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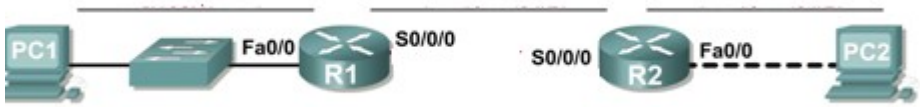
CEL 51, DCCN, Monsoon 2020
Lab 6: Subnet and Router Configuration

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	192.168.1.1	255.255.255.192	N/A
	S0/0/0	192.168.1.65	255.255.255.192	N/A
R2	Fa0/0	192.168.1.129	255.255.255.192	N/A
	S0/0/0	192.168.1.126	255.255.255.192	N/A
PC1	NIC	192.168.1.62	255.255.255.192	192.168.1.1
PC2	NIC	192.168.1.190	255.255.255.192	192.168.1.129

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: 3

It is because 3 networks are formed

1. **Network connected to R1**
2. **Network connected to R2**
3. **Link between R1 and R2.**

What is the subnet mask for this network in dotted decimal format?

I have fixed fixed 1st two bits of last octet.

So 2**2 i.e. 4 subnets possible and we need 3.

And each subnet can have 2**6 i.e. 64 hosts.

So, subnet mask is

Binary : 11111111.11111111.11111111.11000000

Dotted Decimal Format : 255.255.255.192

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

Subnet mask in slash format : 255.255.255.192/26

Because 24+2=26 bits are fixed for network id.

How many usable hosts are there per subnet?

Each subnet contains 26 i.e. 64 hosts**

In which first and last address is not usable because they represent network and broadcast address.

26 – 2=64-2=62 hosts.**

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

1. Assign subnet 1 to the network attached to R1. - **192.168.1.0/26**
2. Assign subnet 2 to the link between R1 and R2. – **192.168.1.64/26**
3. Assign subnet 3 to the network attached to R2. – **192.168.1.128/26**

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. – **192.168.1.1**
2. Assign the last valid host address in subnet 1 to PC1. – **192.168.1.62**
3. Assign the first valid host address in subnet 2 to the WAN interface on R1. – **192.168.1.65**
4. Assign the last valid host address in subnet 2 to the WAN interface on R2. – **192.168.1.126**
5. Assign the first valid host address in subnet 3 to the LAN interface of R2. – **192.168.1.129**

6. Assign the last valid host address in subnet 3 to PC2. – **192.168.1.190**

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

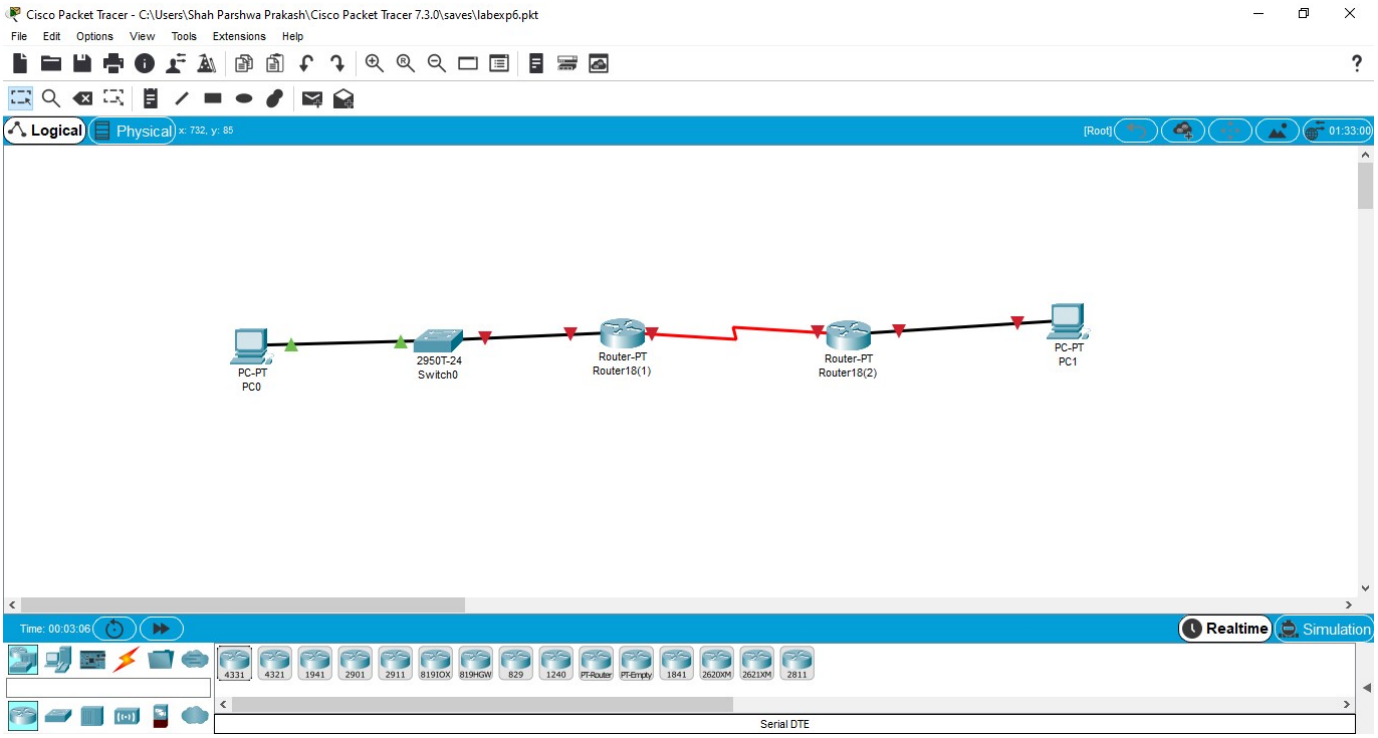
Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	192.168.1.1	255.255.255.192	N/A
	S0/0/0	192.168.1.65	255.255.255.192	N/A
R2	Fa0/0	192.168.1.129	255.255.255.192	N/A
	S0/0/0	192.168.1.126	255.255.255.192	N/A
PC1	NIC	192.168.1.62	255.255.255.192	192.168.1.1
PC2	NIC	192.168.1.190	255.255.255.192	192.168.1.129

Task 3: Configure the Serial and FastEthernet Addresses.

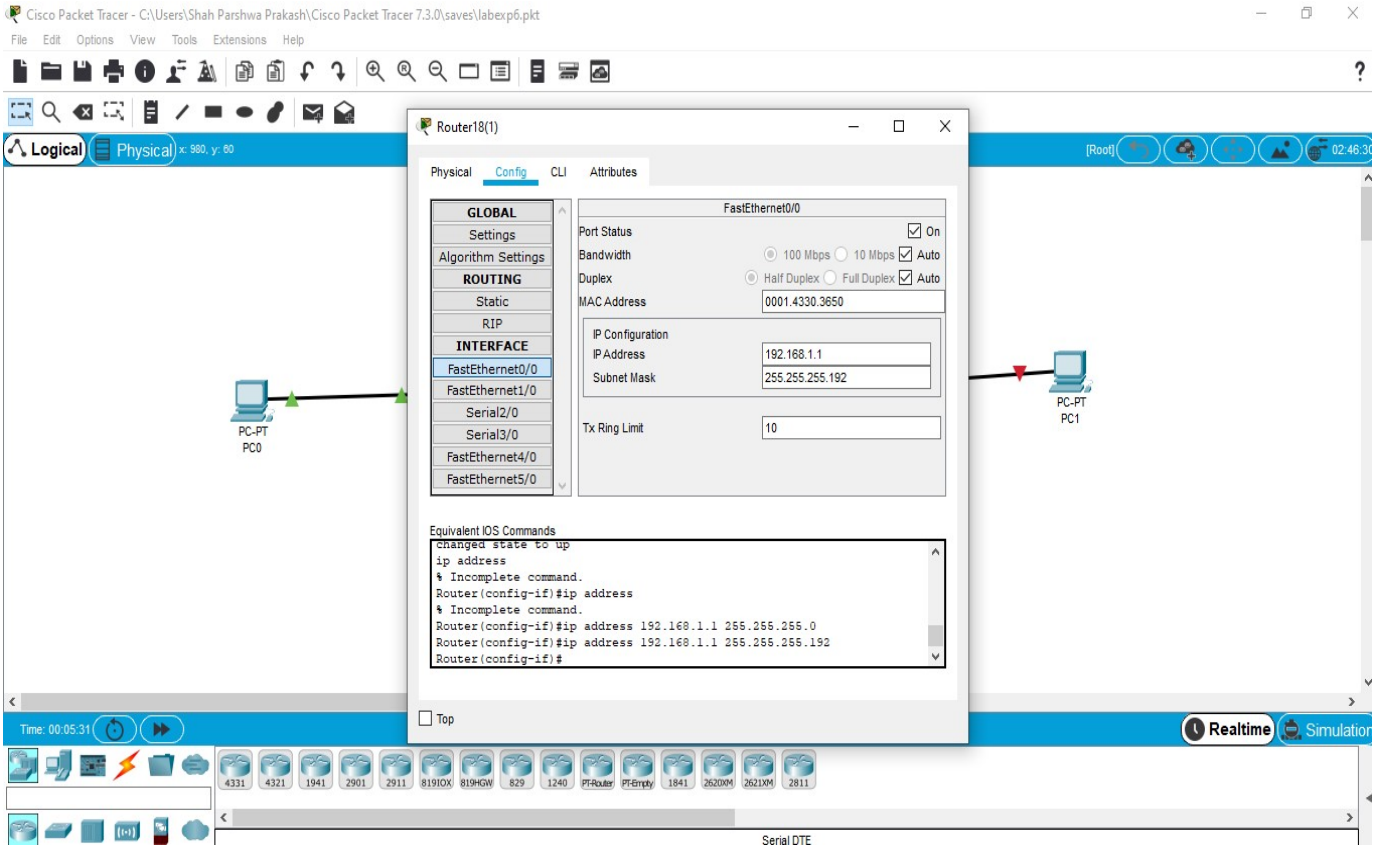
Step 1: Configure the router interfaces.

