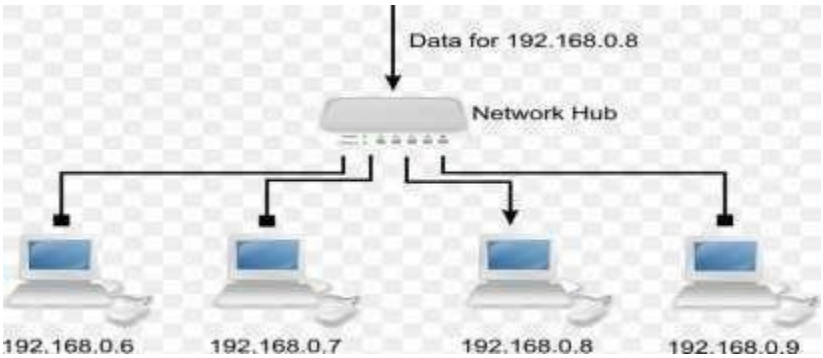
Practical-1

Aim: To study about various network connecting devices and wires used for their interconnection.

Theory:

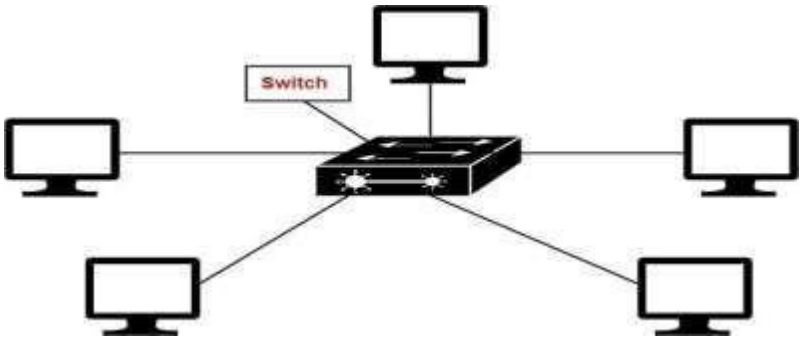
Various network connecting devices are following:

1. **Hub-** Hubs connect multiple computer networking devices together. A hub is the simplest in the family of network connecting devices because it connects LAN components with identical protocols. A hub can be used with both digital and analog data, provided its settings have been configured to prepare for the formatting of the incoming data. For example, if the incoming data is in digital format, the hub must pass it on as packets; however, if the incoming data is analog, then the hub passes it on in signal form. Hubs do not perform packet filtering or addressing functions; they just send data packets to all connected devices. Hubs operate at the Physical layer of the OSI model.

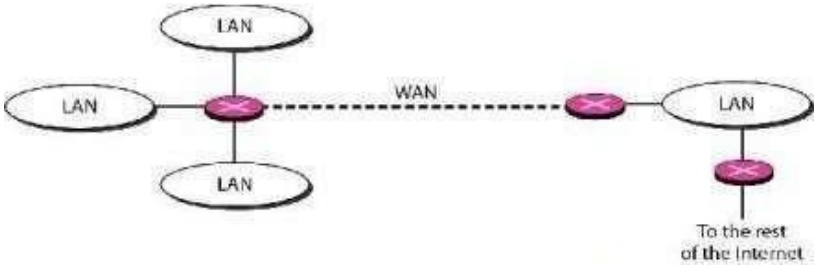


2. **Switch-** A switch is a multiport device that improves network efficiency. Strands of LANs are usually connected using switches. Generally, switches can read the hardware addresses of incoming packets to transmit them to the appropriate destination. A switch can work at either the Data Link layer or the Network

layer of the OSI model. A multilayer switch is one that can operate at both layers, which means that it can operate as both a switch and a router.

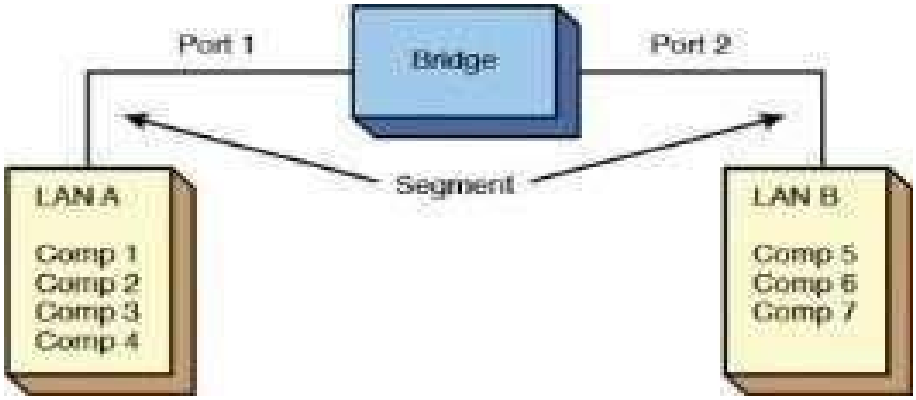


3. **Router-** A router is a three-layer device that routes packets based on their logical addresses (host-tohost addressing). A router normally connects LANs and WANs in the internet and has a routing table that is used for making decisions about the route. The router, with the help of a routing table, has knowledge of routes a packet could take from its source to its destination. Routers normally work at the Network layer of the OSI model.



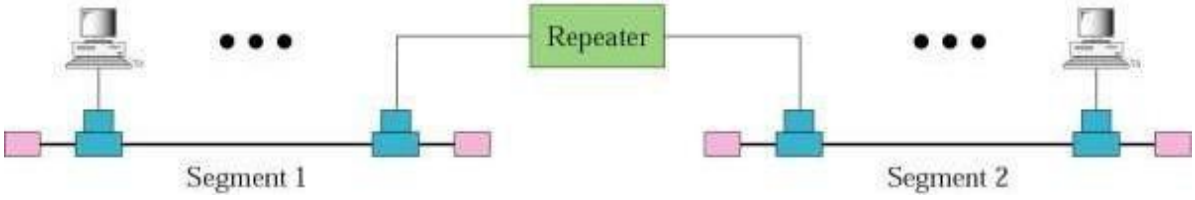
4. **Bridge-** Bridges are used to connect two or more hosts or network segments together. The basic role of bridges in network architecture is storing and forwarding frames between the different segments that the bridge connects. A bridge operates in both the physical and the data link layer. As a physical

layer device, it regenerates the signal it receives. As a data link layer device, the bridge can check the physical (MAC) addresses (source and destination) contained in the frame.



5. **Gateway-** A gateway can translate the data from one type of network to the other type. Gateway is a protocol convertor. It can receive a packet formatted for one protocol and change it to a packet formatted for a different protocol before forwarding it. Gateways can operate at any network layer.

6. **Repeater-** Repeater works on physical layer. A repeater receives the signal and it regenerates the signal in original bit pattern before the signal gets corrupted. It does not amplify the signal, it just regenerates it. A repeater has no filtering capability. It is used to extend the physical distance of LAN. A repeater cannot connect two LANs, but it connects two segments of the same LAN.



7. **Access Point-** While an access point (AP) can technically involve either a wired or wireless connection, it commonly means a wireless device. An AP works at the Data Link layer, and it can operate either as a bridge connecting a standard wired network to wireless devices or as a router passing data transmissions from one access point to another.

Various types of cables are following:

1. **Console cable-** Also known as Cisco cables, rollover cables and management cables — are designed for a specific purpose. They connect Cisco networking devices to terminals or PCs for configuration.

Typically, the Cisco end will connect via RJ45, and the terminal end will conclude in a serial connection.

2. **Copper straight through-** When you connect two devices of different types together, you use a straight through cable. When you connect two devices of the same type together, you use a crossover cable. All Pg. 6 cables are straight through if you insert a network device between two devices of the same kind.

3. **Coaxial cable-** Sometimes known as coax cable, is an electrical cable which transmits radio frequency (RF) signals from one point to another.

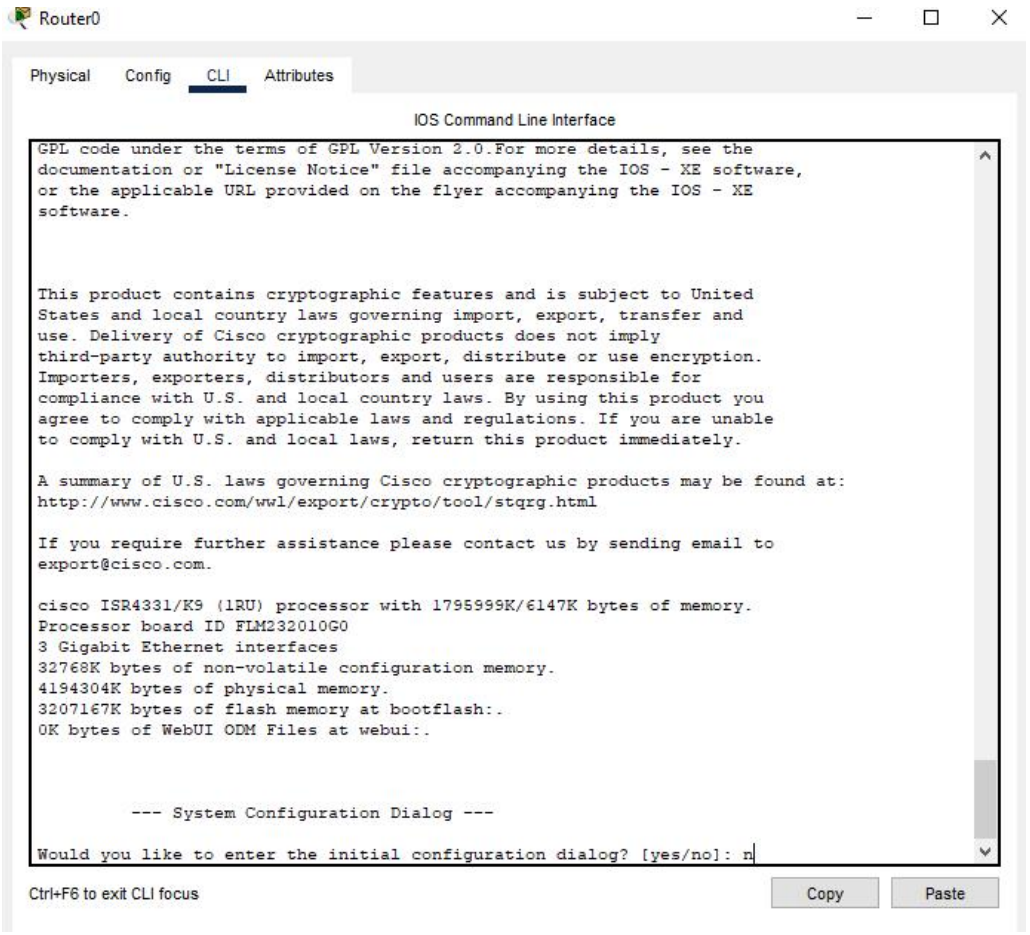
4. **DCE AND DTE cables-** With the DCE cable, (red zigzag with clock) the side you click first will be the DCE, the second will be DTE. With the DTE cable (red zigzag no clock) the side you click first will be DTE, the second will be DCE.

Practical No :- 2

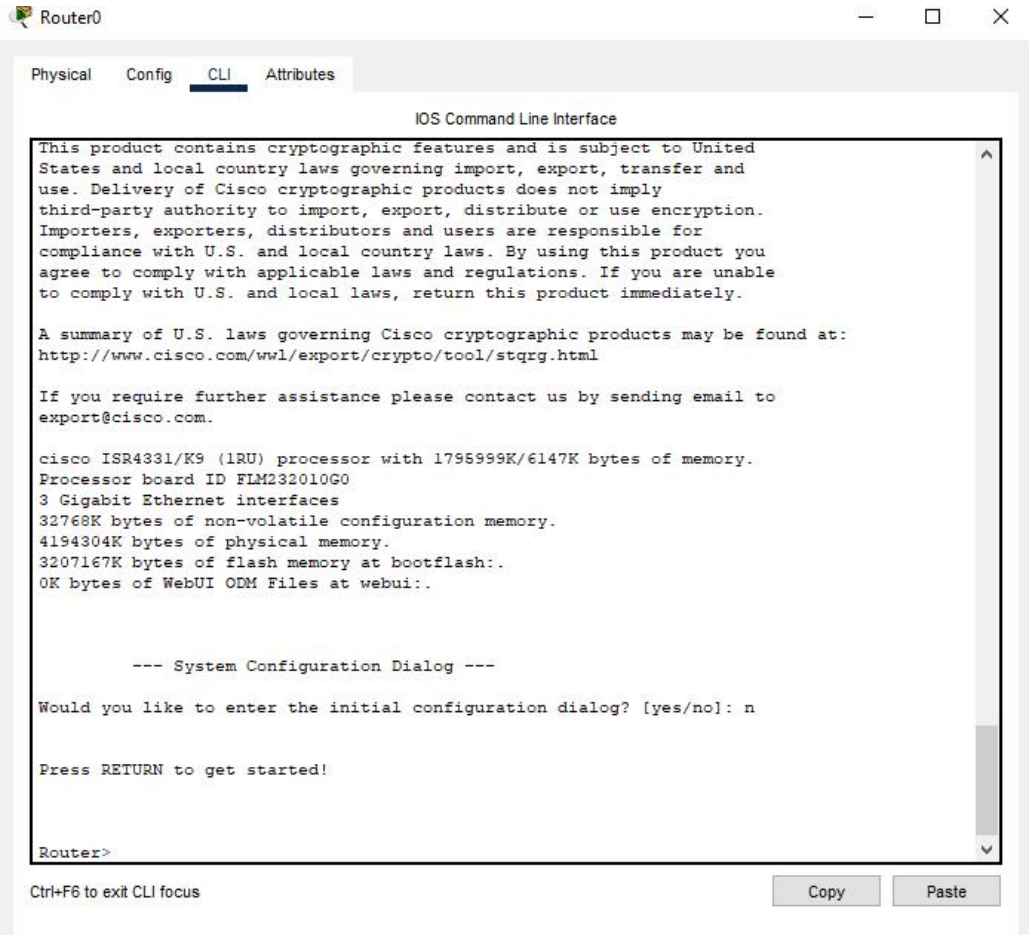
AIM:- Connecting and Logging on to a Cisco Router along with the introduction to the Basic User Interface.

THEORY:

1. To select Router 1, click on the eRouters button located at the top of yourscreen and select “Router 1”.

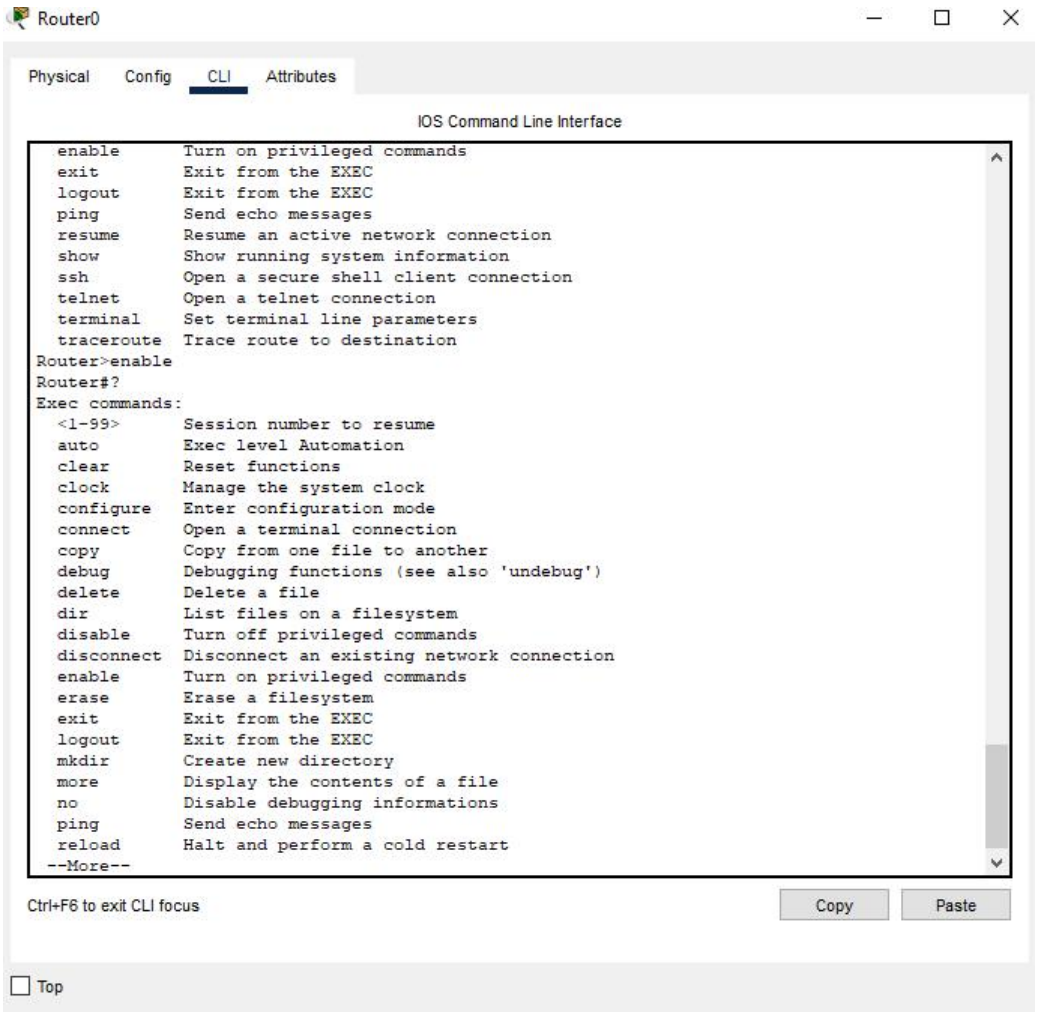


2.) The Router 1 window will open and the text “Press Enter to Start” will appear.

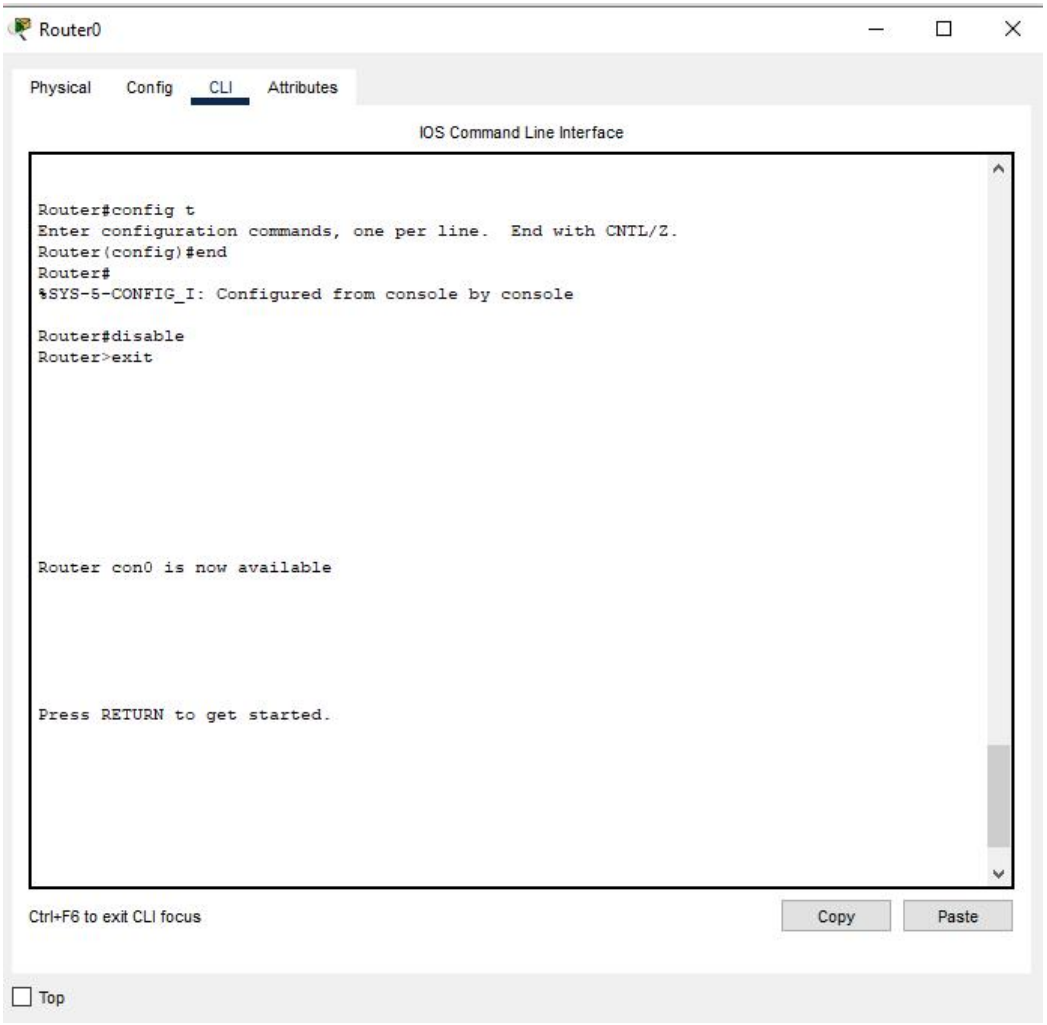


3.) Click inside the Router 1 window and press the "Enter" key to get started. You are now connected to Router 1 and are at the user mode prompt. The prompt is broken down into two parts, the hostname and the mode. "Router" is the Router 1's hostname and ">" means you are in user mode.

4.) Press RETURN to get Started Router>



5.) Next, type the command enable to get to the privileged mode prompt.
Router>enable Router#



6.) To get back to the user mode, simply type disable. From the user mode type logout or exit to leave the router.

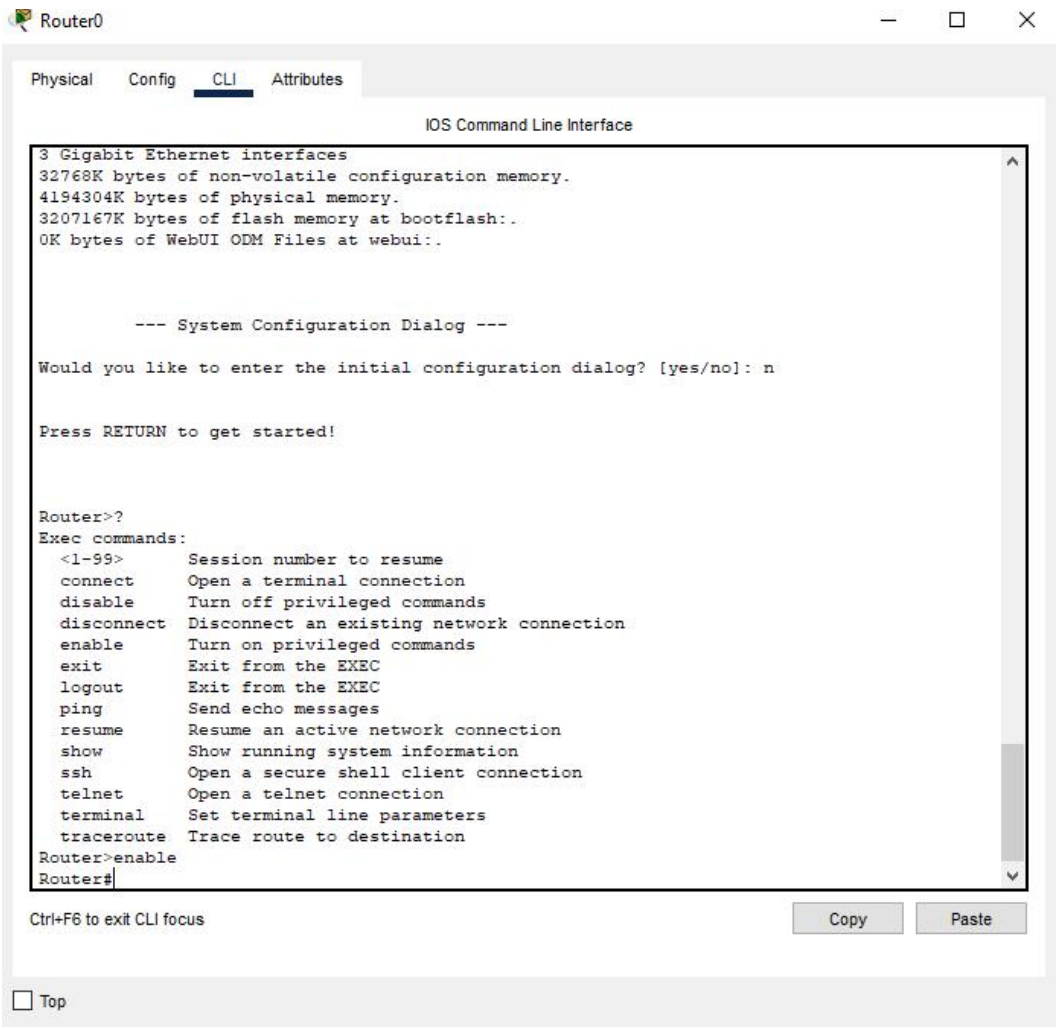
Router#disable Router> Router>exit

Router con0 is now available Press RETURN to get started

Basic User Interface:

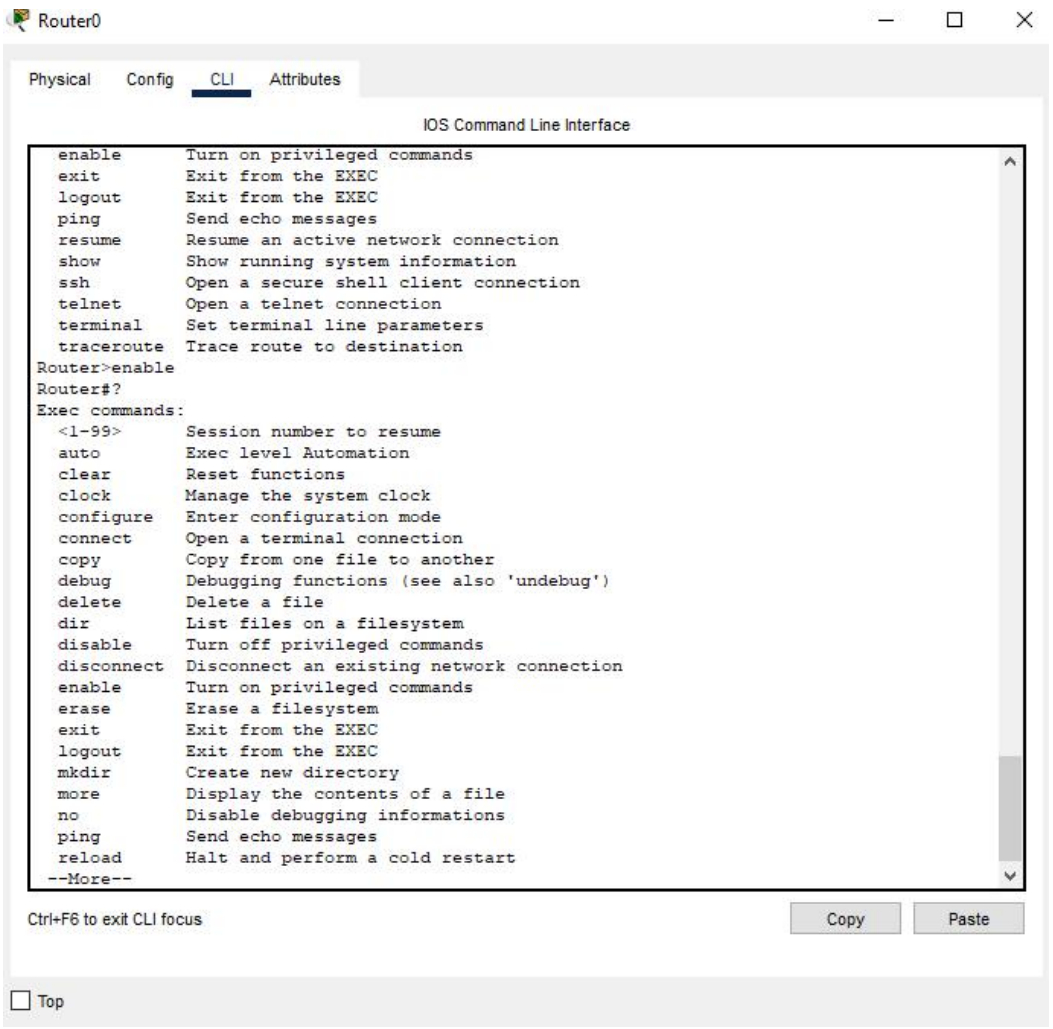
We will be using Router 1. To select Router 1 click on the button labelled "Router 1" at the top of your screen.

1. Press <enter> to get to the router prompt.
   Router>



2.) You are now in User mode. Type the command that is used to view all the available commands at this prompt.

Router>?



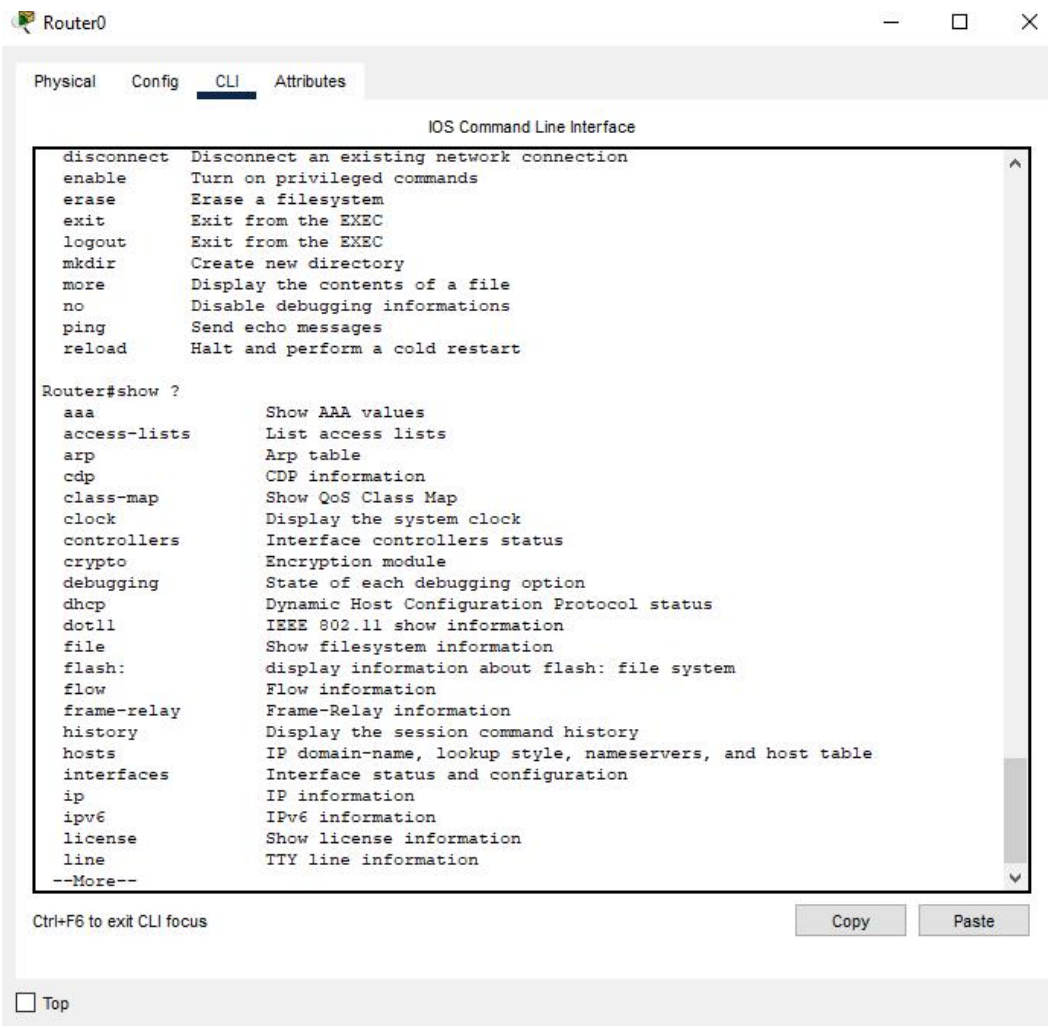
3.) Type the command used to enter Privilege mode.

