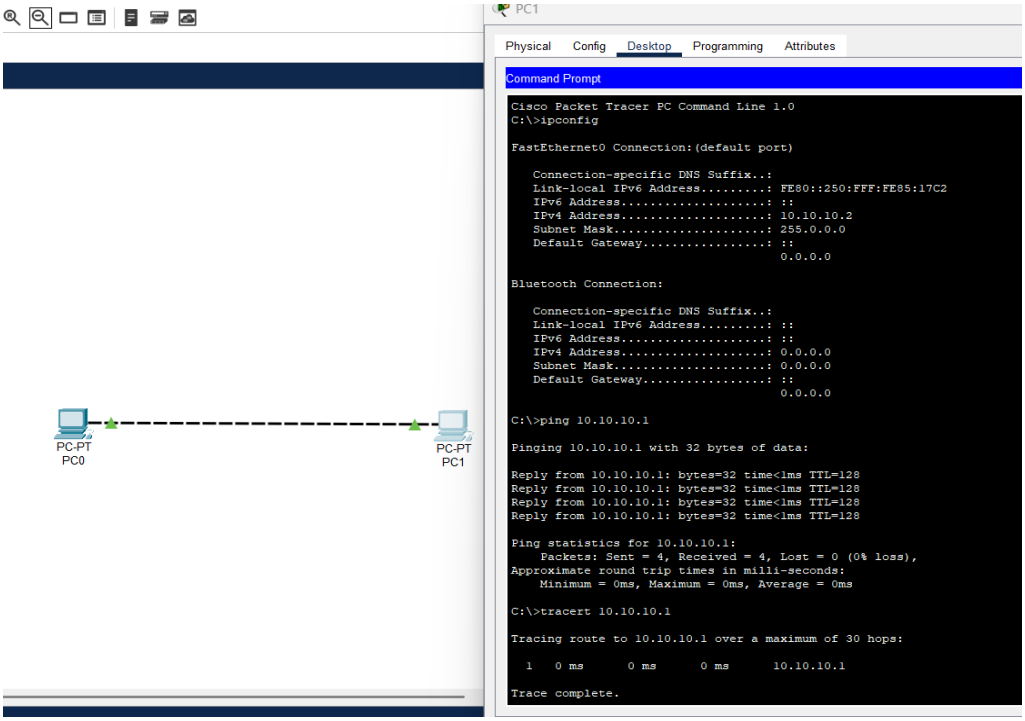
COMPUTER NETWORK PRACTICAL
SIMRAN AGRAWAL (230383)

QUES 1: To study basic network command and network configuration commands.

- **ipconfig**: Display the current device's IP configuration
- **ping**: Test connectivity to a remote host by sending ICMP echo request
- **tracert**: Display the route packets taken to reach the destination

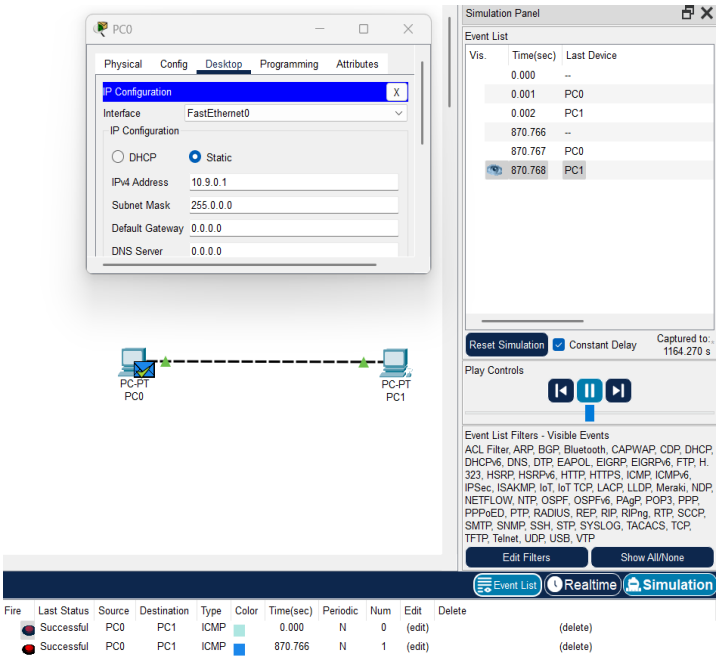


QUES 2: To study and perform PC to PC communication using Ethernet

Types of Cables:

1. Straight-Through Cable: Connects different types of devices (e.g. a PC to a switch). Pins on one end match the pins on the other end (1-to-1 wiring).