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.

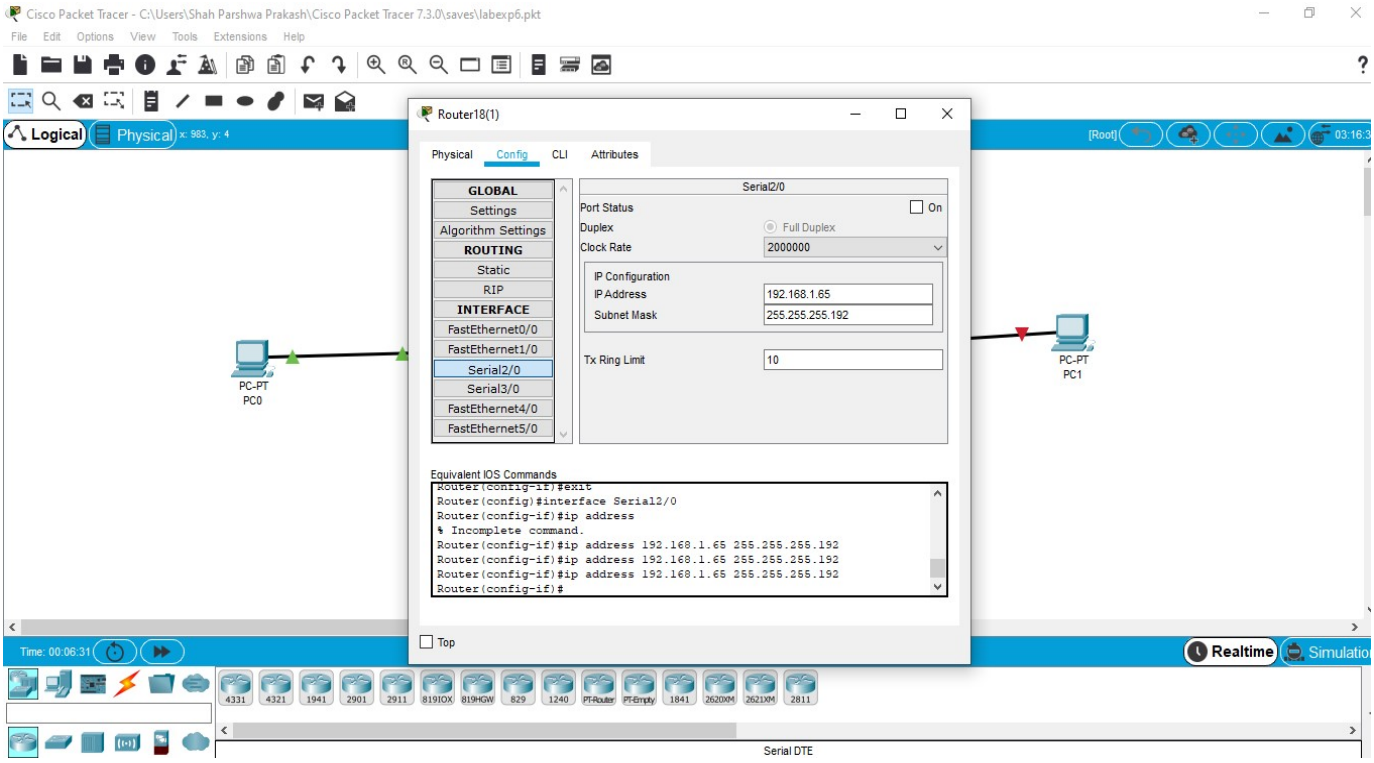
1)Initial network



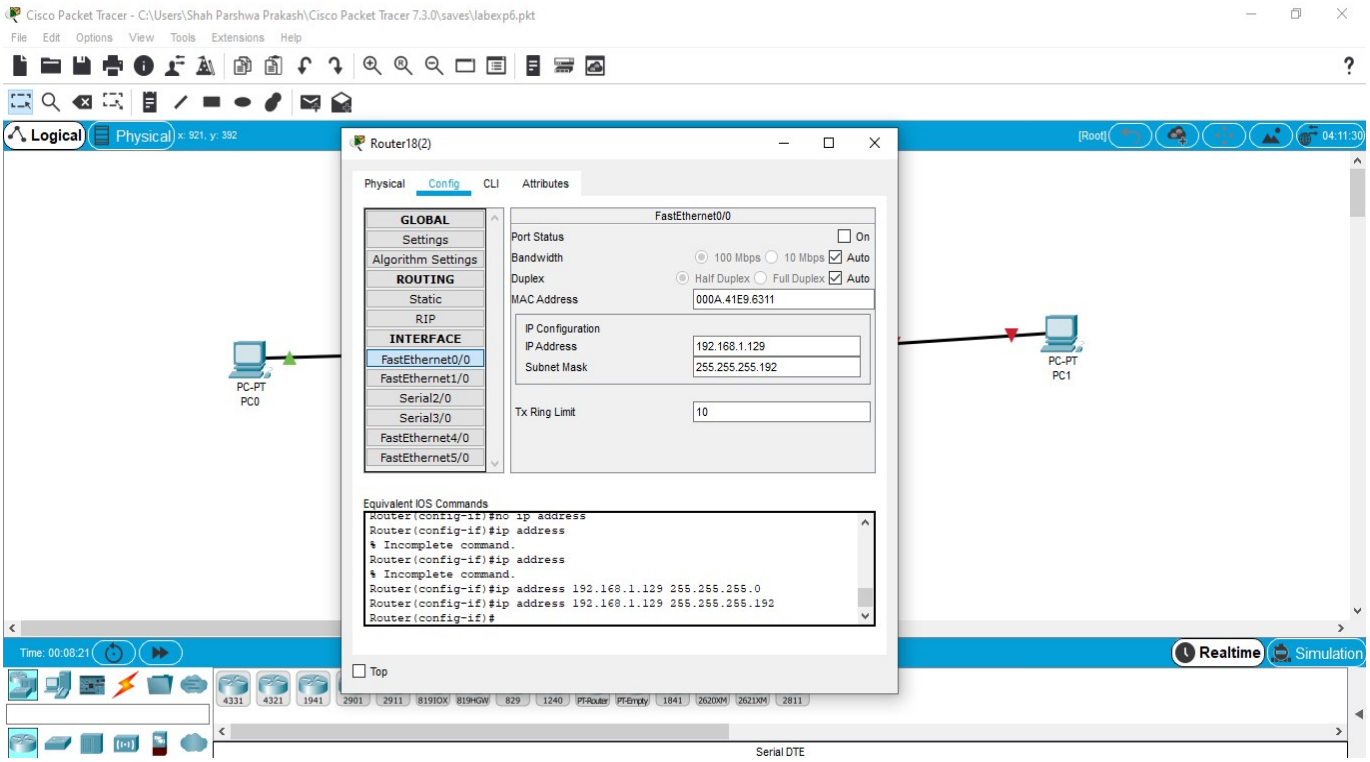
2) Configure IP Address and Subnet Mask of Fa0/0 interface of R1.