Router>enable

Router#

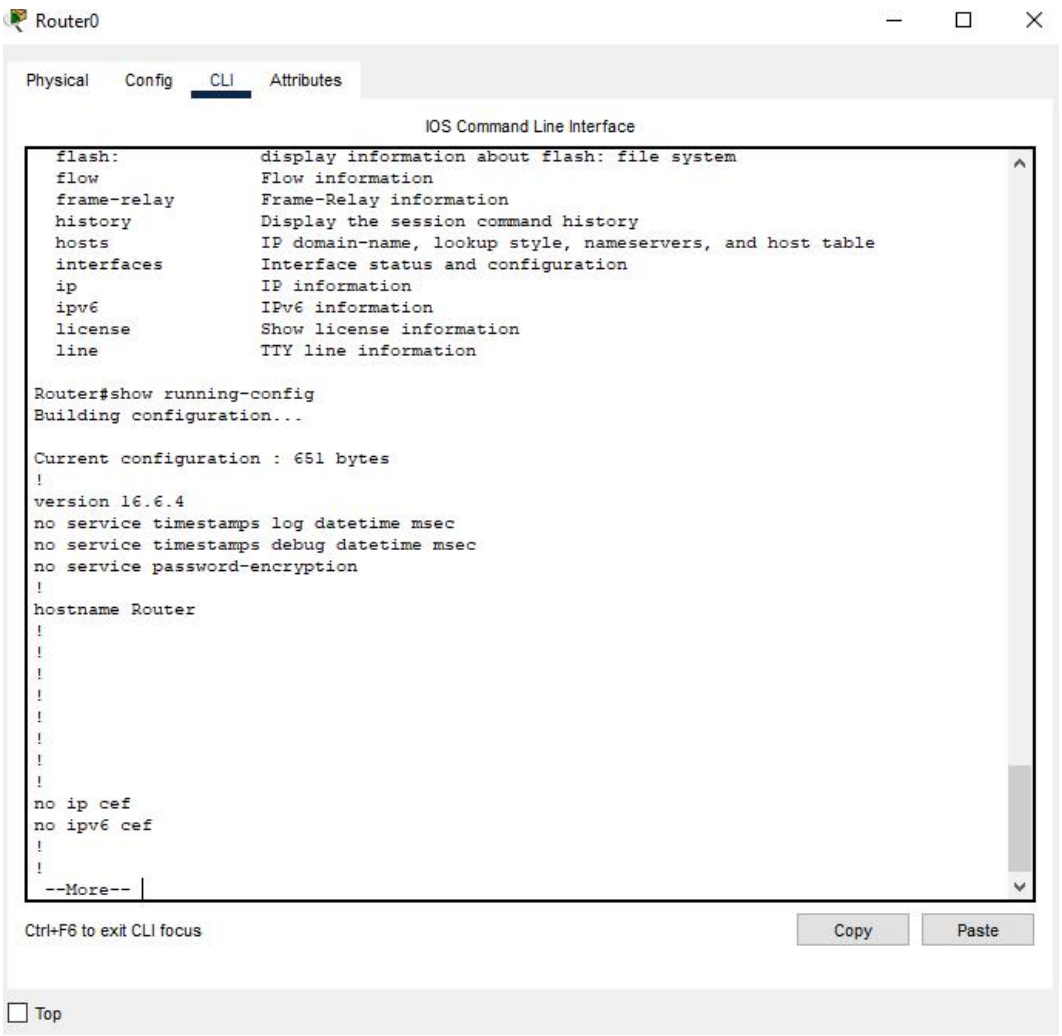
View the available commands in Privilege mode.

Router# ?



5.) Type the command that will allow you to see all of the show commands.

Router# show ?

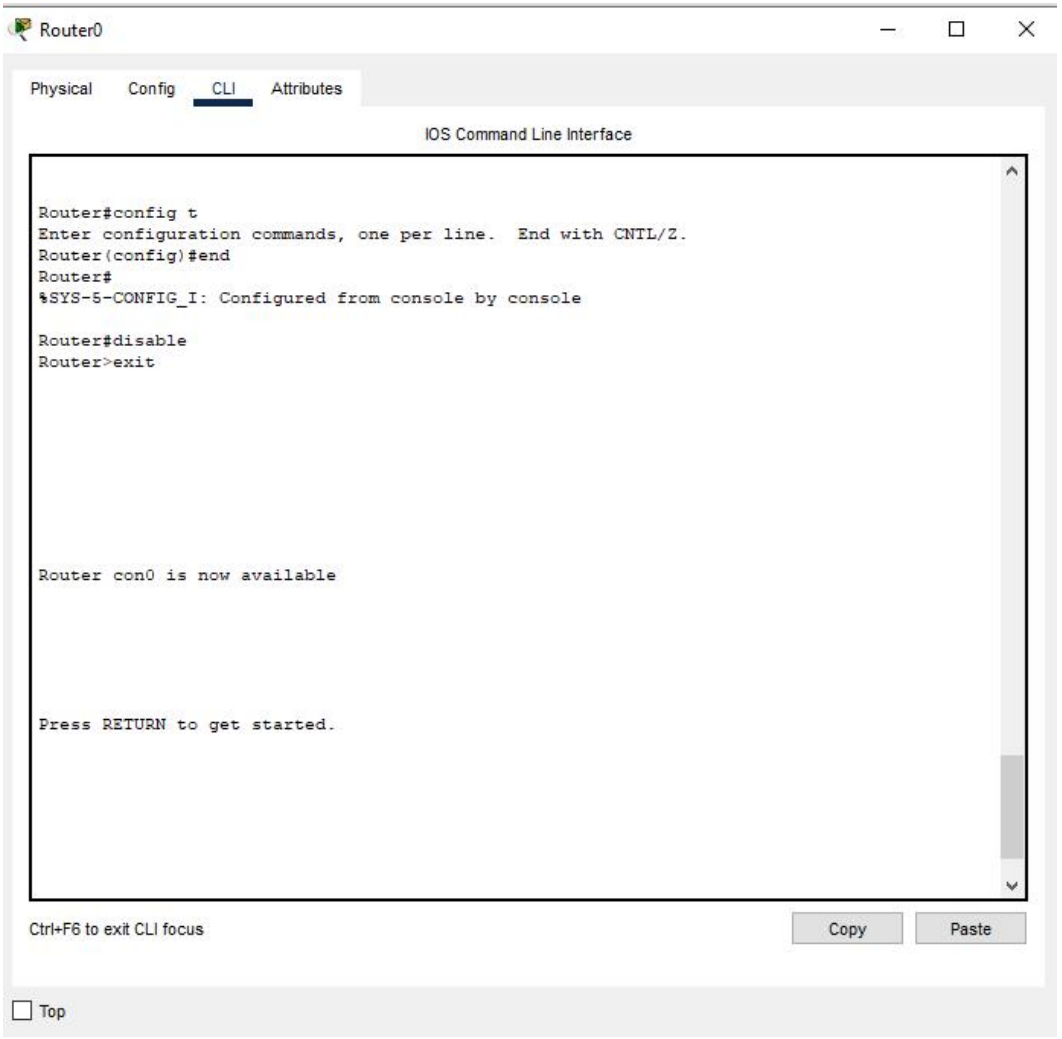


6.) Type the command that will allow you to see the active or running configuration.

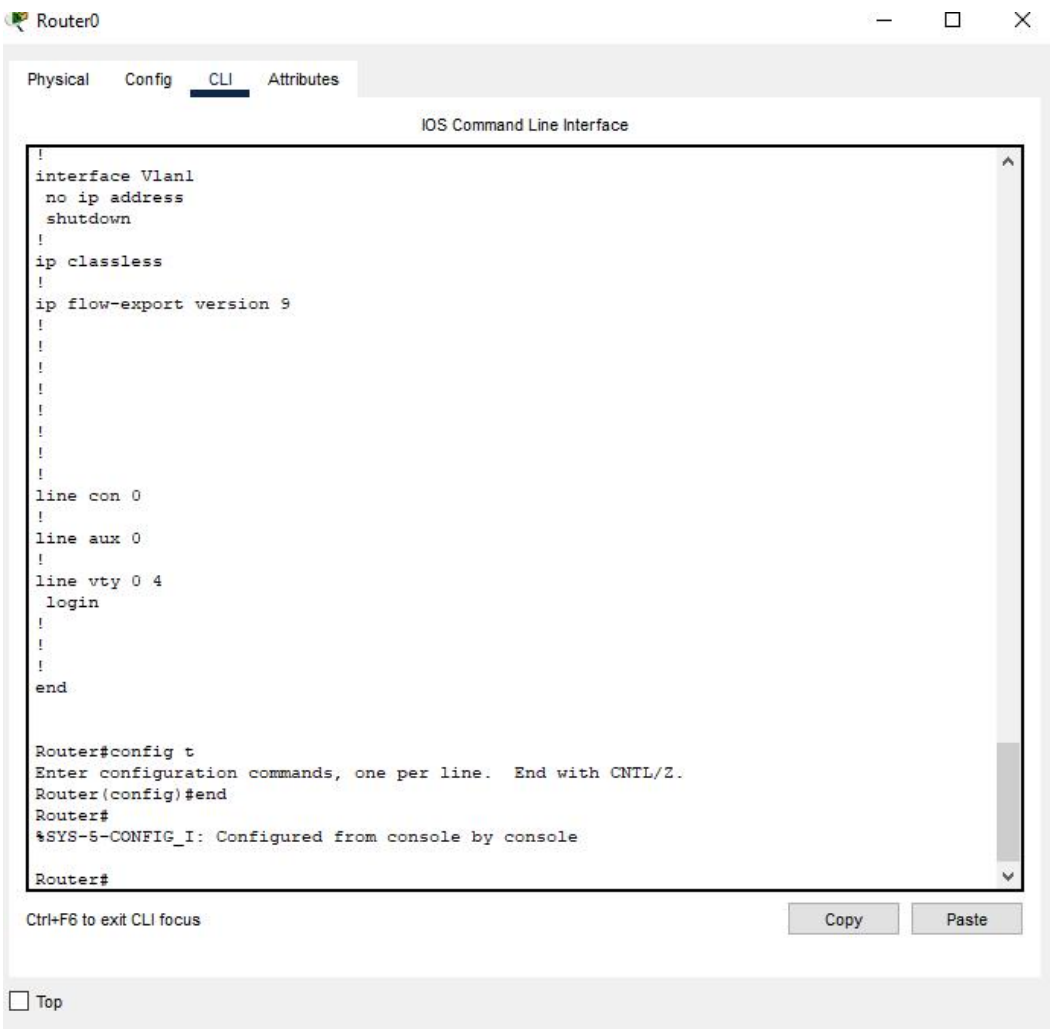
Router#show running-config

7.) The more prompt, hit the key that will show you the next page of information.

<spacebar>



8.) Type one of the commands that will log you out of the router.
Router#exit or Router#disable



From privilege mode you can enter Configuration mode by typing CONFIG T. You can exit configuration mode type END or +z

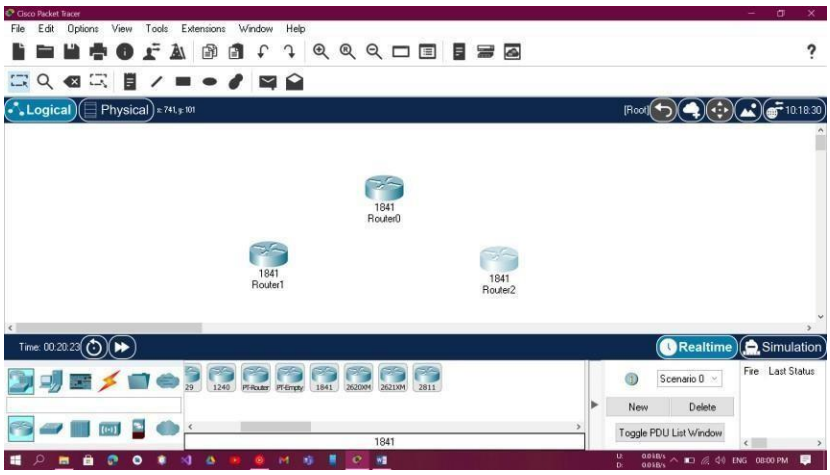
Router#config t

Router(config)#end

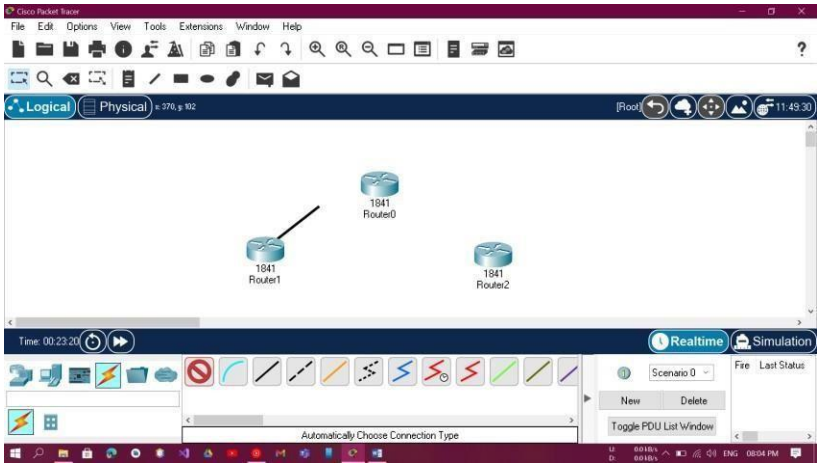
Practical - 3

AIM: To demonstrate the functions of Cisco Discovery Protocol.

STEP 1: Firstly Open the Cisco Packet Tracer and Under Network Devices Section Drag and Drop the Router (1841). We select three router for testing purpose.

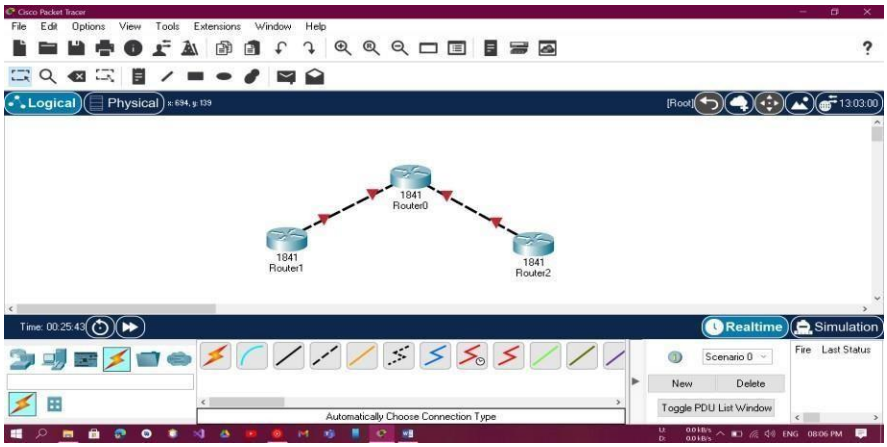


STEP 2: Then Under Connections Section Select the automatically choose connection type wire. In this CISCO PACKET TRACER automatically choose suitable wire for that device according to connection.

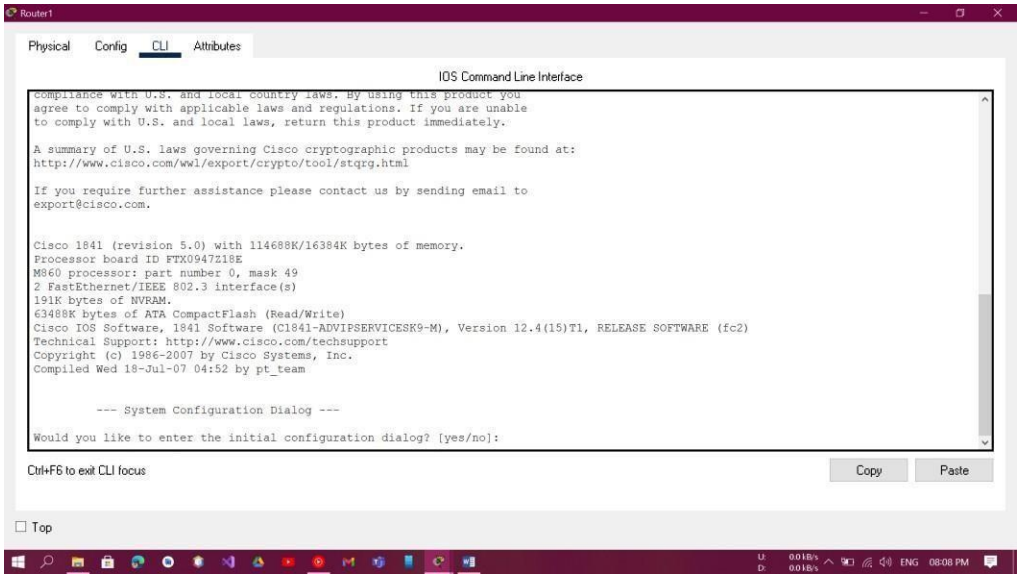


STEP 3: After click on Wire then click on router 1 and then drag the wire to router0 for making physical connection between router1 and router0.

Repeat this Step for router2 and router0.

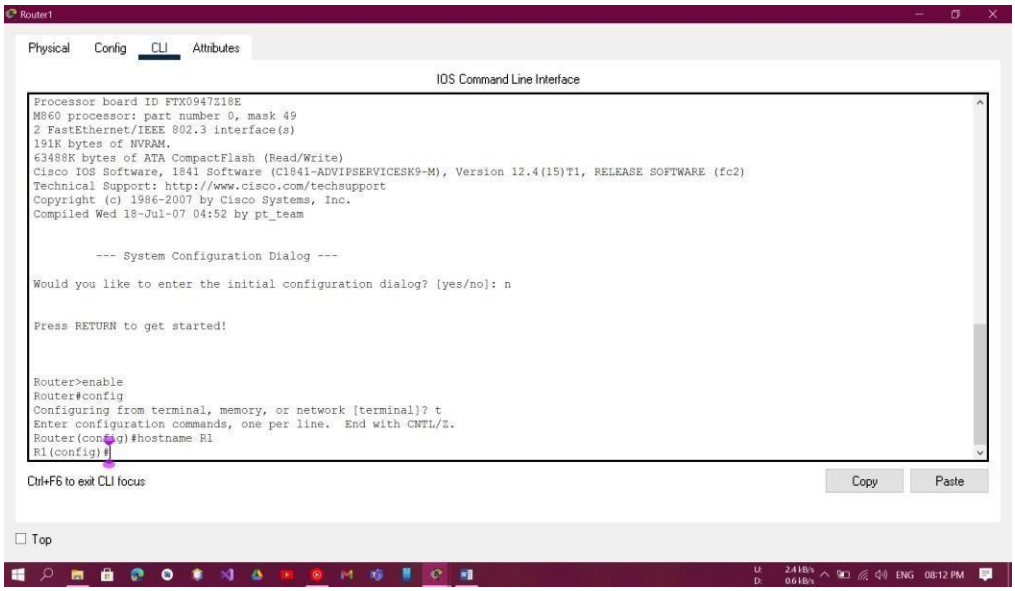


STEP 4: Now we are going to up the interfaces of these routers. For This Double-click on router1 and Under CLI section.

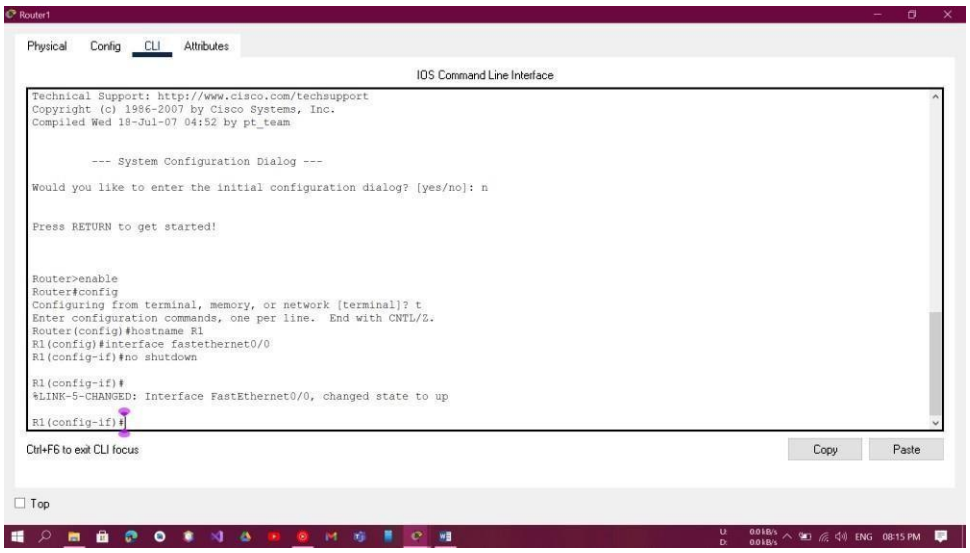


STEP 5: Now we are changing the hostname of router1 we name it as R1. Below this Image is showing Commands use for change host name

Enable command use for enter in privileged mode for access advance level configuration of network device (Router). And **config** command for enter into configuration mode.



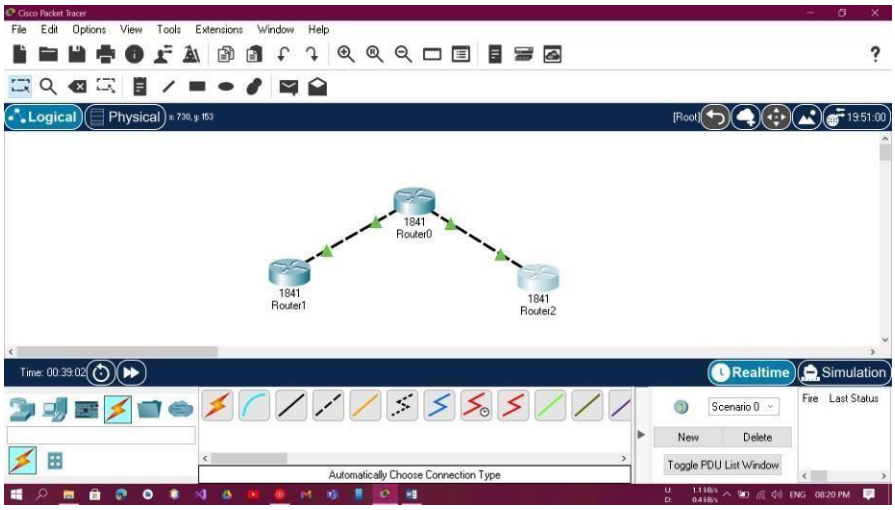
STEP 6: Now we configure the interface of the router connect interface fastethernet 0/0 of router1 to interface fastethernet 0/0 of router0.



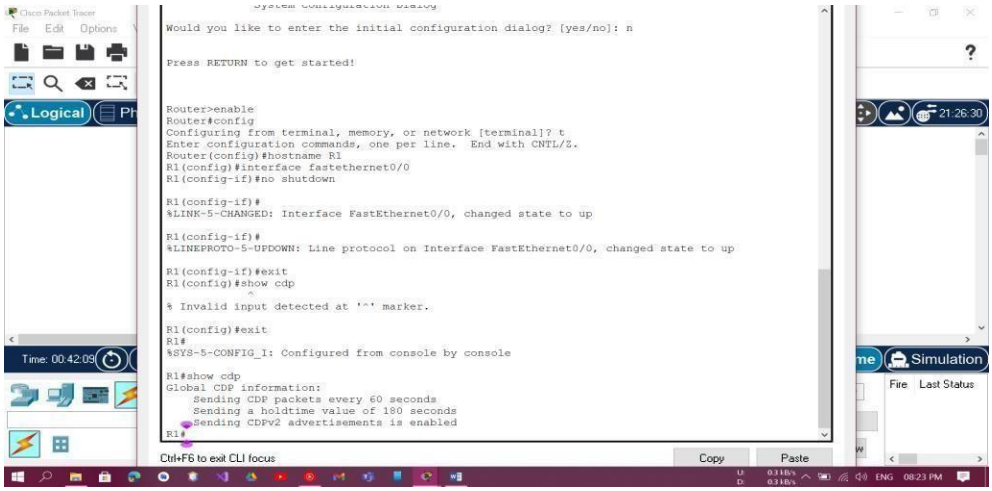
no shutdown command used for changing the state down to up of router.

Repeat this step for router2 and router0 to bring in up state.

STEP 7: After this, it is look like



STEP 8: Now we have to check CDP or CDP neighbour for check neighbour is active or not. **show cdp** or **show cdp neighbor** These two commands used for checking the neighbors is active or not.



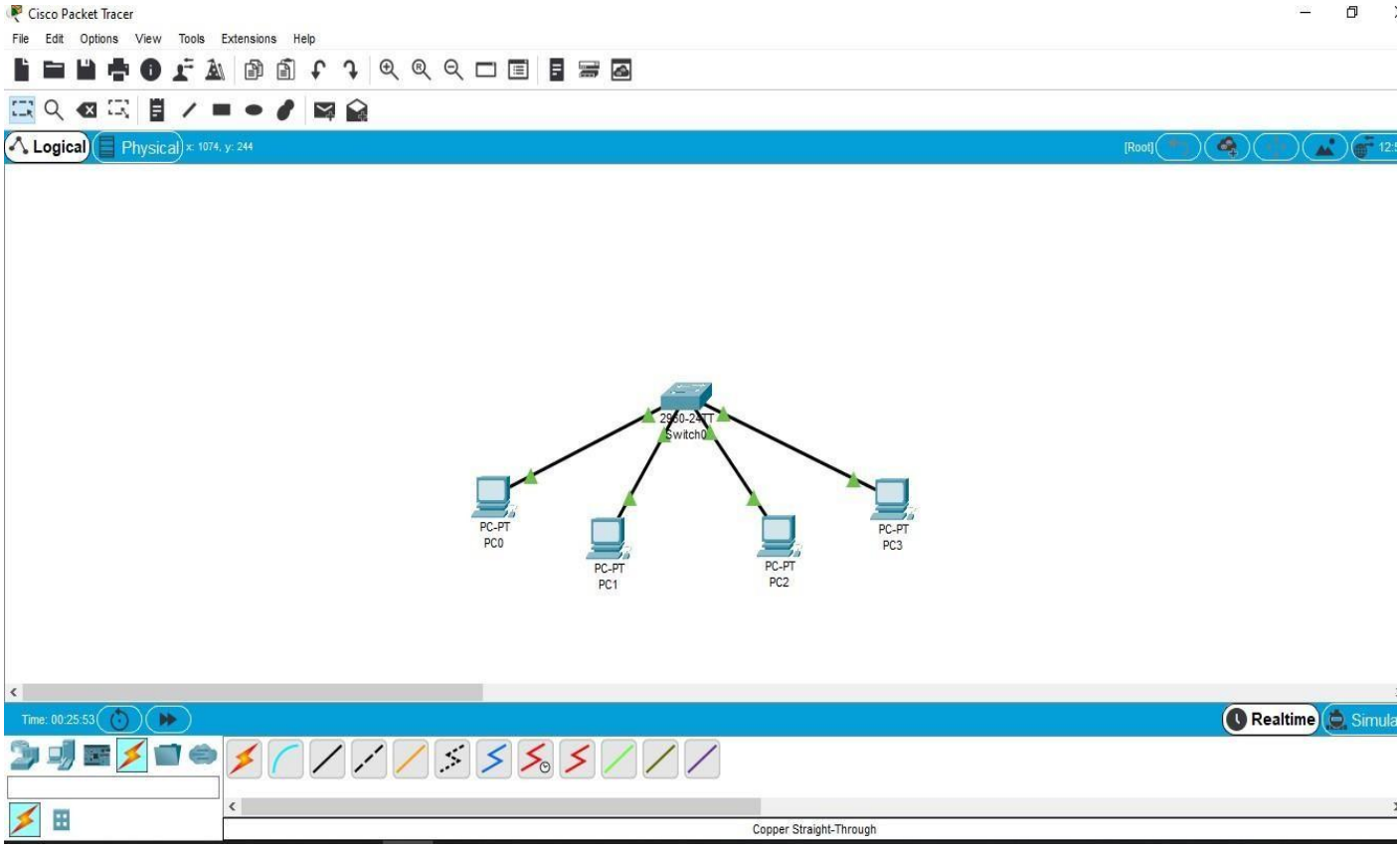
This image shows that router0 or router1 is connected and sending and receiving packets for indentfying status and neighbors hostname and other info.

PRACTICAL:04

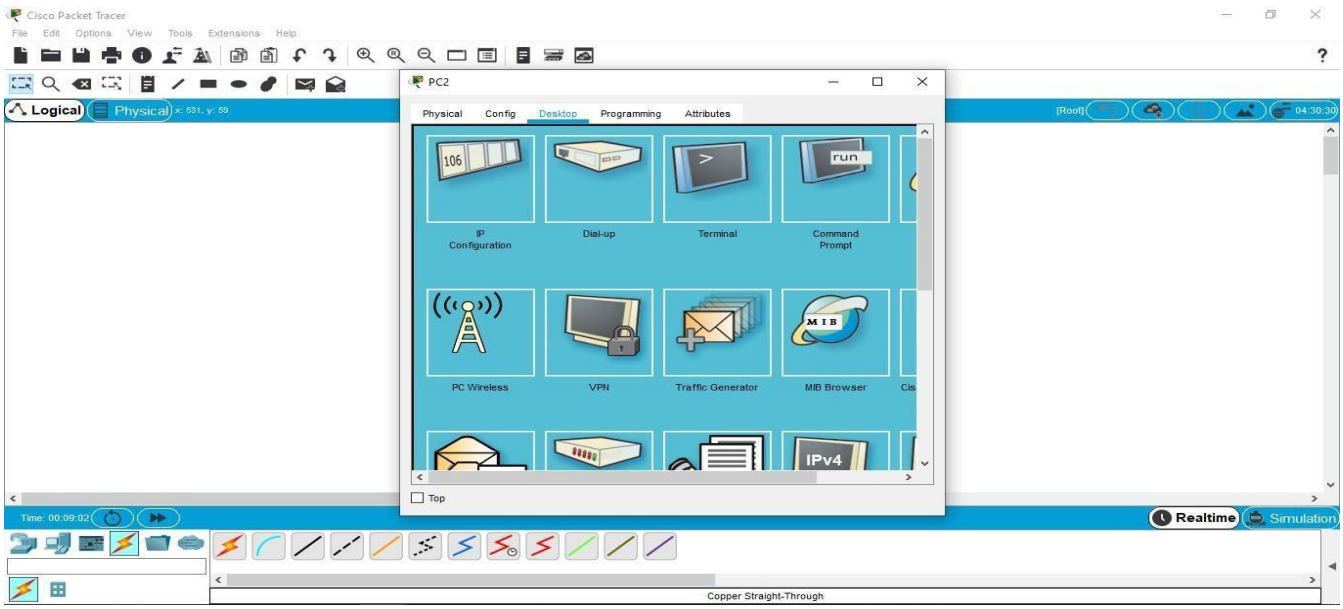
AIM: To study about the configuration of LAN by using Cisco Packet Tracer.

Network Topology for LAN:

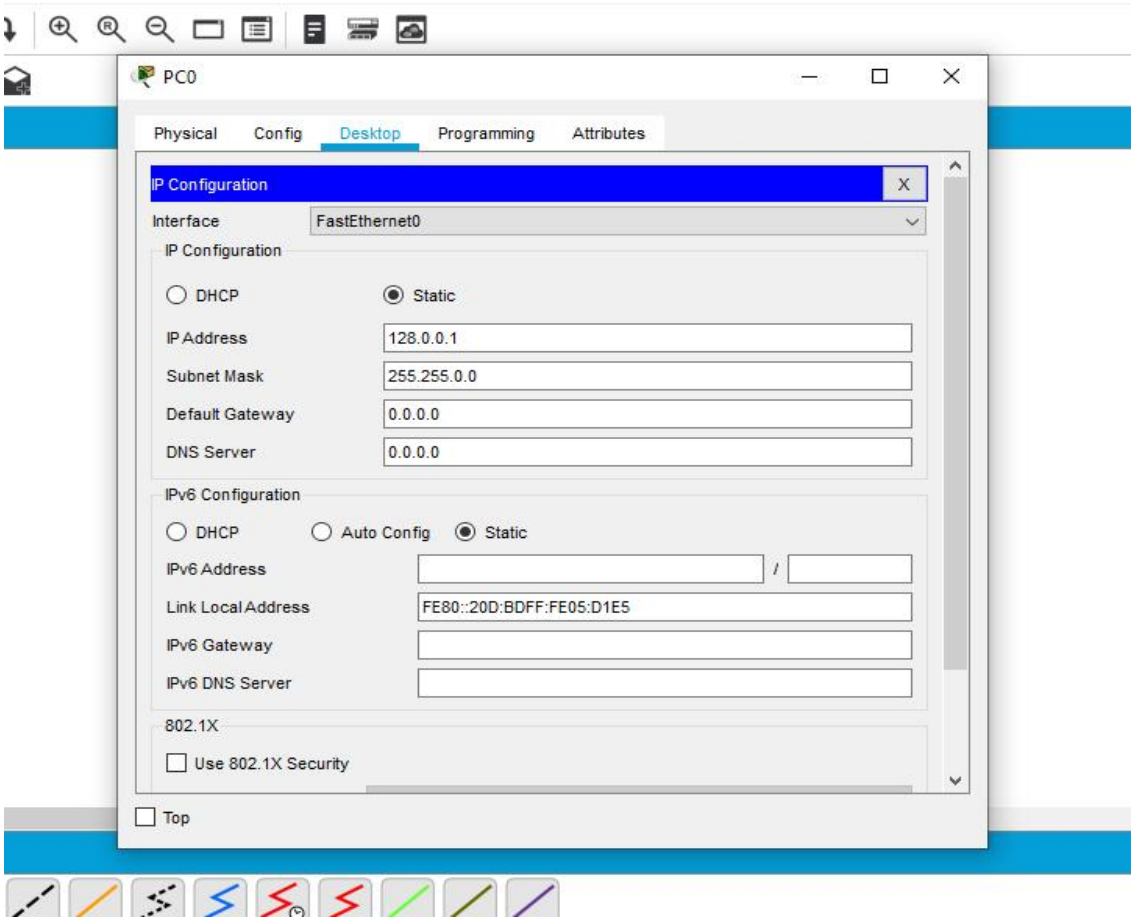
Here, we will be using Switch0 and four PCs to form the network topology and then connect all the devices by using suitable connecting wires.



