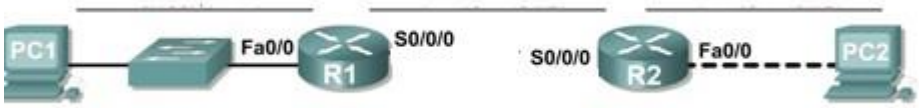
Raj Gorhekar 2018130013 Batch A

CEL 51, DCCN, Monsoon 2020

Lab 6: Subnet and Router Configuration

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	**Fa0/0**	192.168.1.65	255.255.255.192	**N/A**
	S0/0/0	192.168.1.129	255.255.255.192	**N/A**
R2	**Fa0/0**	192.168.1.193	255.255.255.192	**N/A**
	S0/0/0	192.168.1.190	255.255.255.192	**N/A**
PC1	**NIC**	192.168.1.126	255.255.255.192	192.168.1.65
PC2	**NIC**	192.168.1.254	255.255.255.192	192.168.1.193

Learning Objectives

Upon completion of this lab, you will be able to:

- Subnet an address space given requirements.
- Assign appropriate addresses to interfaces and document.
- Configure and activate Serial and FastEthernet interfaces.
- Test and verify configurations.
- Reflect upon and document the network implementation.

Scenario

In this lab activity, you will design and apply an IP addressing scheme for the topology shown in the Topology Diagram. You will be given one address block that you must subnet to provide a logical addressing scheme for the network. The routers will then be ready for interface address configuration according to your IP addressing scheme. When the configuration is complete, verify that the network is working properly.

Task 1: Subnet the Address Space.

Step 1: Examine the network requirements.

You have been given the 192.168.1.0/24 address space to use in your network design. The network consists of the following segments:

- The network connected to router R1 will require enough IP addresses to support 15 hosts.
- The network connected to router R2 will require enough IP addresses to support 30 hosts.
- The link between router R1 and router R2 will require IP addresses at each end of the link.

Step 2: Consider the following questions when creating your network design.

How many subnets are needed for this network?

Ans: Three subnets mentioned as follows :

First subnet is the network connected to router R1, second subnet is the link between routers R1 and R2 and the third subnet is the network connected to router R2 .

What is the subnet mask for this network in

dotted decimal format?

Ans: We need 3 subnets for this network which can be represented by 2 bits

So, the subnet mask becomes: **11111111.11111111.11111111.11000000000**

i.e. **255.255.255.192**

What is the subnet mask for the network in slash format?

Ans: The subnet mask for the network in slash format is the number of ones in the subnet mask written in dot separated format

Hence, subnet mask for the network in slash format is **/26**

How many usable hosts are there per subnet?

Ans: In IPv4, there are two IPs that cannot be assigned to any devices. These are the **Network ID** and the **Broadcast IP address**. Therefore, you need to subtract two addresses from the total IP formula.

$2^6 - 2 =$ **62** usable hosts per subnet.

Step 3: Assign sub-network addresses to the Topology Diagram.

1. Assign subnet 1 to the network attached to R1.

   Subnet 1: 11000000.10101000.00000001.01000000 = 192.168.1.64

   Network ID: 11000000.10101000.00000001.01000000 = 192.168.1.64/26

   1st usable IP: 11000000.10101000.00000001.01000001 = 192.168.1.65/26

   Last usable IP: 11000000.10101000.00000001.01111110 = 192.168.1.126/26

   Broadcast IP: 11000000.10101000.00000001.01111111 = 192.168.1.127/26

2. Assign subnet 2 to the link between R1 and R2.

   Subnet 2: 11000000.10101000.00000001.10000000 = 192.168.1.128

   Network ID: 11000000.10101000.00000001.10000000 = 192.168.1.128/26

   1st usable IP: 11000000.10101000.00000001.10000001 = 192.168.1.129/26

   Last usable IP: 11000000.10101000.00000001.10111110 = 192.168.1.190/26

   Broadcast IP: 11000000.10101000.00000001.10111111 = 192.168.1.191/26

3. Assign subnet 3 to the network attached to R2.

   Subnet 3: 11000000.101010000.00000001.1100000 = 192.168.1.192

   Network ID: 11000000.10101000.00000001.11000000 = 192.168.1.192/26

   1st usable IP: 11000000.10101000.00000001.11000001 = 192.168.1.193/26

   Last usable IP: 11000000.10101000.00000001.11111110 = 192.168.1.254/26

   Broadcast IP: 11000000.10101000.00000001.11111111 = 192.168.1.255/26

Task 2: Determine Interface Addresses.

Step 1: Assign appropriate addresses to the device interfaces.

1. Assign the first valid host address in subnet 1 to the LAN interface on R1. Ans: 192.168.1.65
2. Assign the last valid host address in subnet 1 to PC1. Ans: 192.168.1.126
3. Assign the first valid host address in subnet 2 to the WAN interface on R1. Ans: 192.168.1.129

4. Assign the last valid host address in subnet 2 to the WAN interface on R2. Ans: 192.168.1.190

5. Assign the first valid host address in subnet 3 to the LAN interface of R2. Ans: 192.168.1.193
6. Assign the last valid host address in subnet 3 to PC2. Ans: 192.168.1.254

Step 2: Document the addresses to be used in the table provide under the Topology

Task 3: Configure the Serial and FastEthernet Addresses.

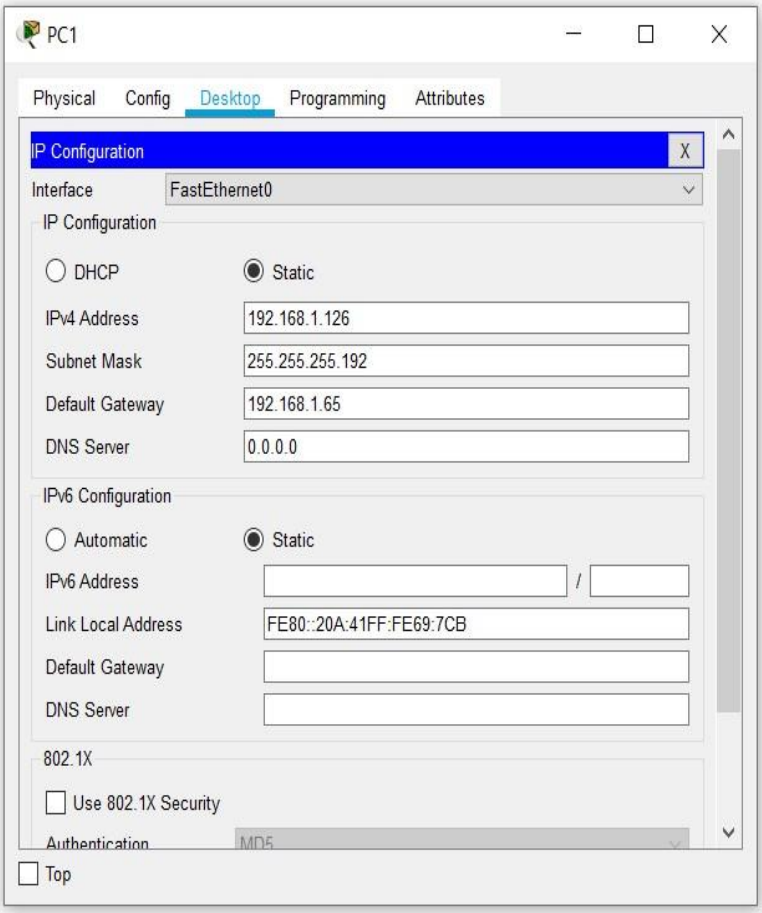
Step 1: Configure the router interfaces.