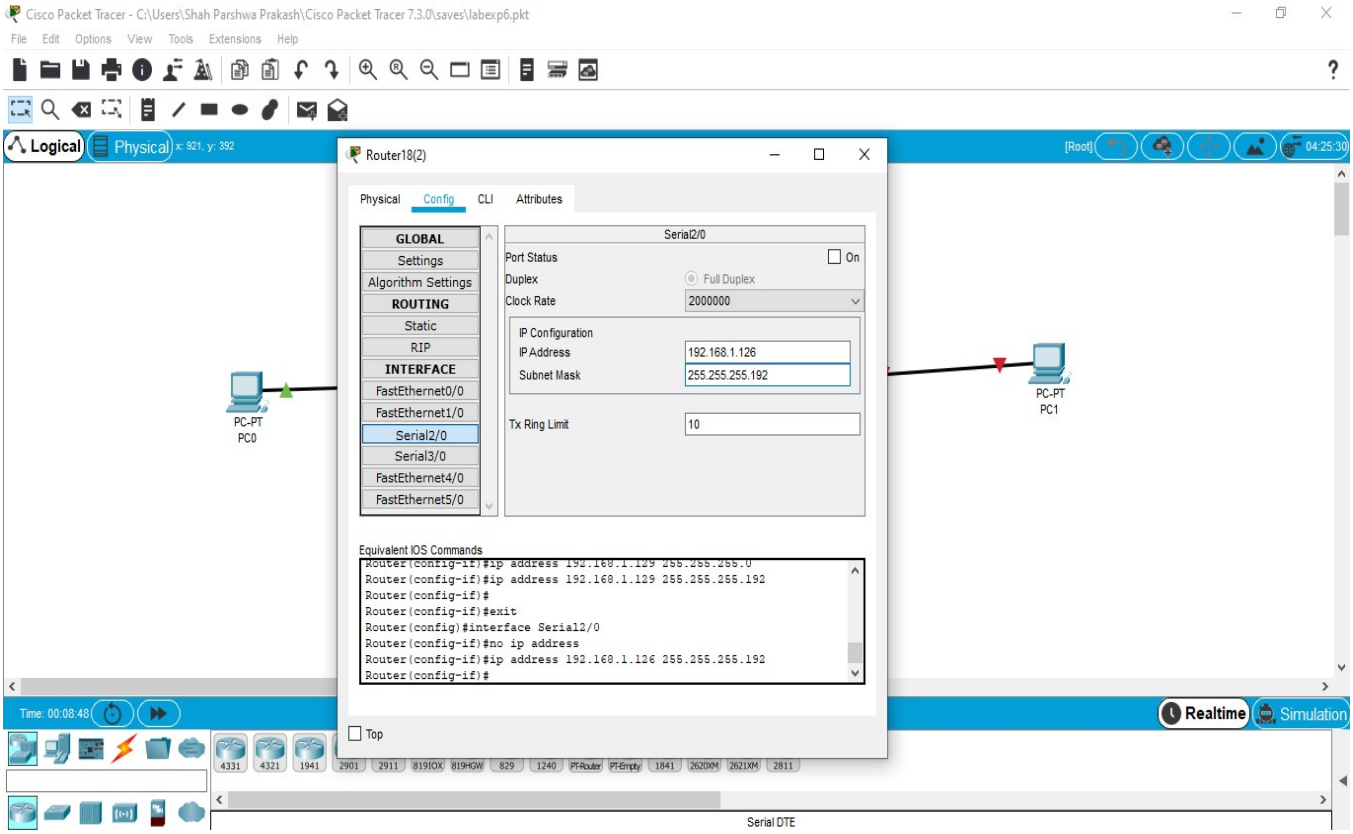
3) Configure IP Address and Subnet Mask of S0/0/0 interface of R1.



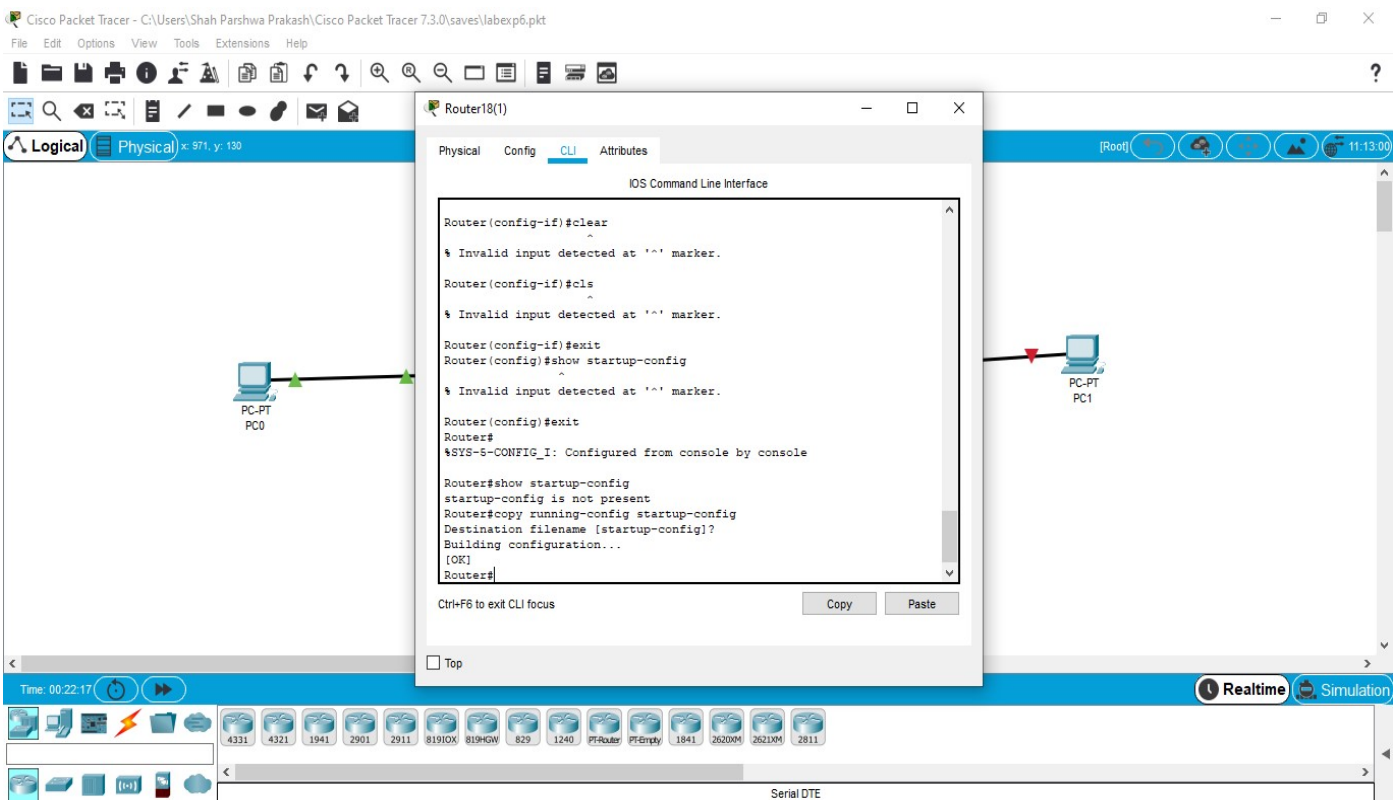
4) Configure IP Address and Subnet Mask of Fa0/0 interface of R2