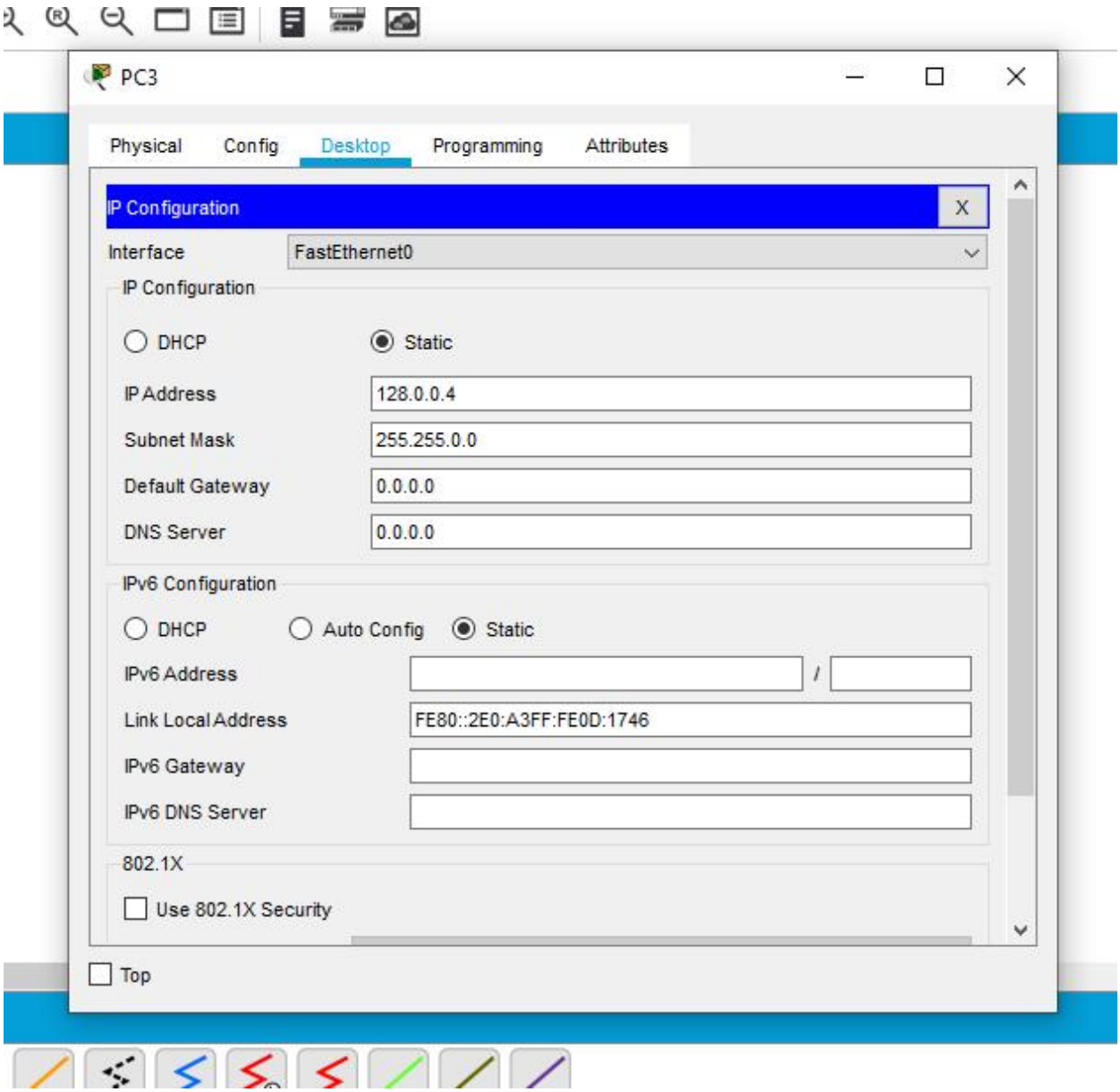
Configuration of IP, subnet mask and default gateway at pc side



Configuration at PC -0:

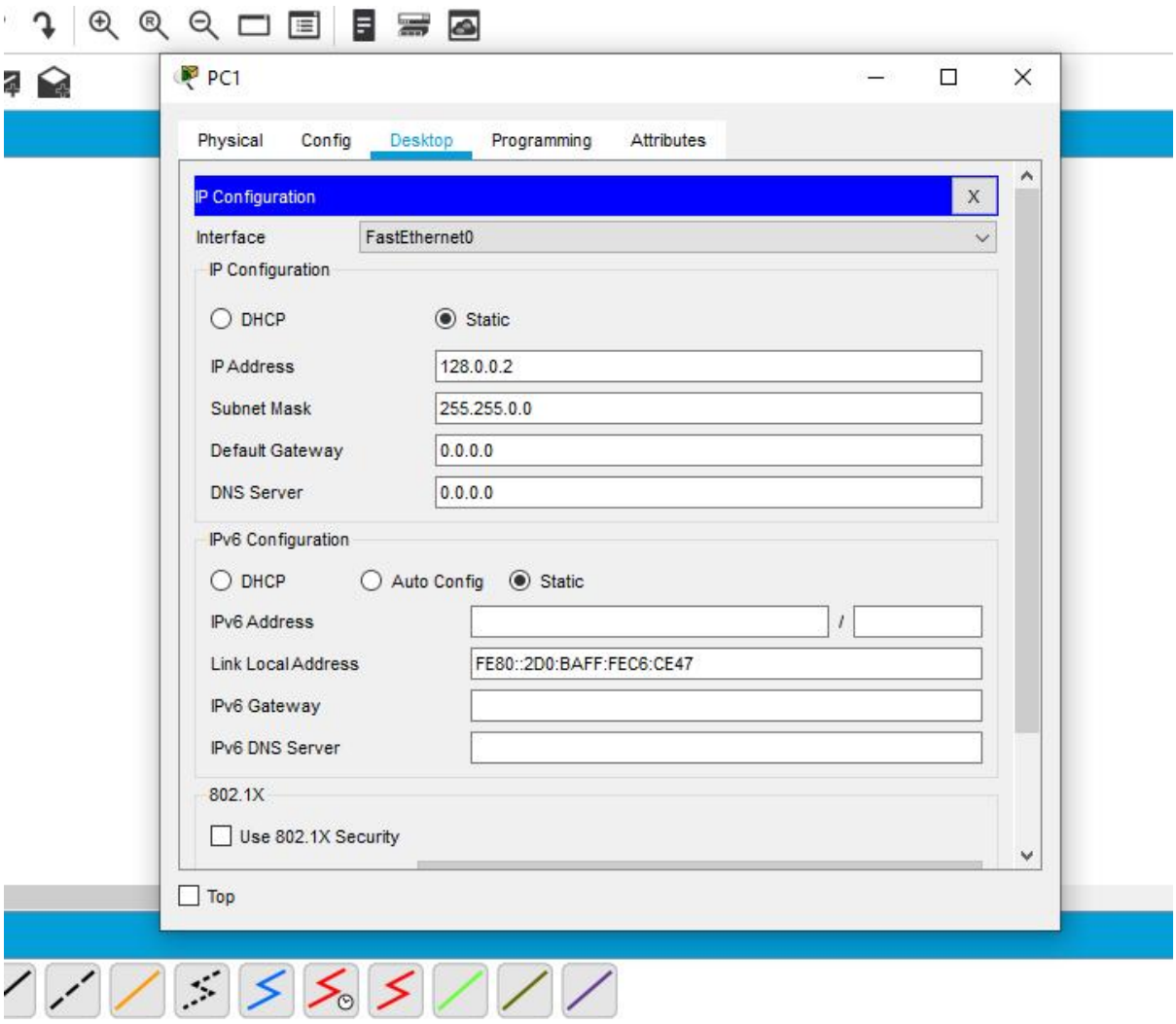


Configuration at PC -3:

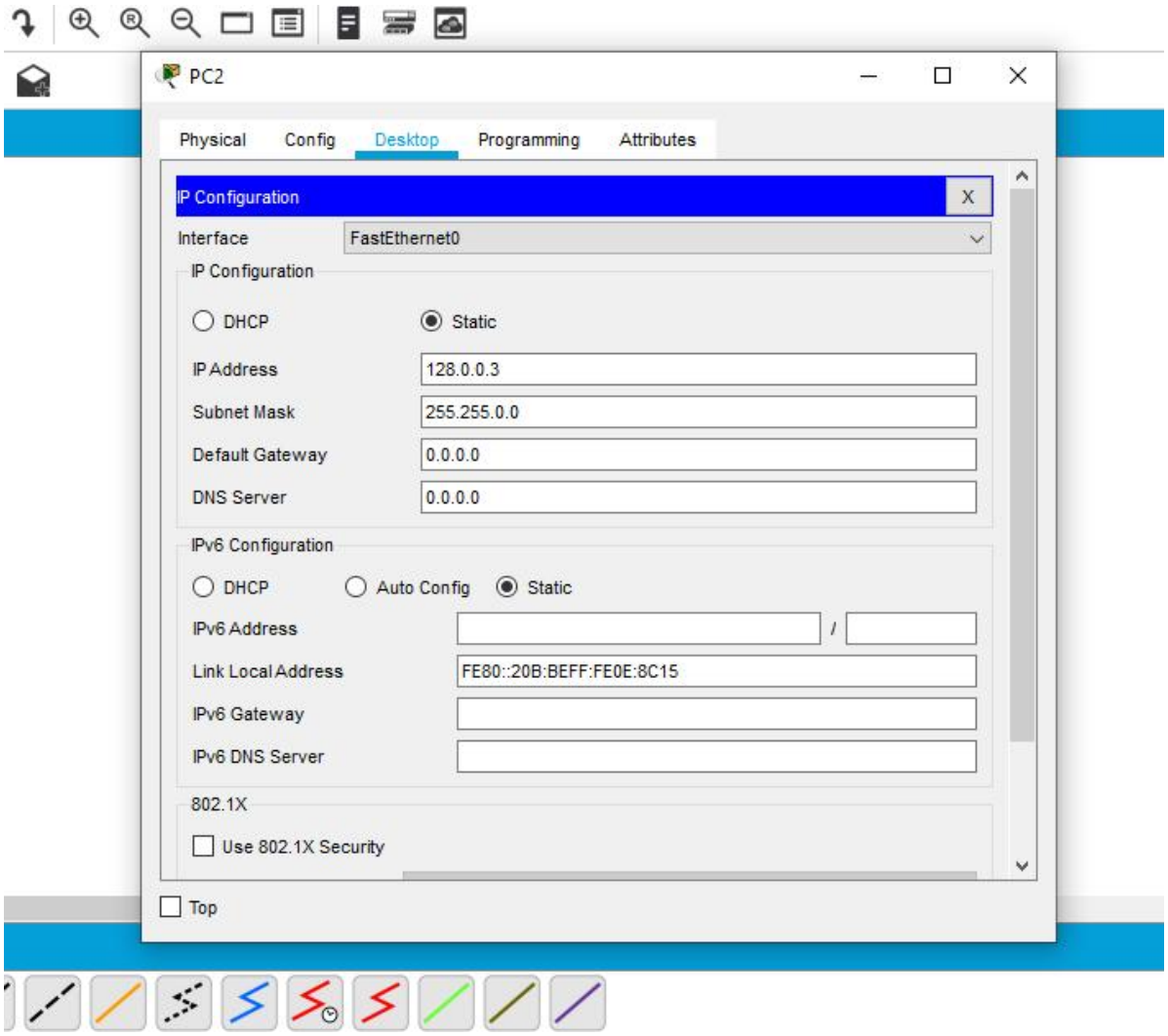


In the same way other PCs are also required to configure IP, subnet mask and default gateway so that they can be a part of the LAN.

Configuration at PC -1:



Configuration at PC -2:

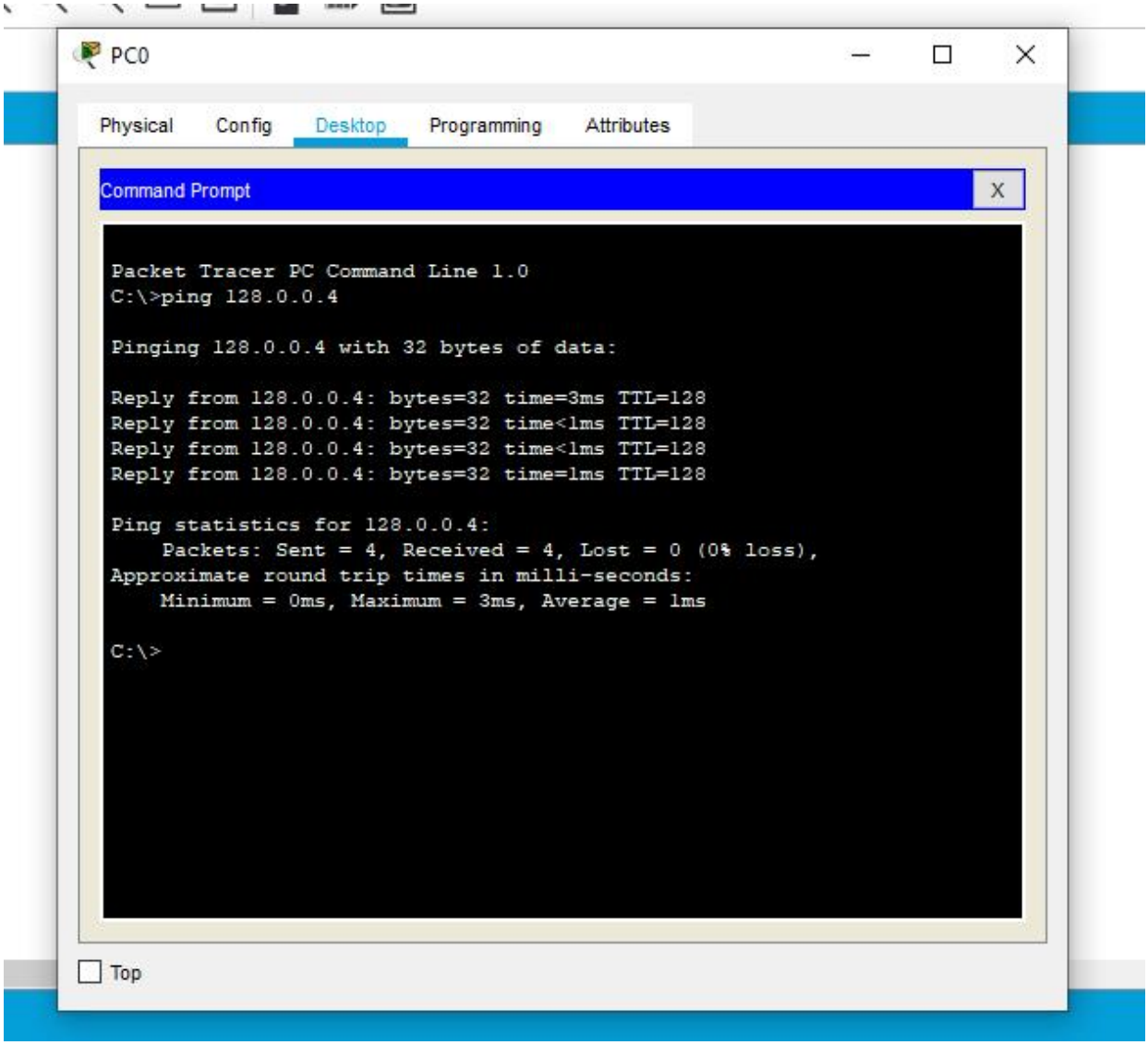


After the completion of configuration of IP, subnet mask and default gateway at each PC, PING(Packet Inetr Net Groper) will be used to check the connectivity of LAN. PING uses the Internet ControlMessage Protocol (ICMP) to communicate with other devices on the network.

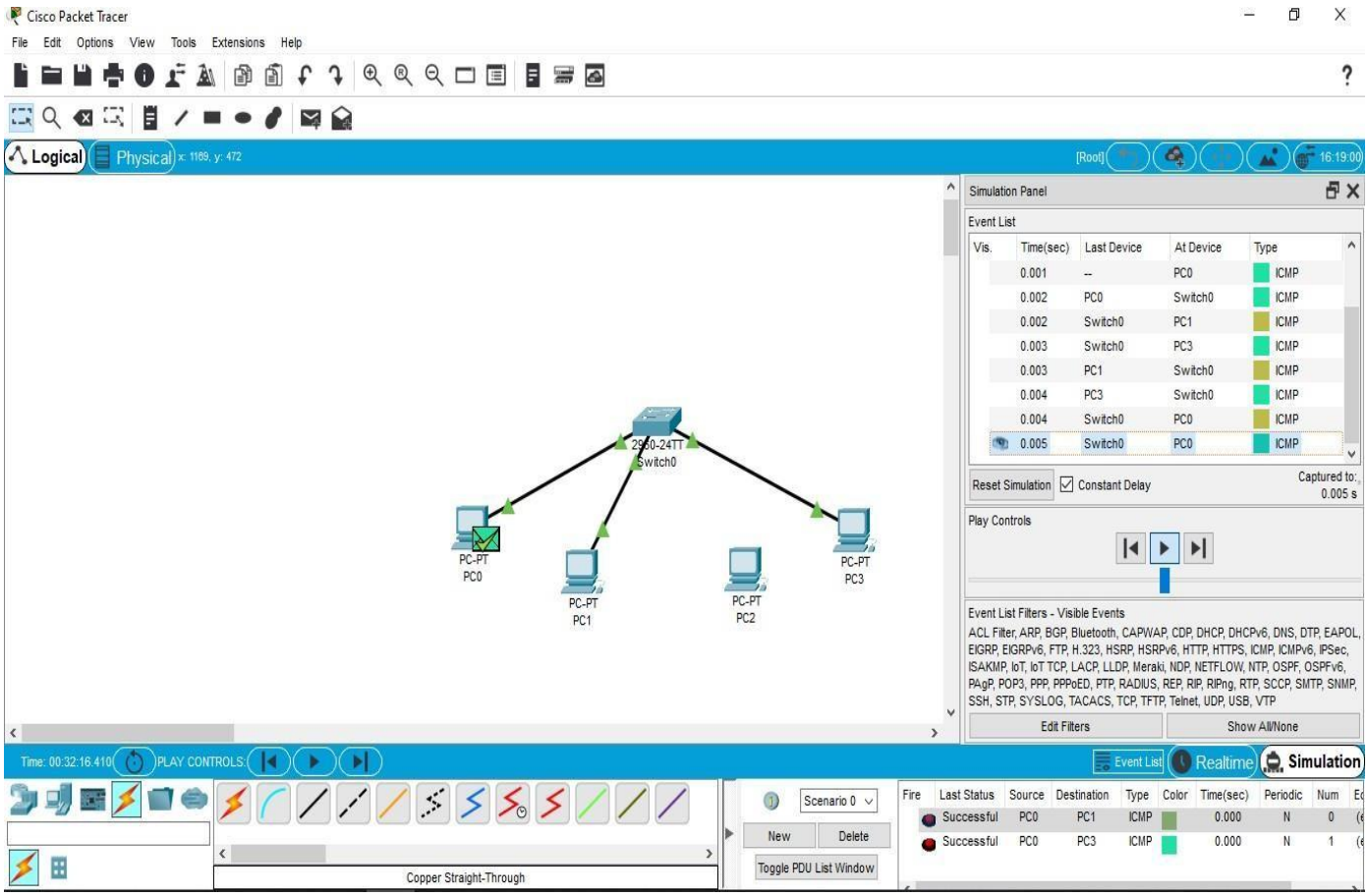
The syntax is:

ping ip-address

Using Ping command at PC0:



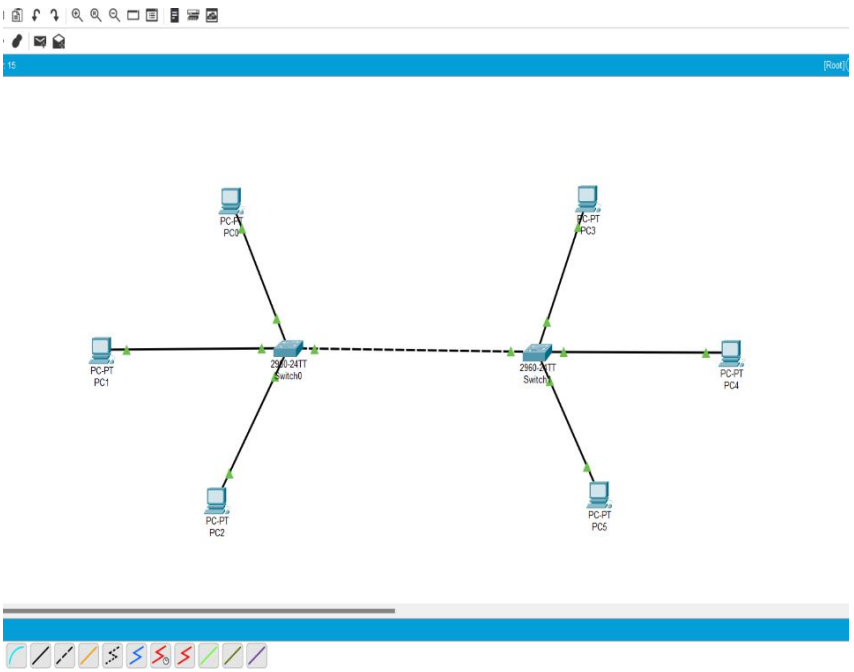
Delivering message from PC0 to PC1 and PC3



Practical-05

AIM: To study about the process of configuring Inter-connection of LANs by using Cisco Packet Tracer.

Network topology for inter-LAN:

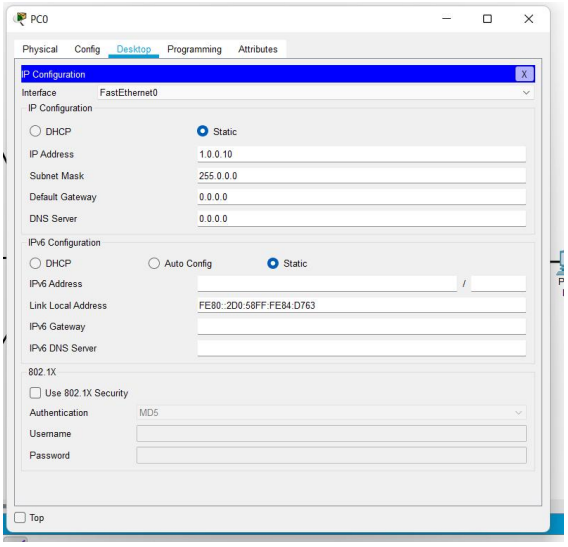


Here, two LANs will be formed by using required Switches and PCs and then all the devices will be connected by using suitable connecting wires. The switches should be connected using GigabitEthernet.

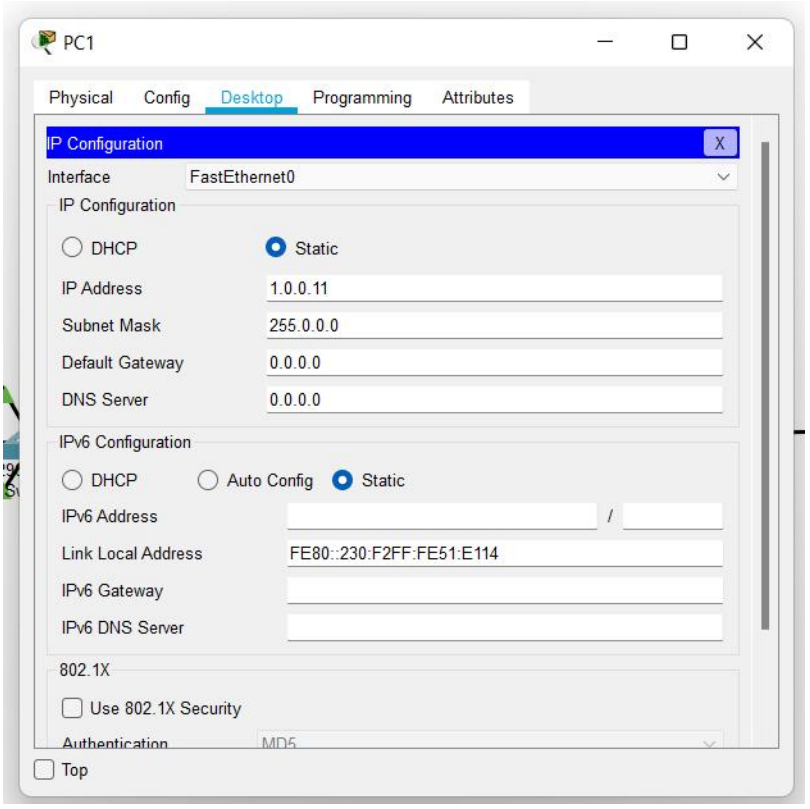
LAN-1 will have three PCs- PC0, PC1 and PC2 and LAN-2 will have PC3, PC4 and PC5.

Configuration of IP, subnet mask and default gateway at PC side:

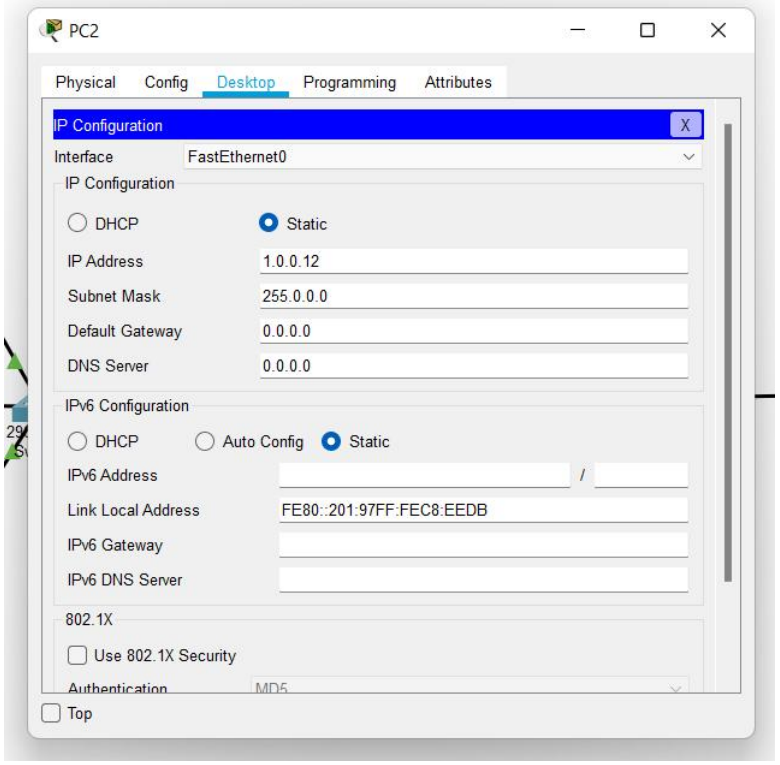
Configuration at PC0:



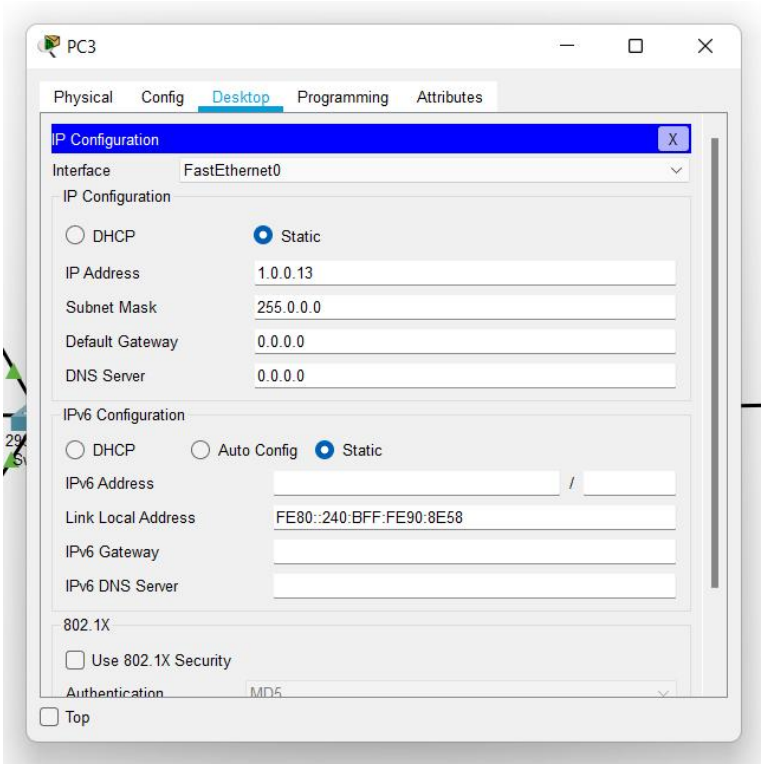
Configuration at PC1:



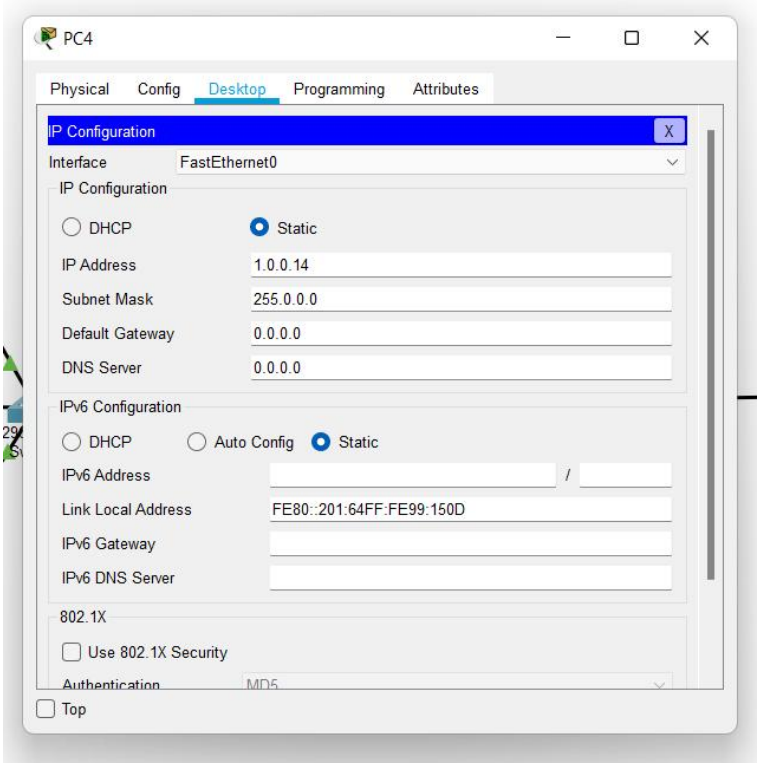
Configuration at PC2:



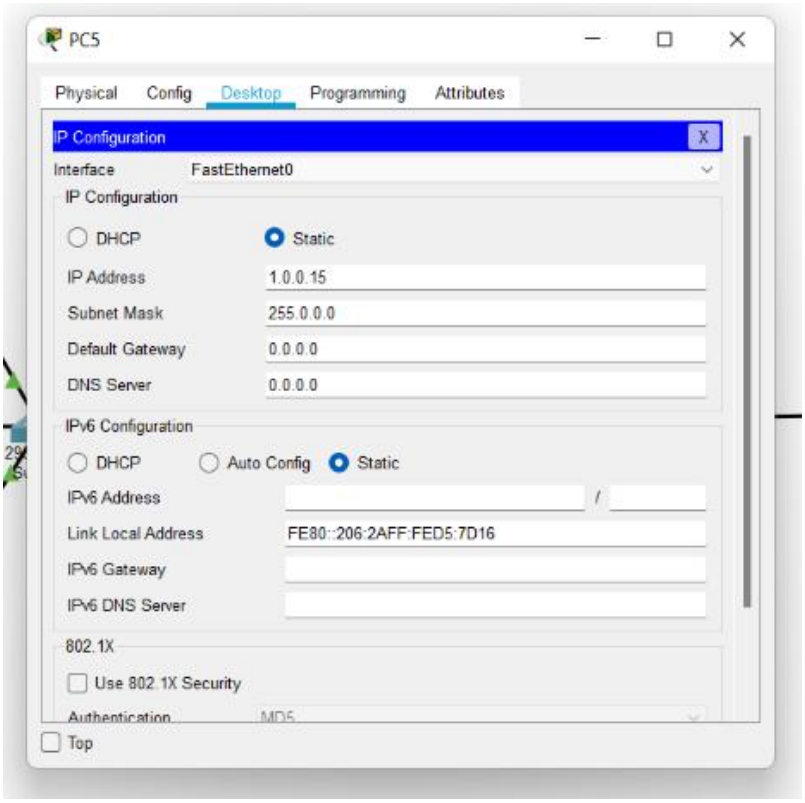
Configuration at PC3:



Configuration at PC4:



Configuration at PC5:



Following IPs will be given to PCs :

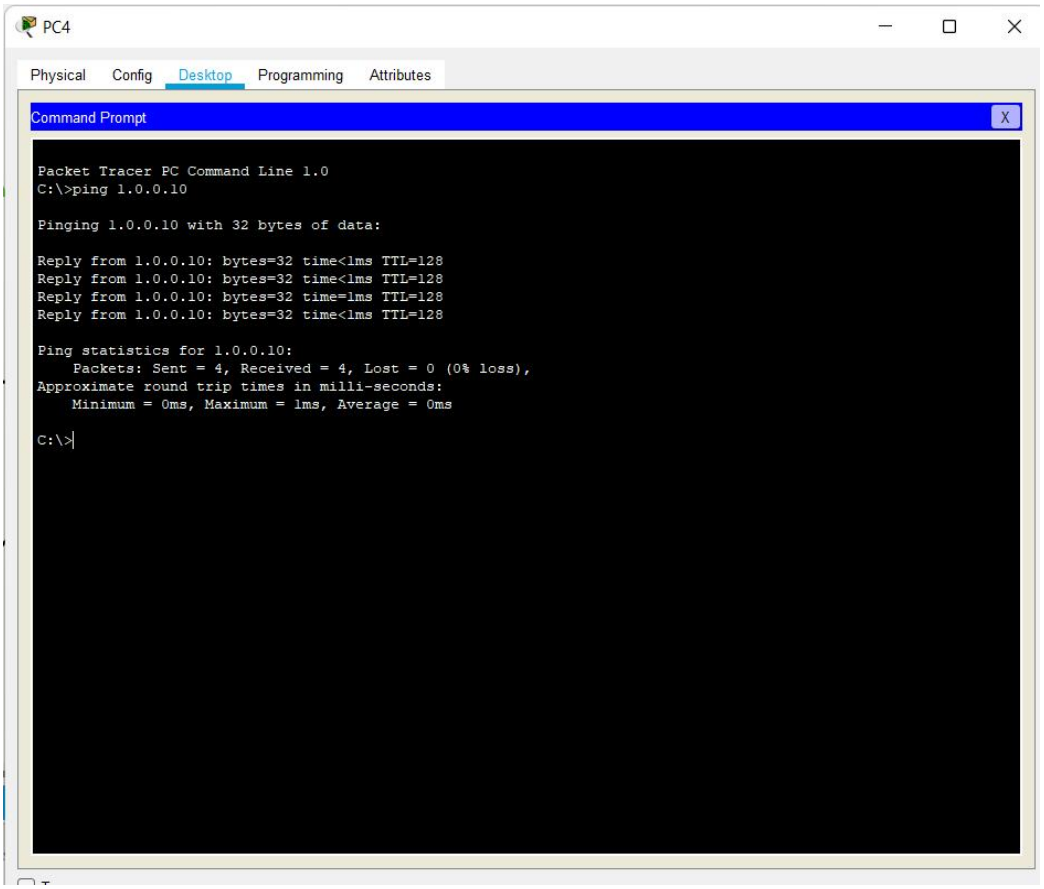
PC No.	IP Used	LAN Id
PC0	1.0.0.10	LAN-1
PC1	1.0.0.11	
PC2	1.0.0.12	
PC3	1.0.0.13	LAN-2
PC4	1.0.0.14	
PC5	1.0.0.15	

After the completion of configuration of IP, subnet mask and default gateway at each PC, PING(Packet Inter Net Groper) will be used to check the connectivity of LAN. PING uses the Internet Control Message Protocol (ICMP) to communicate with other devices on the network.

