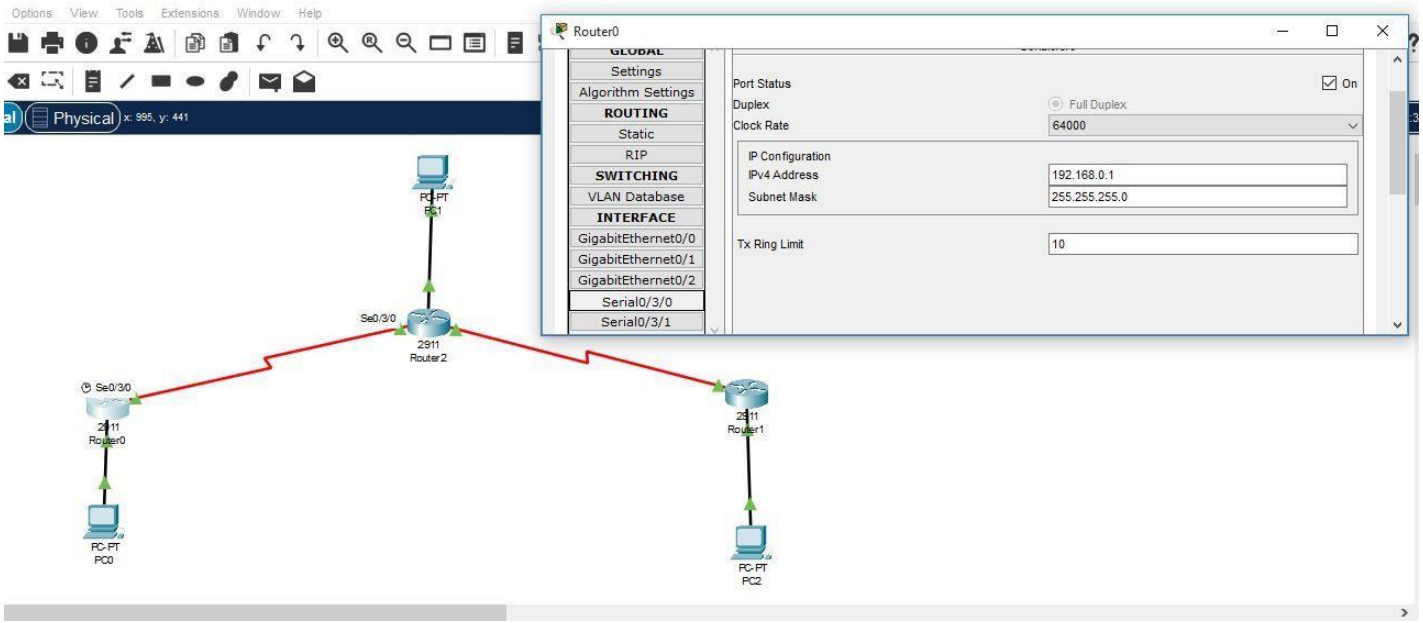


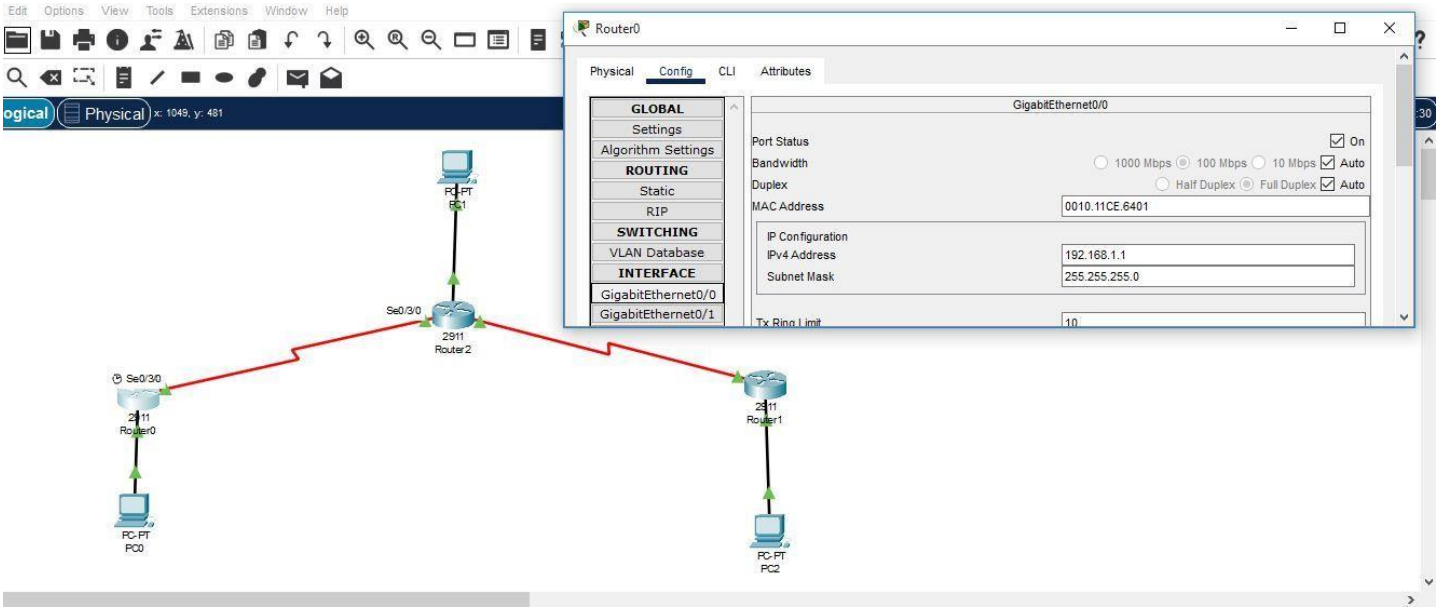