Configure the interfaces on the R1 and R2 routers with the IP addresses from your network design. Please note, to complete the activity in Packet Tracer you will be using the Config Tab. When you have finished, be sure to save the running configuration to the NVRAM of the router.

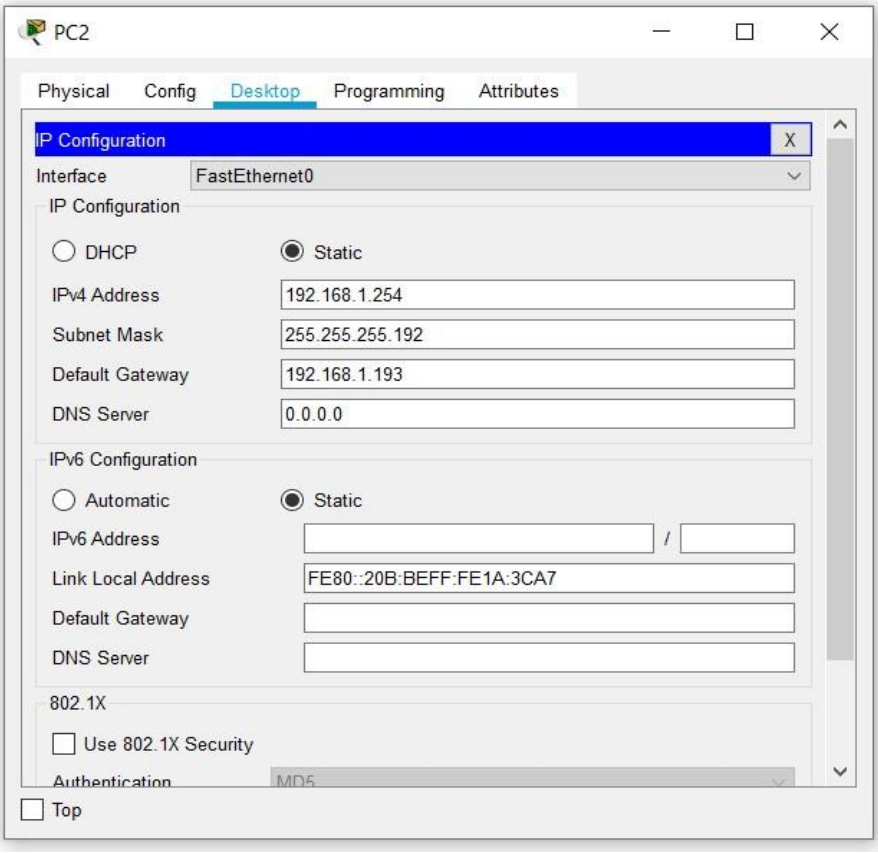
Step 2: Configure the PC interfaces.

Configure the Ethernet interfaces of PC1 and PC2 with the IP addresses and default gateways from your network design.