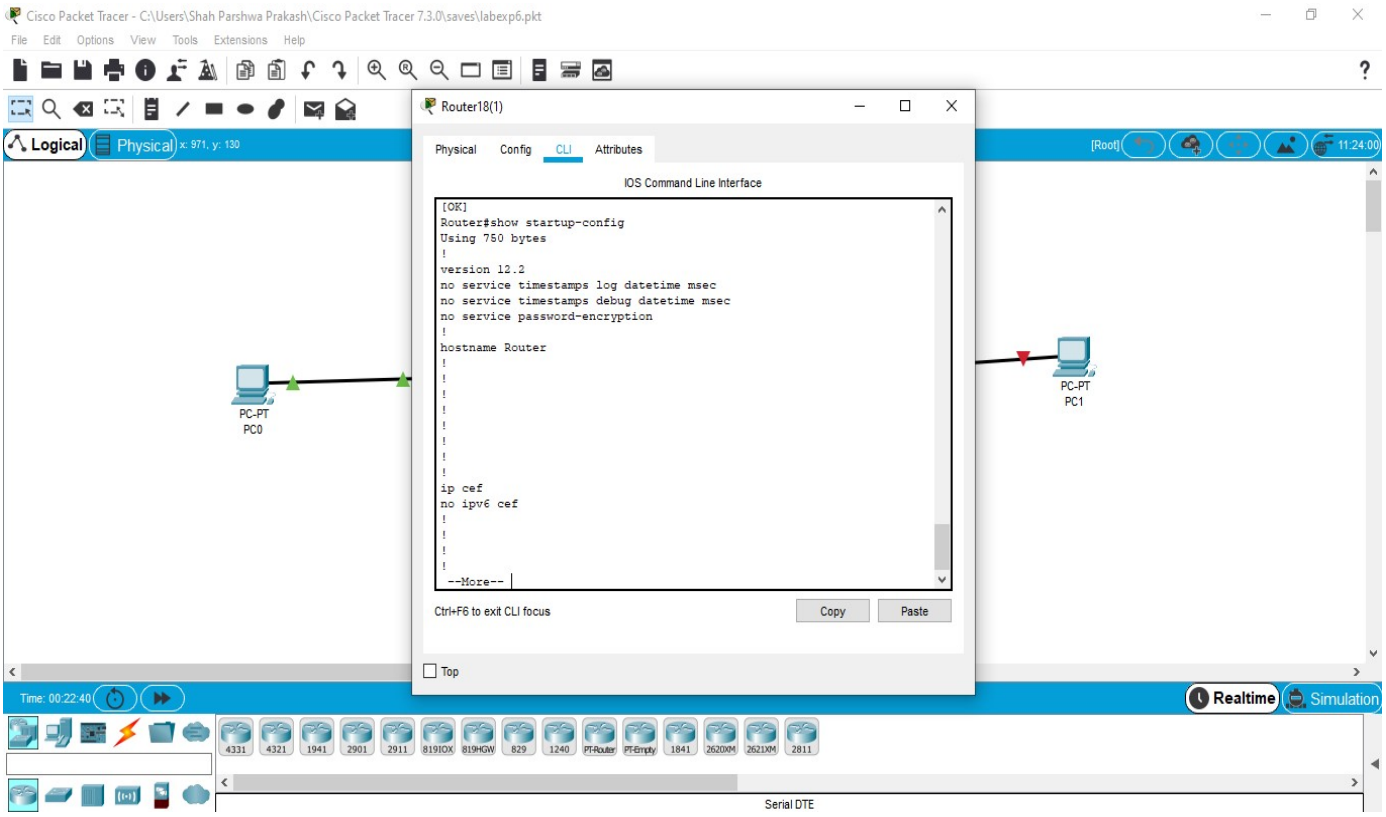


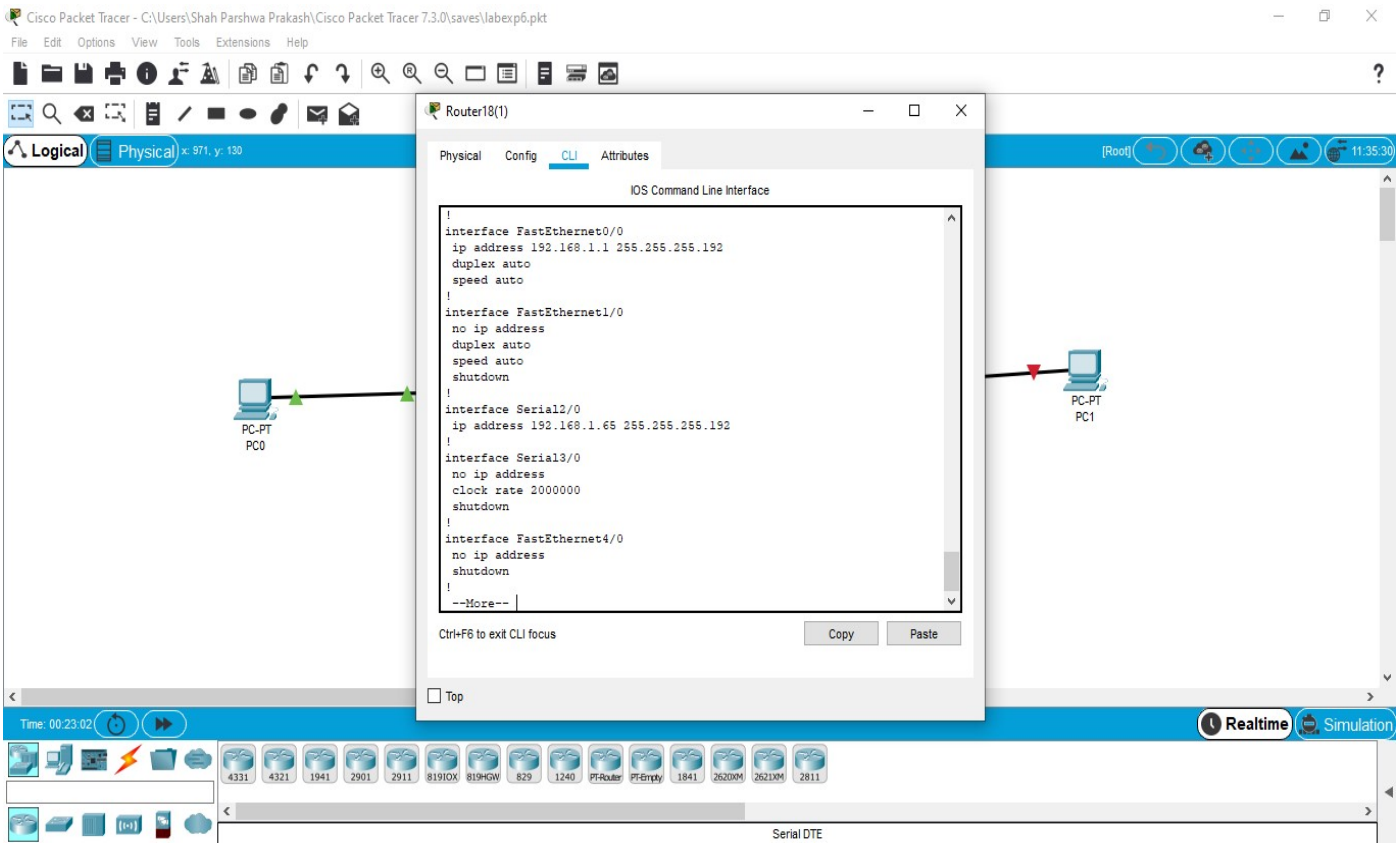
5) Configure IP Address and Subnet Mask of S0/0/0 interface of R2