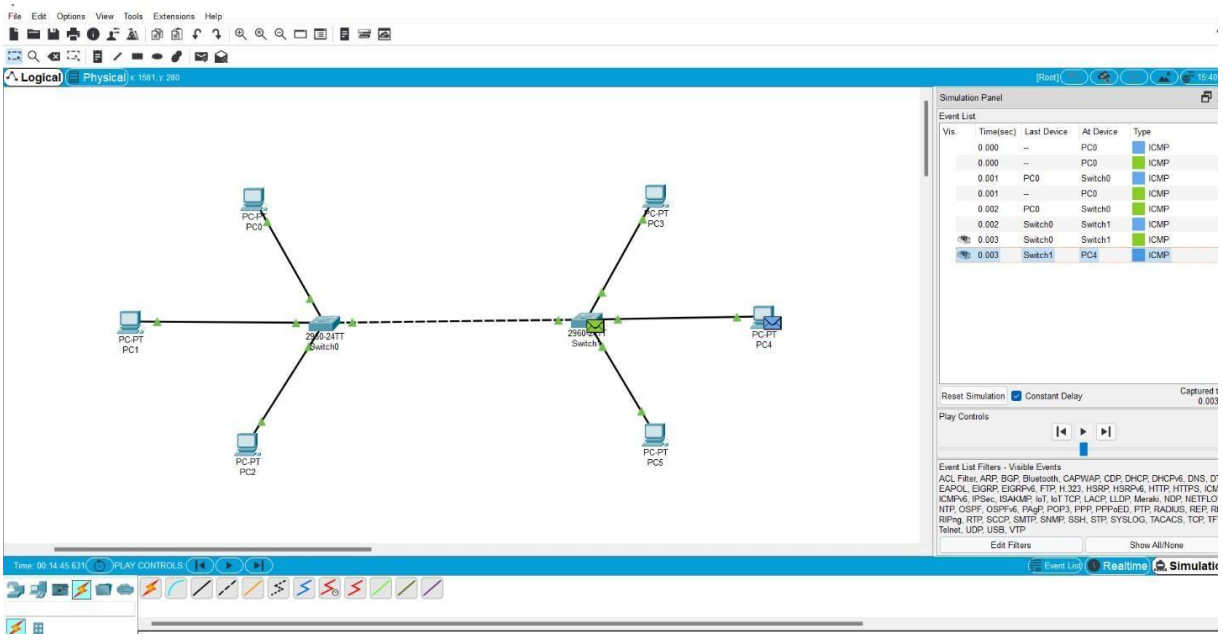
The syntax is:

ping ip-address

Using Ping command at PC4:



Sending message from PC0 to PC4:

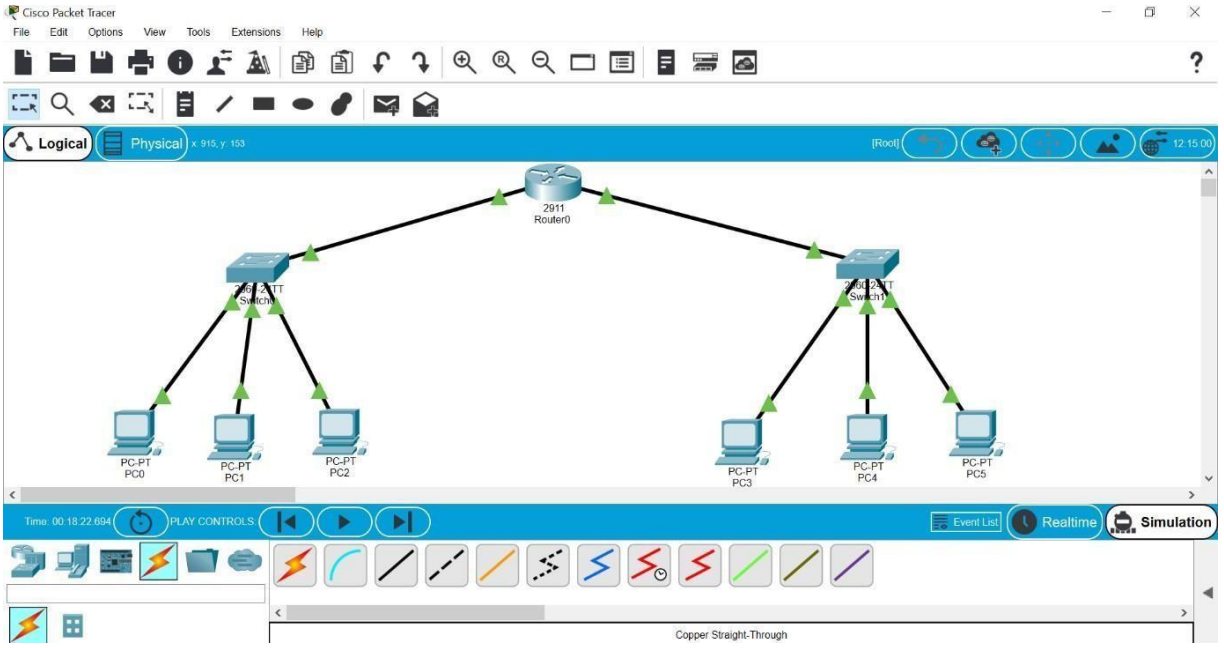


EXPERIMENT-6

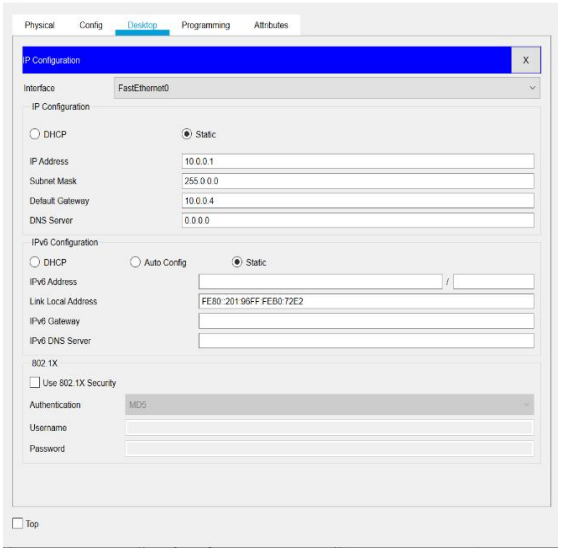
AIM: To study about the configuration of Inter connection between different networks by using Cisco Packet Tracer.

Here, we will be using required switches and PCs to form two different LANs by connecting them with suitable wire and then both the network will be interconnected by using router.

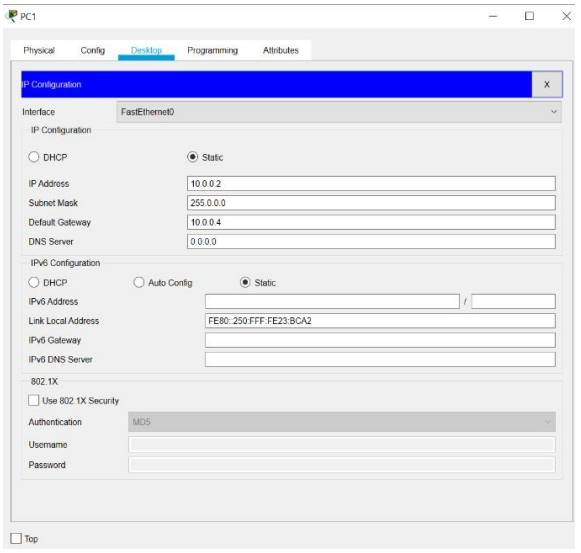
Network-1 will contain PC0, PC1, PC2, connected with a switch and Network-2 will have PC3, PC4 and PC5 connected with another switch. Router0 will be used to interconnect both the Network-1 and Network-2.



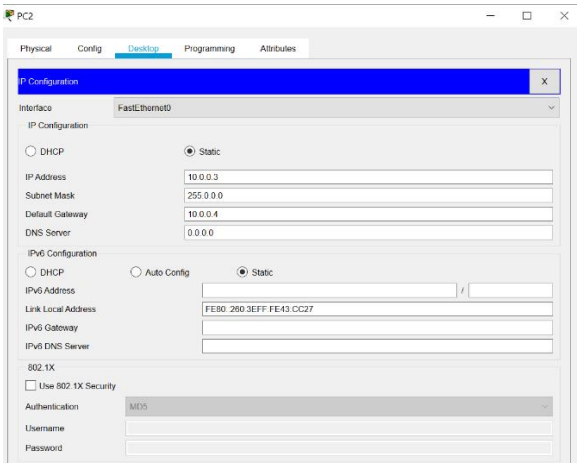
Configuration of IP, subnet mask, default gateway and DNS at PC side: PC-0:



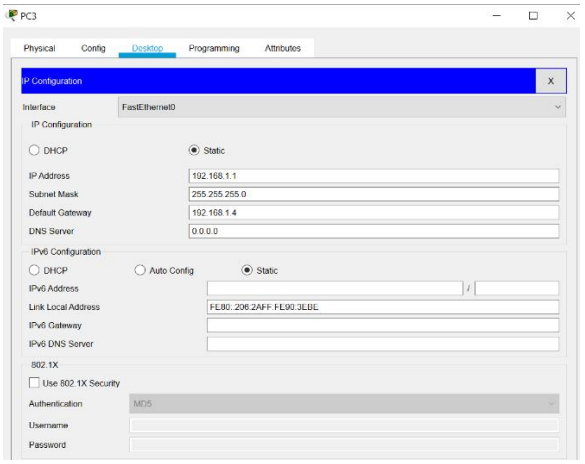
PC-1:



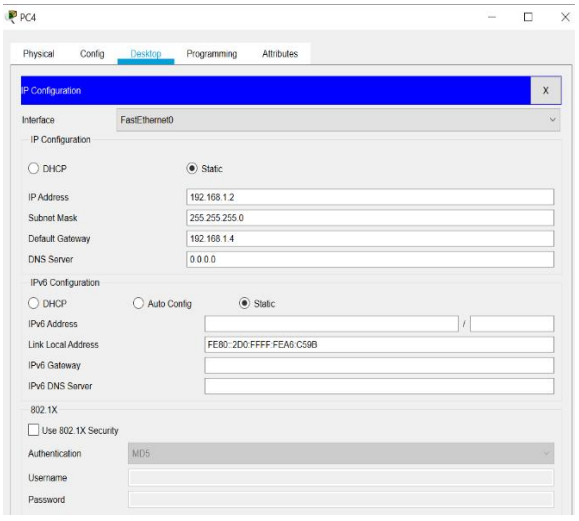
PC-2:



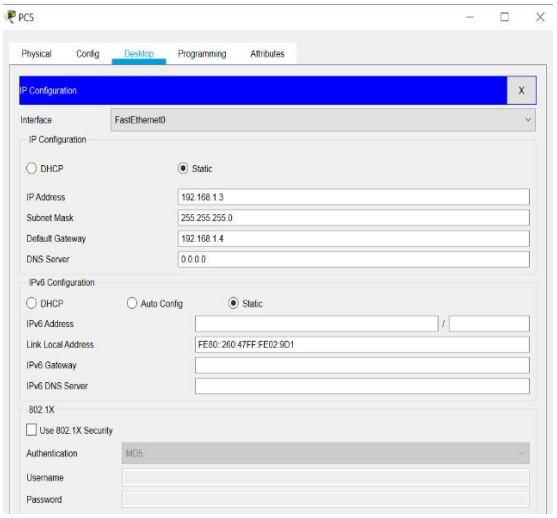
PC-3:



PC-4:

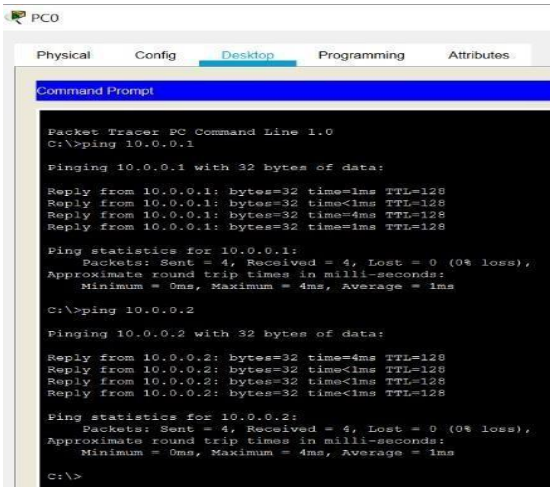


PC-5:

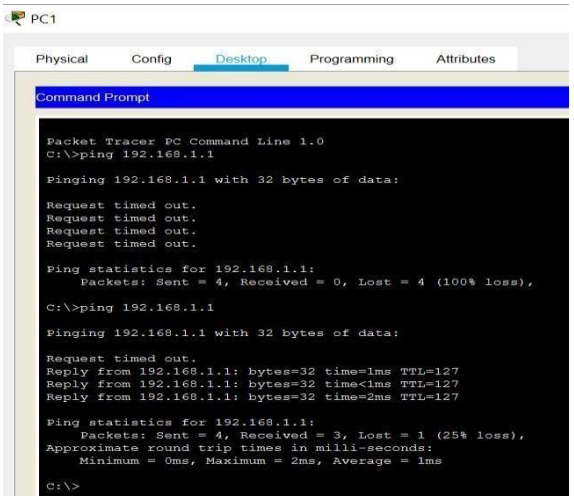


After the completion of configuration of IP on at both the interfaces of Router0, PING will be used to check the connectivity between networks. PING uses the Internet Control Message Protocol (ICMP) to communicate with other devices on the network.

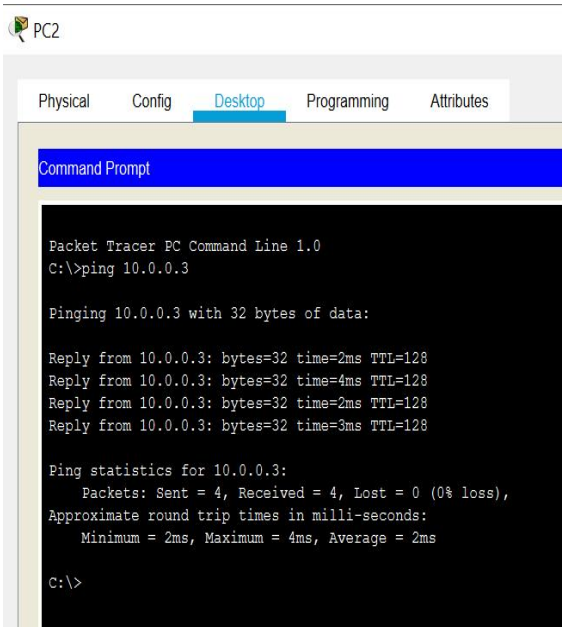
Using Ping command at PC0:



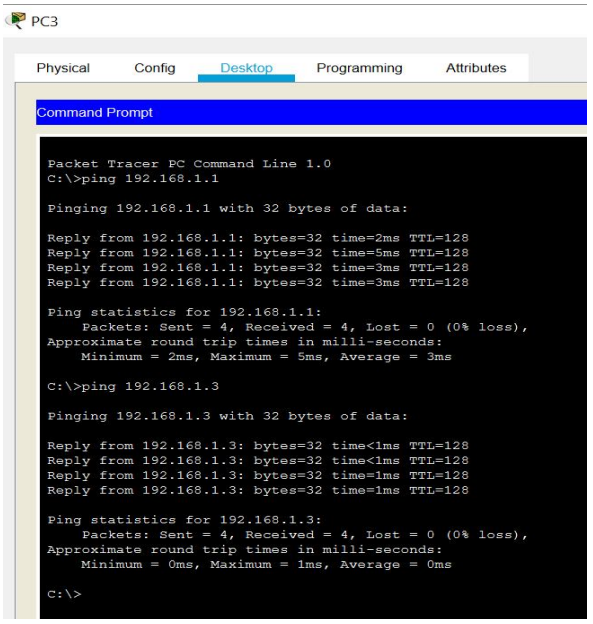
Using Ping command at PC1:



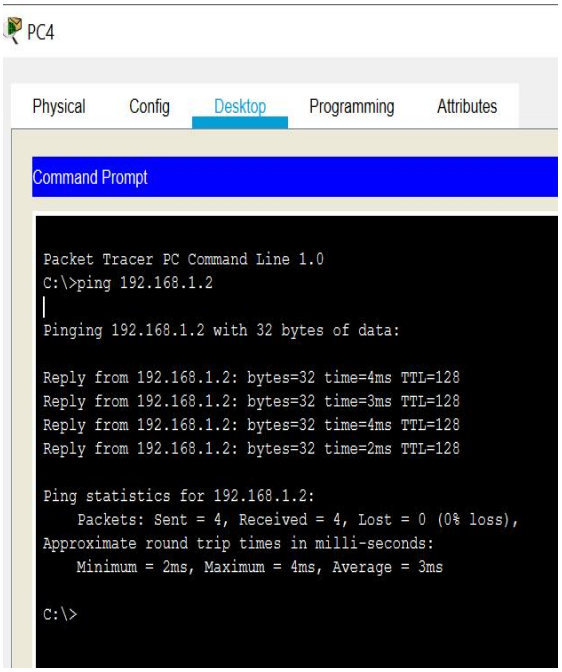
Using Ping command at PC2:



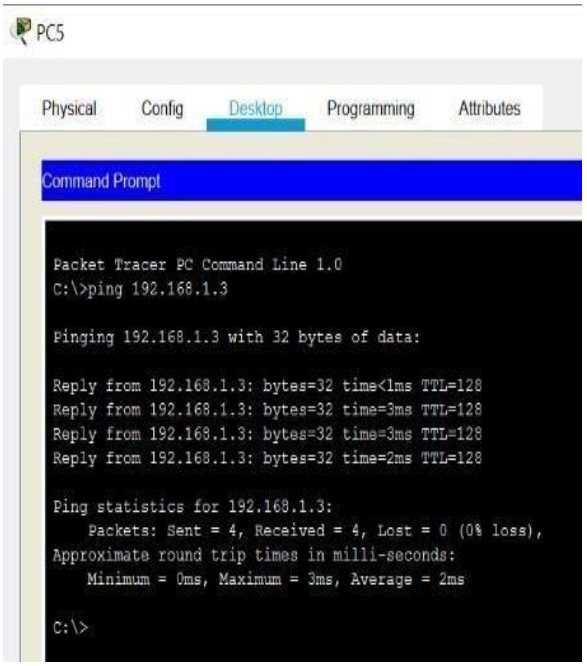
Using Ping command at PC3:



Using Ping command at PC4:

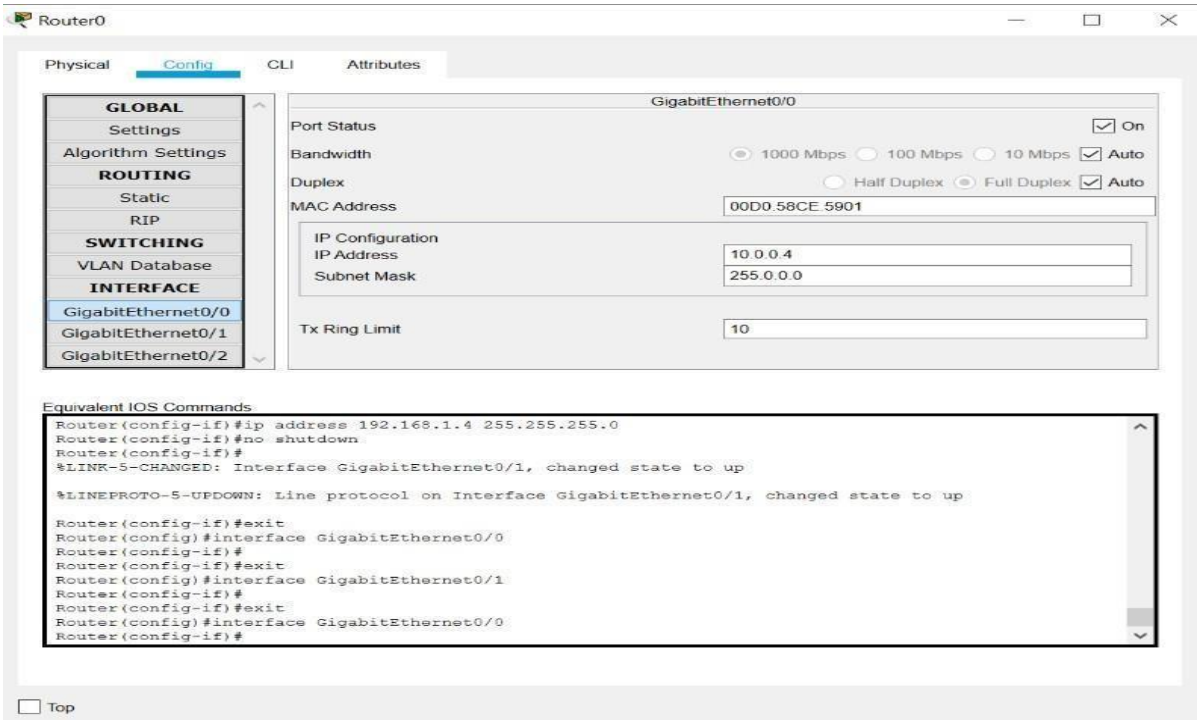


Using Ping command at PC5:

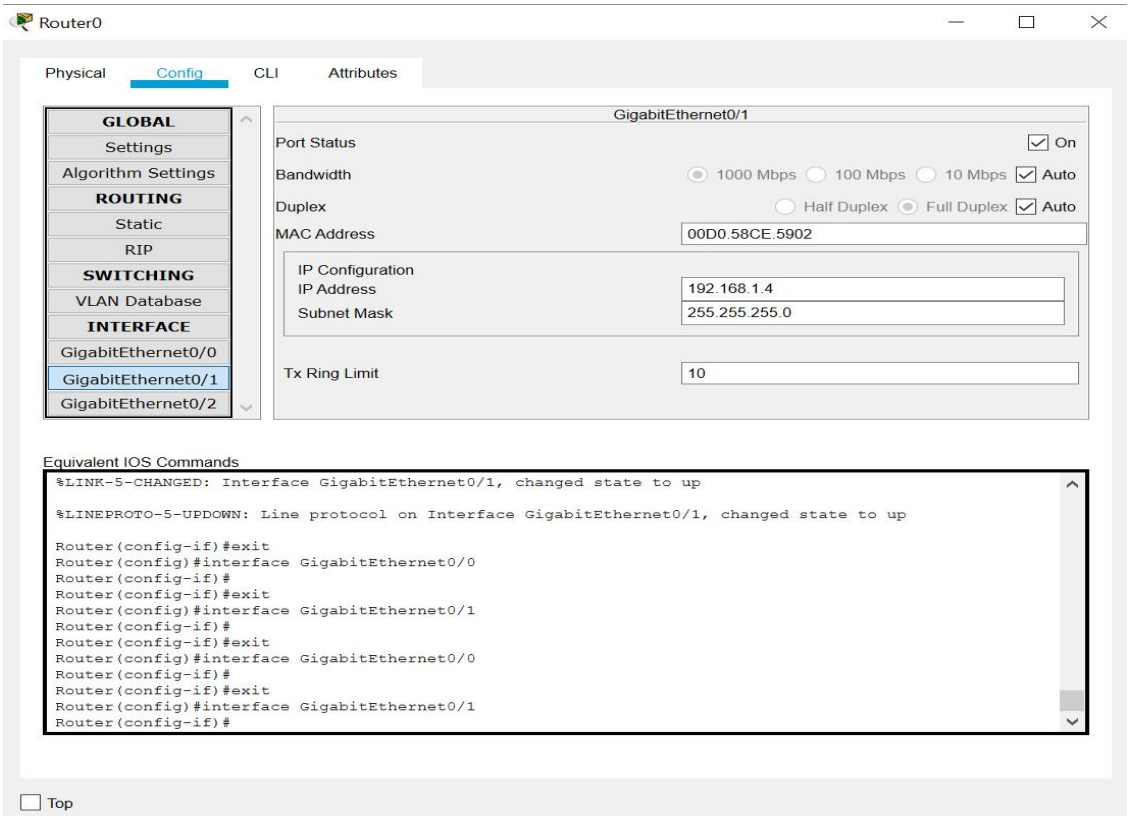


CONFIGURATION OF IP AND SUBNET MASK AT ROUTER: As Router0 is used to interconnect both the Networks, gigabit interfaces 0/0 and 0/1 will be used to connect Network-1 and Network-2 respectively. So, gigabit interface 0/0 of Router0 need to be configured to communicate with network

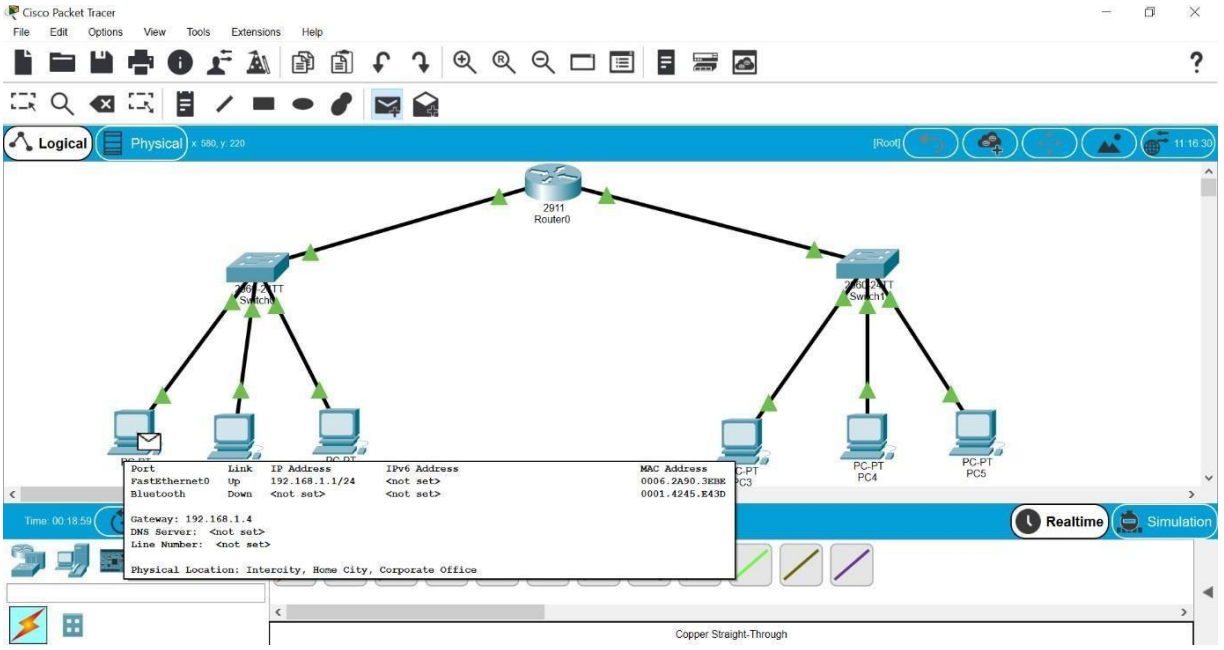
Gigabit Ethernet 0/0 interface configuration:



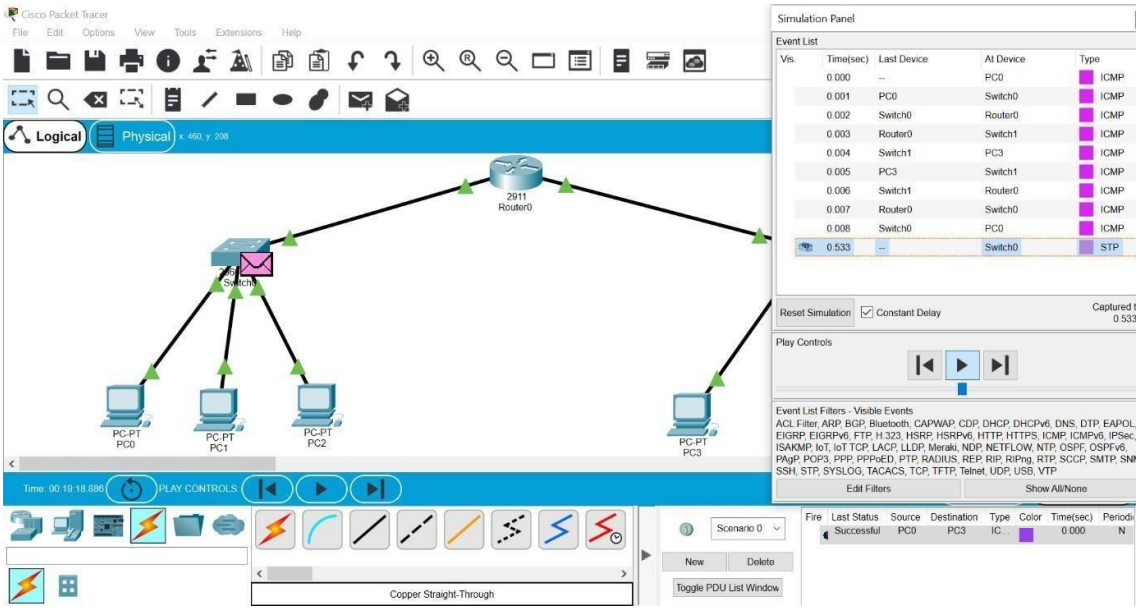
Gigabit Ethernet 0/1 interface configuration:



Delivering message from PC-0 to PC-3:



Message successfully delivered:



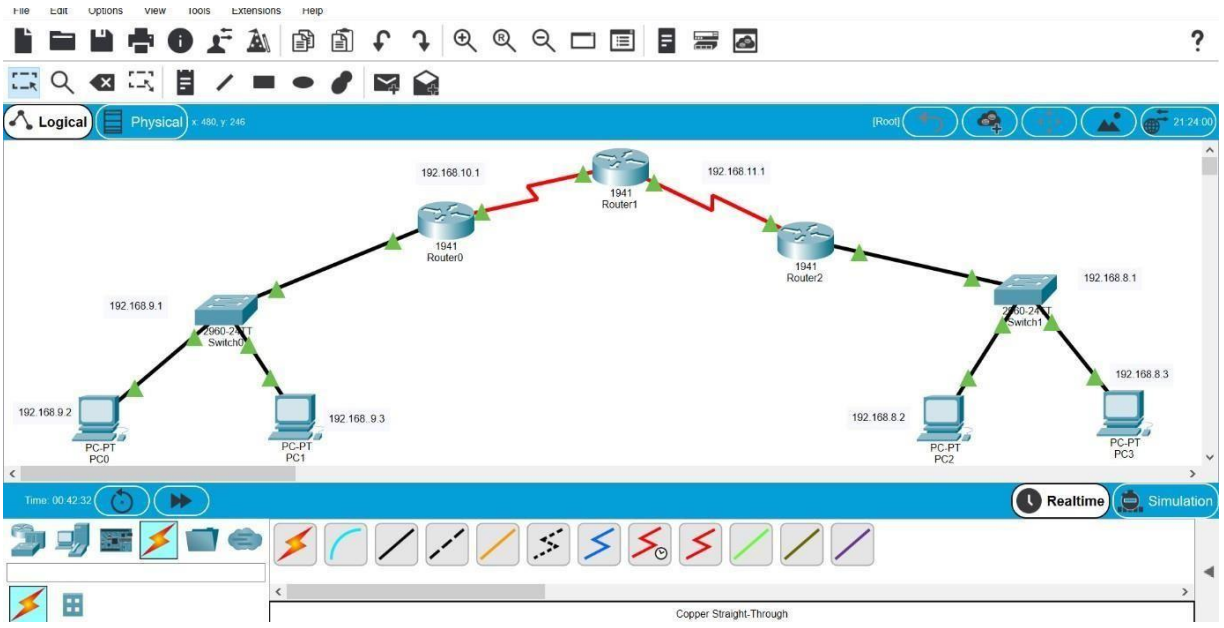
EXPERIMENT-7

AIM: To study about the configuration of static routing Inter-connection and communication of different networks by using Cisco Packet Tracer.