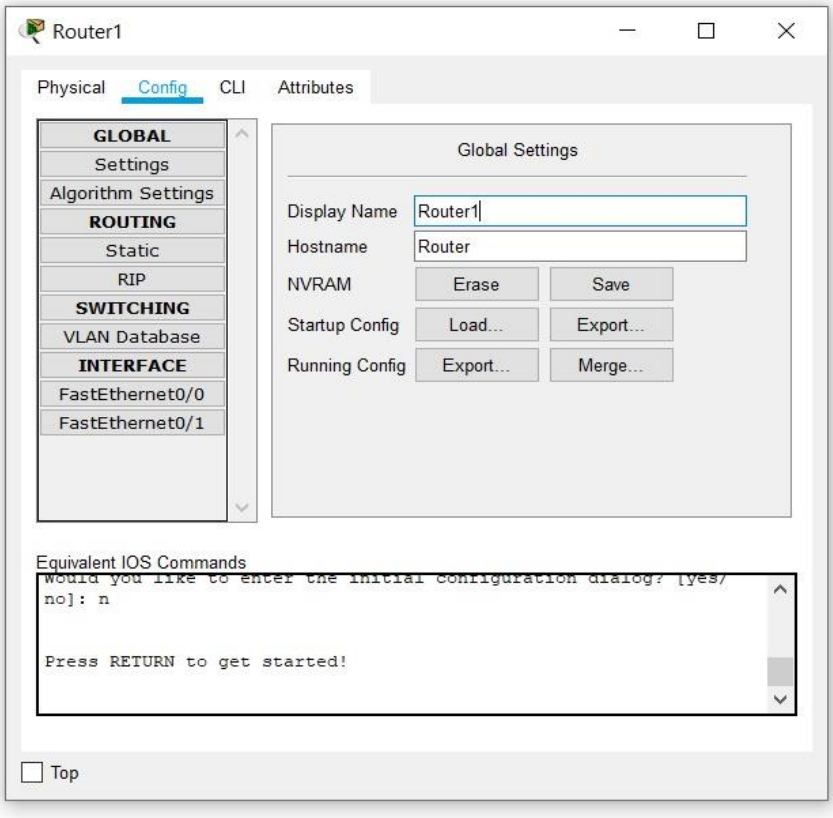
Configuration of PC1

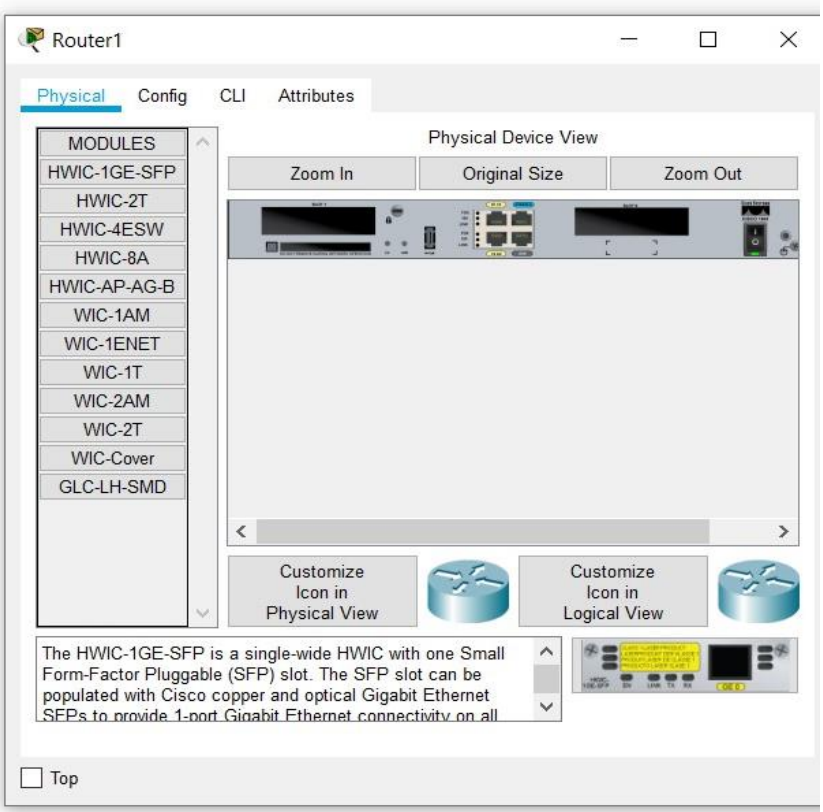


Configuration of PC2

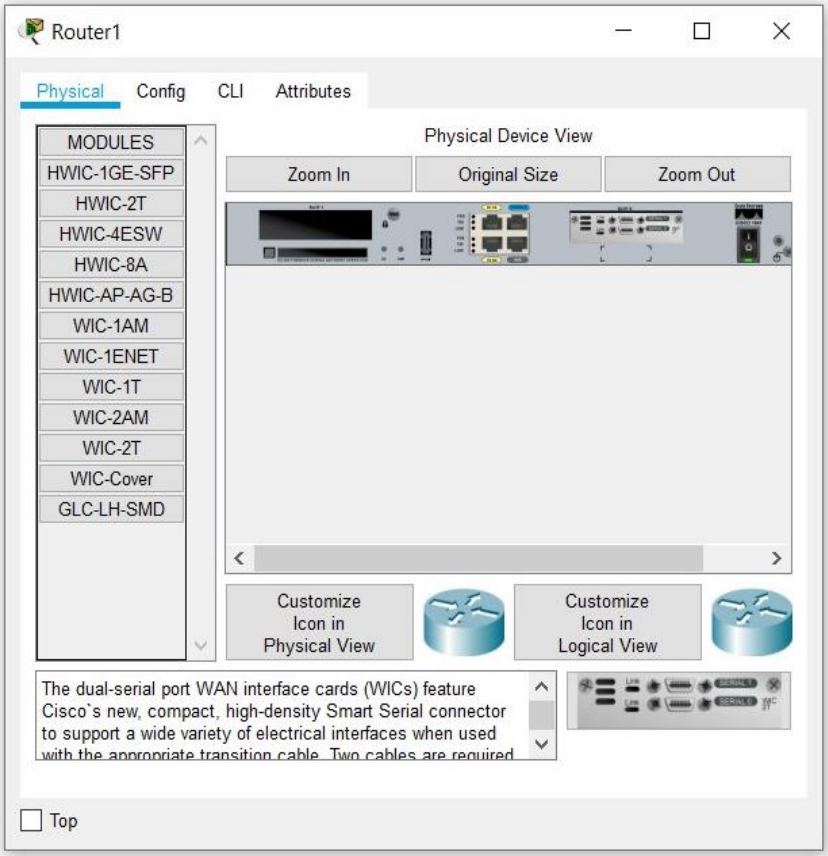


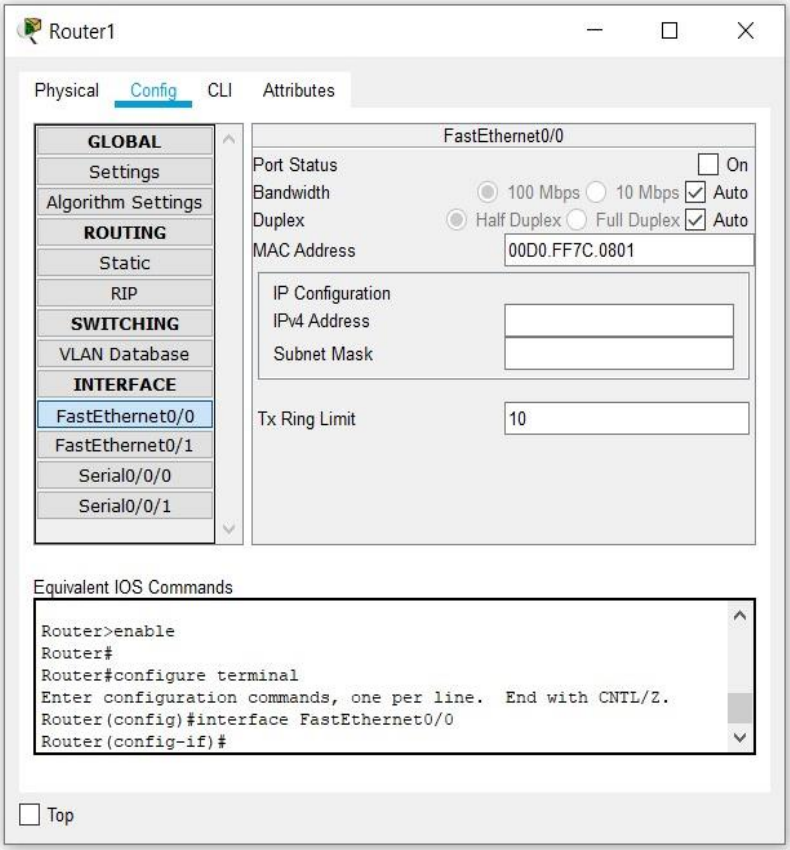
Configuration of Router 1



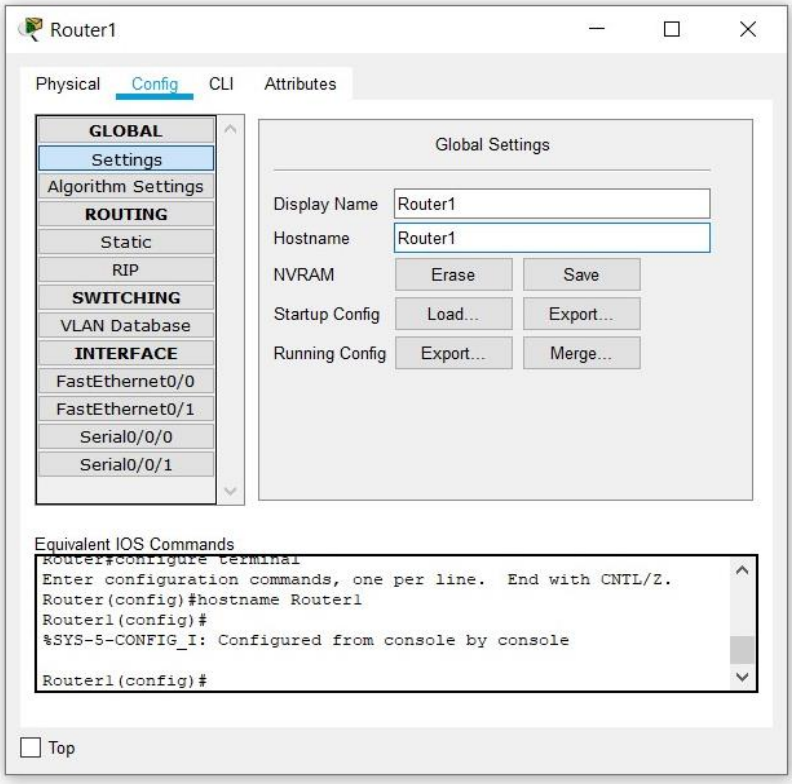


Adding WIC-2T card for serial port