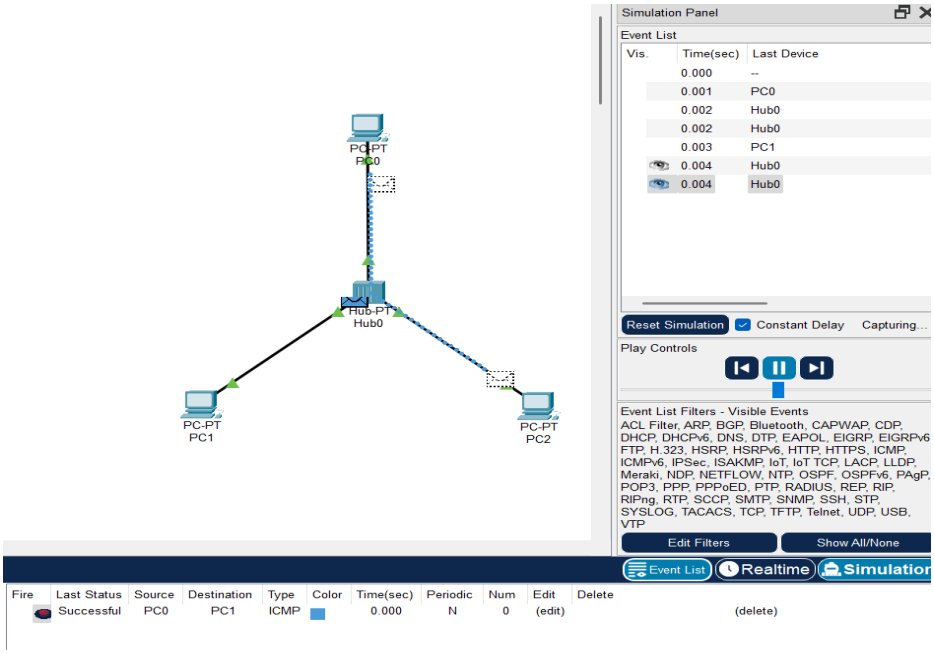
2. Crossover Cable: Connects similar devices directly (e.g. PC to PC). The wiring swaps the transmit and receive signals.

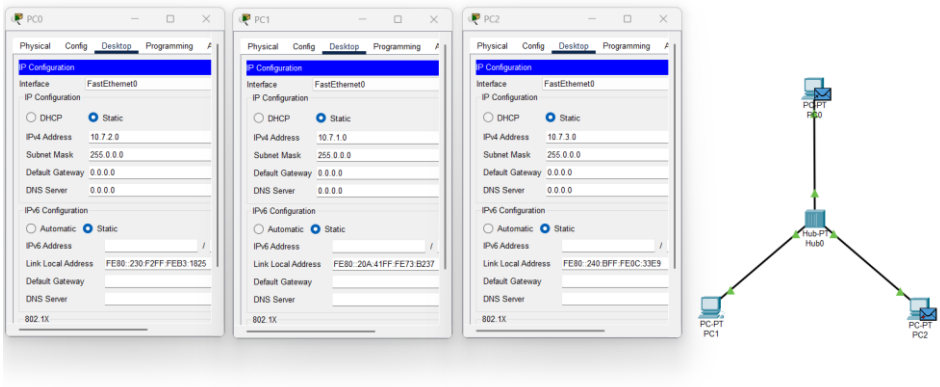


QUES 3: To create Star topology using hub and switch

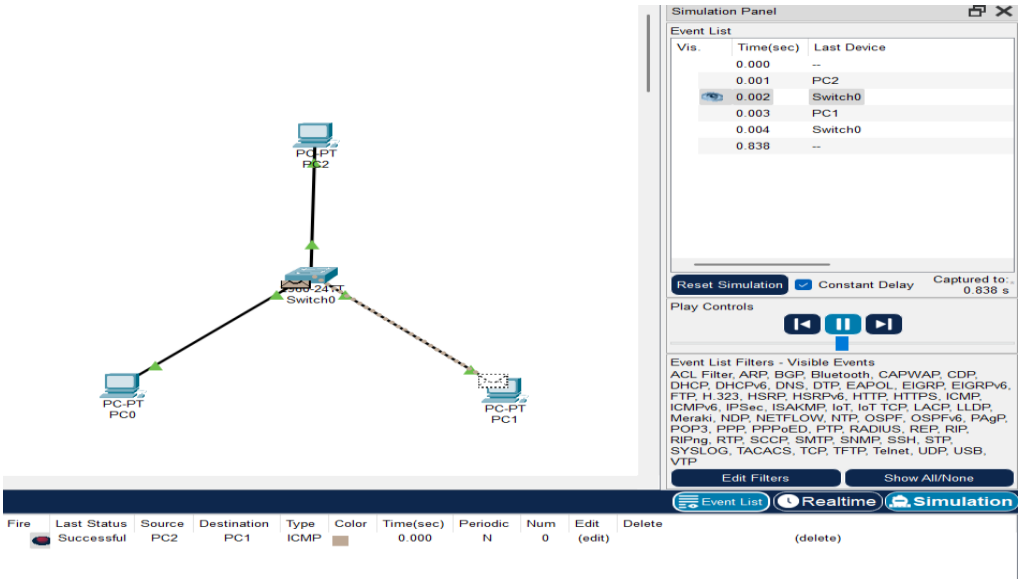
Star topology: each device has a dedicated point-to-point link only to a central controller like hub or switch.