NETWORK TOPOLOGY FOR INTER LAN:

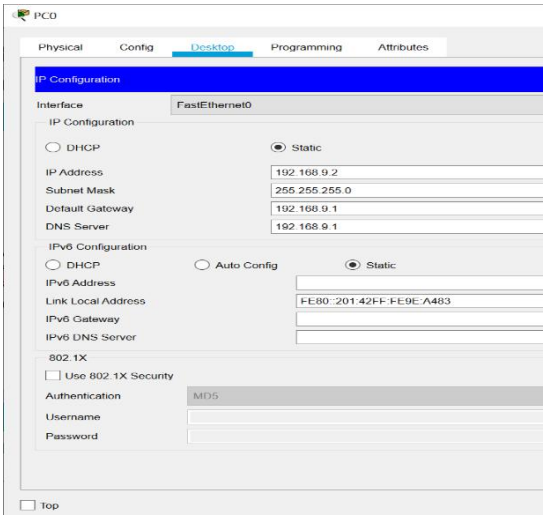
Here, four different networks will be formed by using required Routers, Switches and PCs, these all the devices interconnected by using suitable connecting network cables.

First network at left end contain two PCs, PC0 and PC1, connected with a switch which further connected to Router0 that have network ID as 192.168.9.1. Router0 next connected to Router1 and have the network ID 192.168.10.1; Router1 connected with Router2 and have the network ID 192.168.11.1. At the extreme right end the network that is connected with Router3 is having two PCs connected via a switch have the network ID 192.168.8.1.

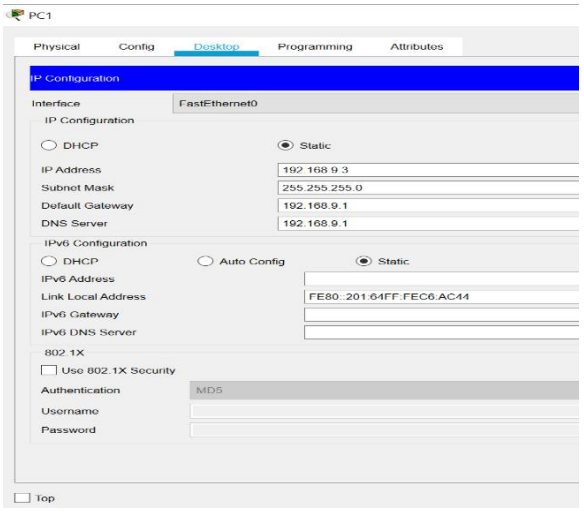


CONFIGURATION OF IP AND SUBNET MASK

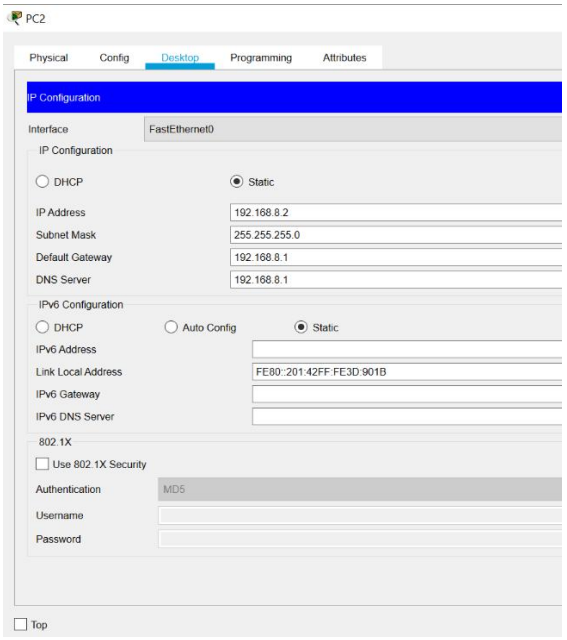
AT PC SIDE: PC0:



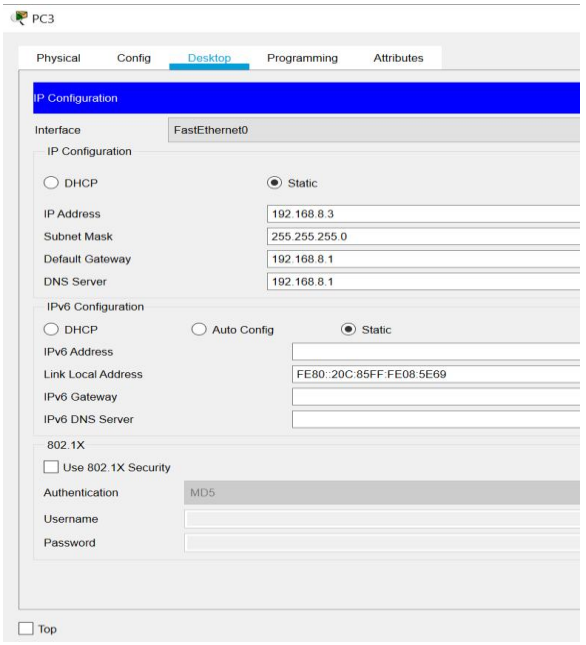
PC1:



PC2:

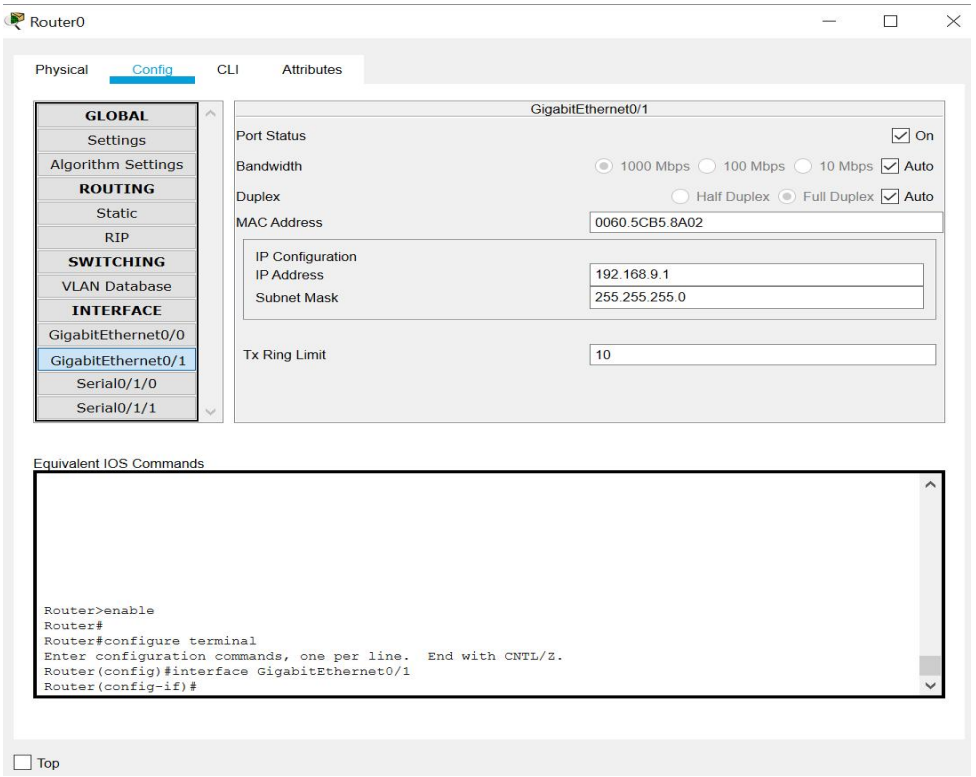


PC3:

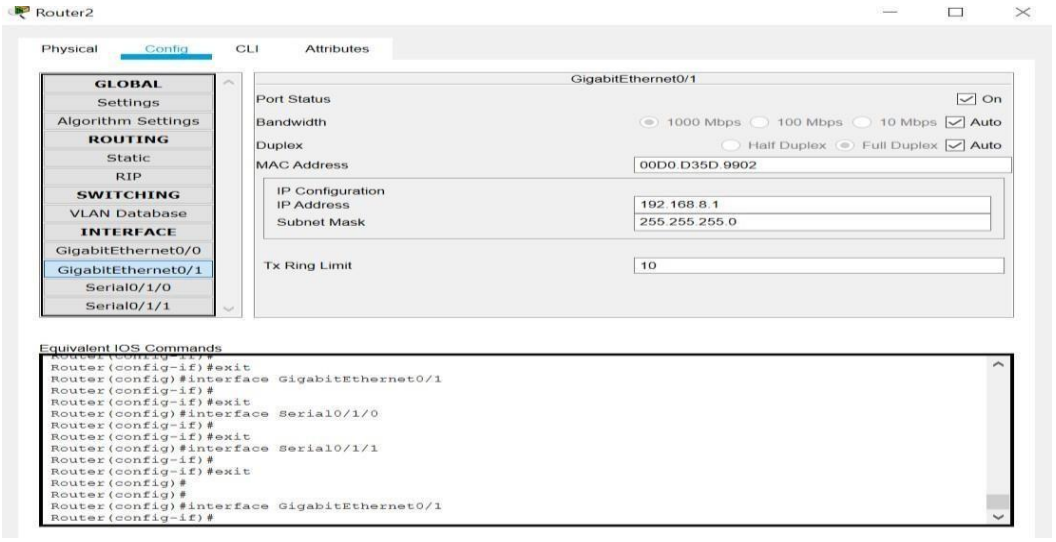


CONFIGURATION OF IP AND SUBNET MASK AT ROUTER:

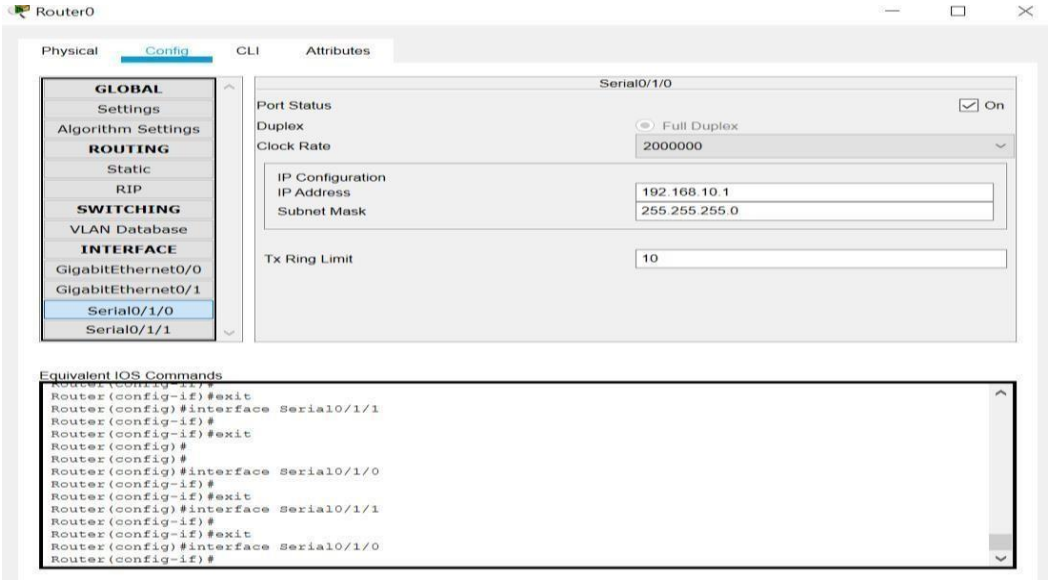
Router0 (Gigabit Ethernet 0/0/1)



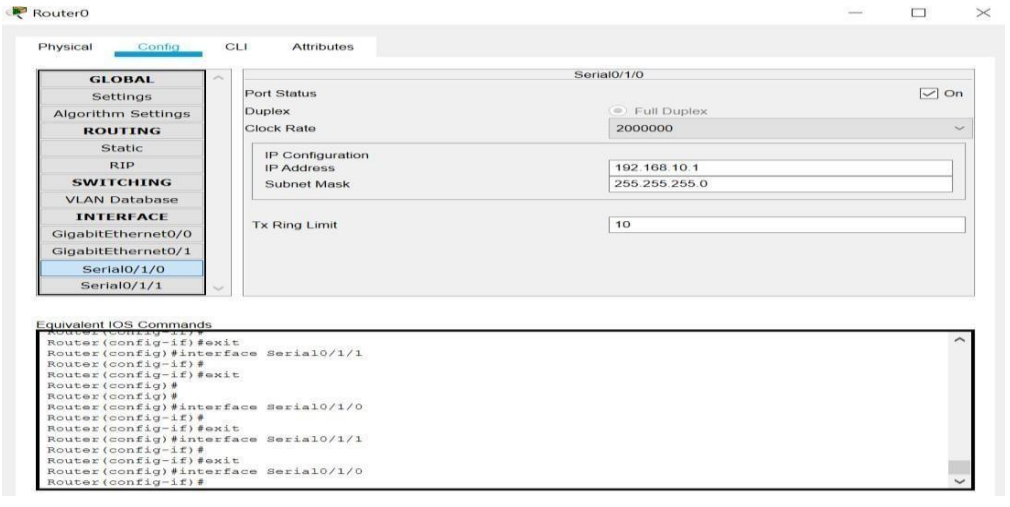
Router2 (Gigabit Ethernet 0/0/1)



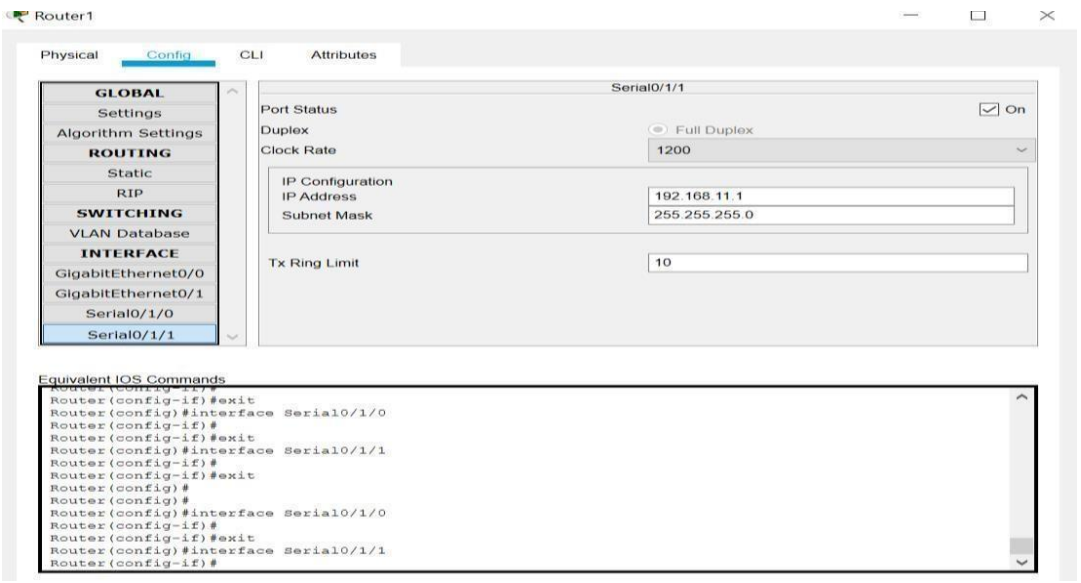
Router0 (Serial 0/1/0):



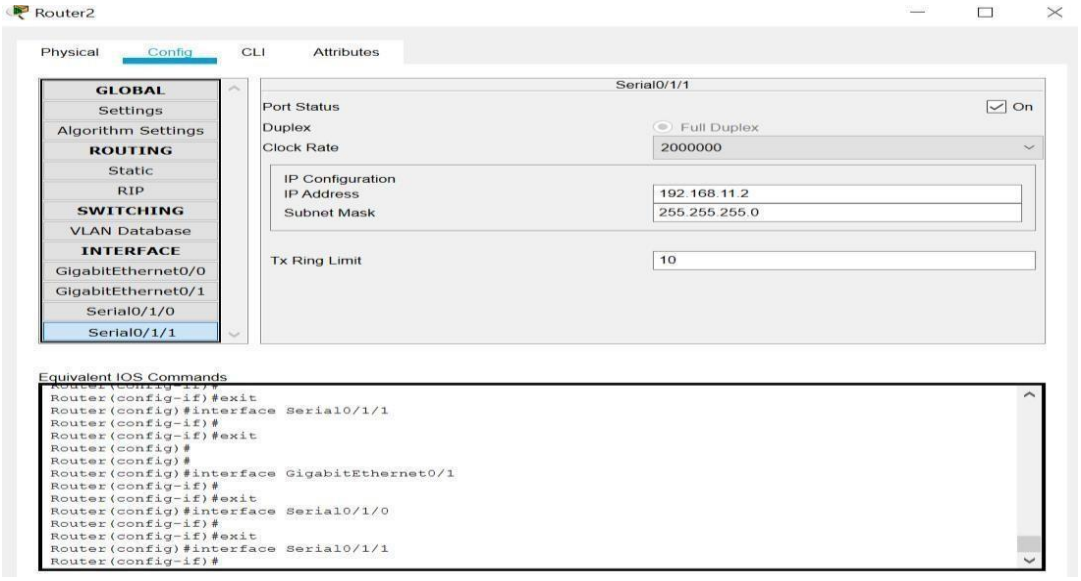
Router1 (Serial 0/1/0):



Router1 (Serial 0/1/1):



Router2 (Serial 0/1/1):



The **Ip-route command** manages static routes in the routing table. Issue this command for each static route to add to the routing table.

R1>enable

R1#configure terminal

R1(config)#no ip

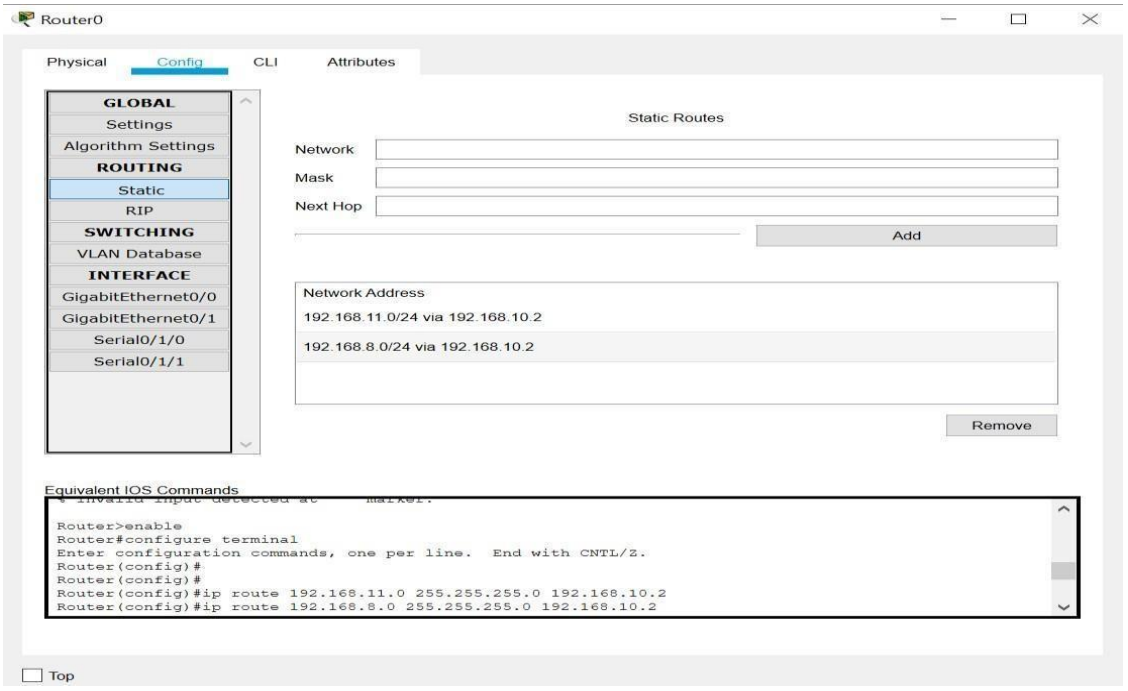
routing R1(config)#ip

routing

R1(config)#ip route 192.168.11.0 255.255.255.0 192.168.10.2

R1(config)#ip route 192.168.9.0 255.255.255.0 192.168.10.2

Router0:

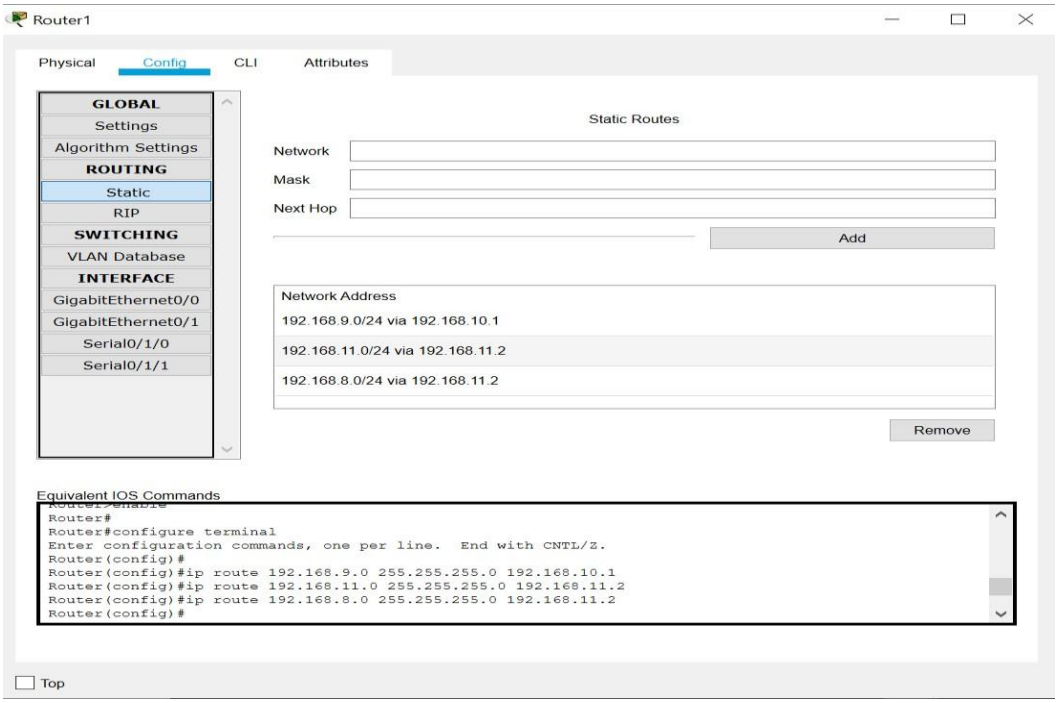


Router1

R1(config)#ip route 192.168.9.0 255.255.255.0 192.168.10.1

R1(config)#ip route 192.168.11.0 255.255.255.0 192.168.11.2

R1(config)#ip route 192.168.8.0 255.255.255.0 192.168.11.2

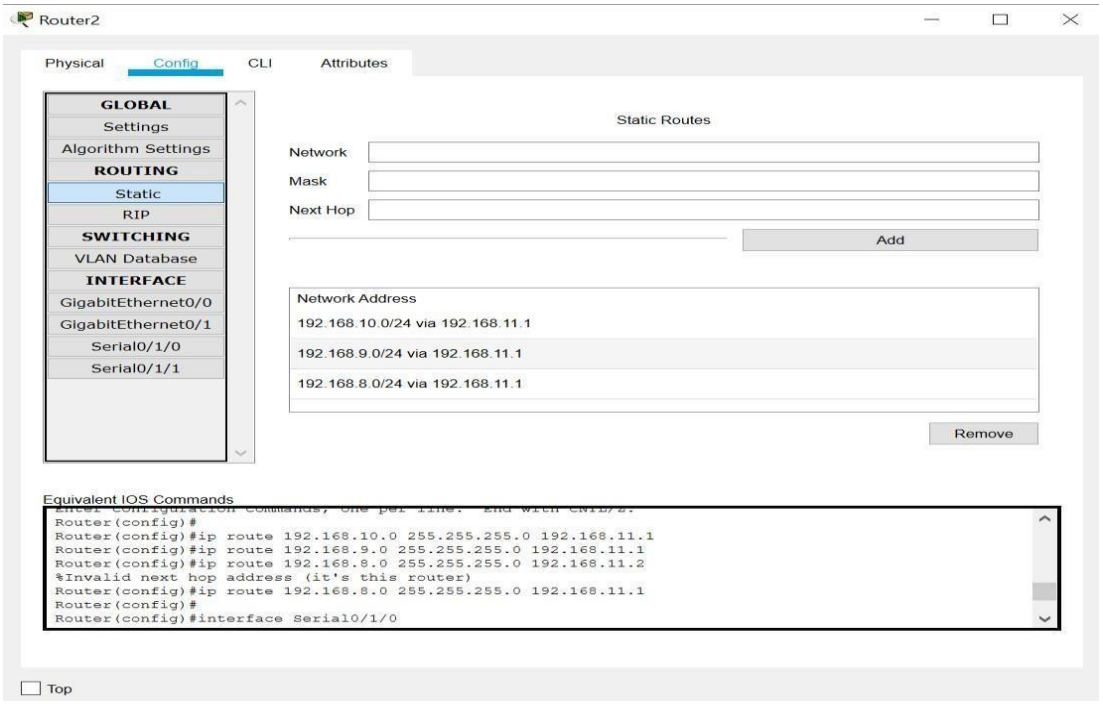


Router2

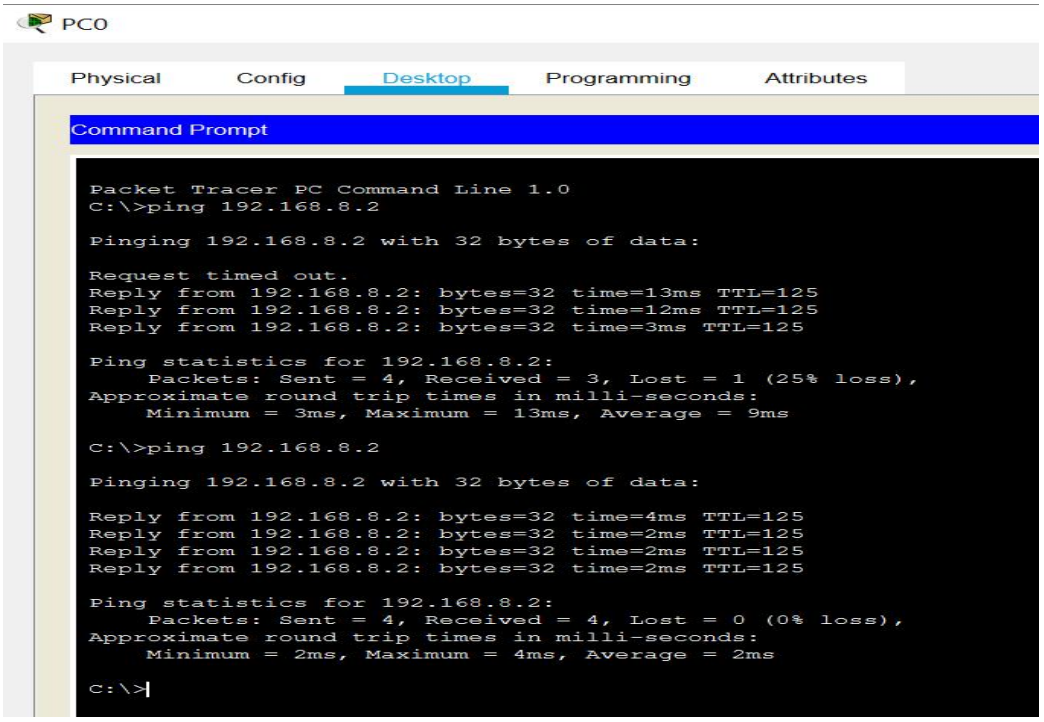
R1(config)#ip route 192.168.10.0 255.255.255.0 192.168.11.1

R1(config)#ip route 192.168.9.0 255.255.255.0 192.168.11.1

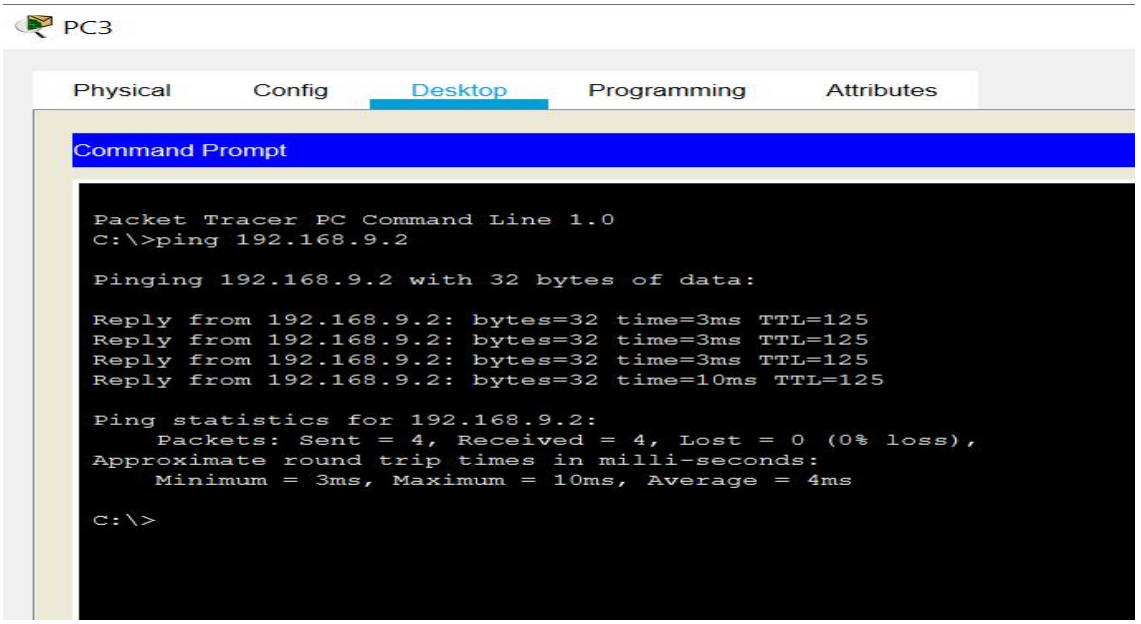
R1(config)#ip route 192.168.8.0 255.255.255.0 192.168.11.2