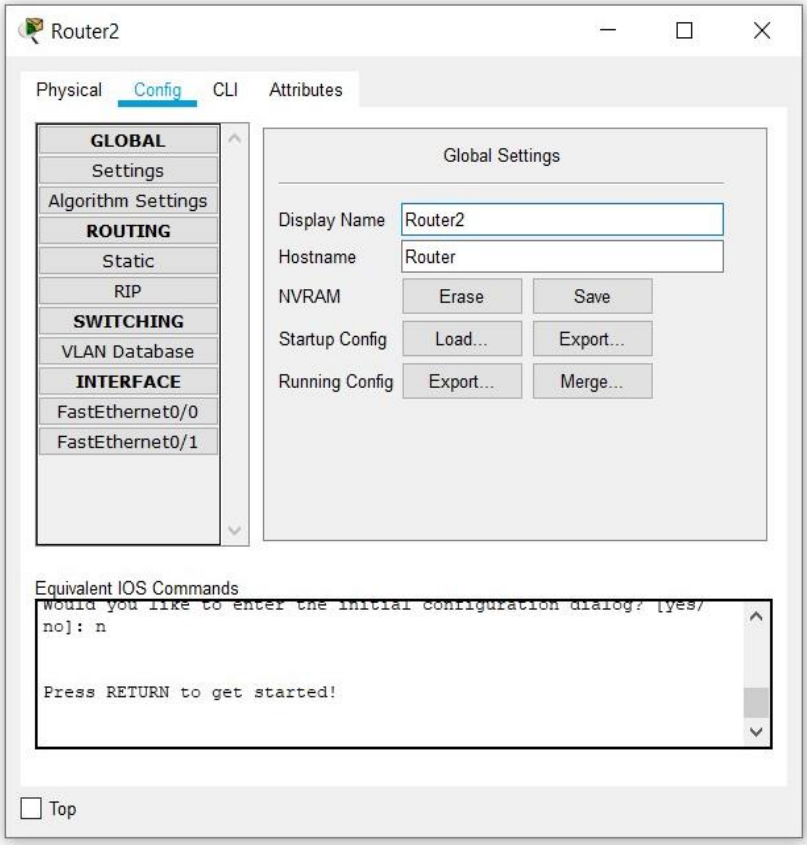


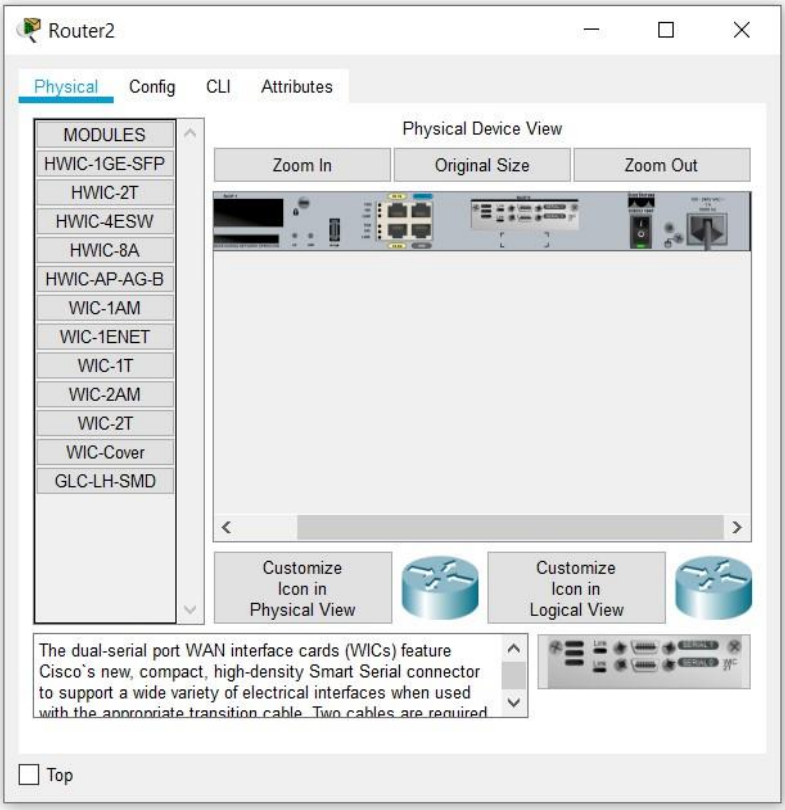


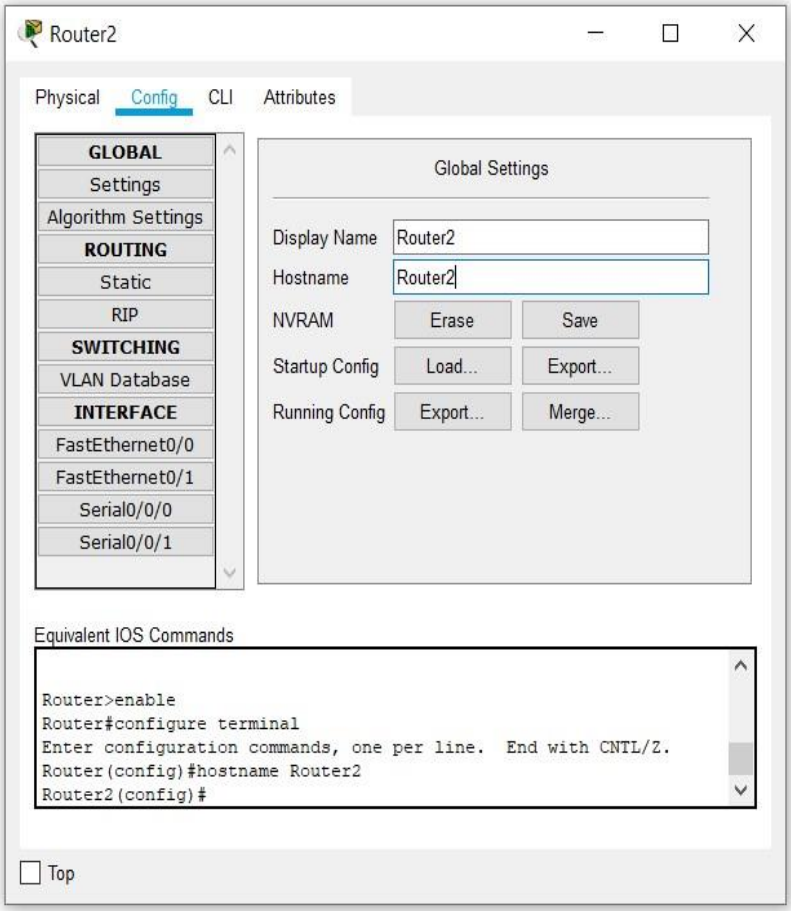
Changing hostname to Router1



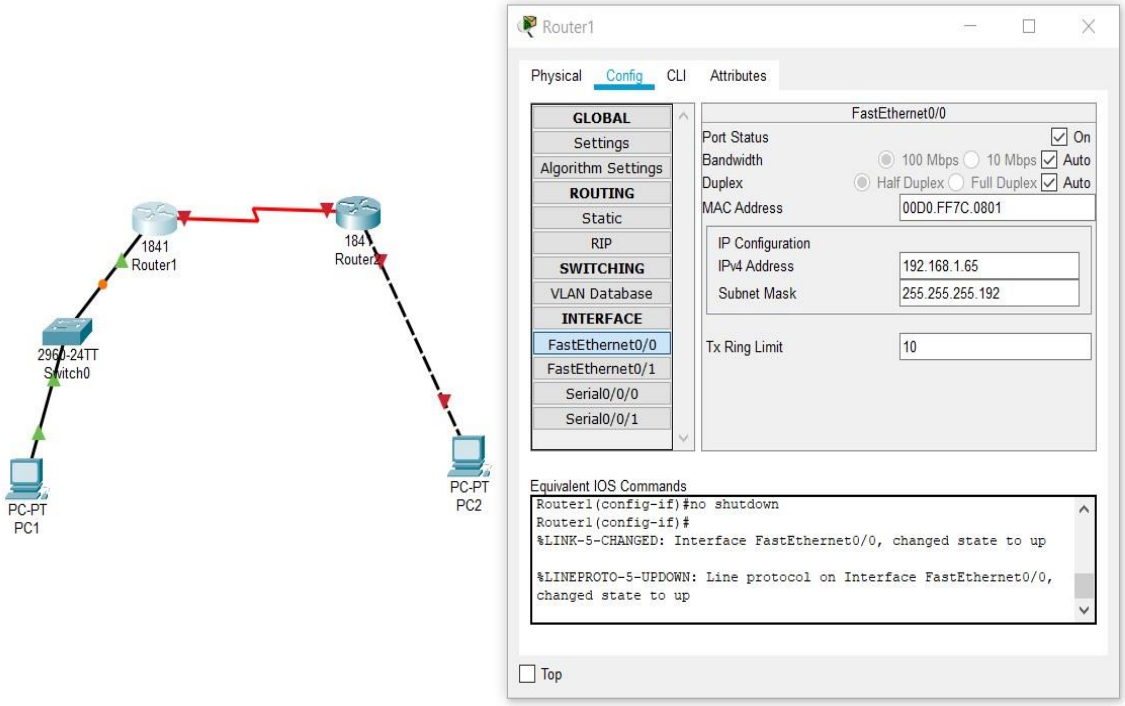
Configuration of Router 2

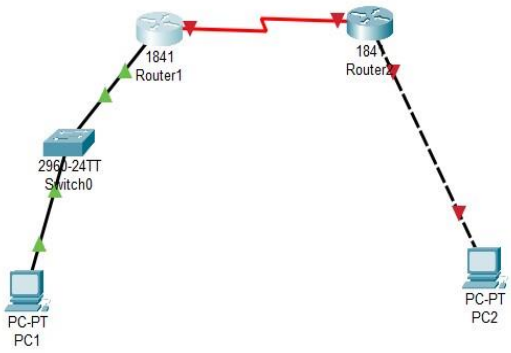


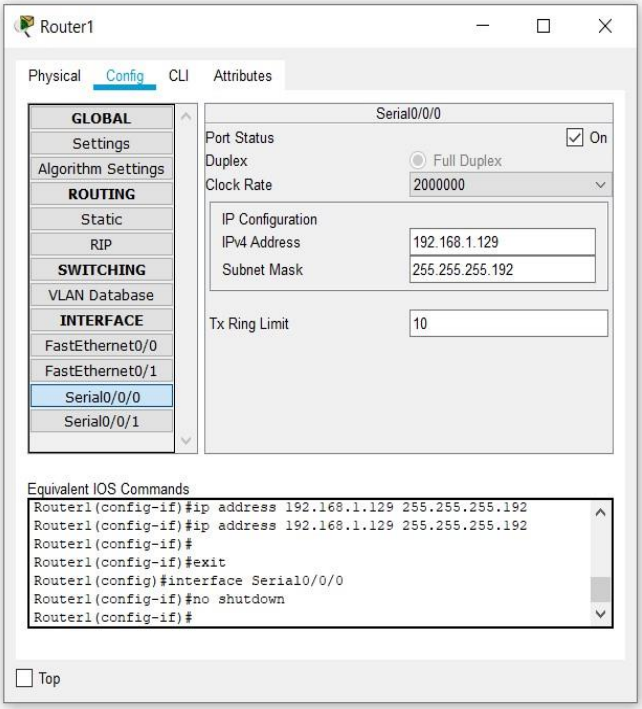