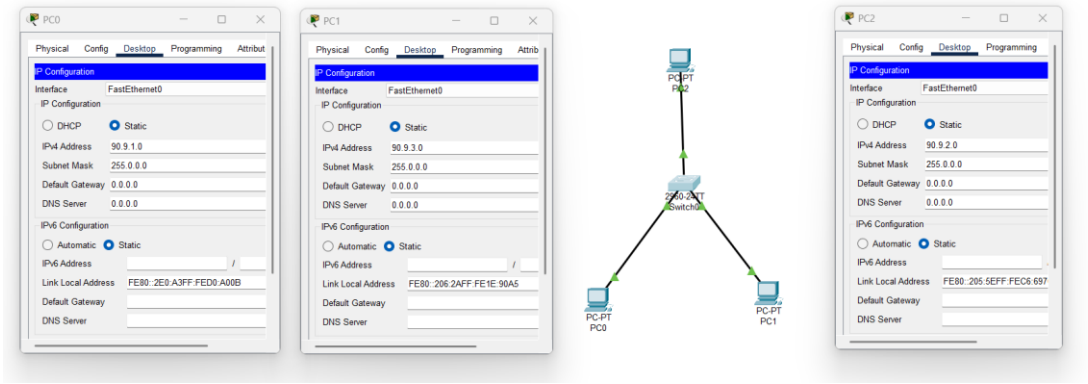
- **Hub** sends the incoming data packet to all connected devices within the same network. When it receives a data packet, it sends the packet to all connected devices, except the one that sent it. The correct recipient device processes the packet, while others discard it. Here, it has 5 ports.





- **Switch** sends the incoming data packet to the intended recipient device within the same network. Maintains a MAC address table, so it knows which device is connected to which port. Here, it has 24 ports.

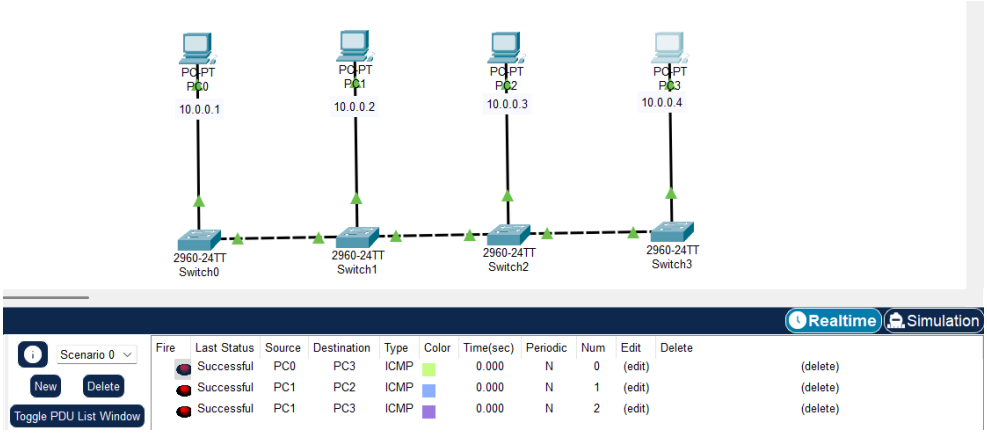




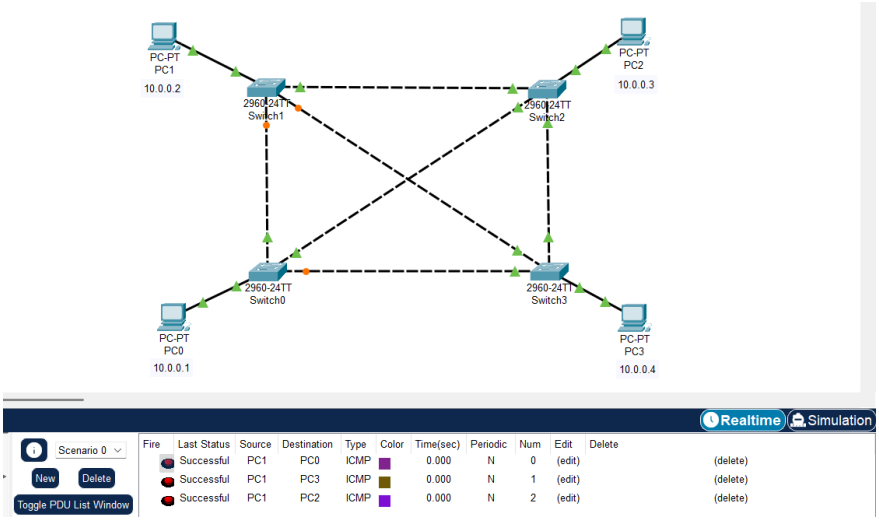
QUES 4: To create Bus, Mesh, Ring, Tree and Hybrid topologies.

- Each PC has only one network port, thus, switch is used to connect it with more than one device.
- If two devices on the same network share the same IP address, it causes conflicts where only the most recently connected device remains active, leading to issues; ensure unique IP addresses to avoid this.