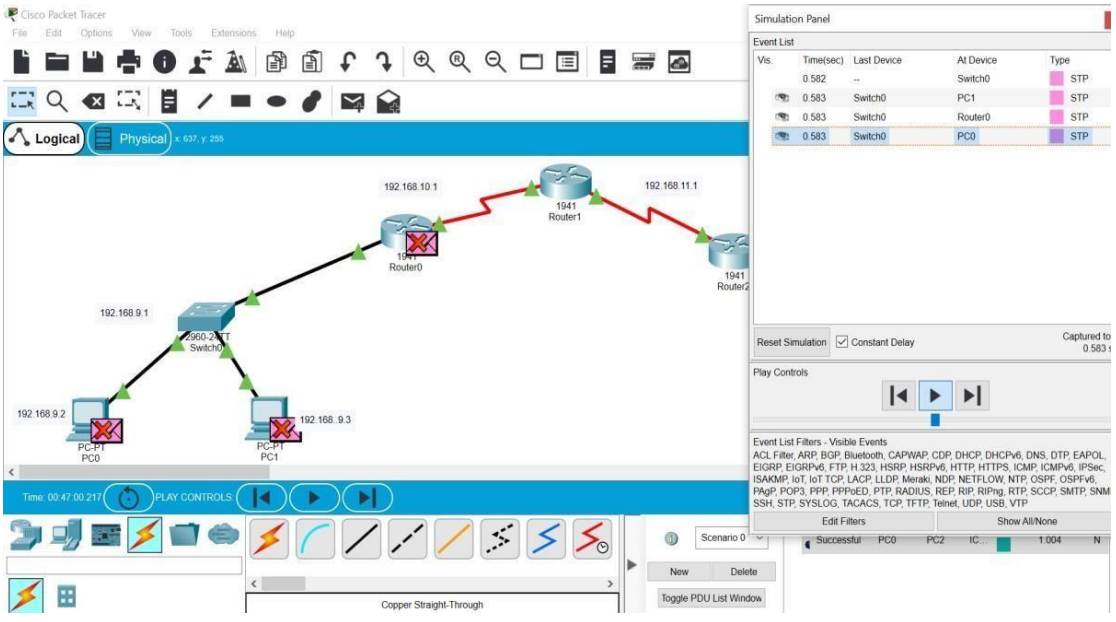
Use of Ping command to confirm the interconnection from PC-0 having IP address 192.168.9.2:



Use of Ping command to confirm the interconnection from PC-3 having IP address 192.168.8.3:



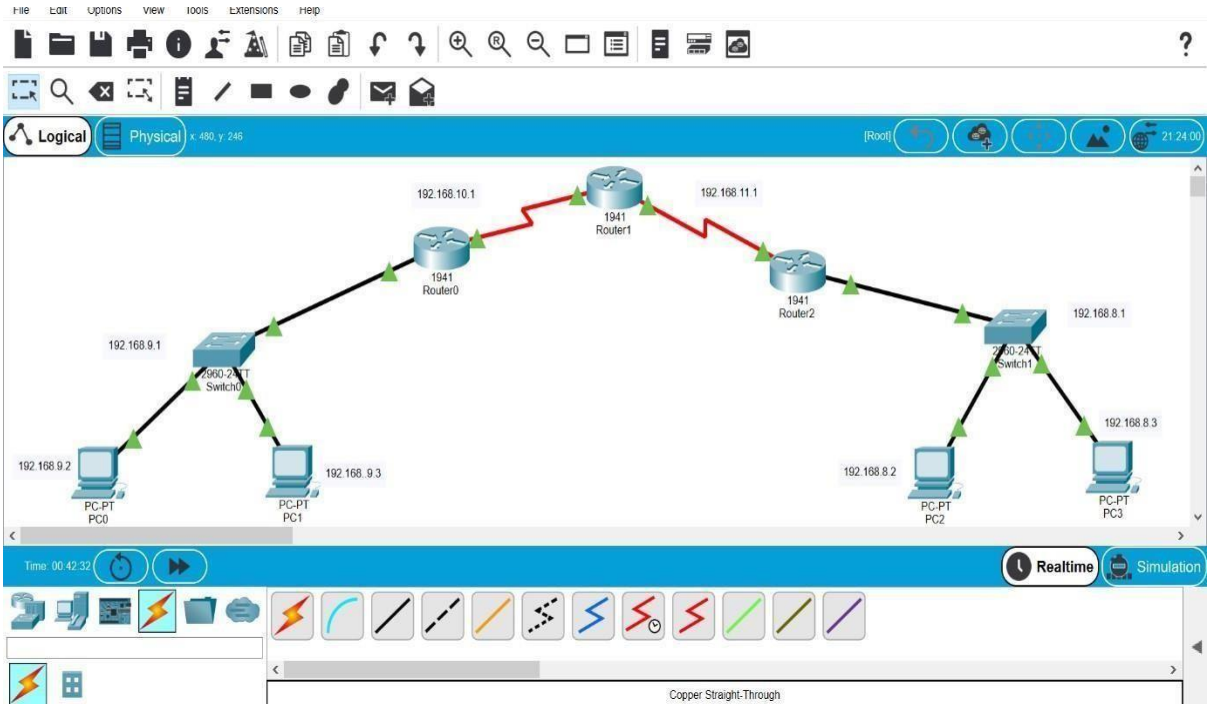
Message successfully delivered:



EXPERIMENT- 8

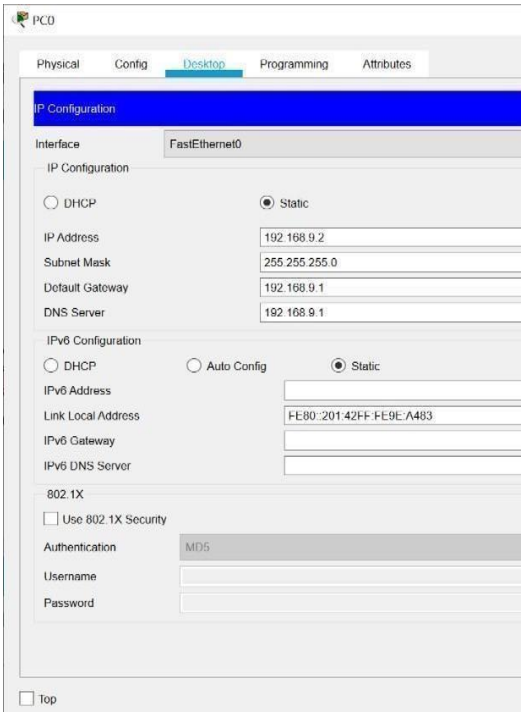
AIM: To study about the configuration of distance vector RIP routing protocol by using Cisco Packet Tracer.

NETWORK TOPOLOGY FOR INTER LAN:

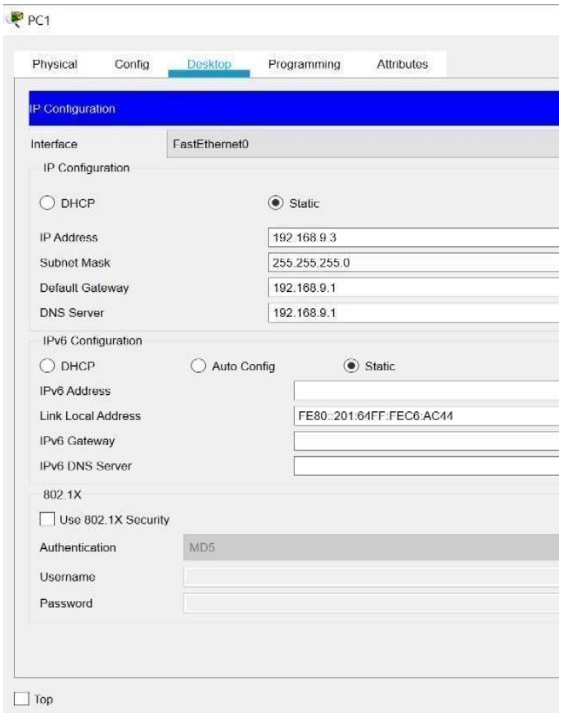


CONFIGURATION OF IP AND SUBNET MASK

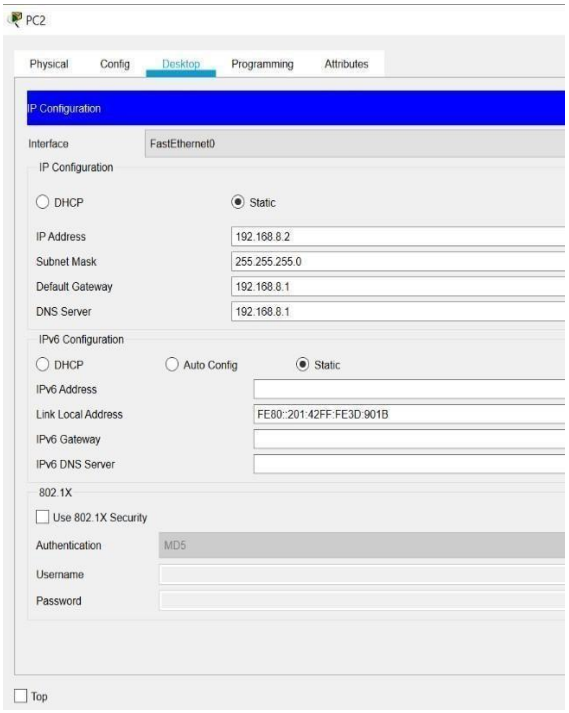
AT PC SIDE: PC0:



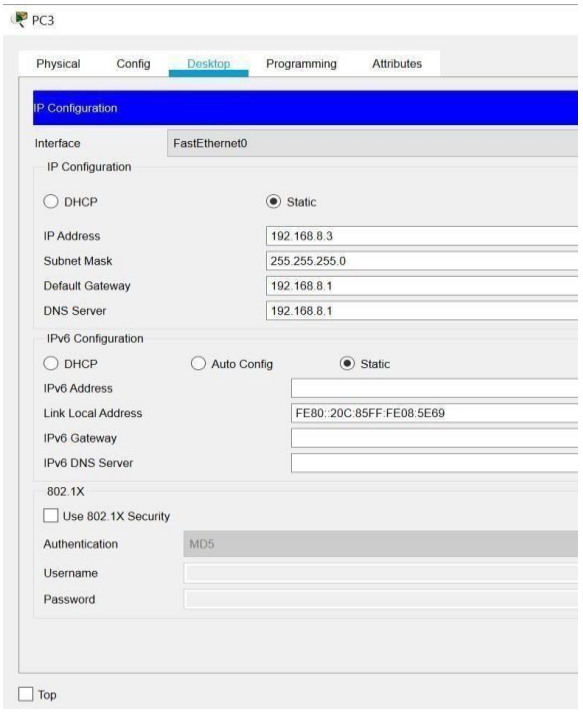
PC1:



PC2:

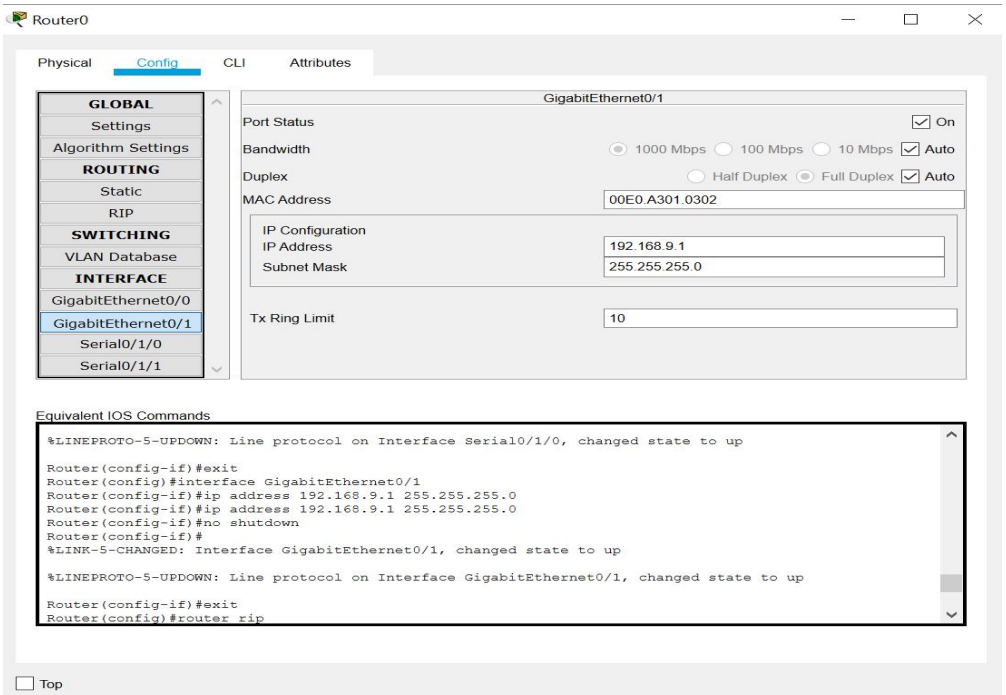


PC3:

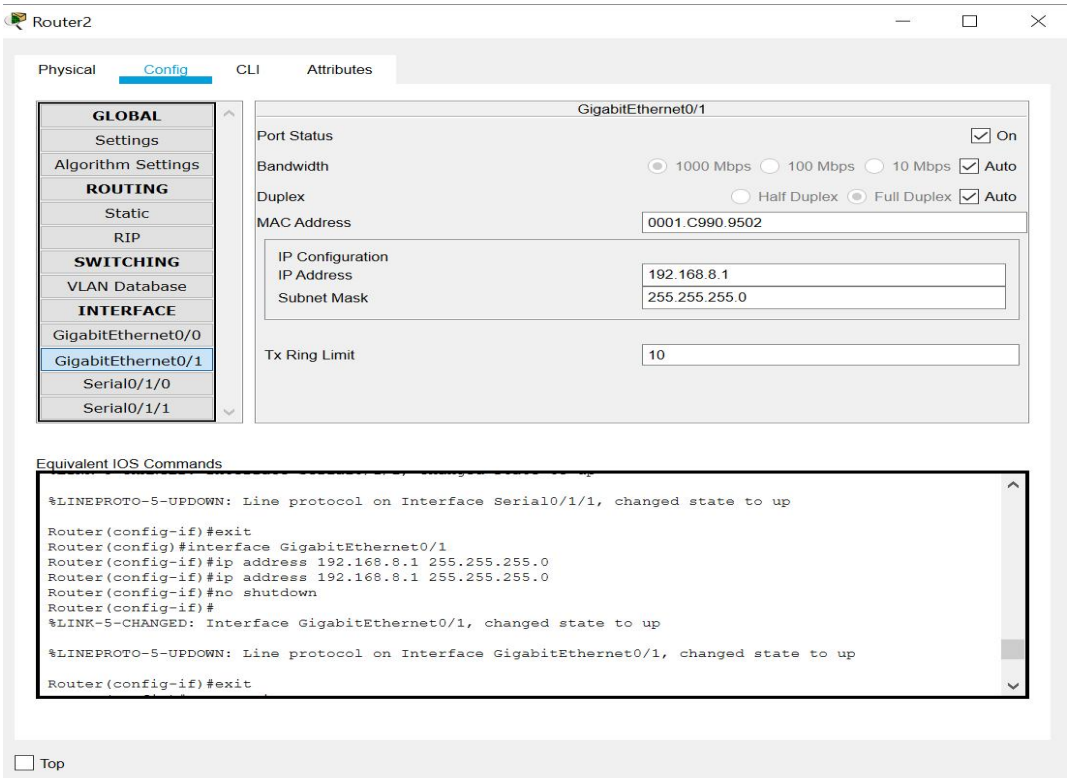


CONFIGURATION OF IP AND SUBNET MASK AT ROUTER:

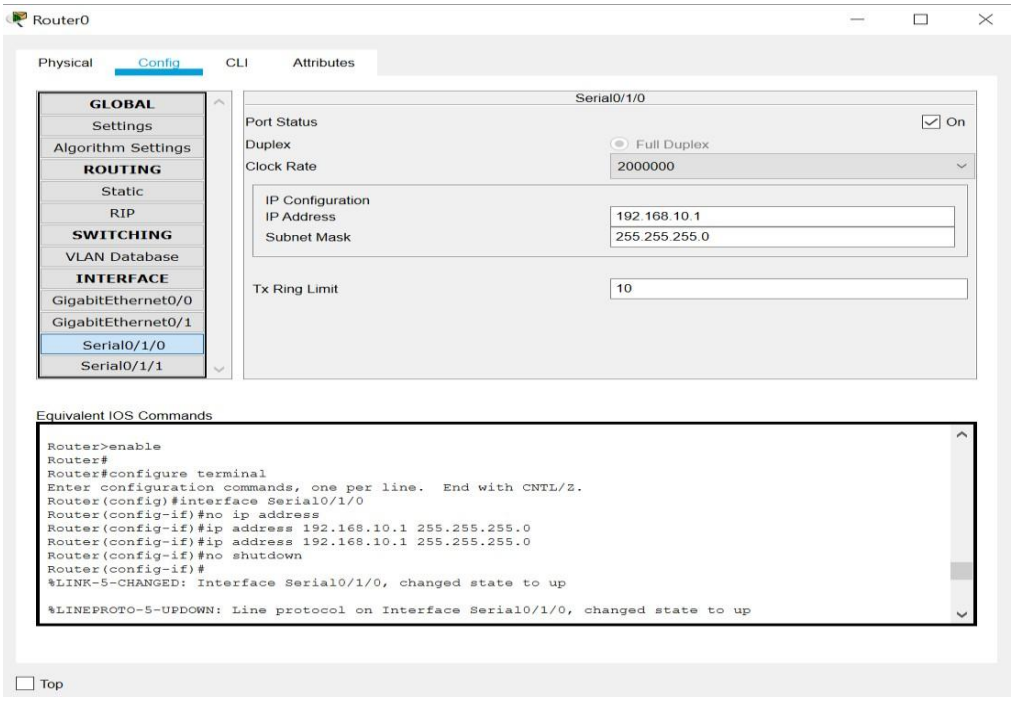
Router0 (GigabitEthernet 0/0/1)



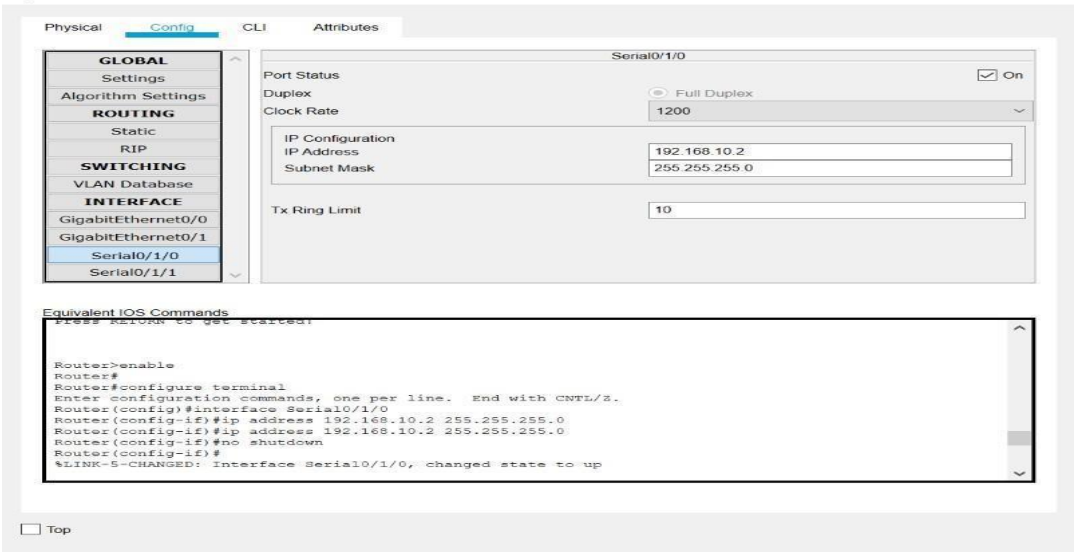
Router2 (GigabitEthernet 0/0/1)



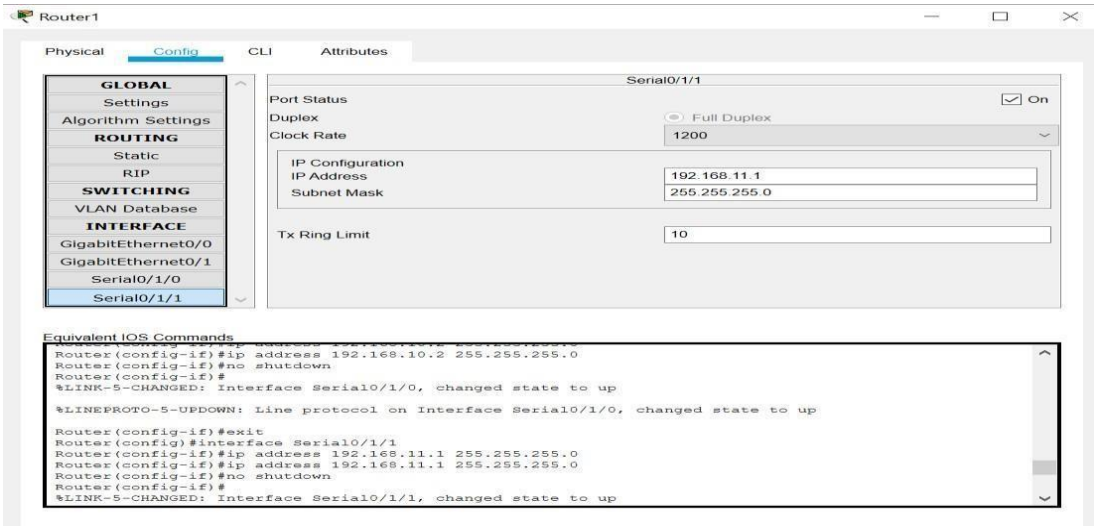
Router0 (Serial 0/1/0):



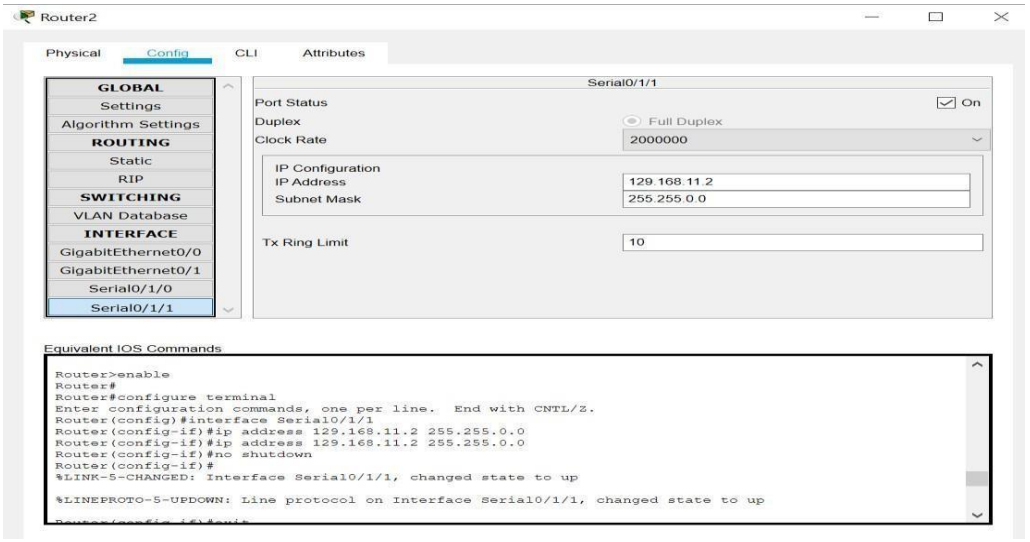
Router1 (Serial 0/1/0):



Router1 (Serial 0/1/1):

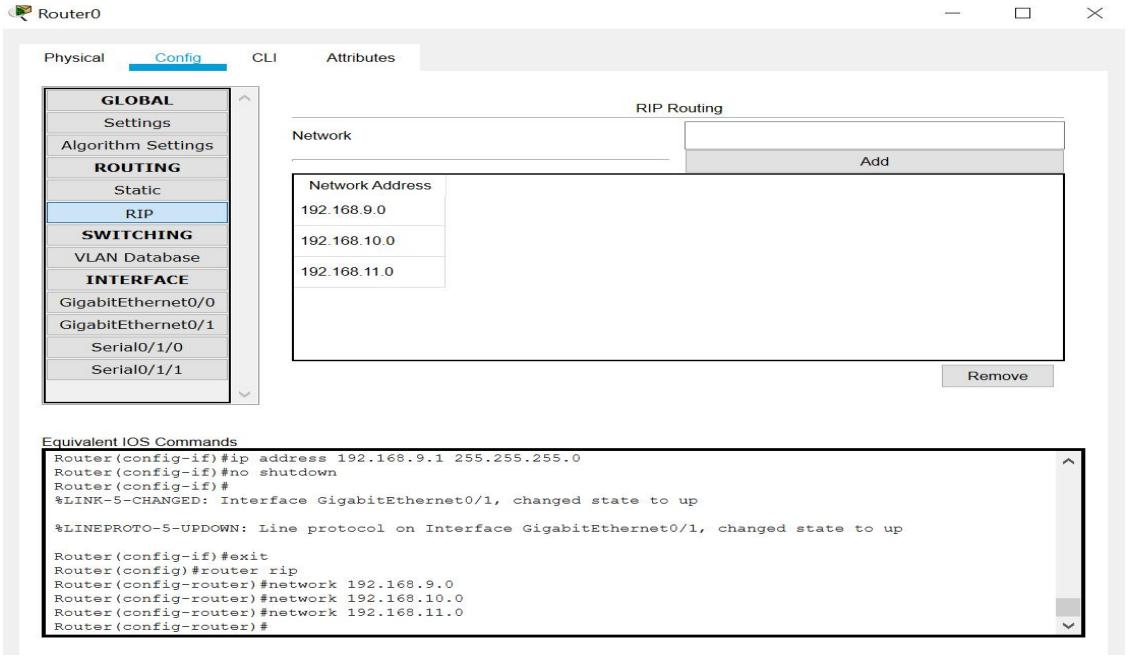


Router2 (Serial 0/1/1):

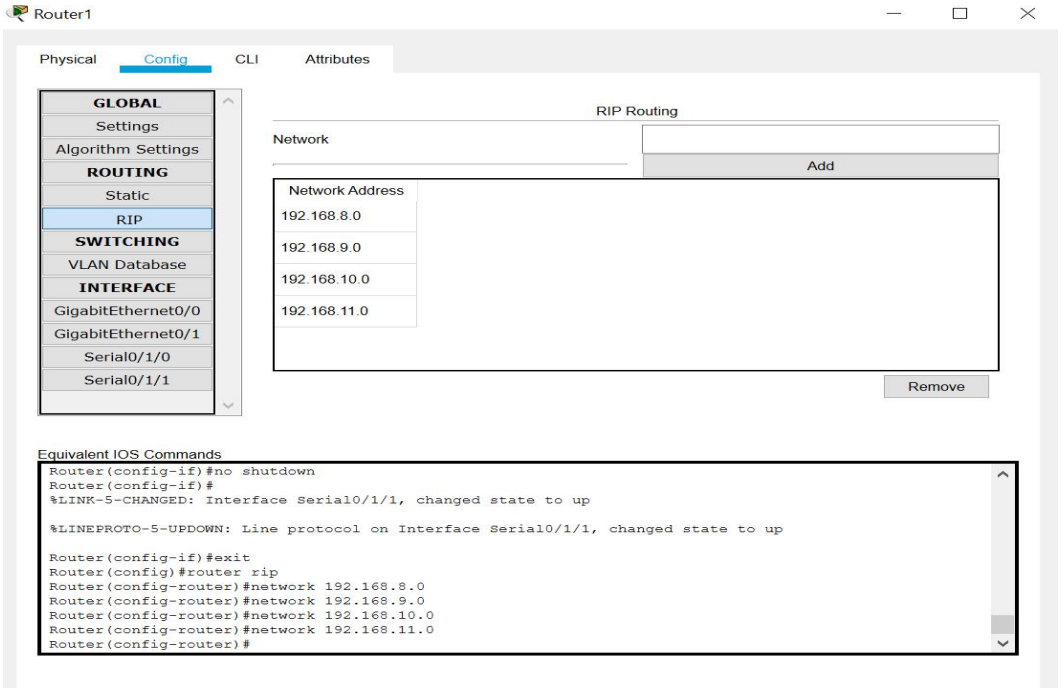


PROCESS OF ADDING RIP (NEIGHBORS'S IP ADDRESS)

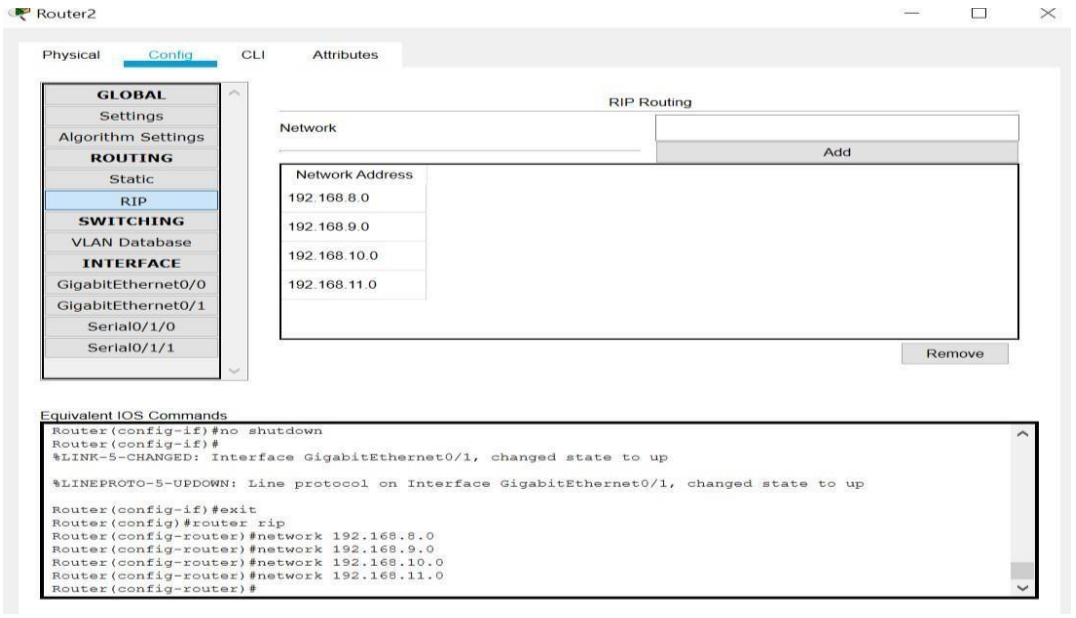
Router0:



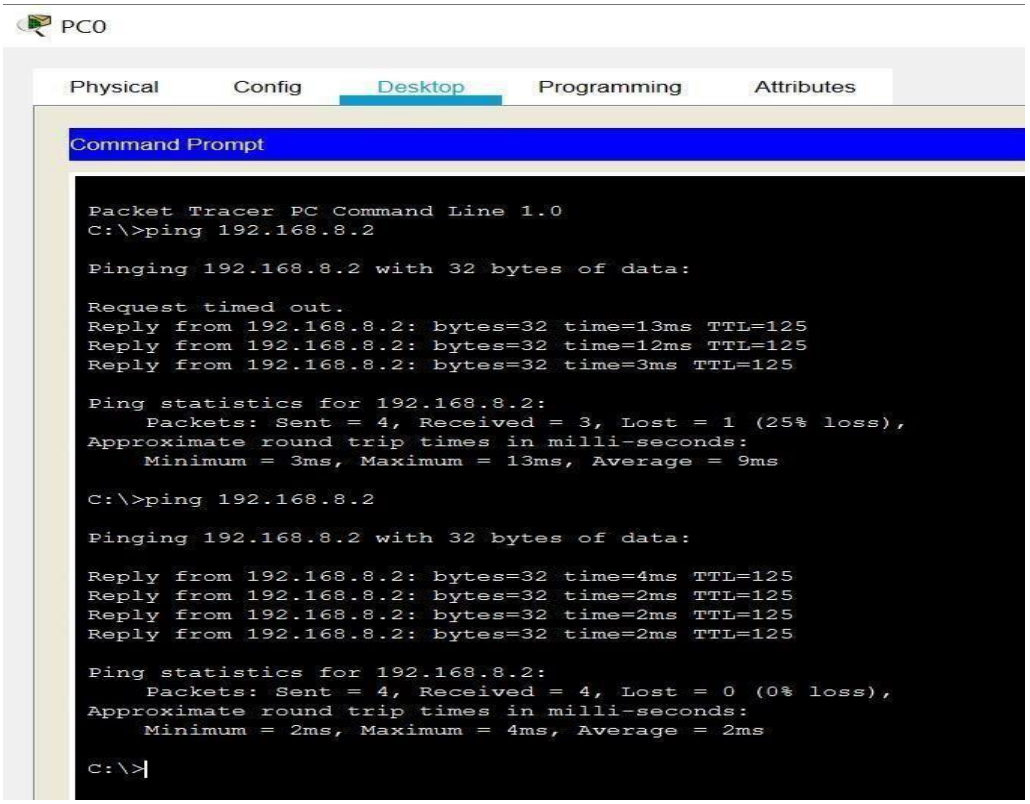
Router1:



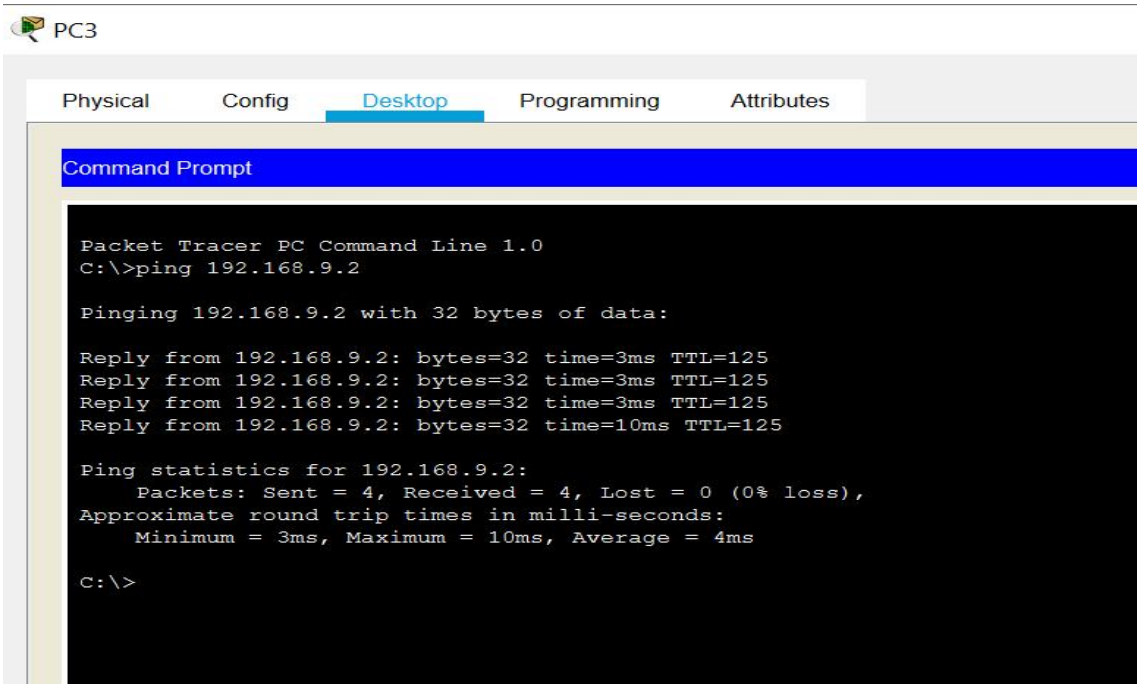
Router2:



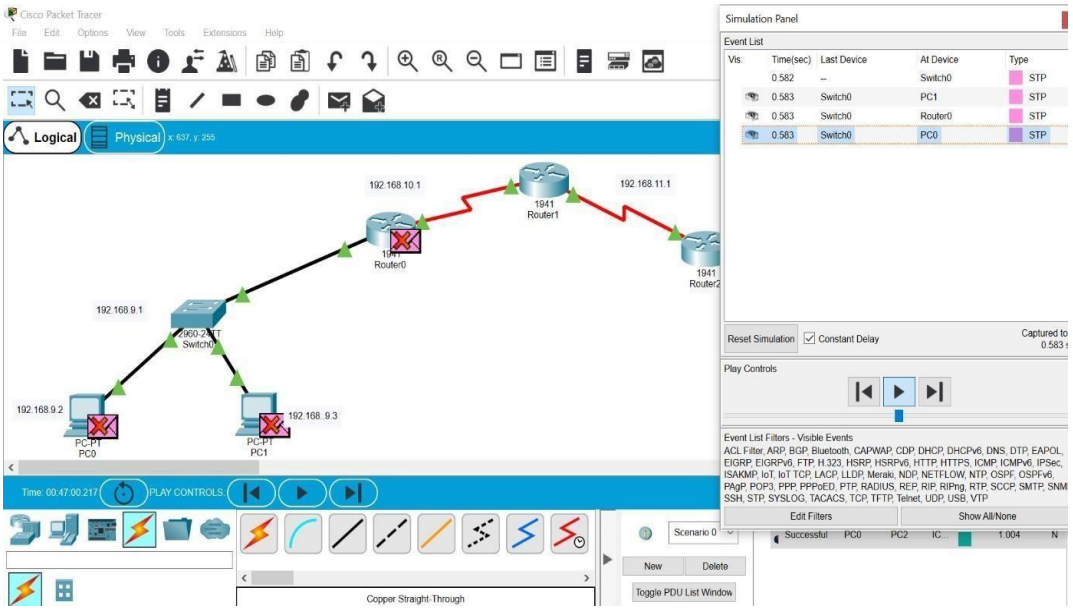
Use of Ping command to confirm the interconnection from PC-0 having IP address 192.168.9.2:



Use of Ping command to confirm the interconnection from PC-3 having IP address 192.168.8.3:



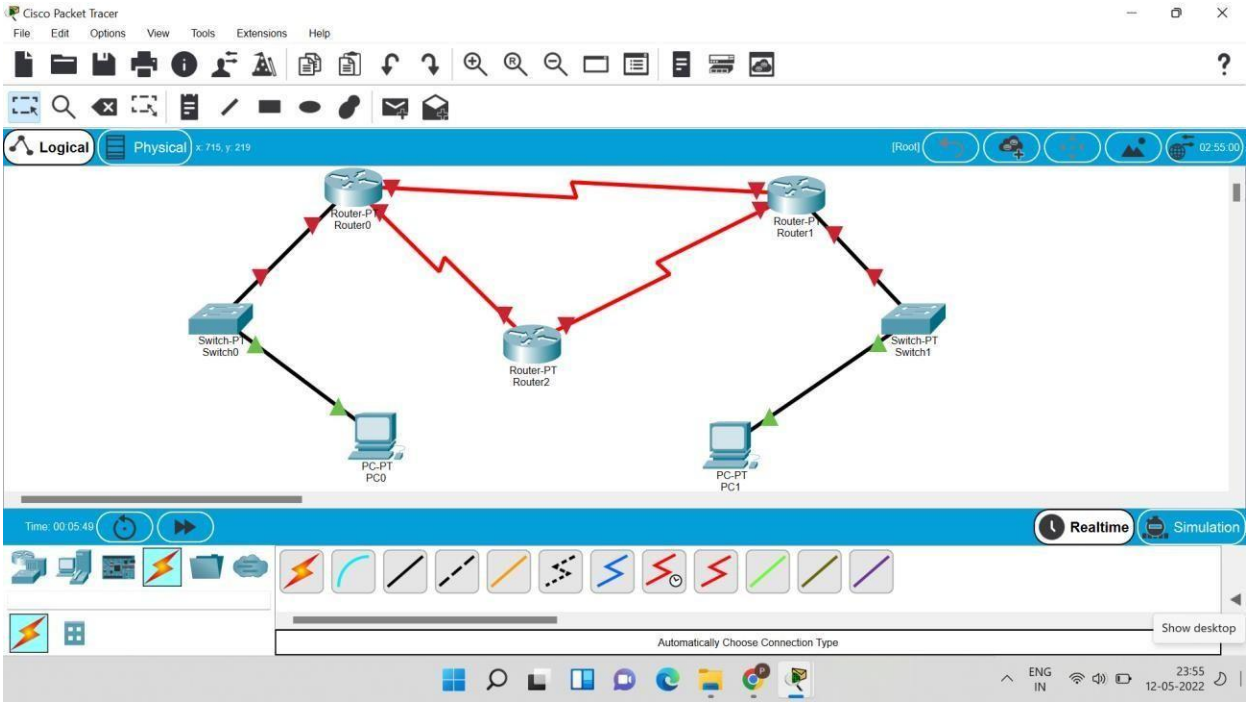
Message Successfully delivered :



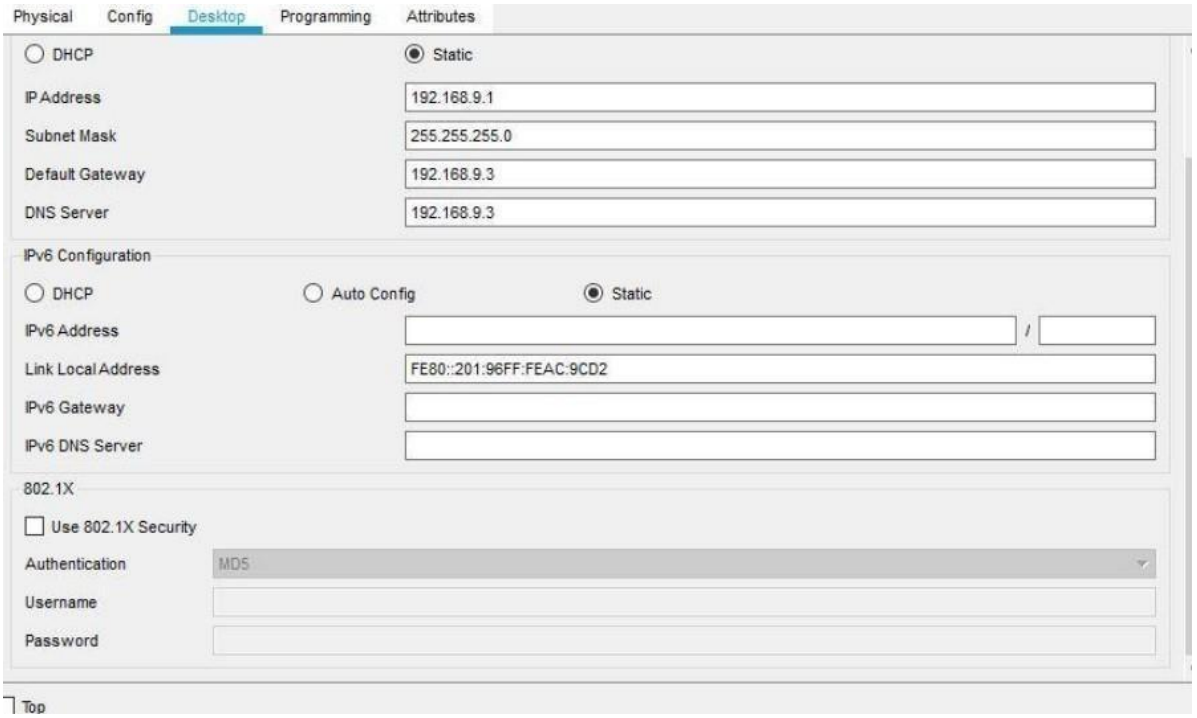
Practical-9

AIM: To study about the configuration of link state OSPF routing protocol by using Cisco Packet Tracer.

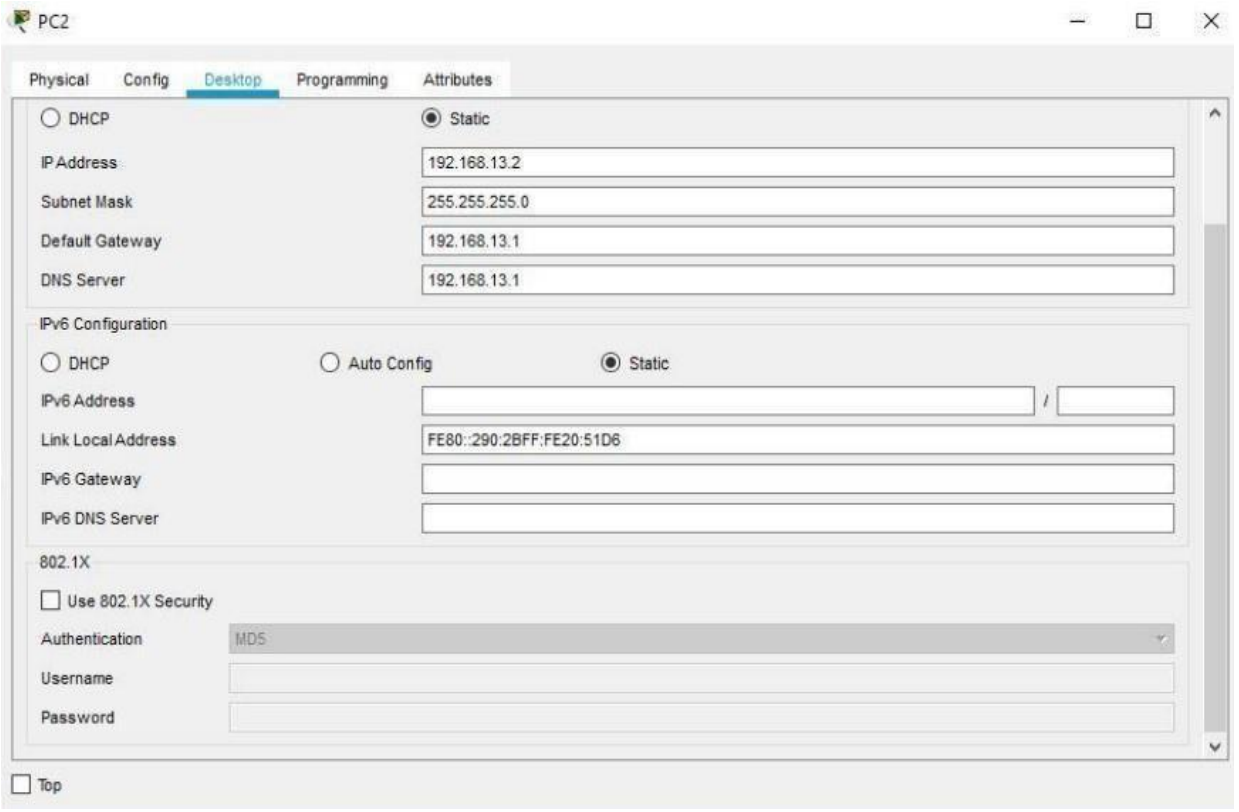
NETWORK TOPOLOGY FOR INTER LAN:



CONFIGURATION OF IP AND SUBNET MASK AT PC: PC-0

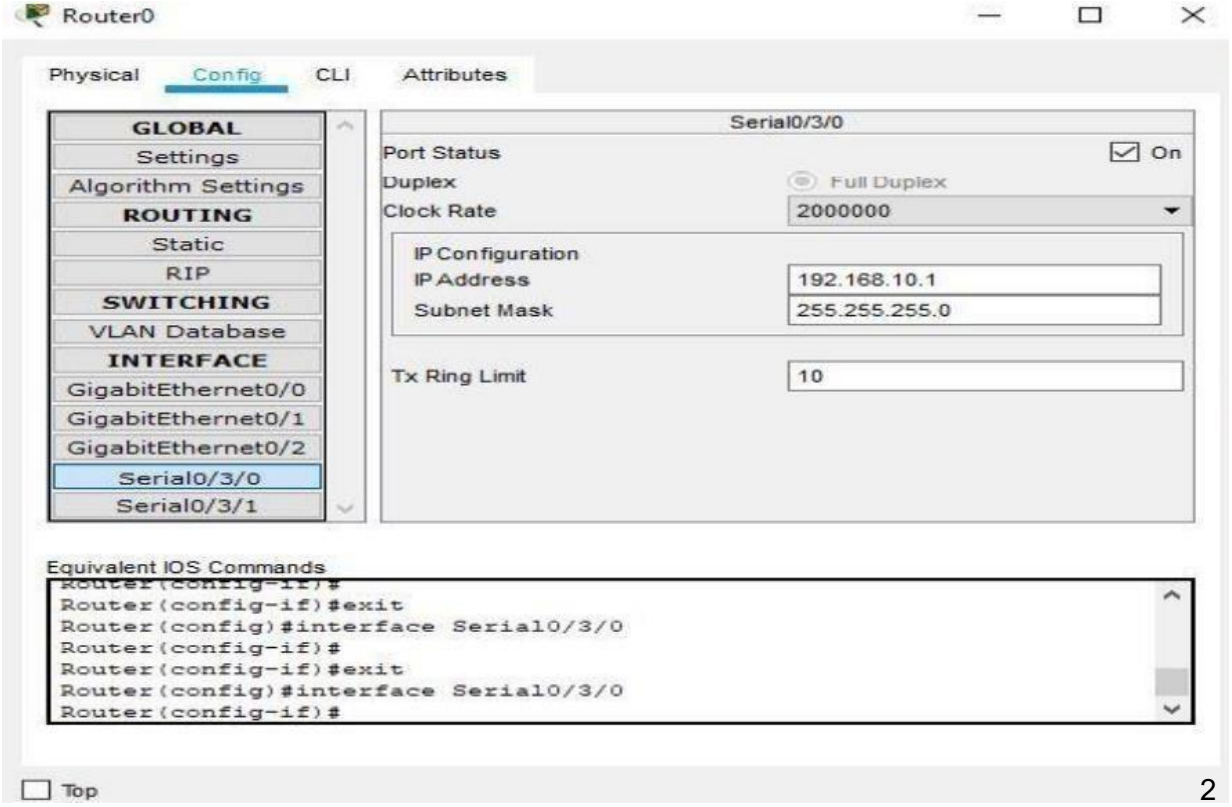


CONFIGURATION OF IP AND SUBNET MASK AT PC: PC-1

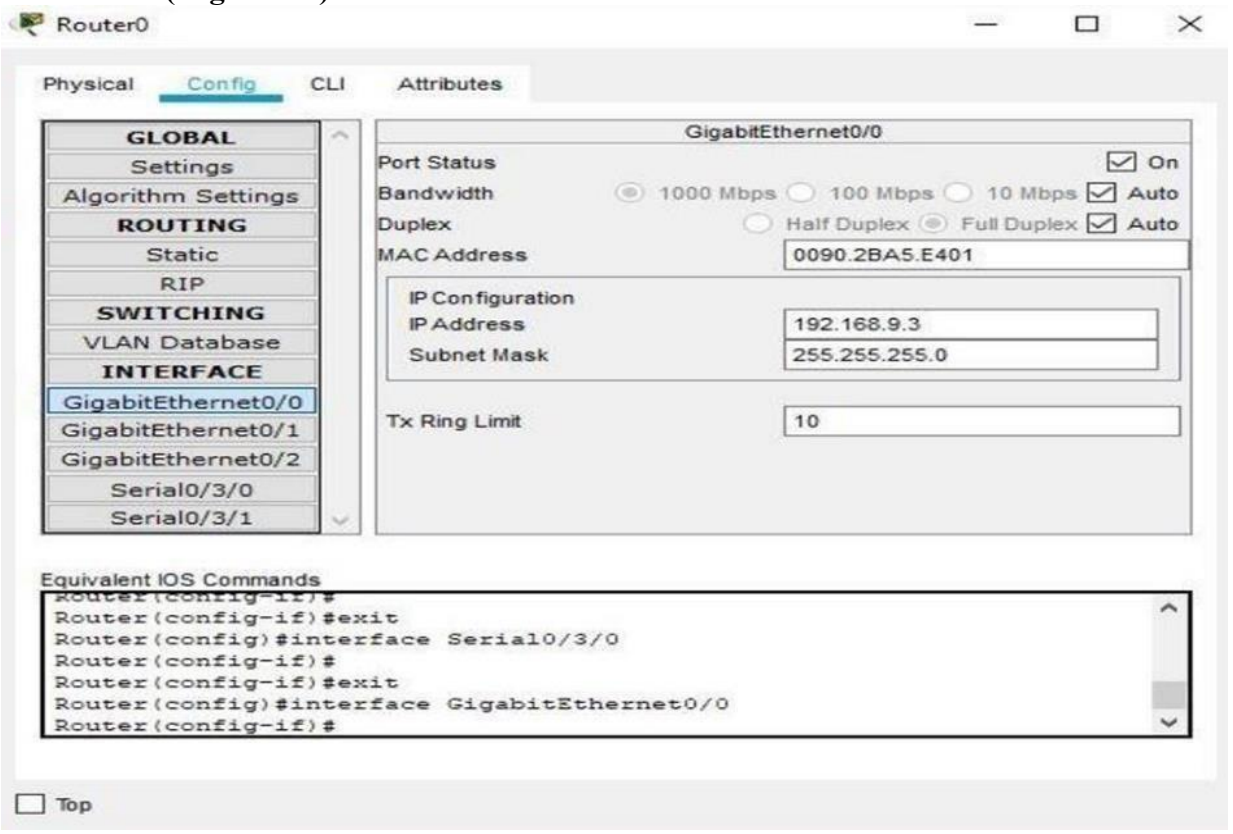


CONFIGURATION OF IP AND SUBNET MASK AT ROUTER:

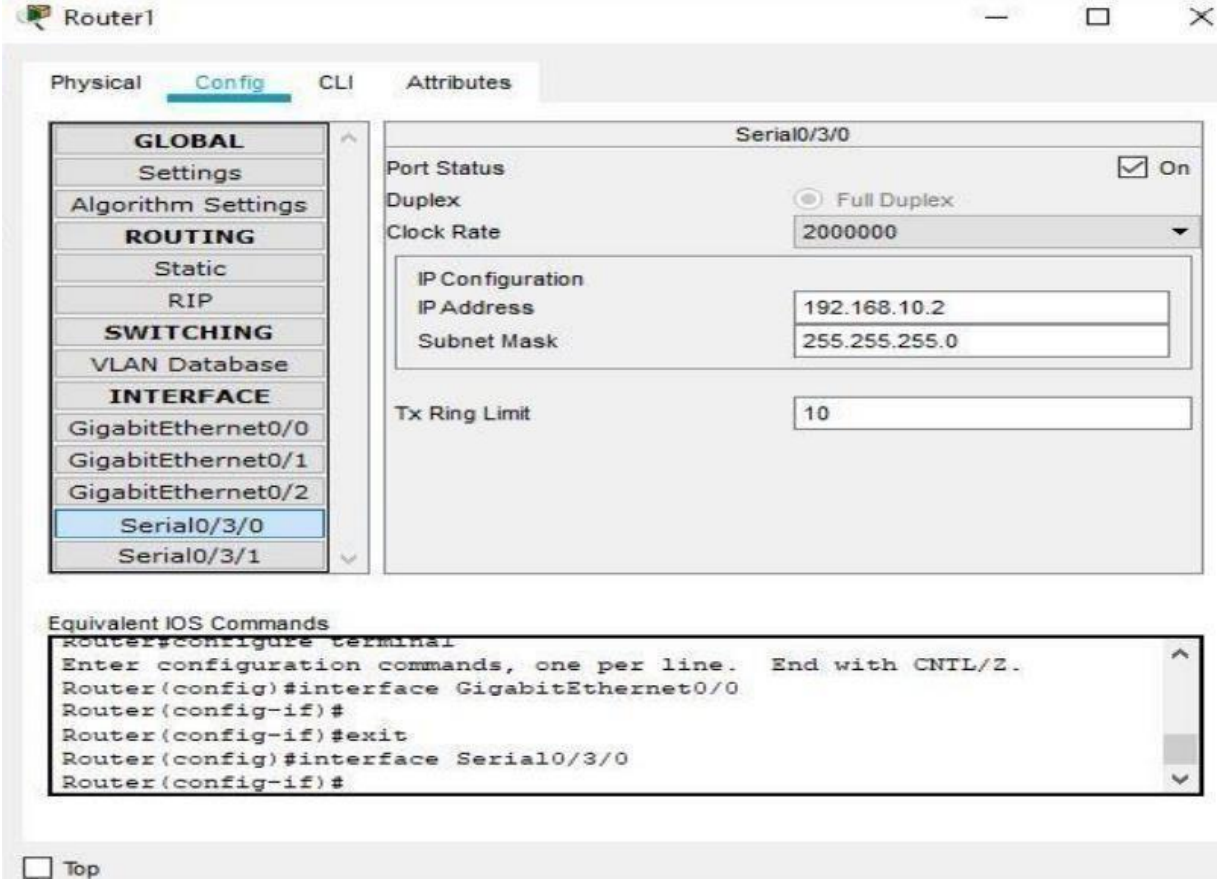
ROUTER-0(SERIAL0/3/0)



ROUTER-0(Gigabit0/0)

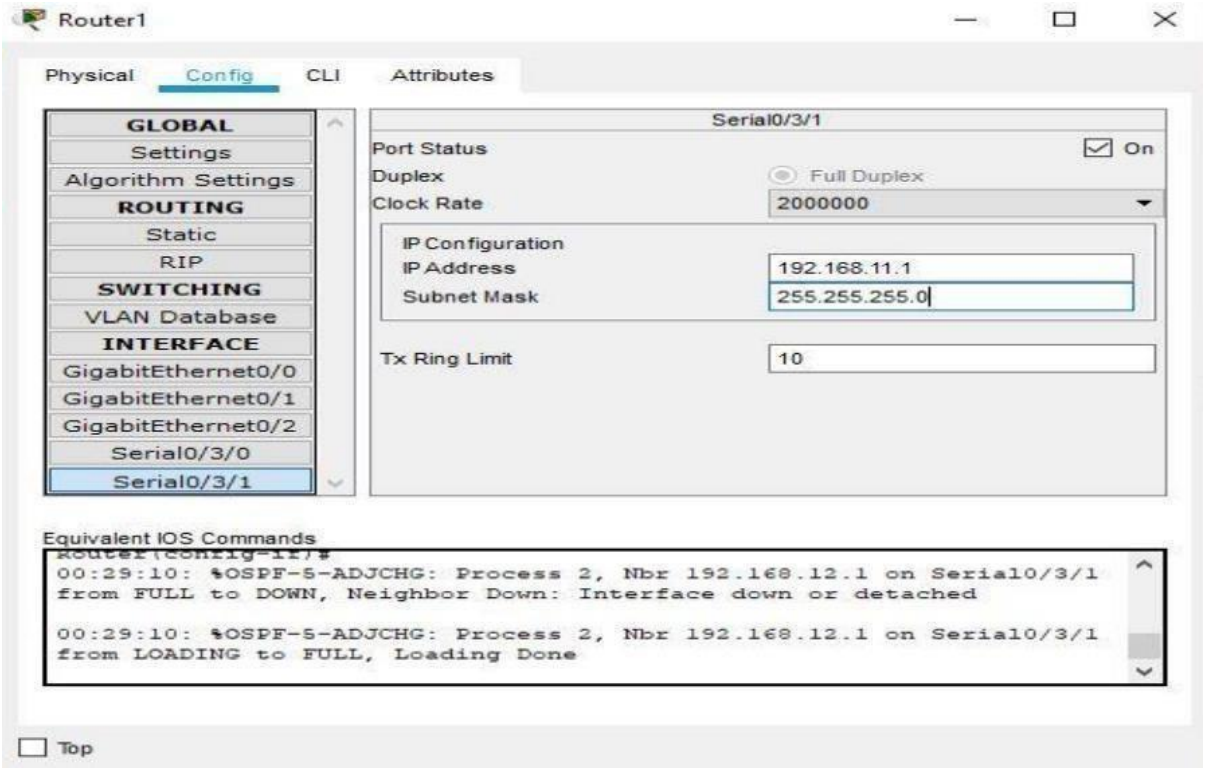


ROUTER-1(SERIAL 3/0)

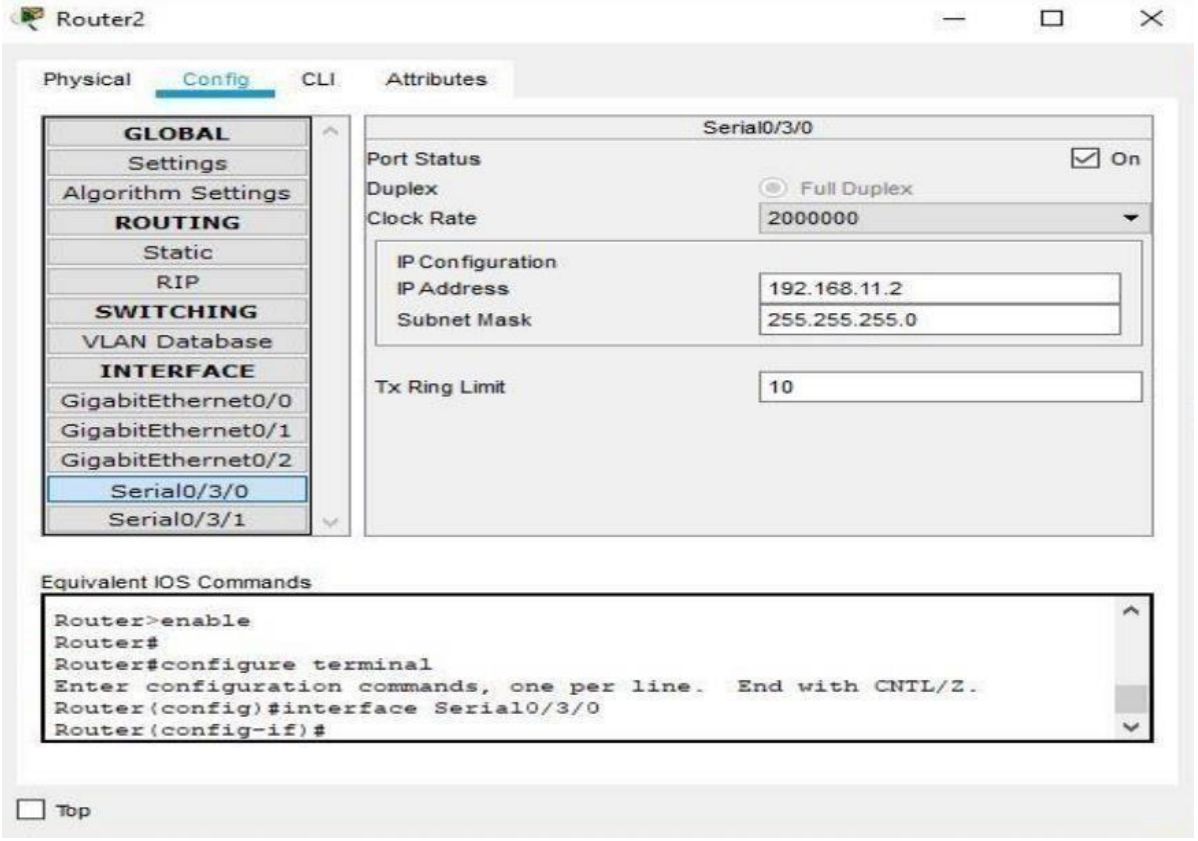


CONFIGURATION OF ROUTER:

ROUTER-1(SERIAL 3/1)

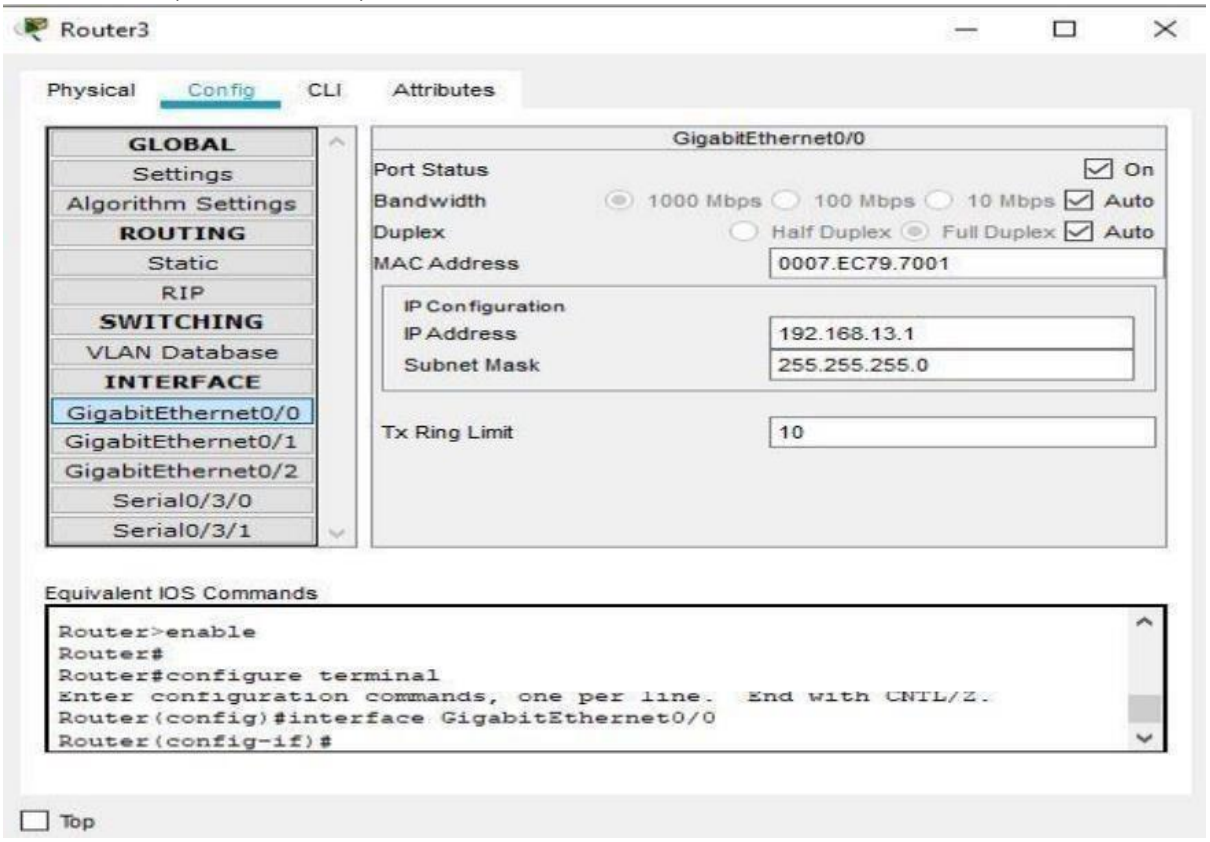


ROUTER-2(SERIAL 3/0)