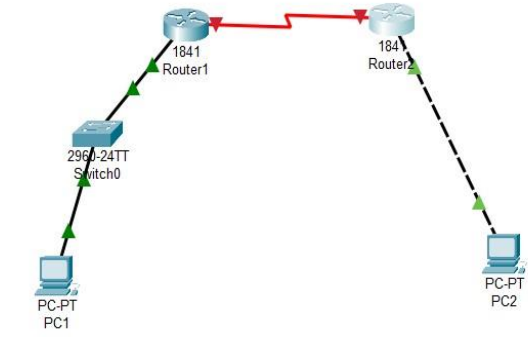
Assigning IP addresses to Router 1

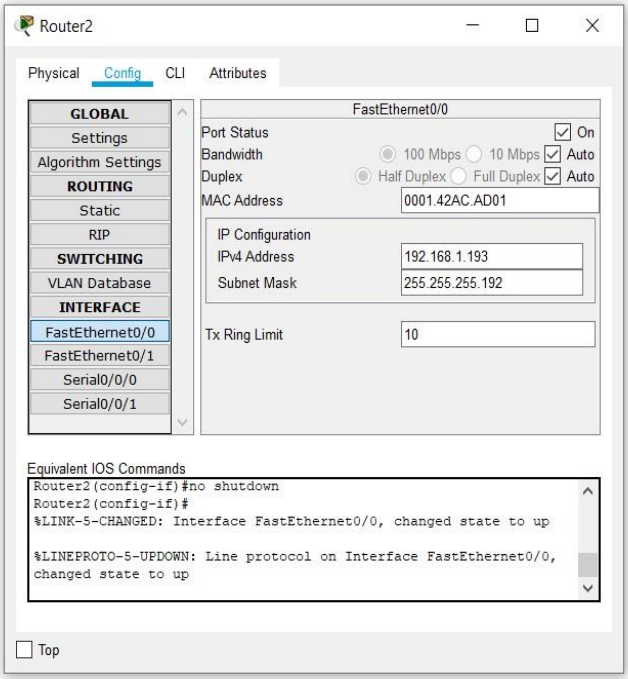


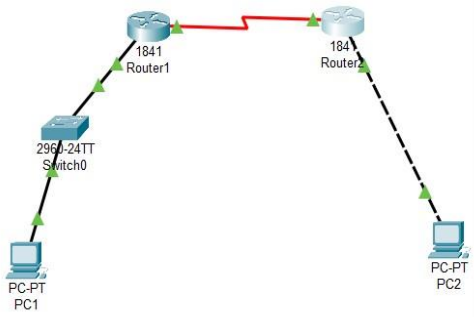


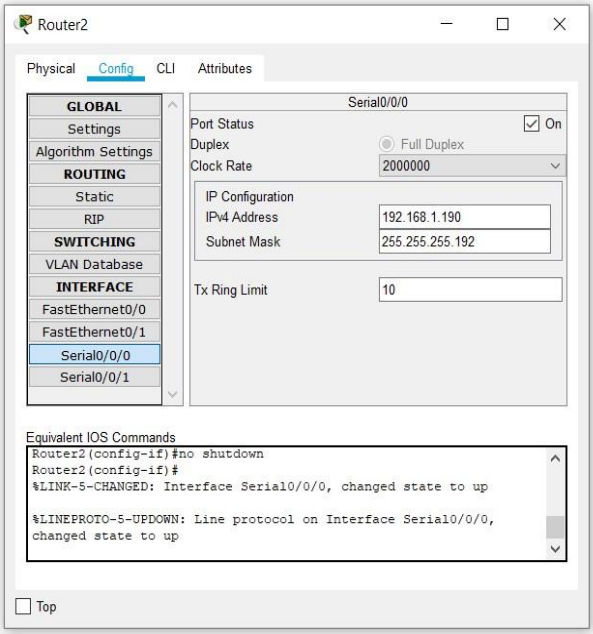


Assigning IP addresses to Router 2

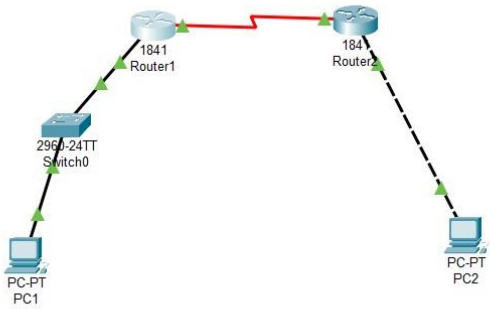


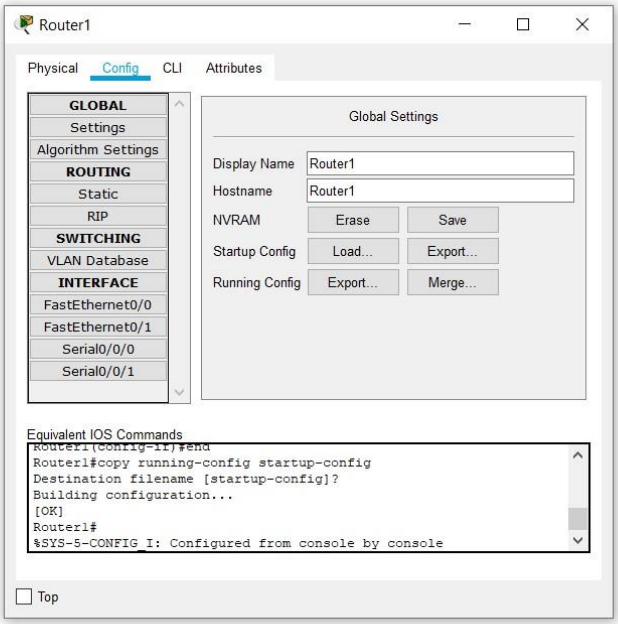