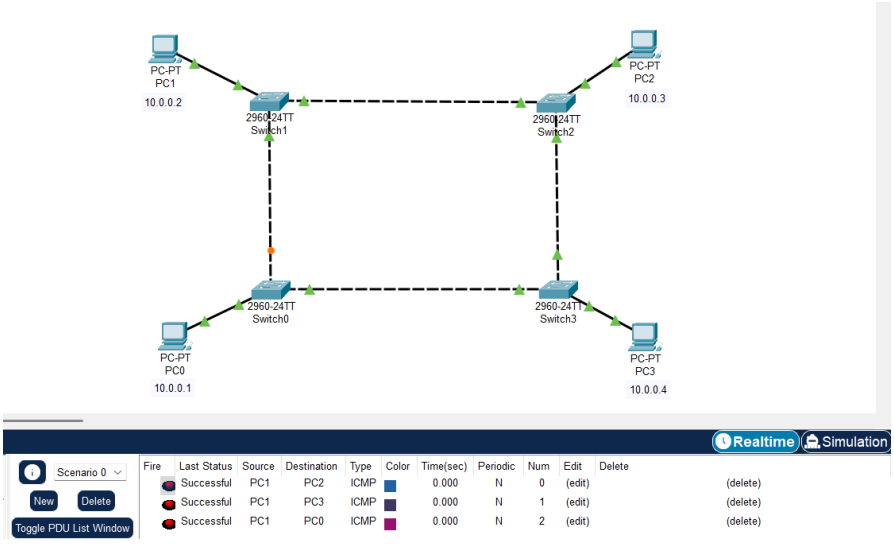
Bus topology: Multi-point connection, where one long cable acts as a backbone to all other devices.



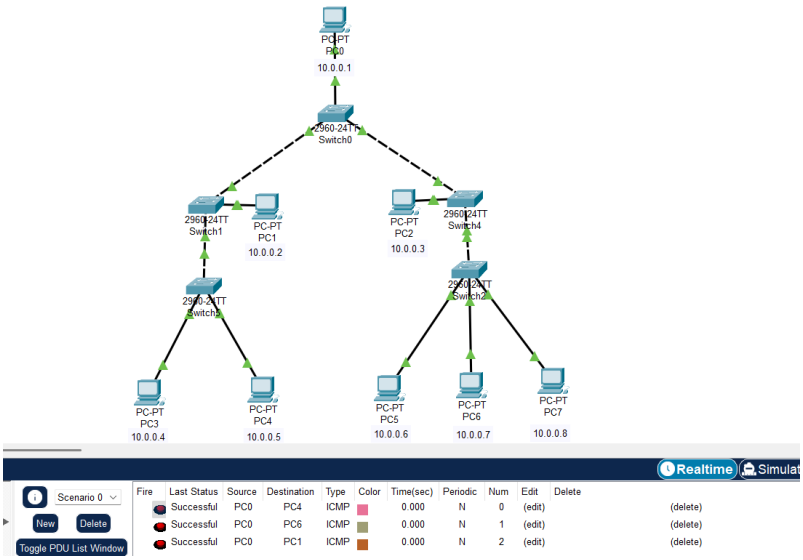
Mesh topology: Every device has a dedicated point-to-point link to every other device.



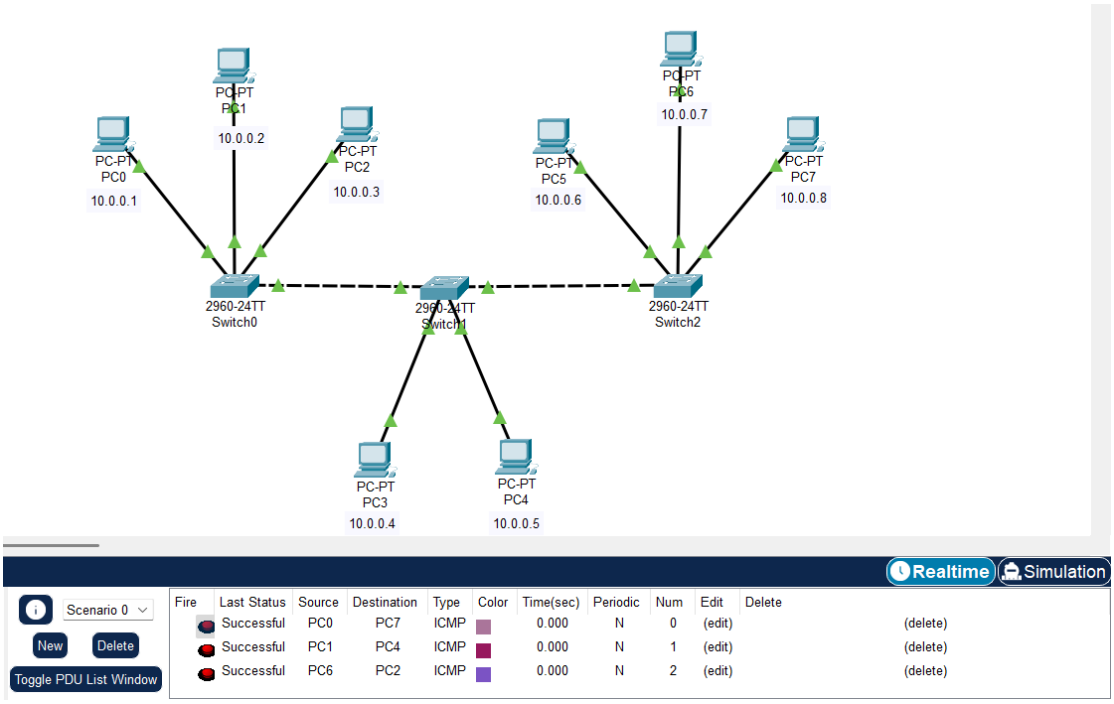
Ring topology: Each device has a dedicated point-to - point connection with only two devices on either side of it.