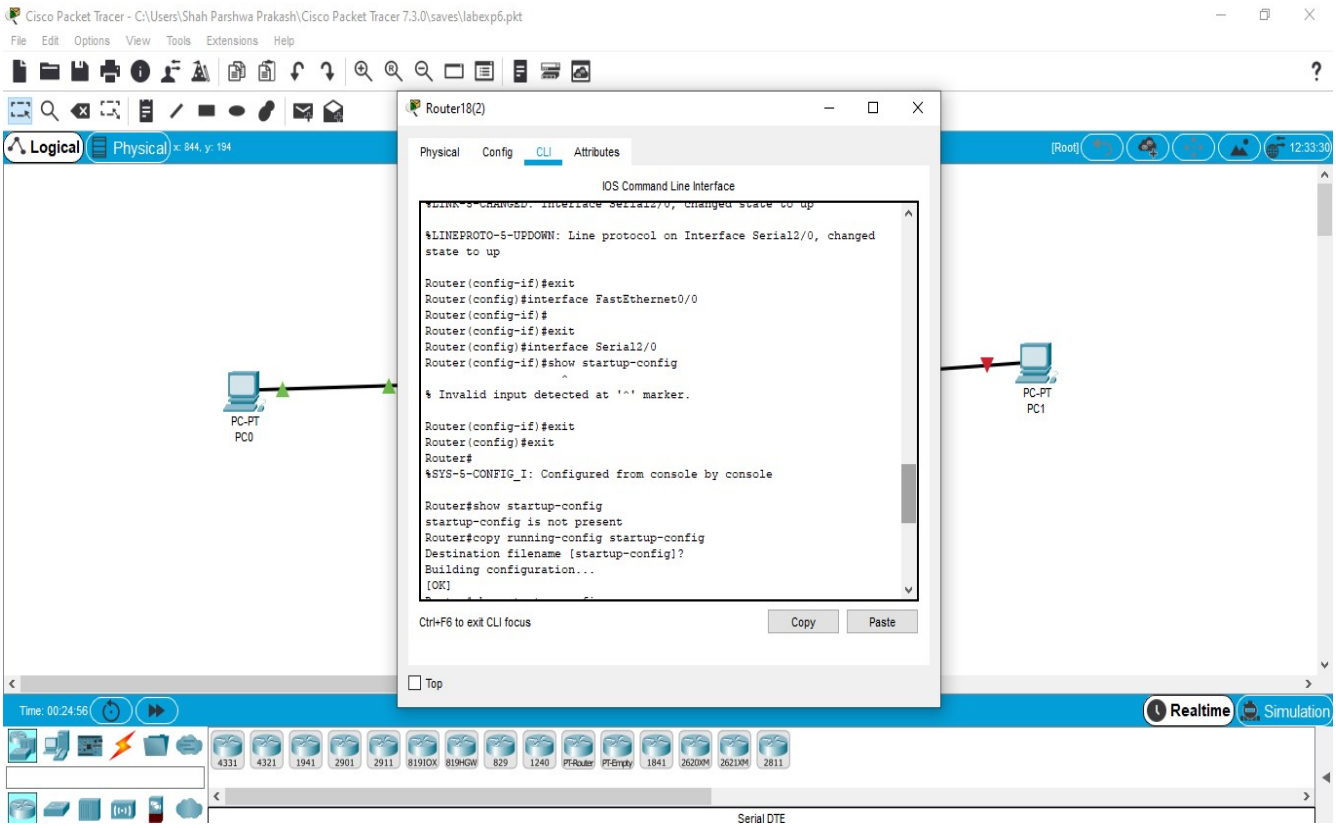
6) Save running-config of R1







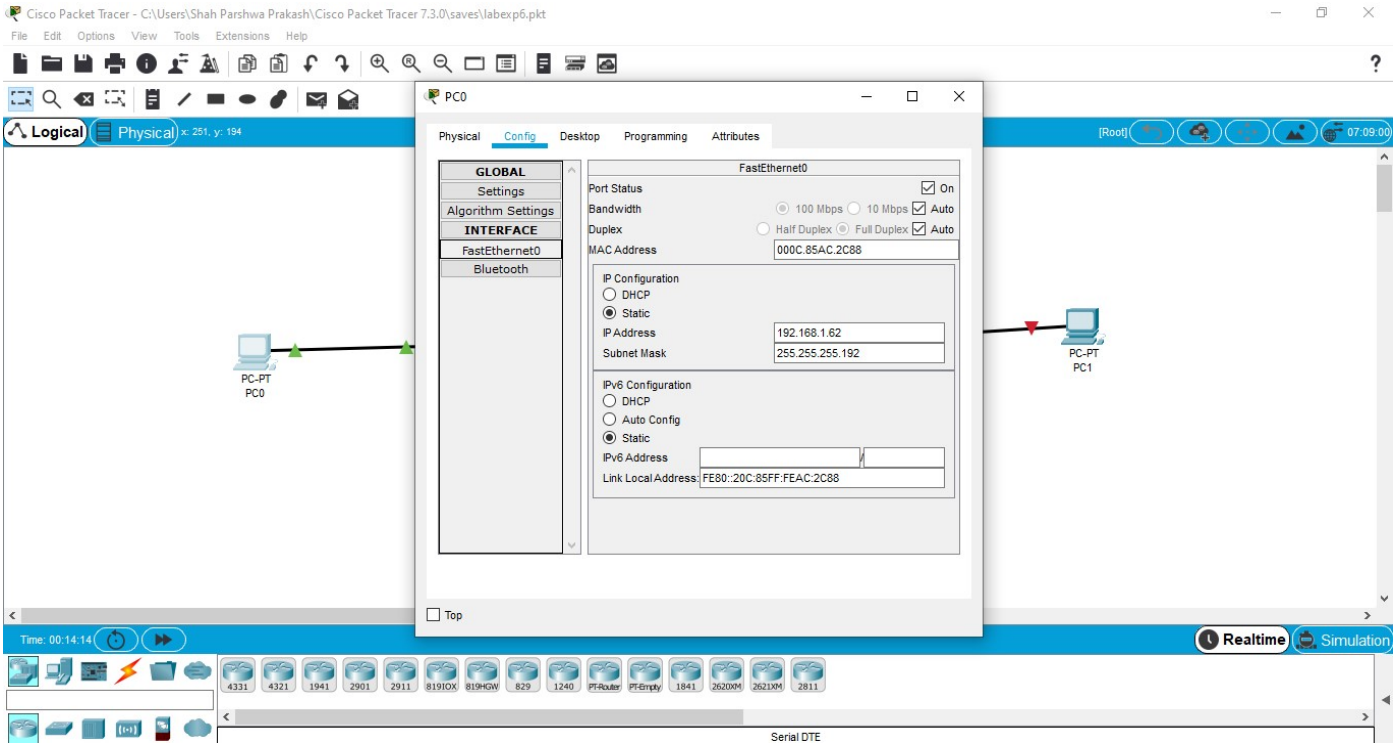
7) Save running-config of R2



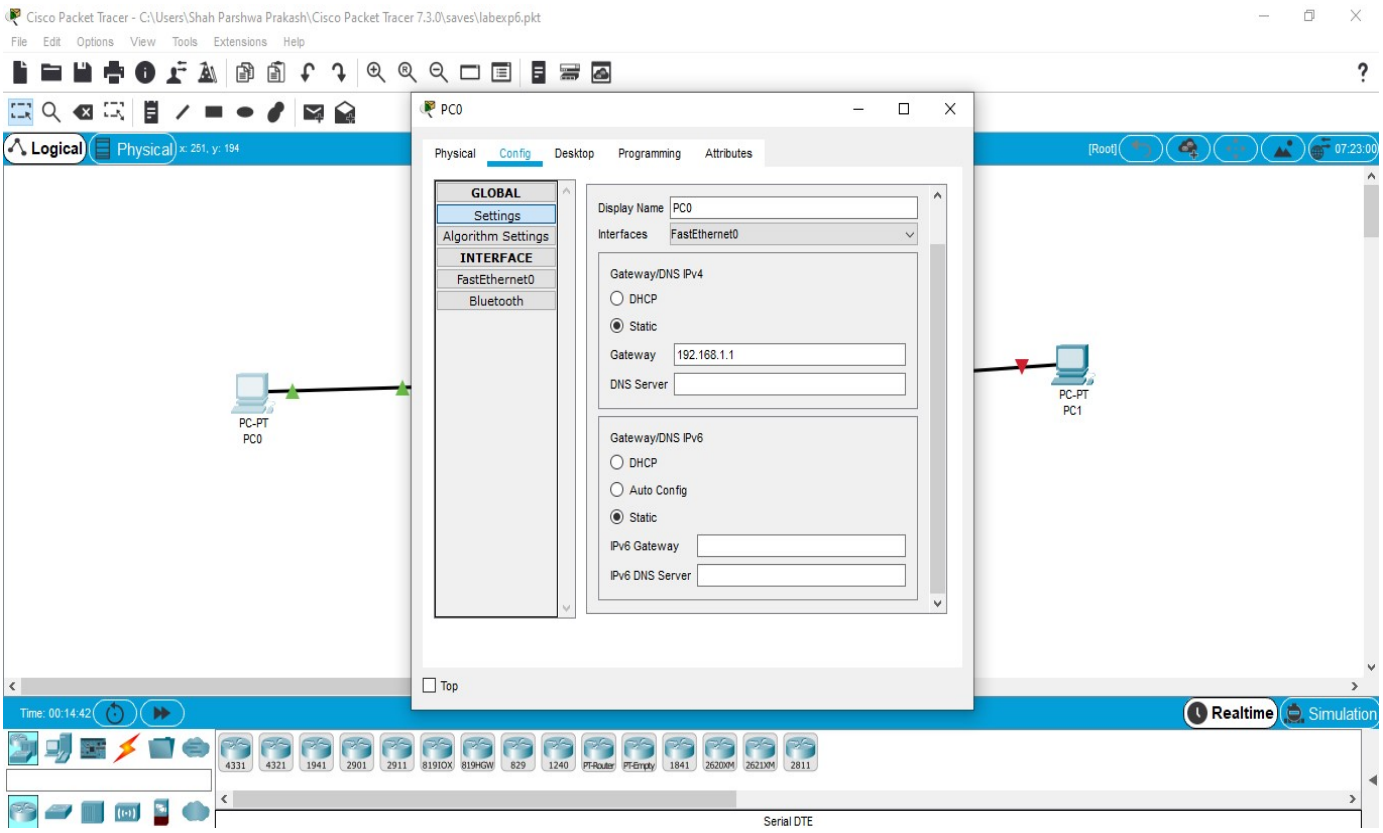
Step 2: Configure the PC interfaces.

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

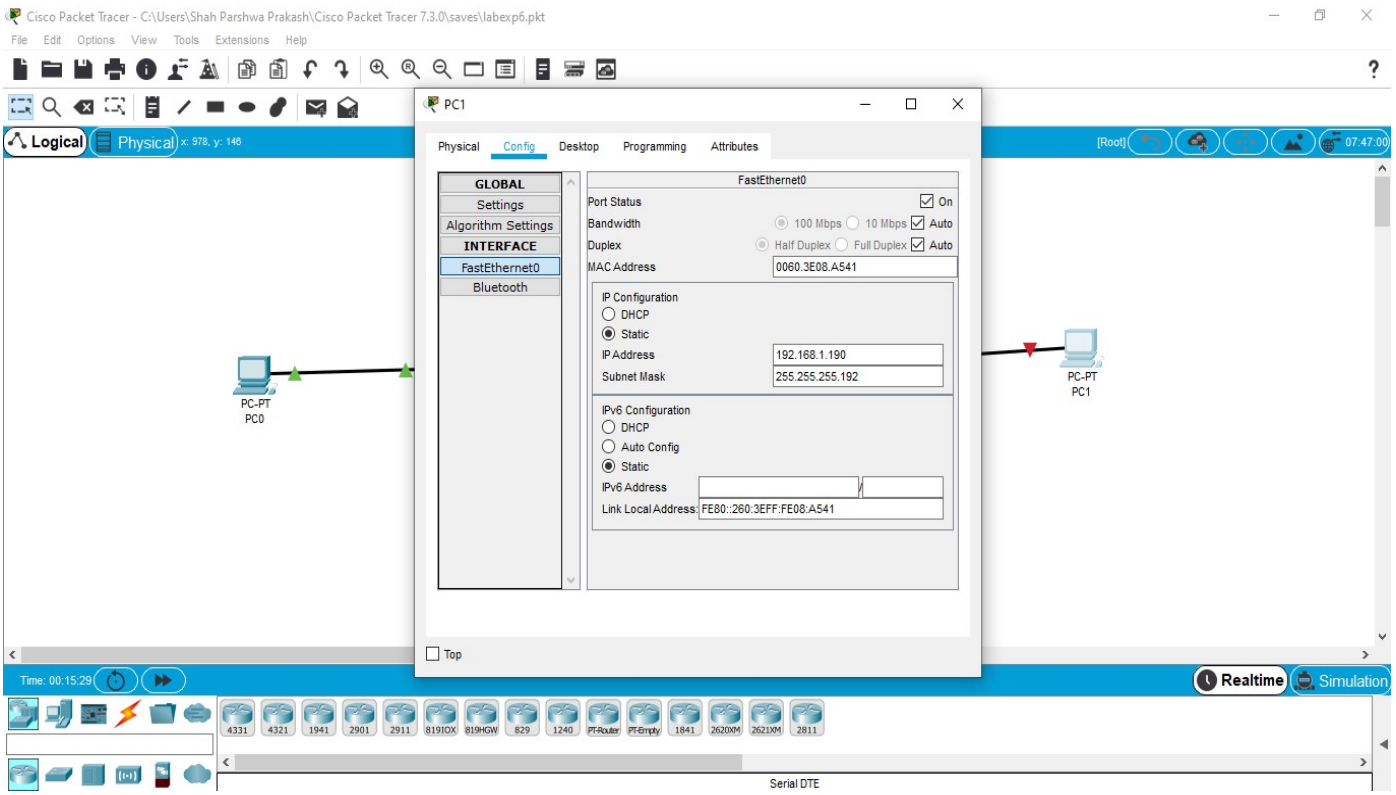
1) Configure IP Address and Subnet Mask of PC0