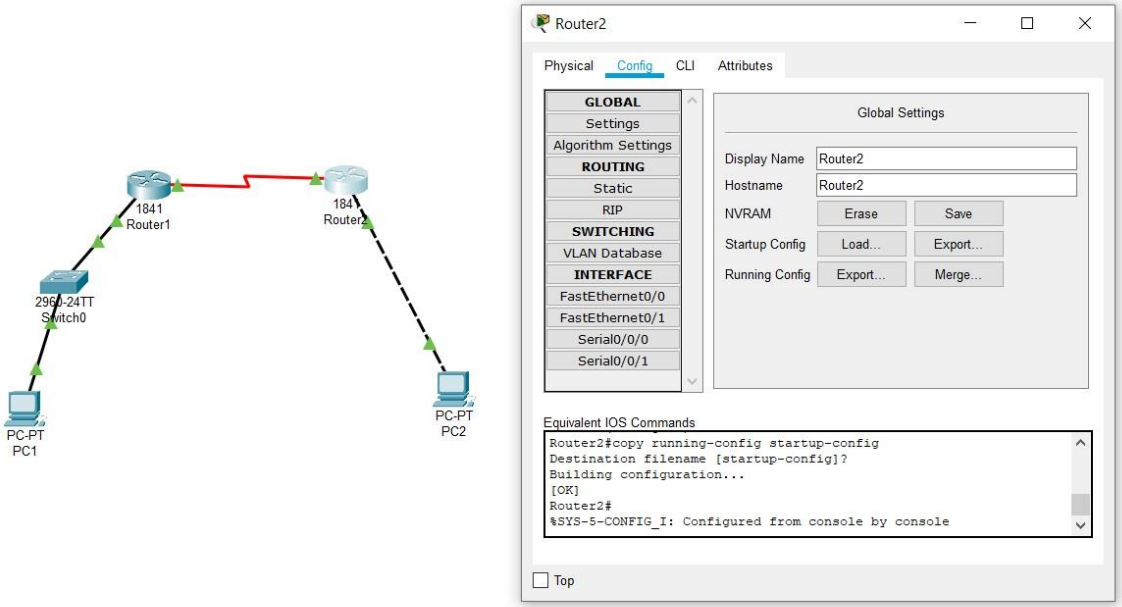


Saving the running configuration to NVRAM of Router 1

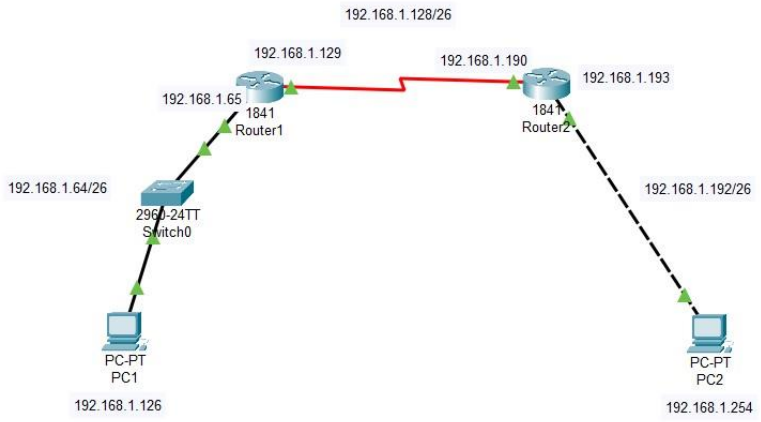




Saving the running configuration to NVRAM of Router 2



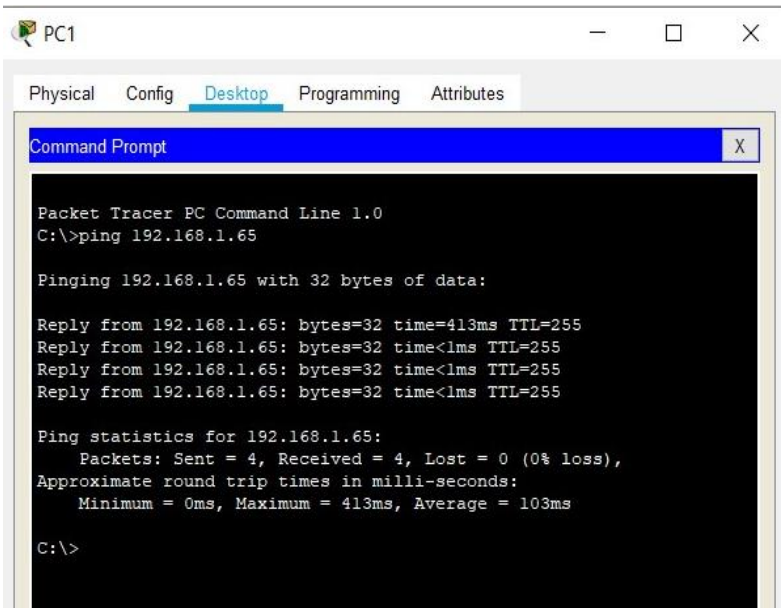
Complete Network



Task 4: Verify the Configurations.