PC2:



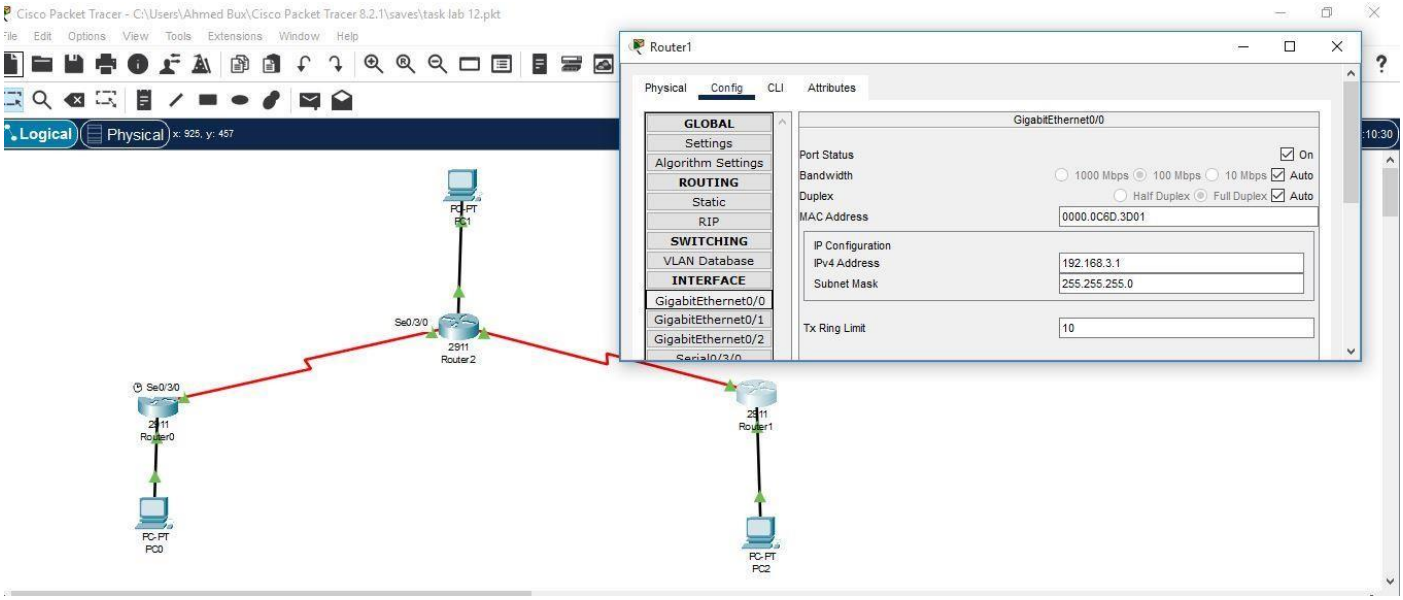
Configuration Of Routers:

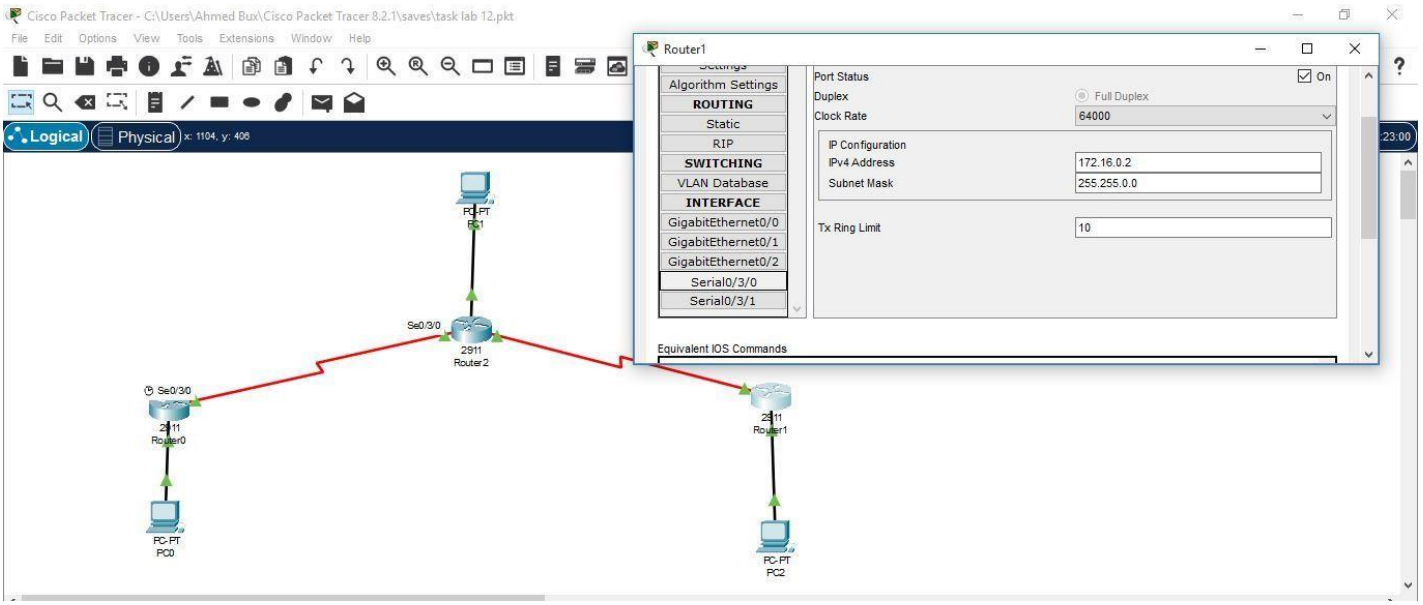
Router 0:



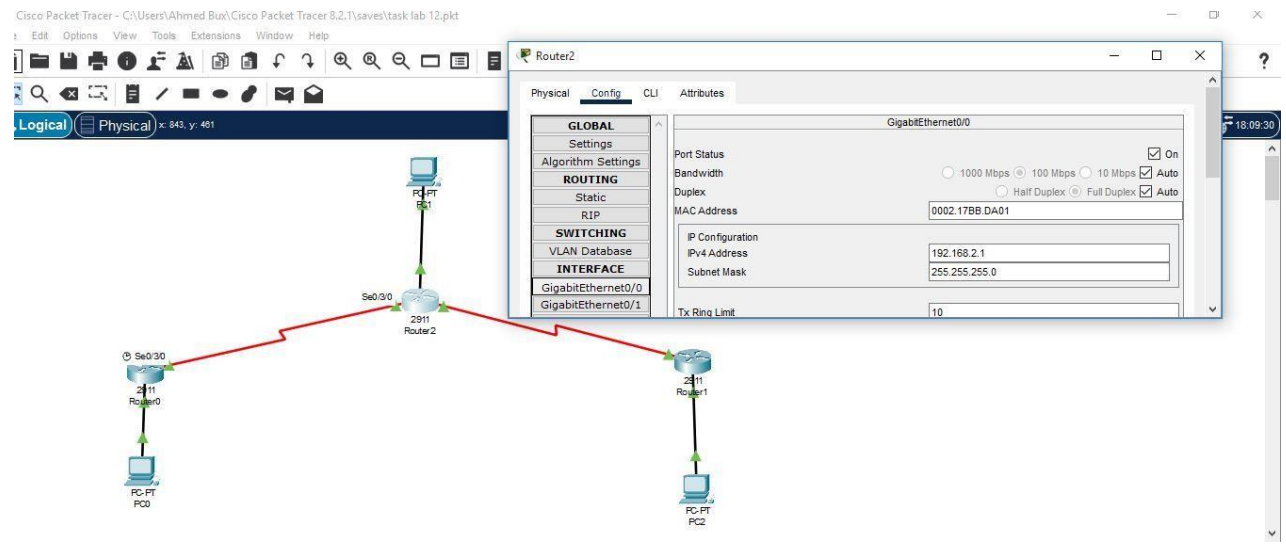


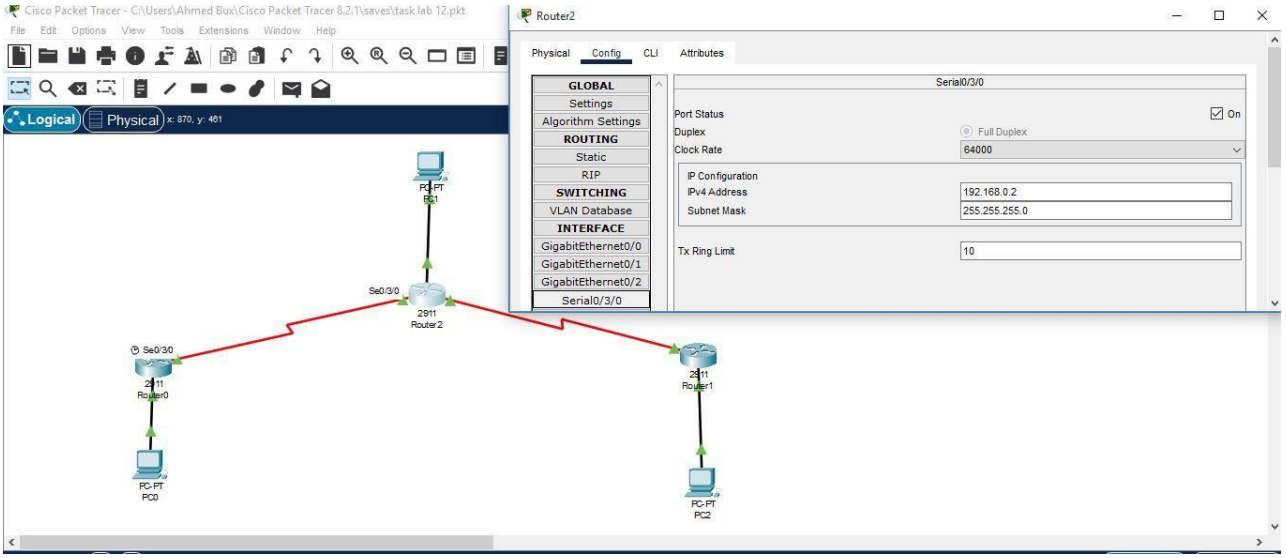
Router 1:

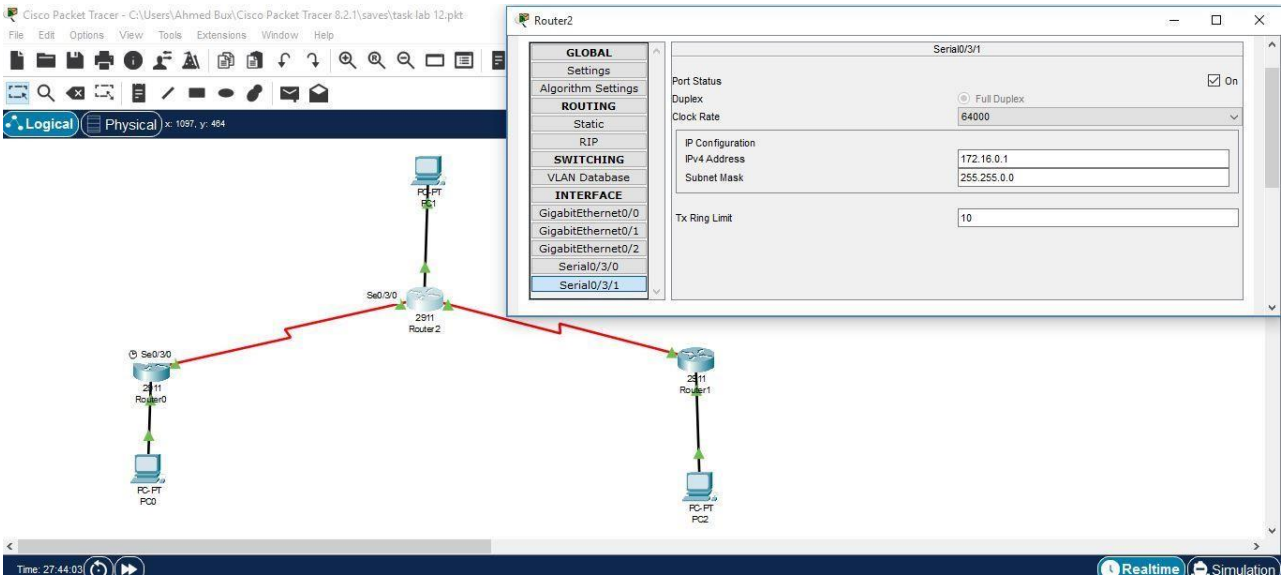

Cisco Packet Tracer - C:\Users\Ahmed Bux\Cisco Packet Tracer 8.2.1\saves\task lab 12.pkt
File Edit Options View Tools Extensions Window Help
Logical
Physical
x: 925, y: 457
Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0000.0C6D.3D01
IP Configuration
IPv4 Address
192.168.3.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10
PC-PT
PC1
Se0/3/0
2911
Router2
Se0/3/0
2911
Router0
PC-PT
PC0
2911
Router1
PC-PT
PC2


Cisco Packet Tracer - C:\Users\Ahmed Bux\Cisco Packet Tracer 8.2.1\saves\task lab 12.pkt
File Edit Options View Tools Extensions Window Help
Logical
Physical
x: 1104, y: 406
Router1
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
Serial0/3/0
Serial0/3/1
Port Status
On
Duplex
Full Duplex
Clock Rate
64000
IP Configuration
IPv4 Address
172.16.0.2
Subnet Mask
255.255.0.0
Tx Ring Limit
10
Equivalent IOS Commands
PC-PT PC1
Se0/3/0
2911 Router2
Se0/3/0
2911 Router0
2911 Router1
PC-PT PC0
PC-PT PC2

Router 2:

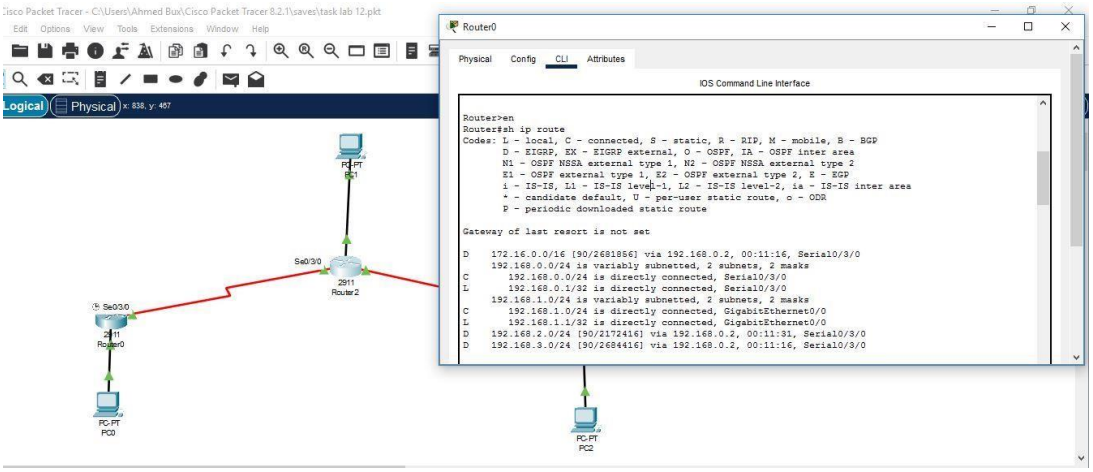




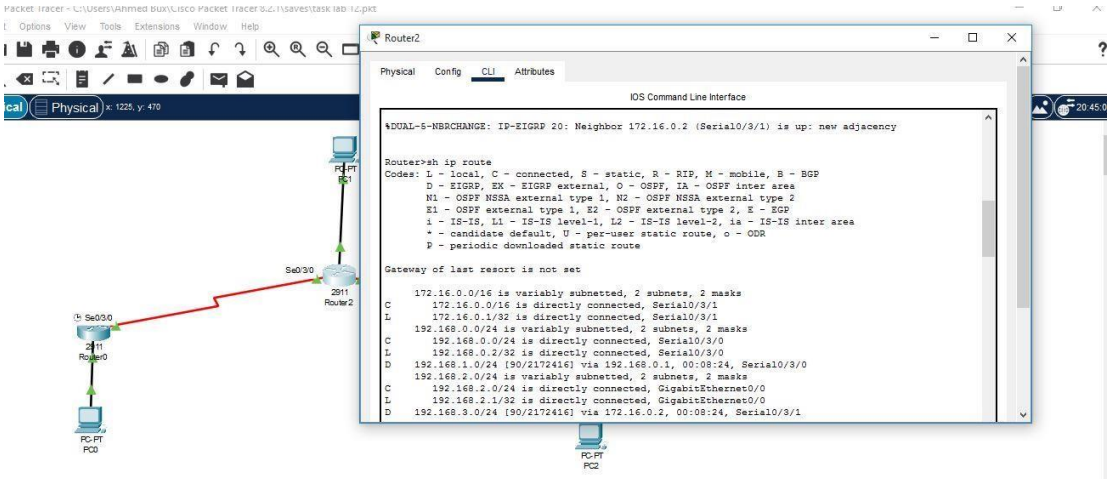


Routing tables:

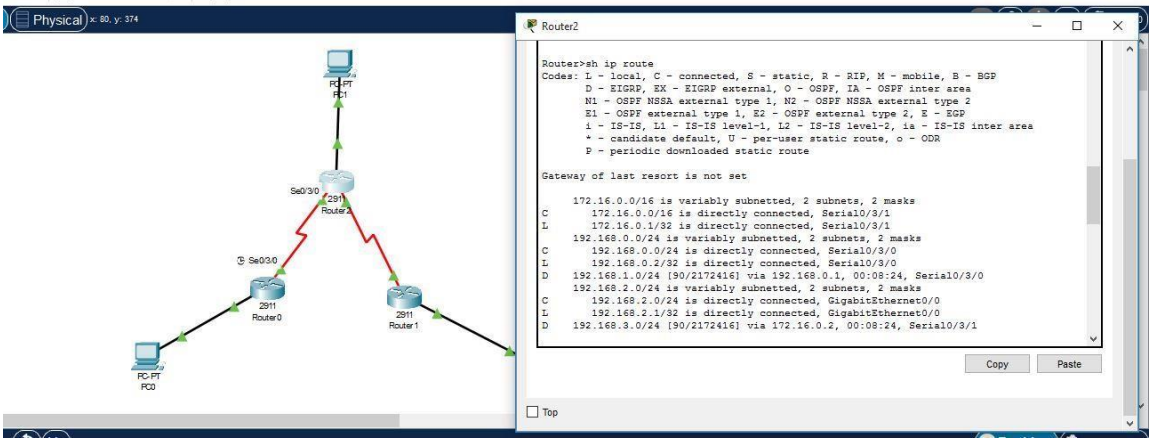
Router 0:



Router 1:

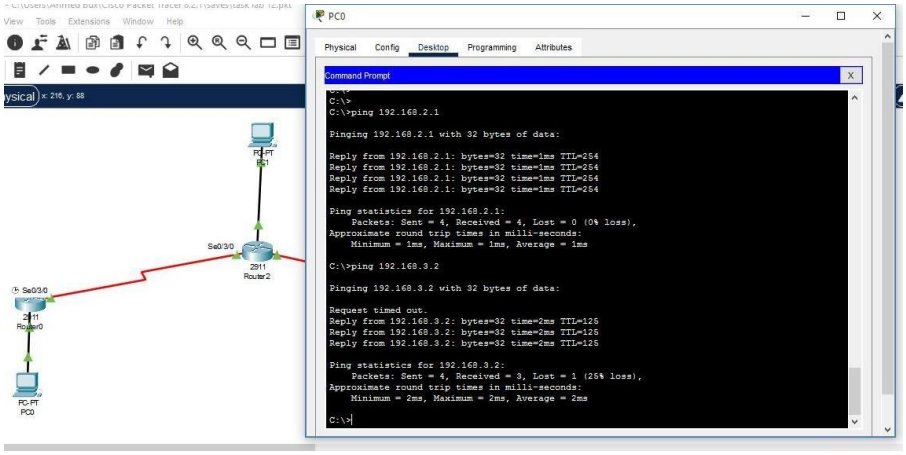


Router 2:

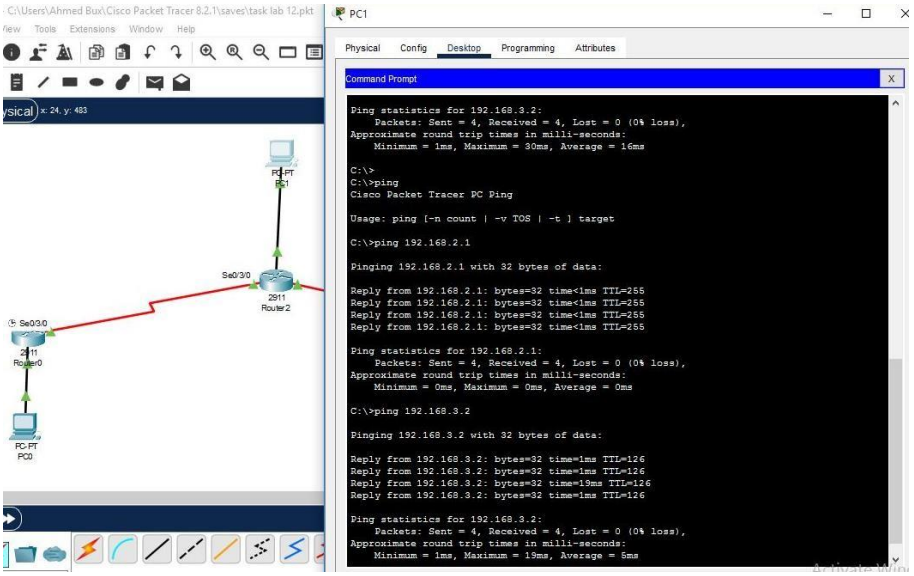


Ping Results:

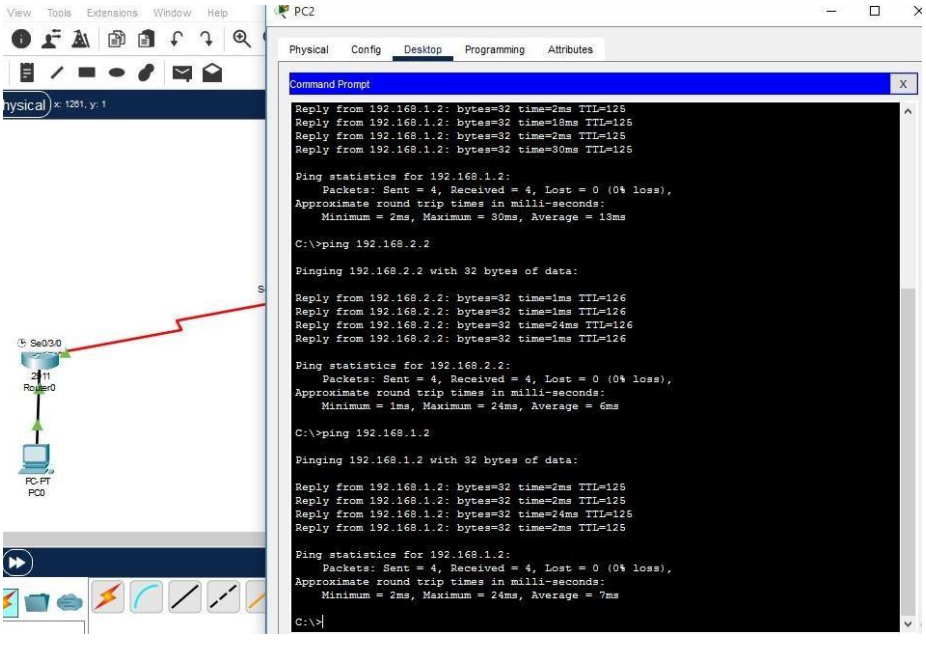
PCO:


PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
C:\>ping 192.168.2.1
Pinging 192.168.2.1 with 32 bytes of data:
Reply from 192.168.2.1: bytes=32 time=1ms TTL=254
Reply from 192.168.2.1: bytes=32 time=1ms TTL=254
Reply from 192.168.2.1: bytes=32 time=1ms TTL=254
Reply from 192.168.2.1: bytes=32 time=1ms TTL=254
Ping statistics for 192.168.2.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
C:\>ping 192.168.3.2
Pinging 192.168.3.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.3.2: bytes=32 time=2ms TTL=125
Reply from 192.168.3.2: bytes=32 time=2ms TTL=125
Reply from 192.168.3.2: bytes=32 time=2ms TTL=125
Ping statistics for 192.168.3.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 2ms, Average = 2ms
C:\>
Se0/3/0
2911
Router2
Router0
PC-PT
PC0

PC1:


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Ping statistics for 192.168.3.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 30ms, Average = 16ms
C:\>
C:\>ping
Cisco Packet Tracer PC Ping
Usage: ping [-n count | -v TOS | -t] target
C:\>ping 192.168.2.1
Pinging 192.168.2.1 with 32 bytes of data:
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Ping statistics for 192.168.2.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.168.3.2
Pinging 192.168.3.2 with 32 bytes of data:
Reply from 192.168.3.2: bytes=32 time=1ms TTL=126
Reply from 192.168.3.2: bytes=32 time=1ms TTL=126
Reply from 192.168.3.2: bytes=32 time=19ms TTL=126
Reply from 192.168.3.2: bytes=32 time=1ms TTL=126
Ping statistics for 192.168.3.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 19ms, Average = 5ms
Se0/3/0
2911
Router2
Router0
PC-PT
PC0

PC2:


PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Reply from 192.168.1.2: bytes=32 time=2ms TTL=125
Reply from 192.168.1.2: bytes=32 time=18ms TTL=125
Reply from 192.168.1.2: bytes=32 time=2ms TTL=125
Reply from 192.168.1.2: bytes=32 time=30ms TTL=125
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 30ms, Average = 13ms
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=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=24ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Ping statistics for 192.168.2.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 24ms, Average = 6ms
C:\>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time=2ms TTL=125
Reply from 192.168.1.2: bytes=32 time=2ms TTL=125
Reply from 192.168.1.2: bytes=32 time=24ms TTL=125
Reply from 192.168.1.2: bytes=32 time=2ms TTL=125
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 24ms, Average = 7ms
C:\>
Se0/3/0
2911
Router0
PC-PT
PC0