Tree topology: Each node is connected to the central node by a single path. The central node is the trunk, and the other nodes are branches.



Hybrid topology: The nodes in a basic topology can communicate with other nodes in the same topology, as well as with nodes in other topologies.



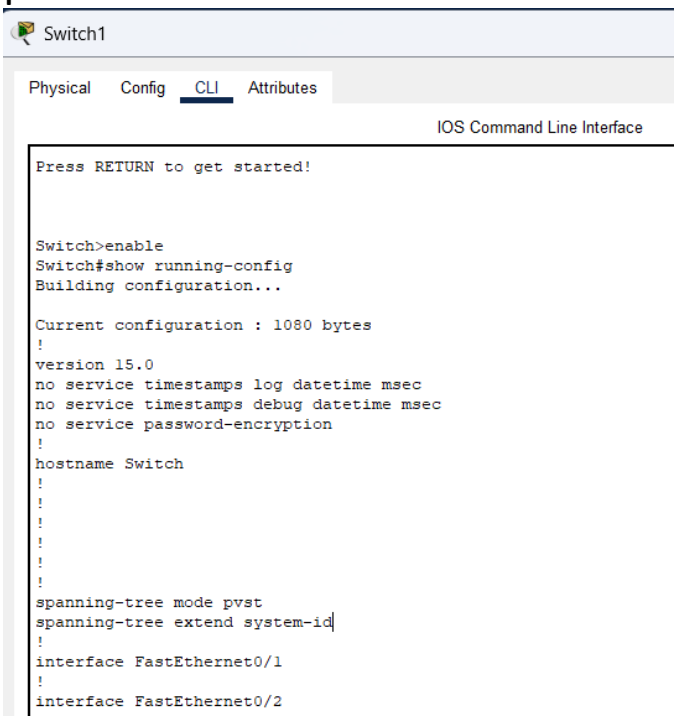
Here, bus and star topologies are used together, allowing nodes to both topologies to communicate with each other.

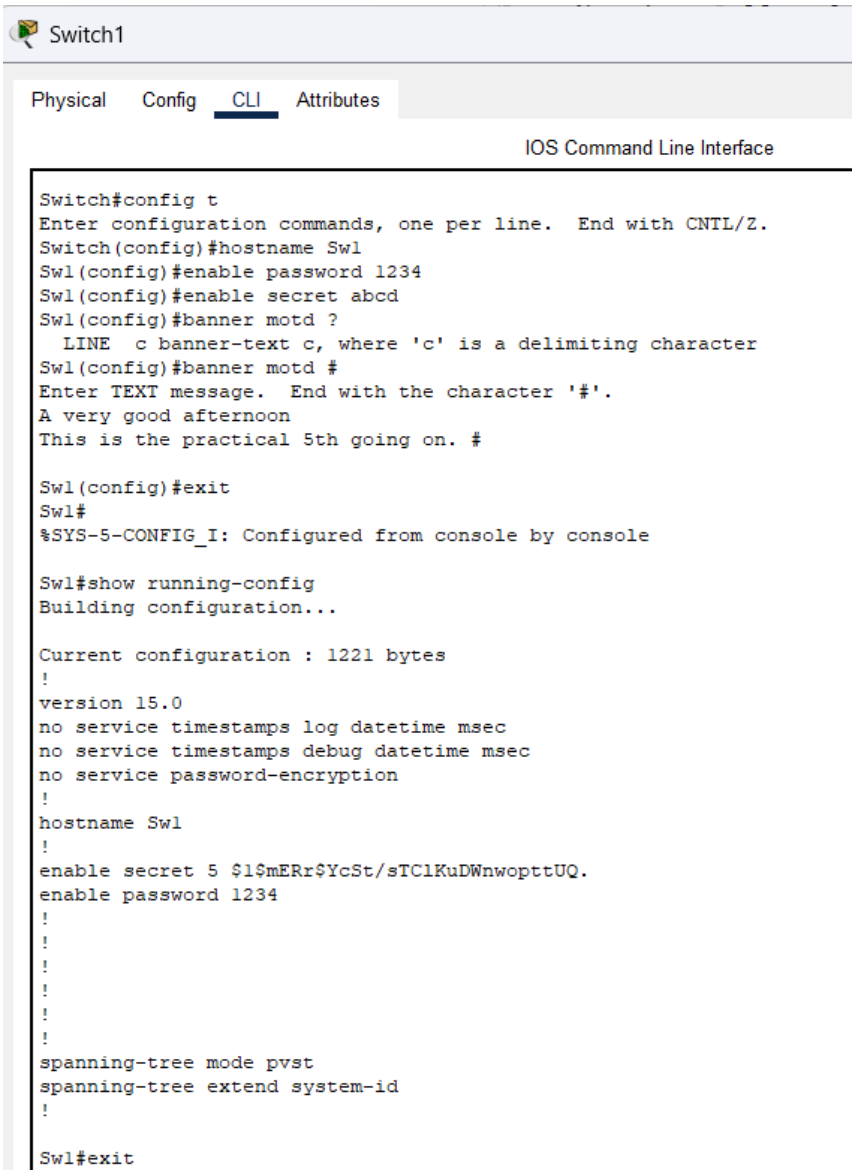
QUES 5: Perform an initial Switch configuration