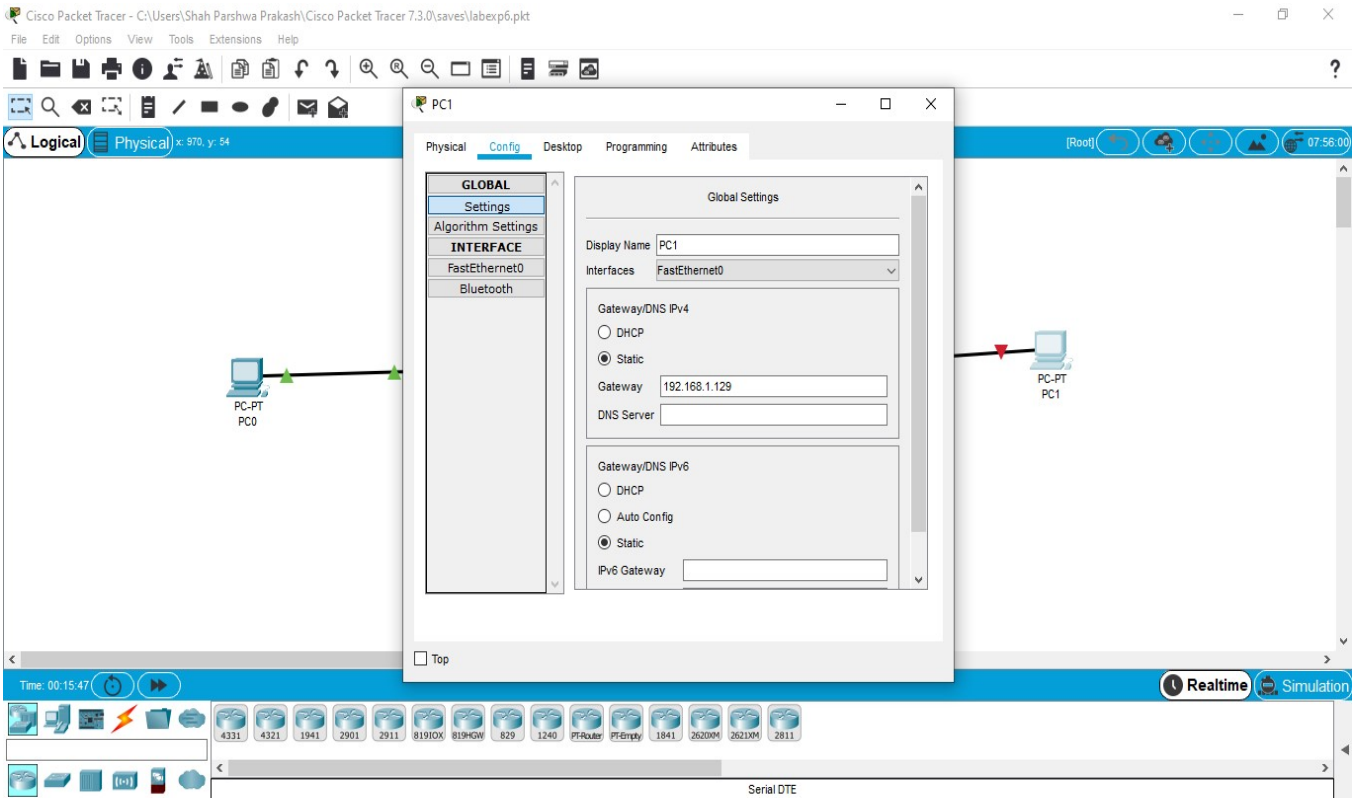
2) Configure Default Gateway of PC0



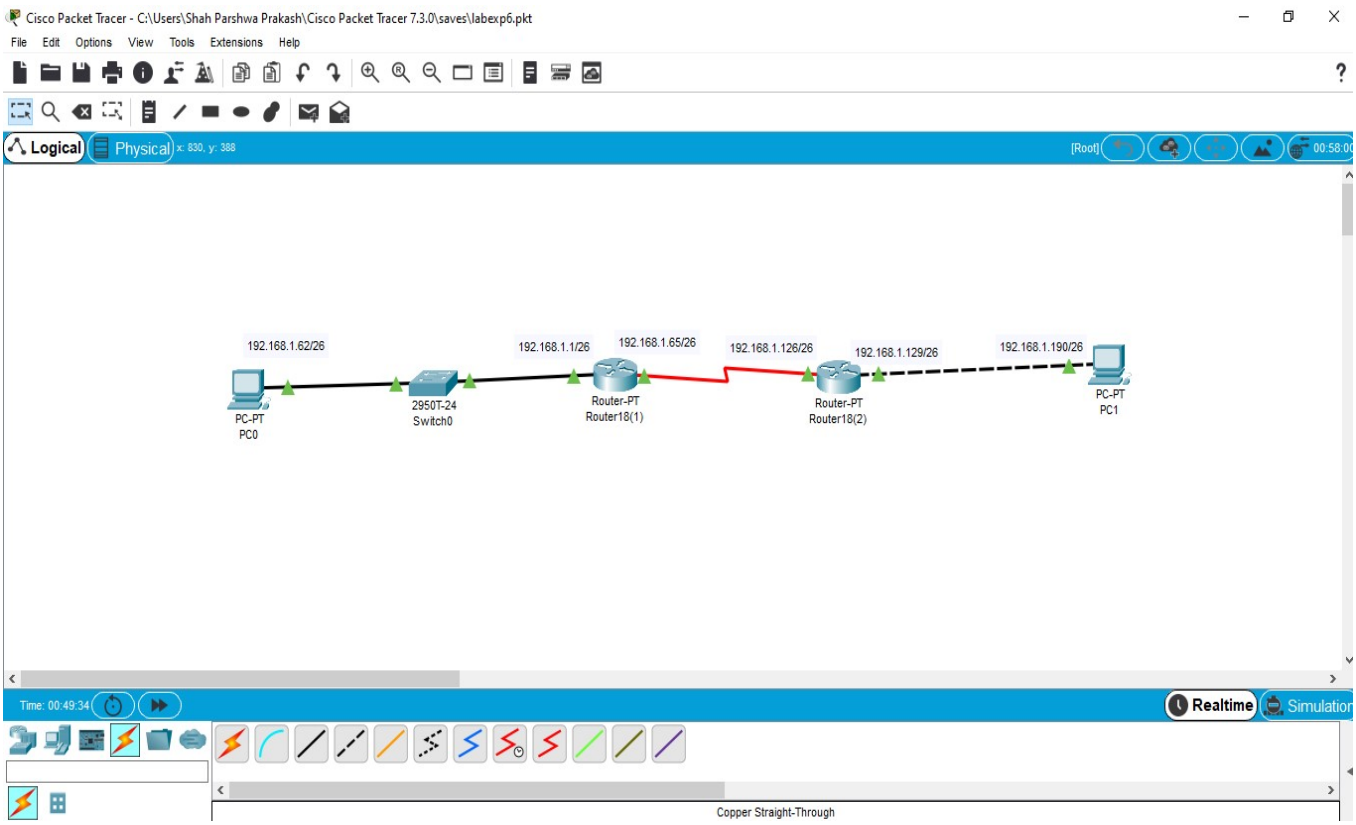
3) Configure IP Address and Subnet Mask of PC1