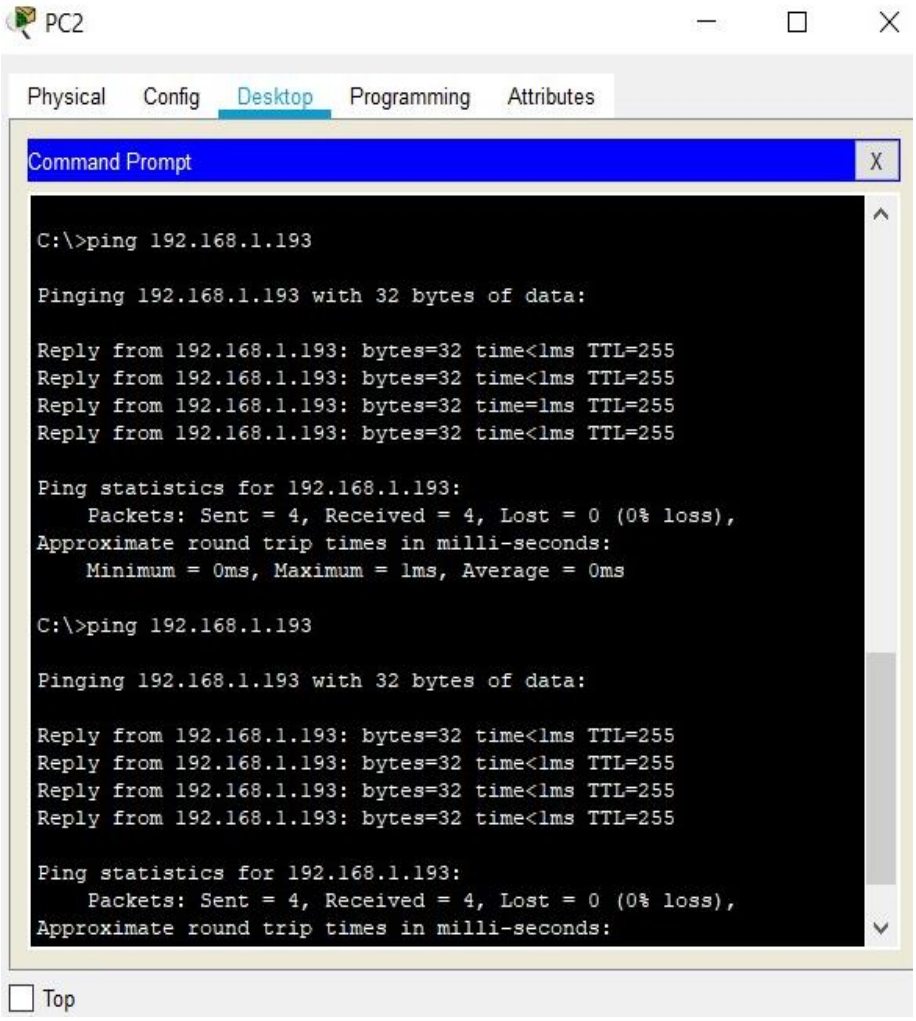
Answer the following questions to verify that the network is operating as expected.

1. From the host attached to R1, is it possible to ping the default gateway? Ans: Yes



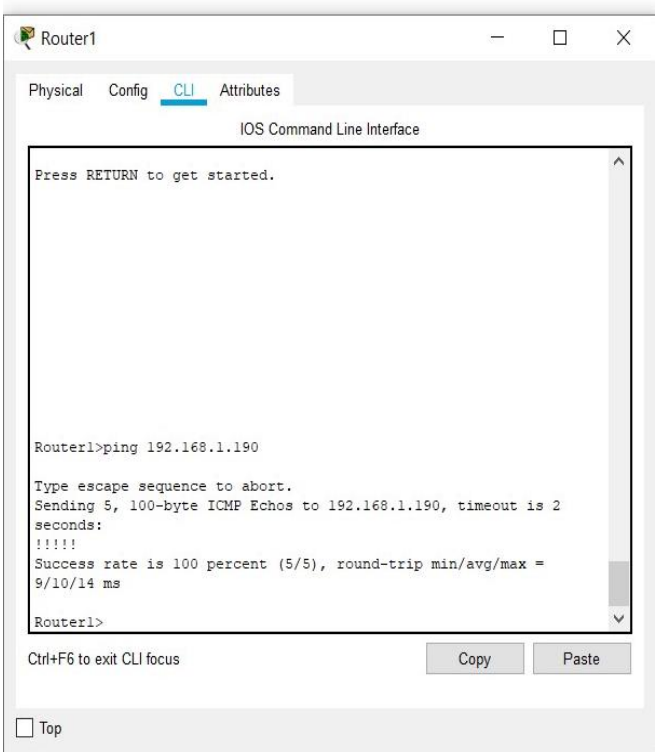
2. From the host attached to R2, is it possible to ping the default gateway?