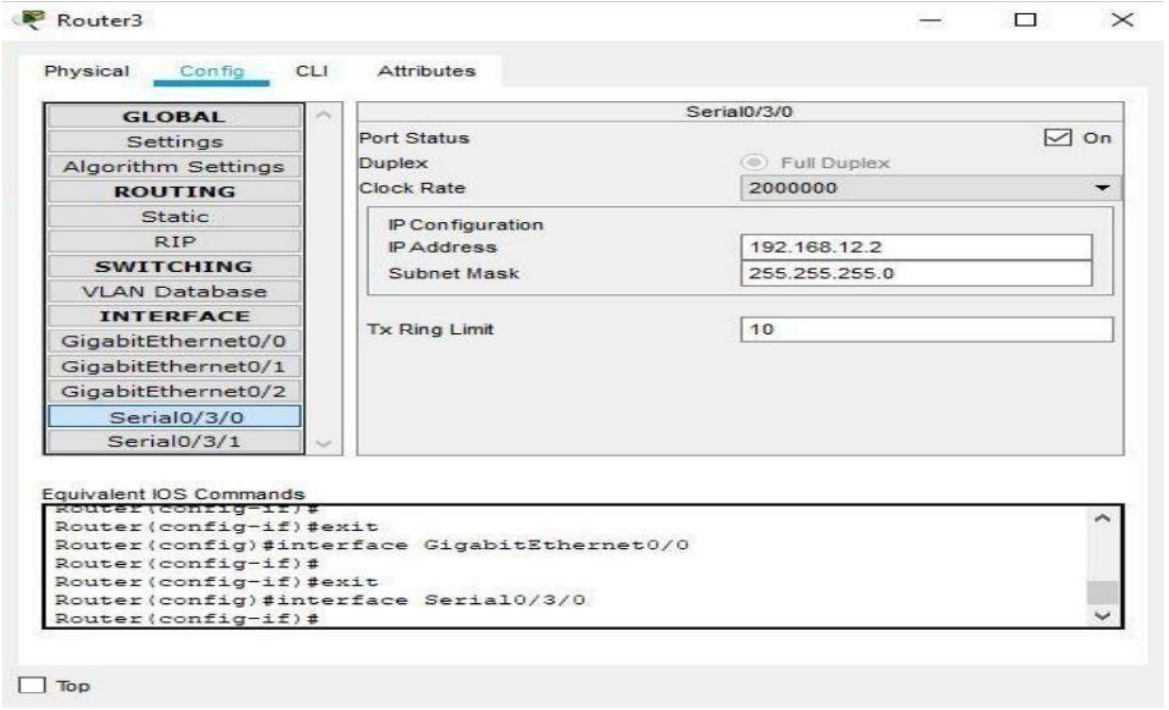


CONFIGURATION OF ROUTERS:

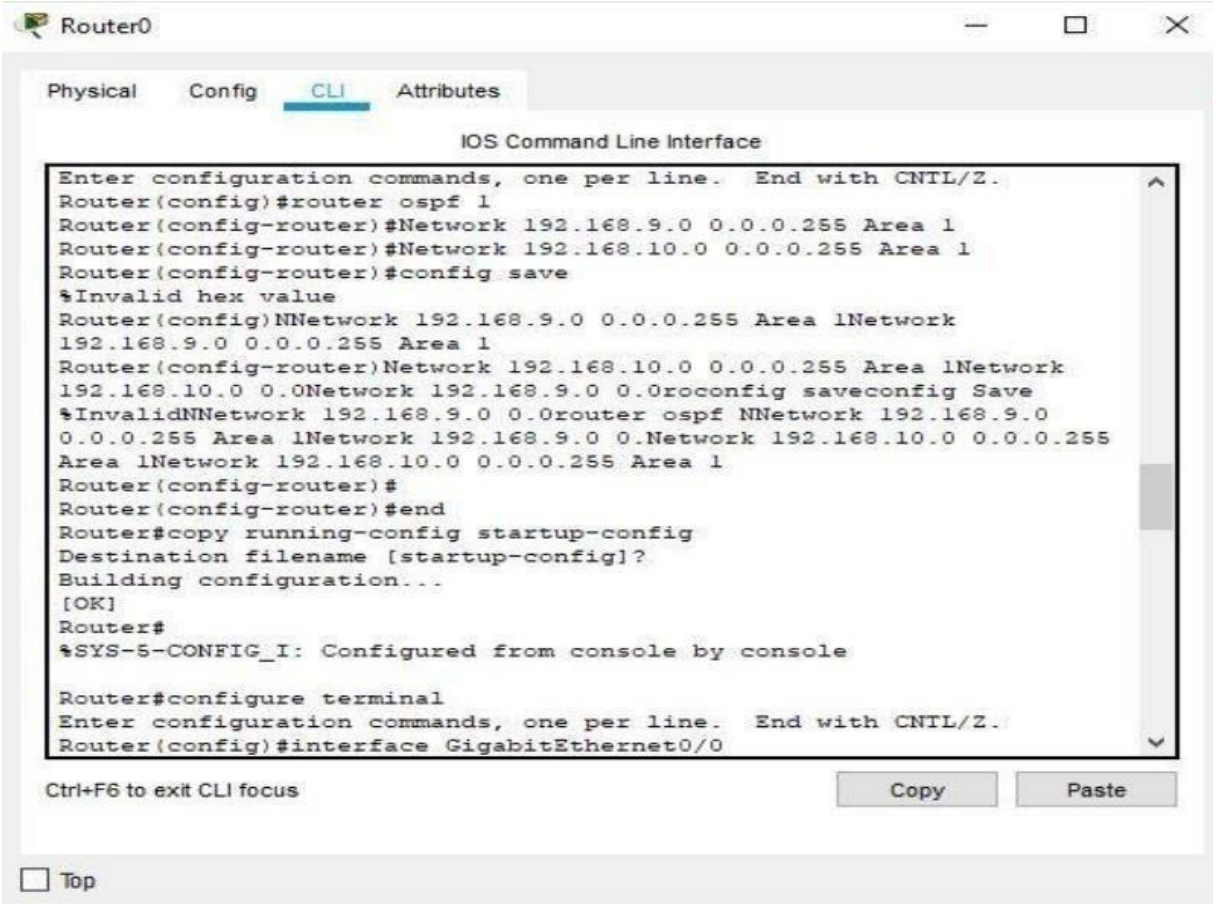
ROUTER 3(GIGABIT0/0)



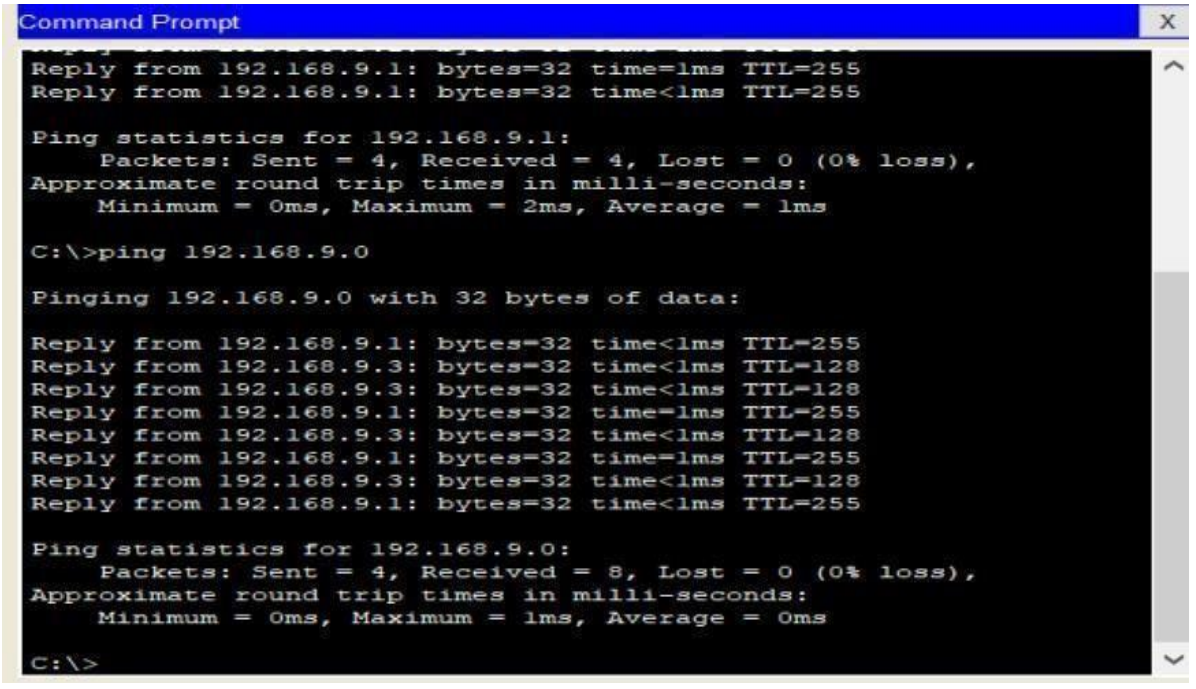
ROUTER-3 (SERIAL3/0)



CLI CONFIGURATION:



PINGING:

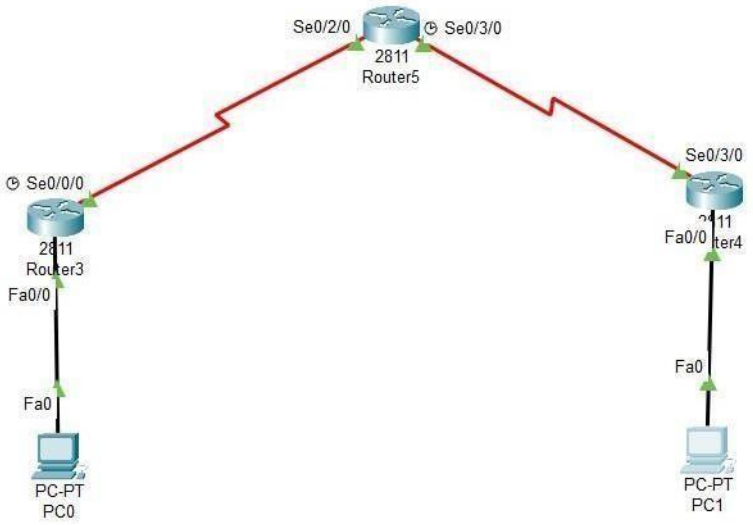


Practical-10

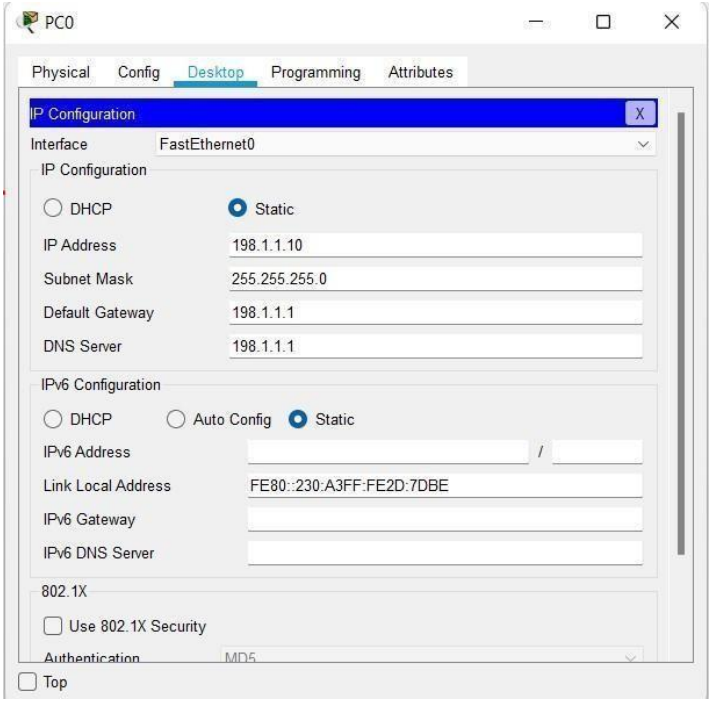
Aim: To study about the configuration of link state EIGRP routing protocol by using Cisco Packet Tracer.

NETWORK TOPOLOGY FOR INTER LAN:

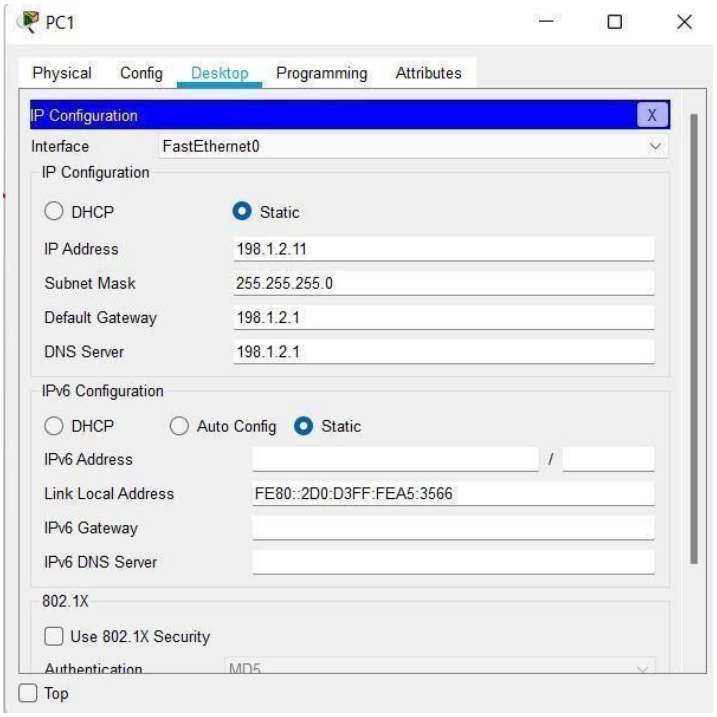
We take three 2811 routers Router3, Router5 & Router4 and two PCs PC0 & PC1. We connect PC0 to Router3 and PC1 to Router4, using copper straight through wires. Then we connect Router3 to Router5 and Router5 to Router4 using serial DCE wires.



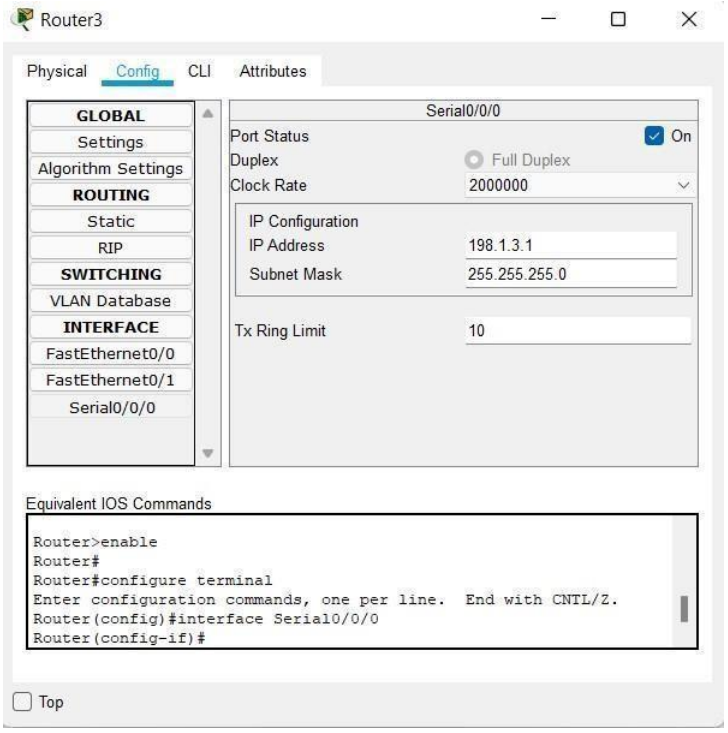
Configuration of PC0:



Configuration of PC1:

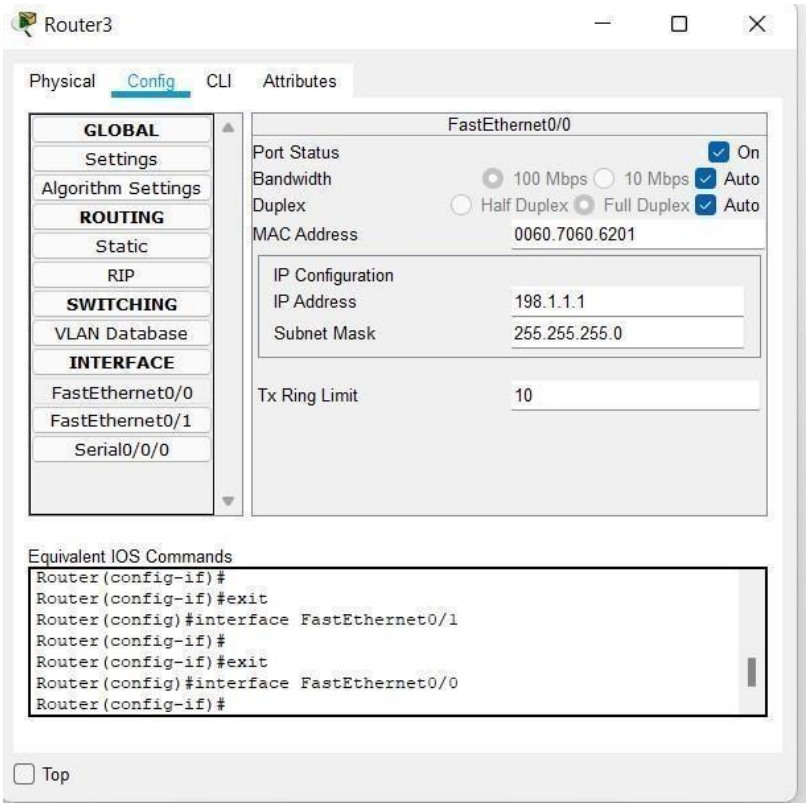


Configuration of Router 3 (Serial 0/0/0):

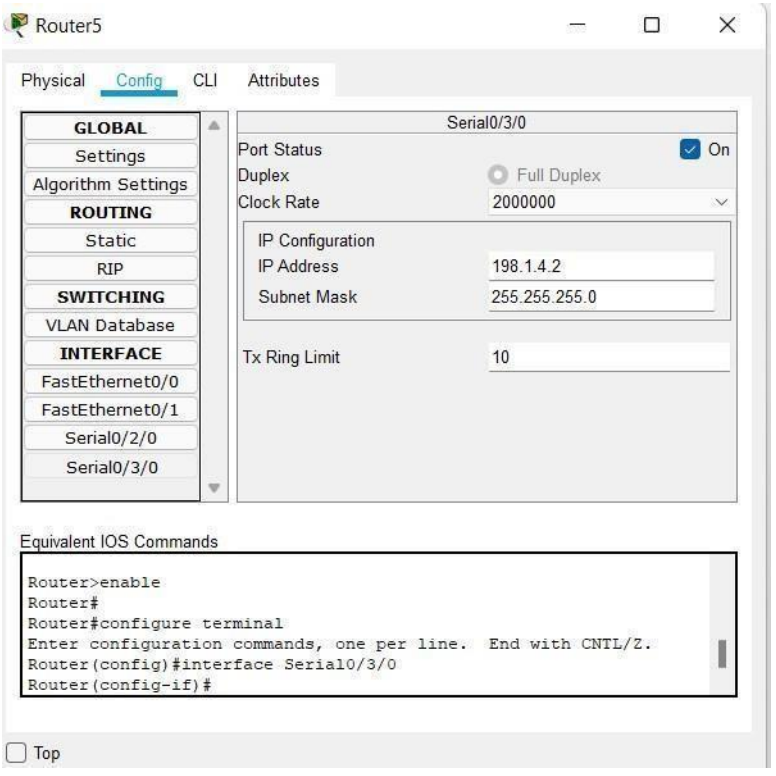


3 (FastEthernet 0/0):

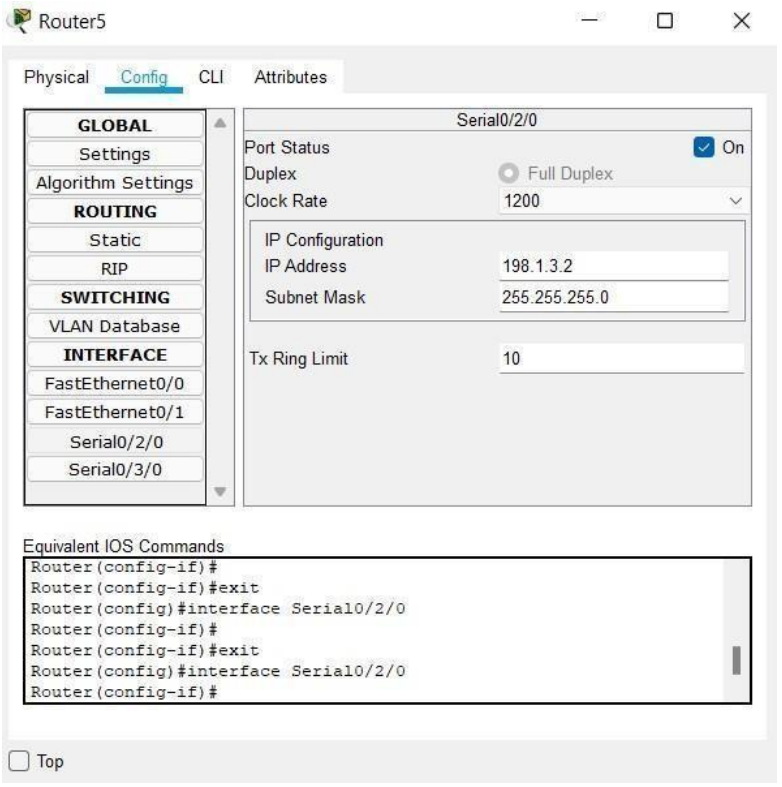
Configuration of Router



Configuration of Router 5 (Serial 0/3/0):

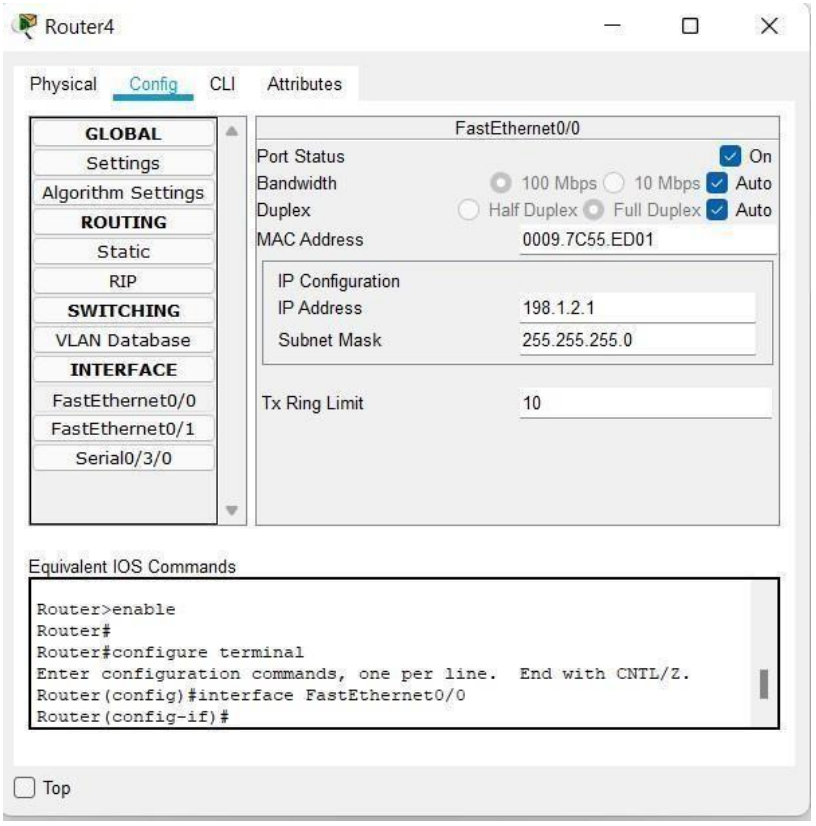


Configuration of Router 5 (Serial 0/2/0):

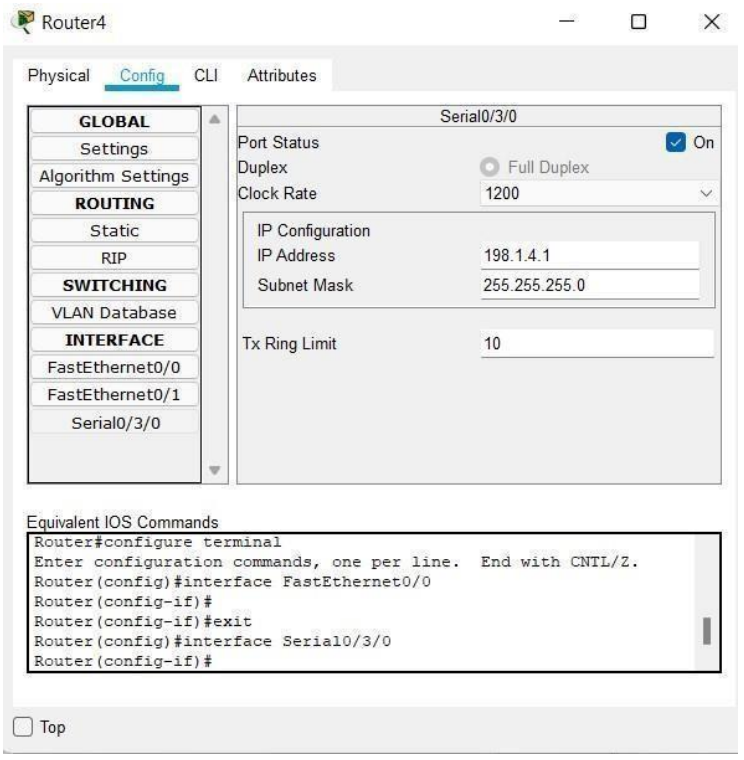


Configuration of Router 4 (FastEthernet 0/0):

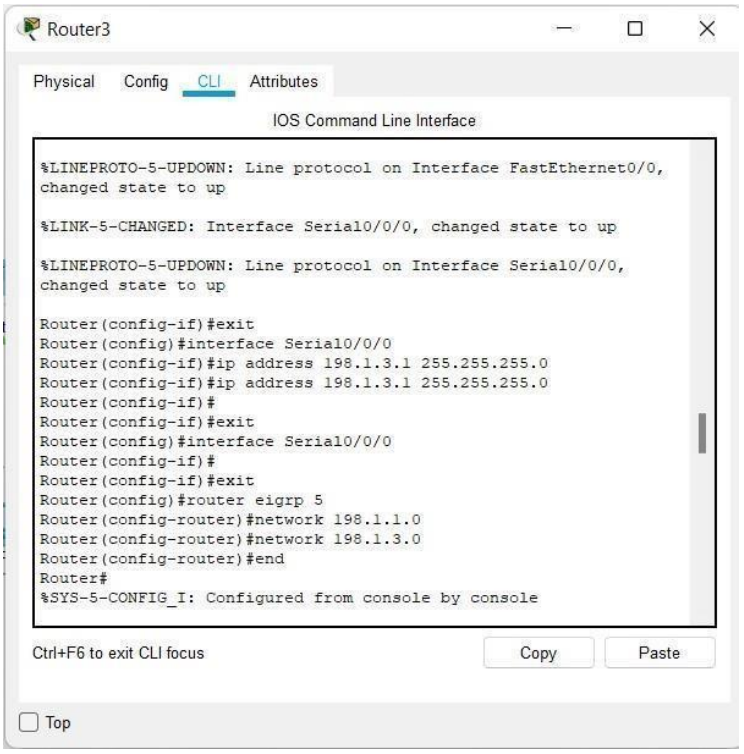
Configuration of Router



4 (Serial 0/3/0):

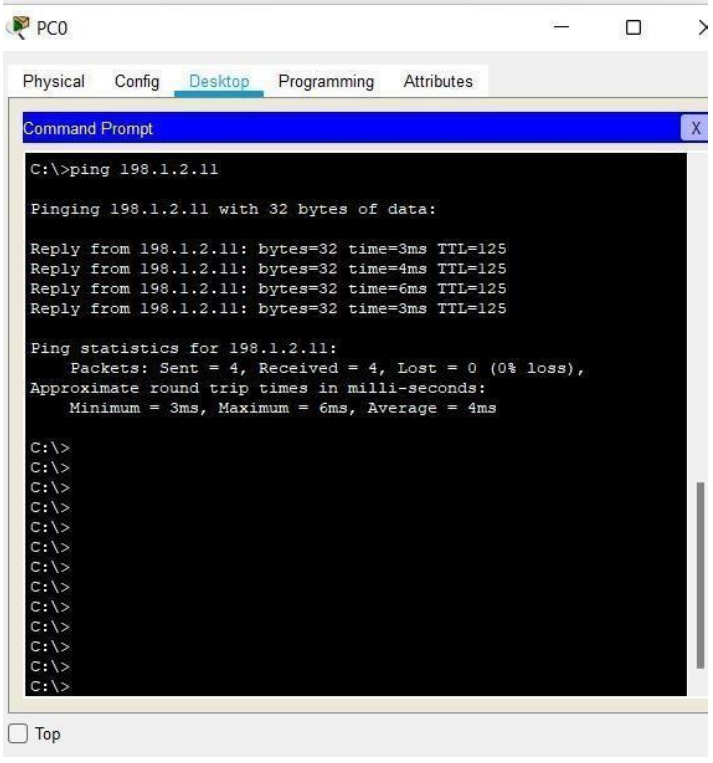


Router3 CLI configuration:

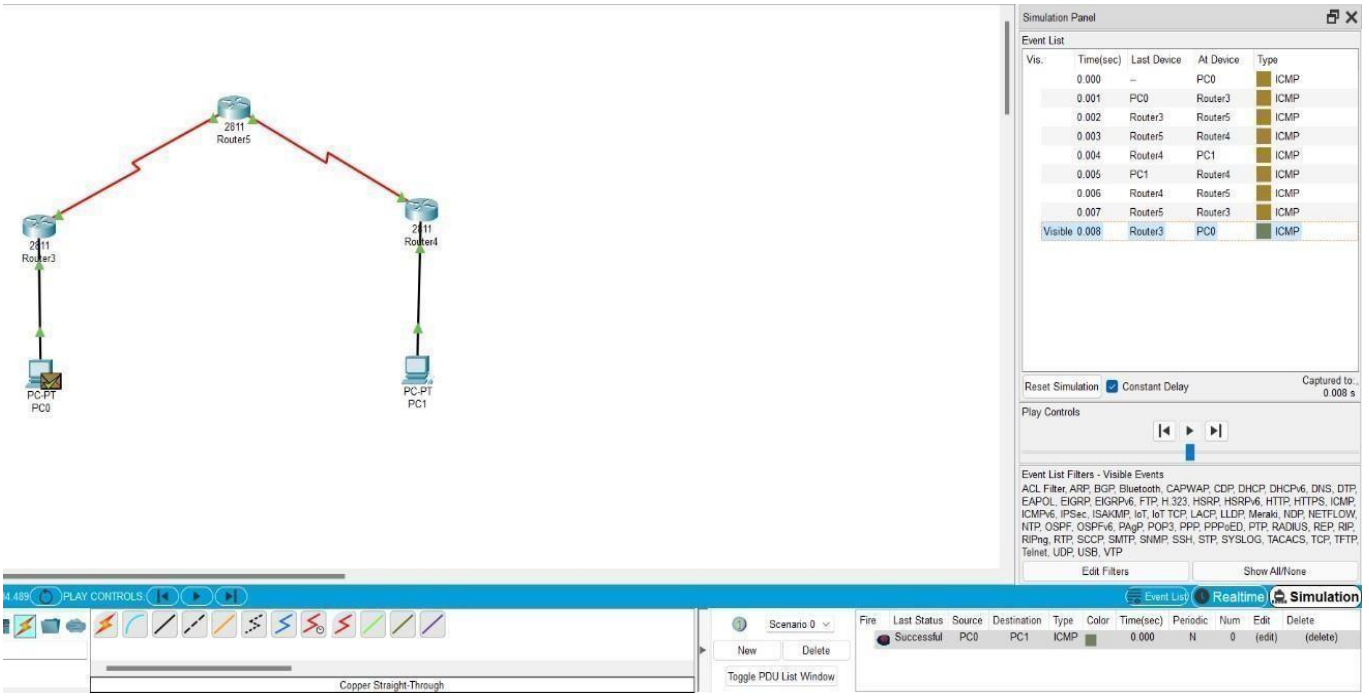


Similarly, the CLI of Router5 & Router4 are configured.

TERMINAL OUTPUT:



Configuration of Router
Sending message from PC0 to PC1:



The tick mark on PC0 shows that message is sent successfully.