4) Configure Default Gateway of PC1



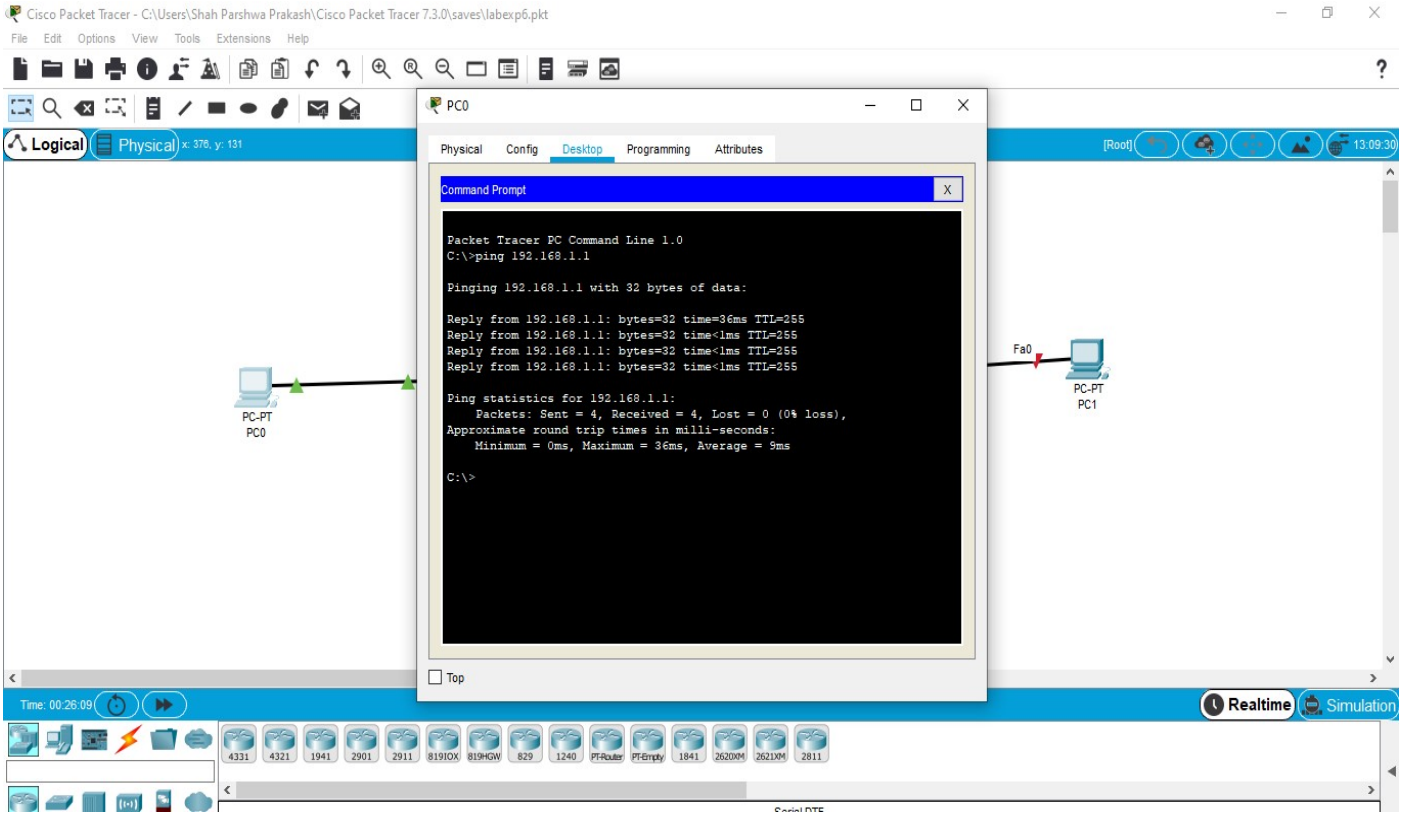
5)Final Network Diagram



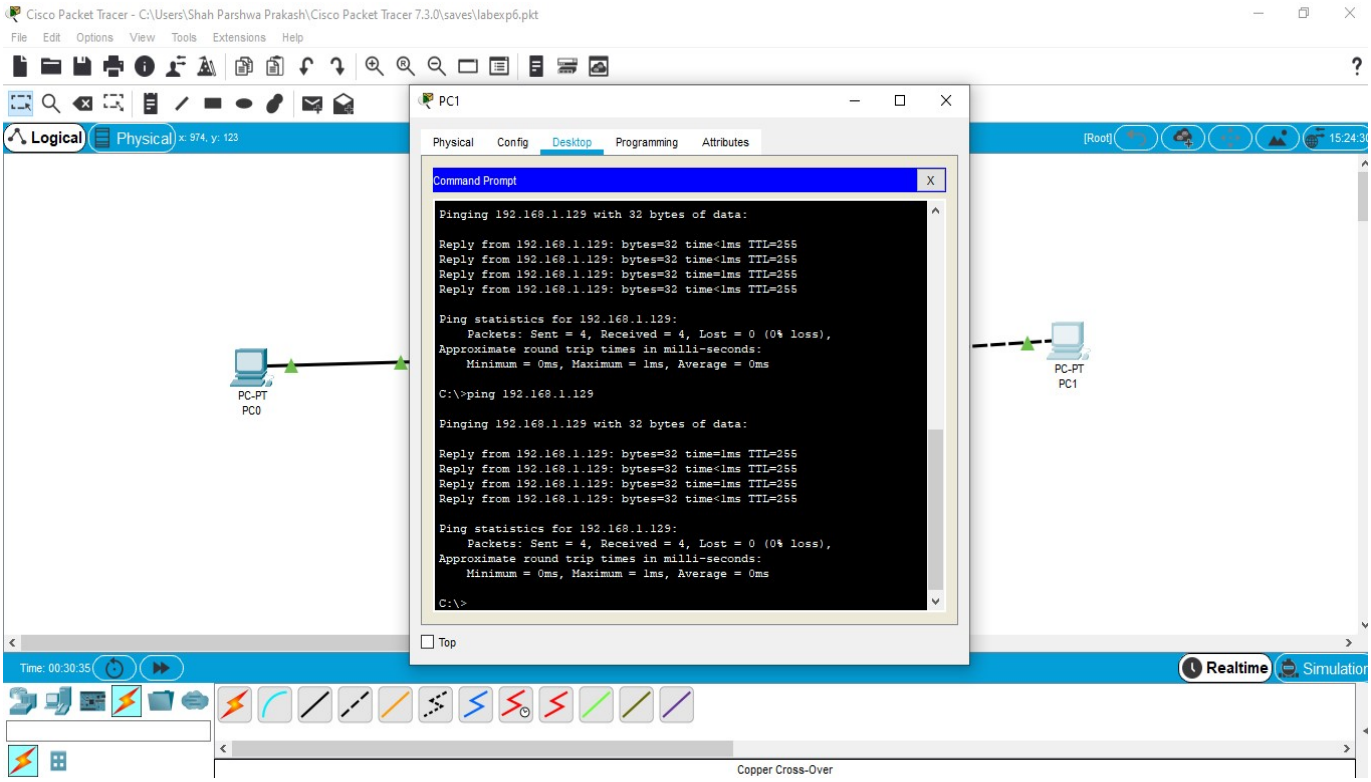
Task 4: Verify the Configurations.

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

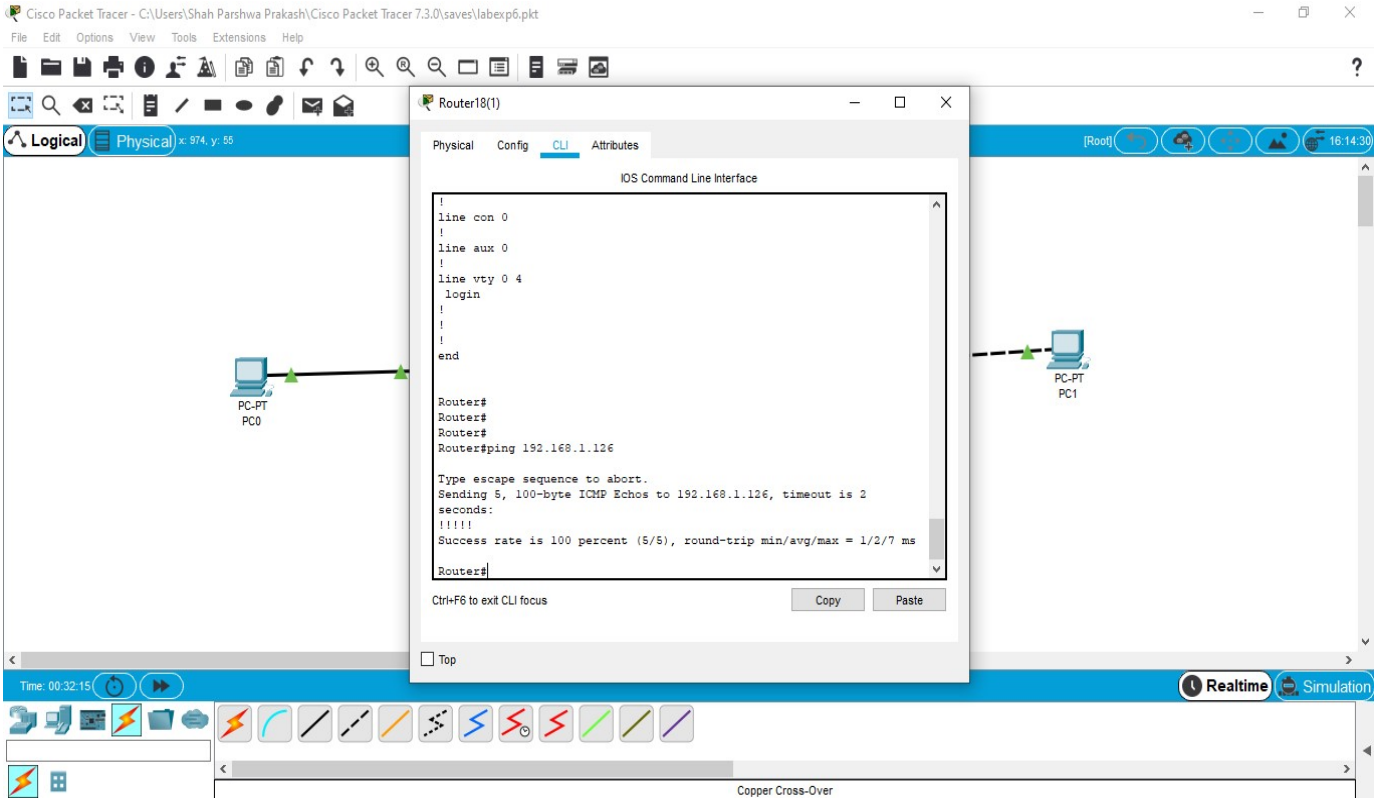
From the host attached to R1, is it possible to ping the default gateway? Yes