	Command or Action	Purpose
1	**enable**	Enables privileged EXEC mode. Enter your password if prompted
2	**config t**	Enters global configuration mode
3	**hostname ___**	Specifies the new name for switch.
4	**enable password** ****	Defines a new password or changes an existing password for access to privileged EXEC mode. By default, no password is defined
5	**enable secret** ****	Defines a secret password, which is saved using a non reversible encryption method. For level (Optional), the range is from 0 to 15. Example: Level 1 is normal user EXEC mode privileges. The default level is 15 (privileged EXEC mode privileges). For password, specify a string from 1 to 25 alphanumeric characters. The string cannot start with a number, is case sensitive, and allows spaces but ignores leading spaces. By default, no password is defined.(Optional) For encryption-type, only type 5, a Cisco proprietary encryption algorithm, is available. If you specify an encryption type, you must provide an encrypted password—an encrypted password that you copy from another

		switch configuration.
6	**Message of the day-banner motd ? d message d**	d - Delimiting character.You cannot use the delimiting character in the banner message.
7	**show running-config**	Displays the current running configuration
8	**exit**	Used to return to the previous mode, such as exiting configuration mode to return to privileged EXEC mode or exiting an interface configuration mode to return to global configuration mode.

The password will be encrypted and will not be read by anyone calling show running-config, unlike enable password.



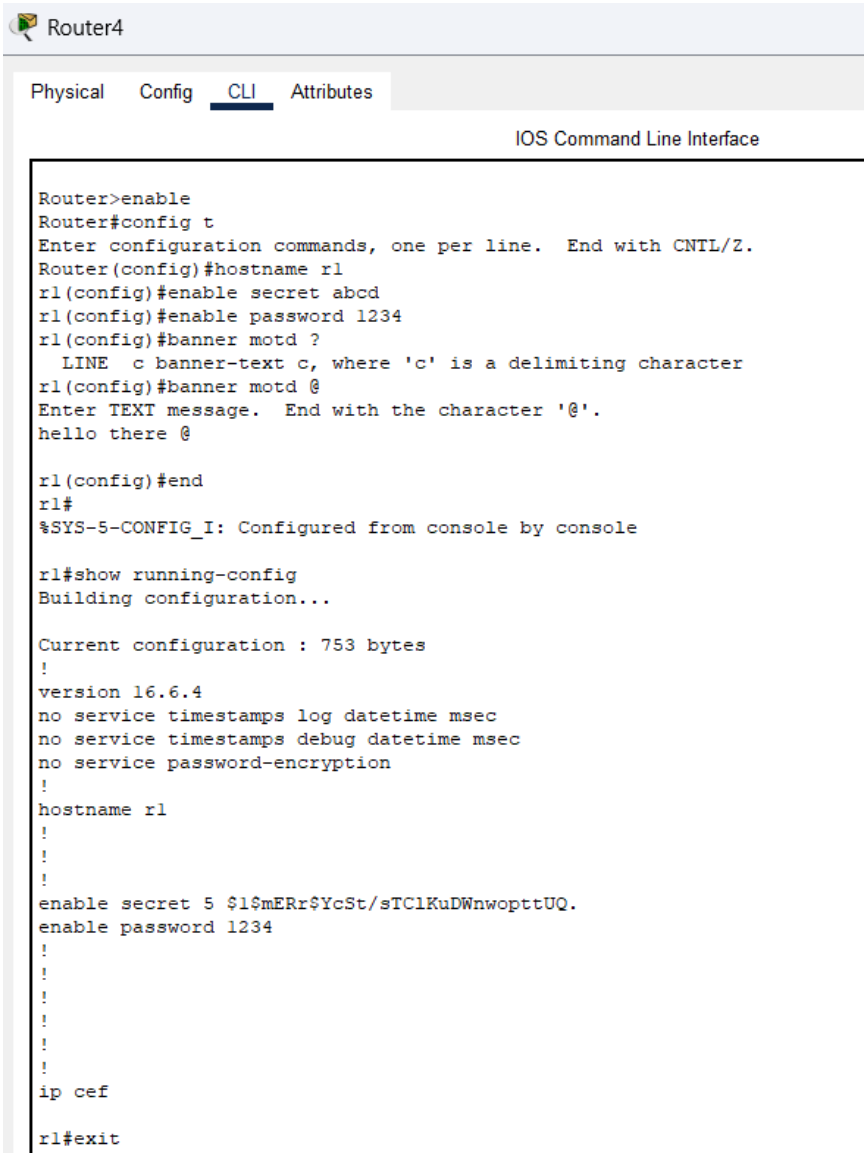


Output:

```
A very good afternoon
This is the practical 5th going on.

Sw1>enable
Password:
Password:
Sw1#
```