   Ans: Yes

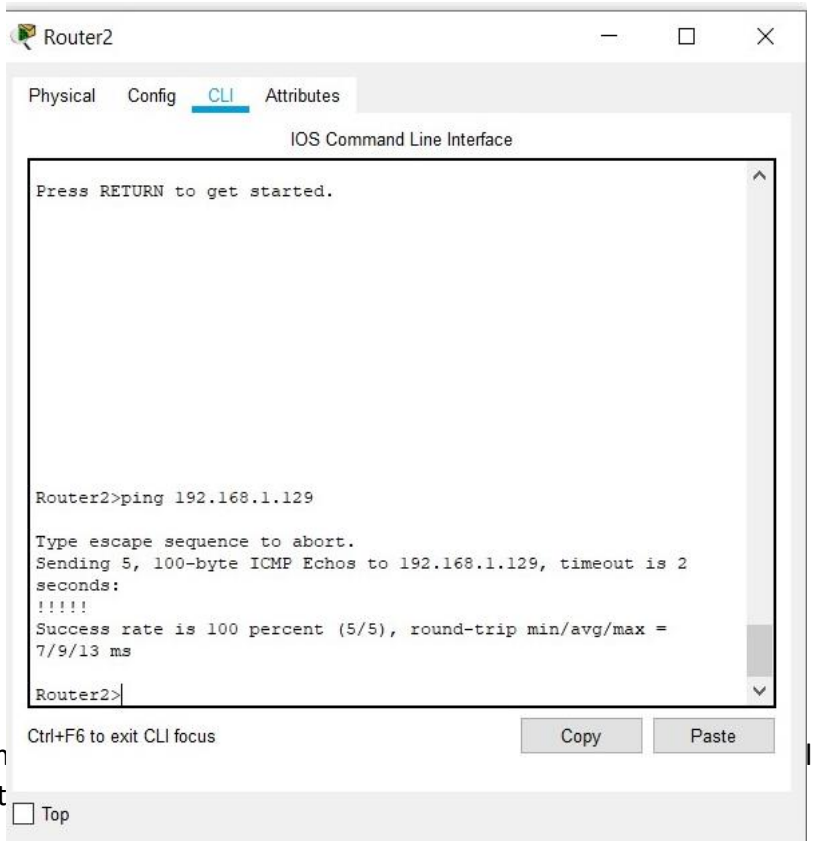


3. From the router R1, is it possible to ping the Serial 0/0/0 interface of R2?

   Ans: Yes



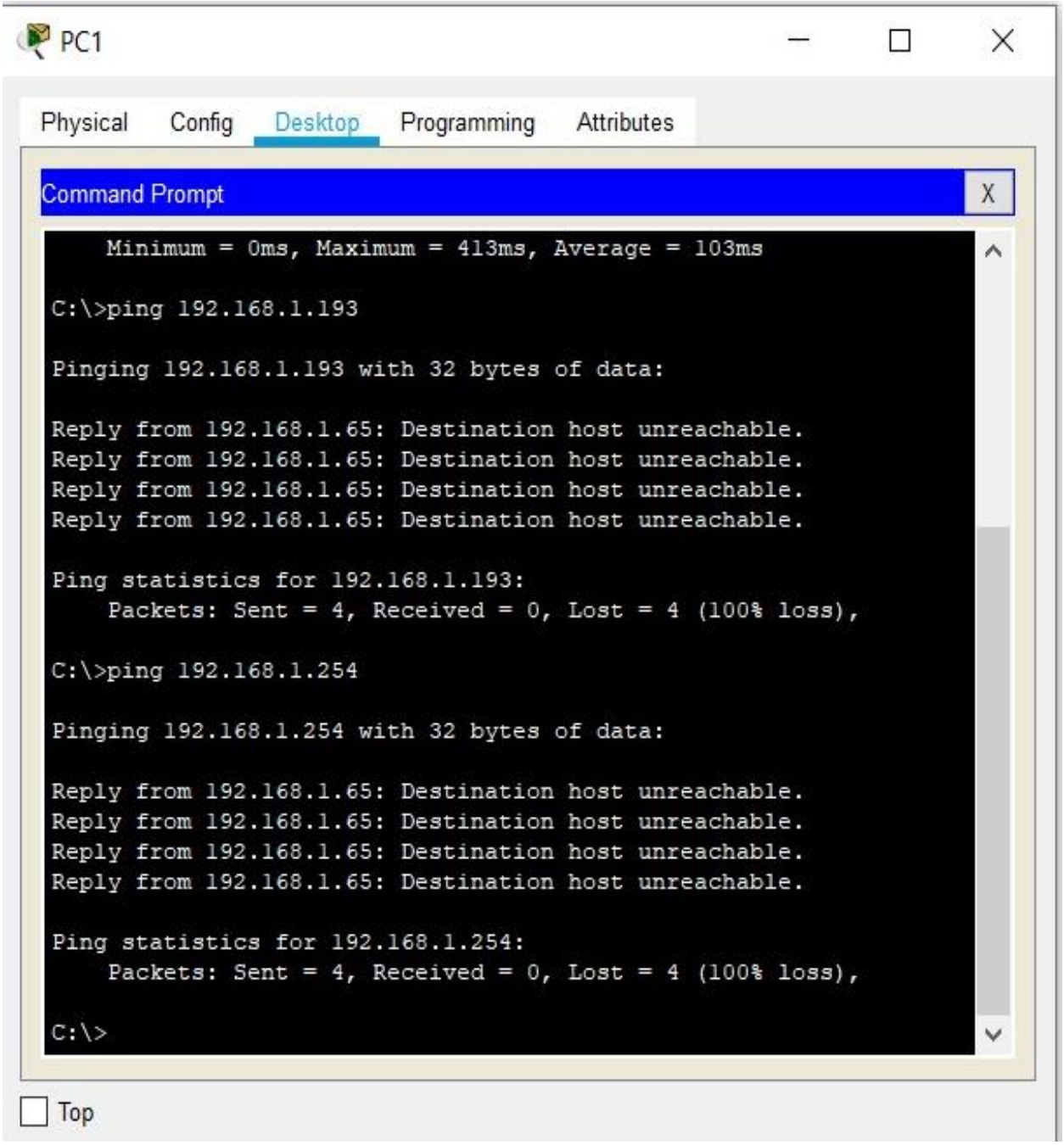
4. From the router R2, is it possible to ping the Serial 0/0/0 interface of R1? Ans: Yes



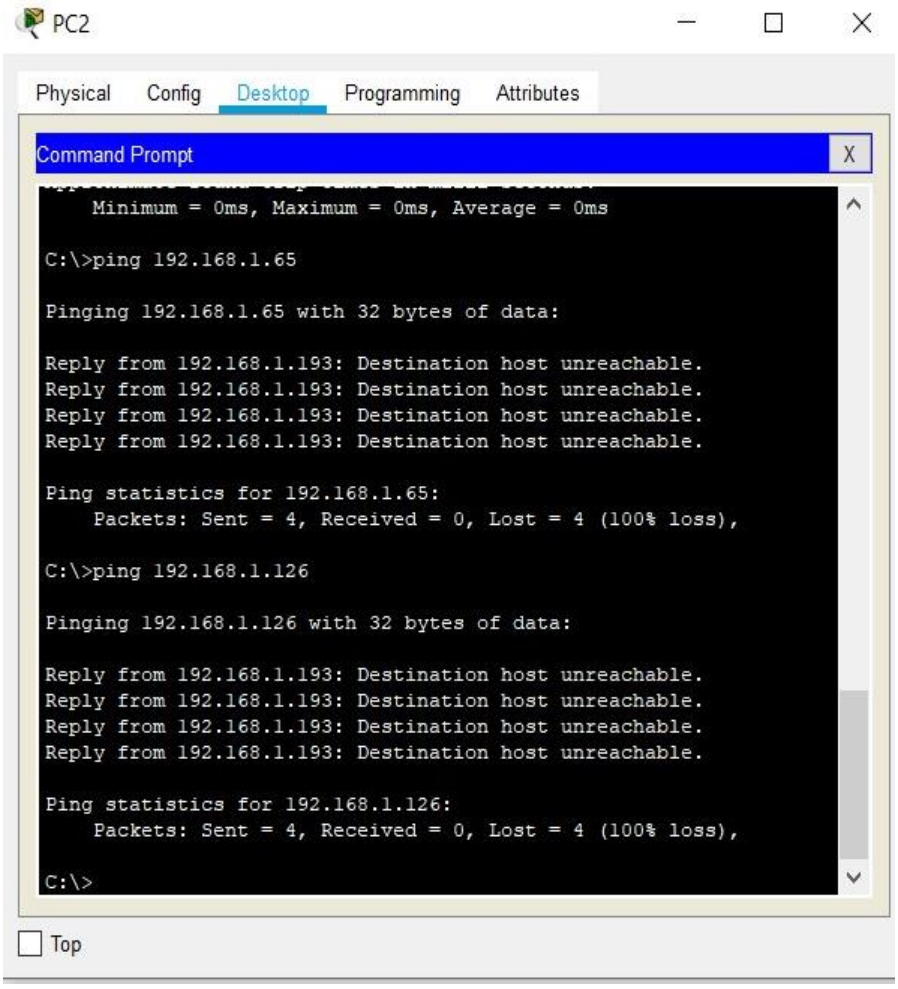
The answer to th led, check your physical connect

Task 5: Reflection

1. Are there any devices on the network that cannot ping each other? Ans: PC1 cannot ping FastEthernet port of Router2 and PC2



PC2 cannot ping FastEthernet port of Router1 and PC1



What is missing from the network that is preventing communication between these devices?

AS static or dynamic routing is not present. Therefore, over here we cannot ping devices on another subnet.

Conclusion:

1. In this experiment, I learned about subnetting a given address space and assigning subnets to various networks according to their mentioned need.