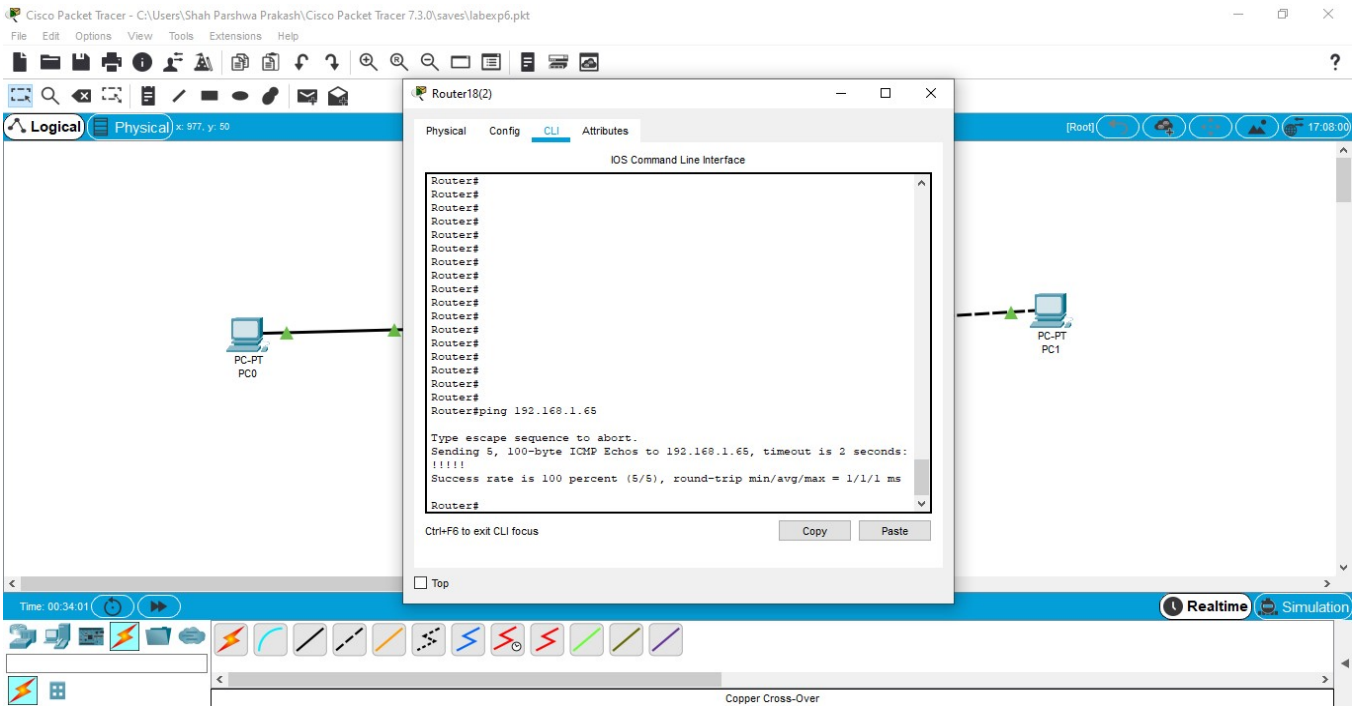
From the host attached to R2, is it possible to ping the default gateway? Yes



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



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

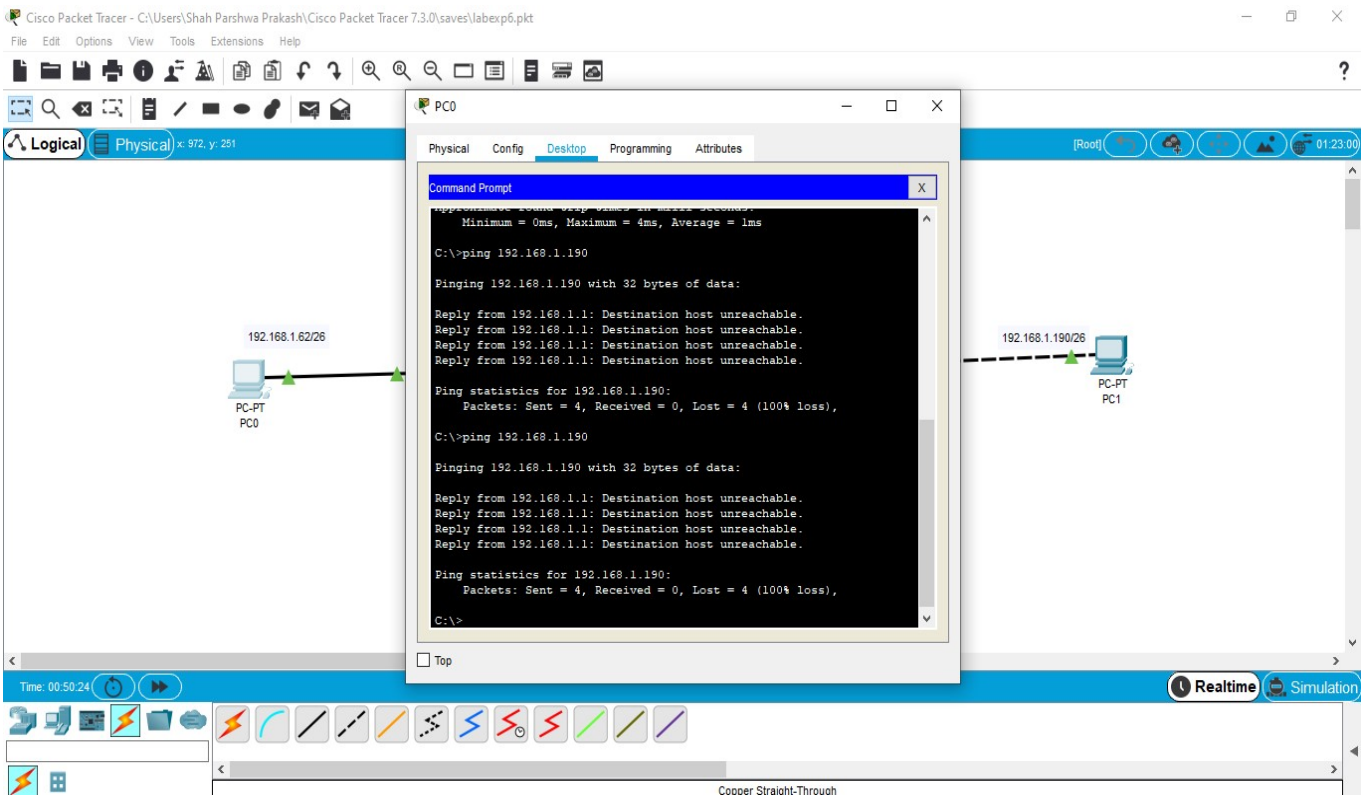


The answer to the above questions should be **yes**. If any of the above pings failed, check your physical connections and configurations.

Task 5: Reflection

Are there any devices on the network that cannot ping each other?

Yes, PC1 and PC2 cannot ping each other.



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

PC0 and PC1 have their respective default gateways and IP Address and both are connected to routers R1 and R2 respectively.They have just the IP information and not the MAC Address information.

Both send their packets to router as it is their default gateway and then router forwards further.

PC0 and PC1 don't have ARP entries for each other so that's why they are not able to communicate.