QUES 6: Perform an initial Router configuration



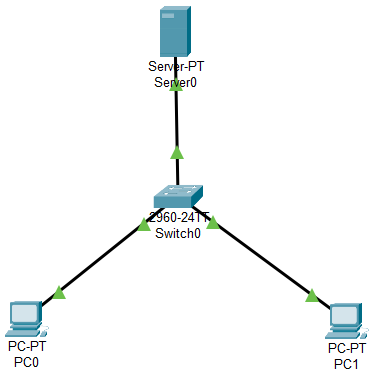
Output:

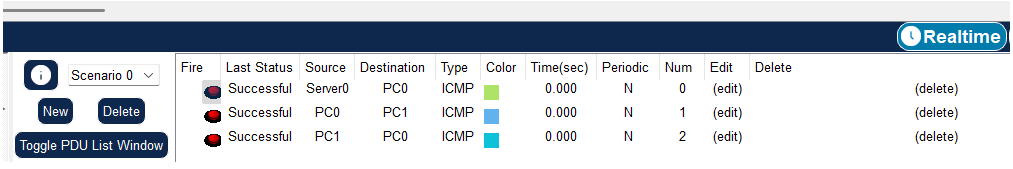
```
hello there

r1>enable
Password:
r1#
```

QUES 7: To implement Client Server Network

- ✓ **DHCP (Dynamic Host Configuration Protocol)** is a network protocol that automatically assigns IP addresses and other network configuration parameters to devices on a network
- ✓ In the network layer, IP addressing uses octal numbers to represent IP addresses, with IPv4 using 32 bits (0-255.0-255.0-255) and IPv6 using 128 bits, providing a significantly larger address space
- ✓ IP addresses are categorized as either **static** (unchanging) or **dynamic** (changing), with static IPs used for routers and servers requiring consistent identification, while dynamic IPs are common for home networks and devices that don't need a persistent address.

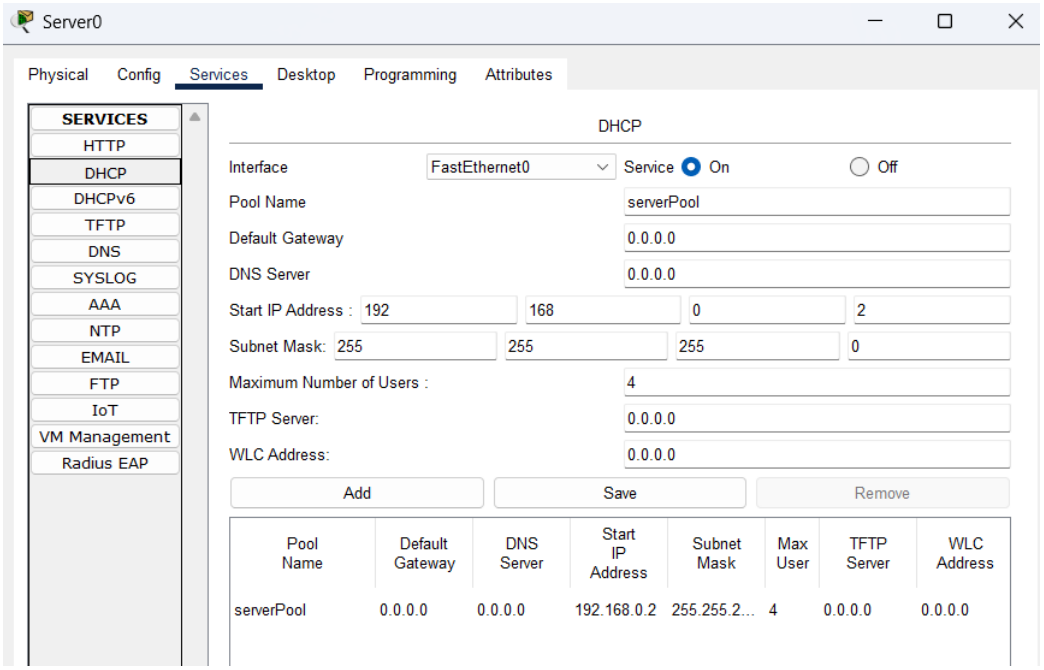




STEPS:-

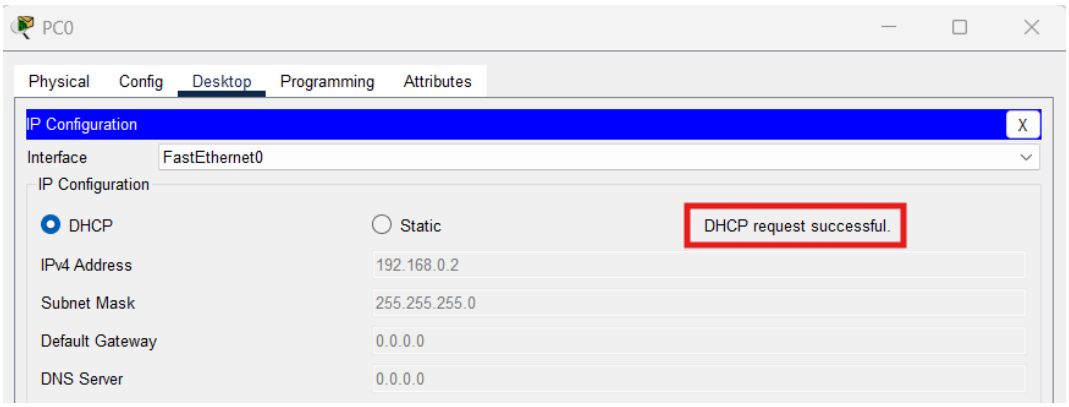
1. Server:
   a) Config > FastEthernat0
   b) Assign static IP address (eg 192.168.0.1)

c) Services > DHCP
d) Turn on the services
e) Fill : Start IP Address (eg 192.168.0.2)
f) Modify Maximum number of users (optional)
g) Click Save



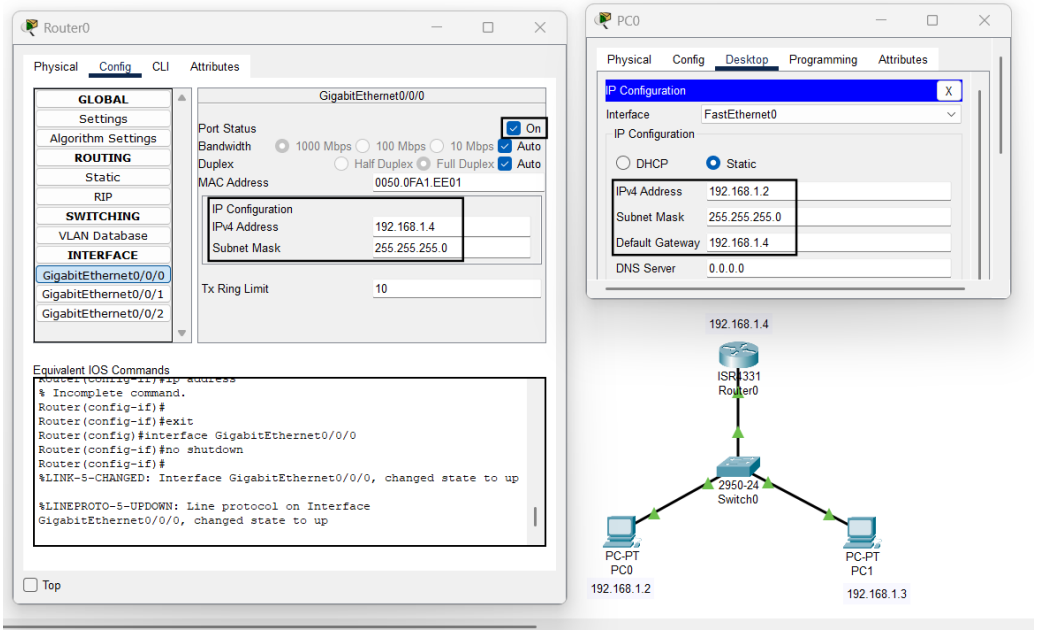
2. Systems (PCs):
a) Desktop > IP Configuration
b) Select DHCP

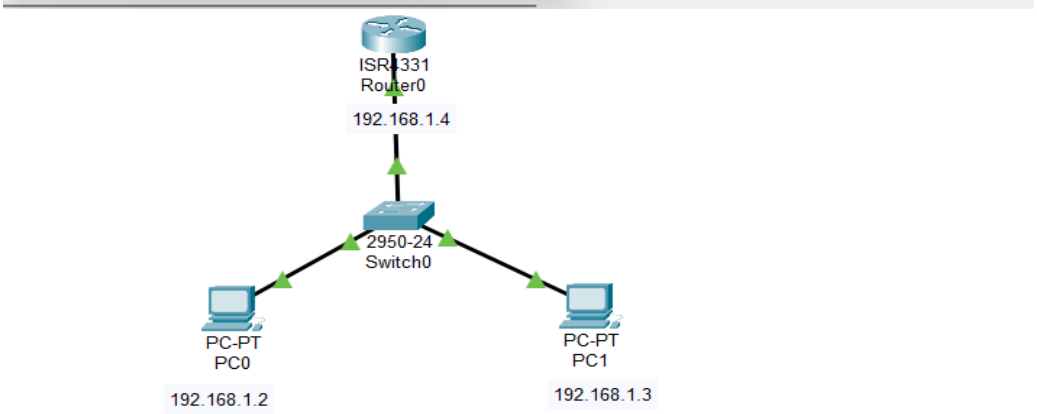
It will automatically assign the IP address. This is creating a pool of IP addresses.



QUES 8: To implement connection between devices using router.

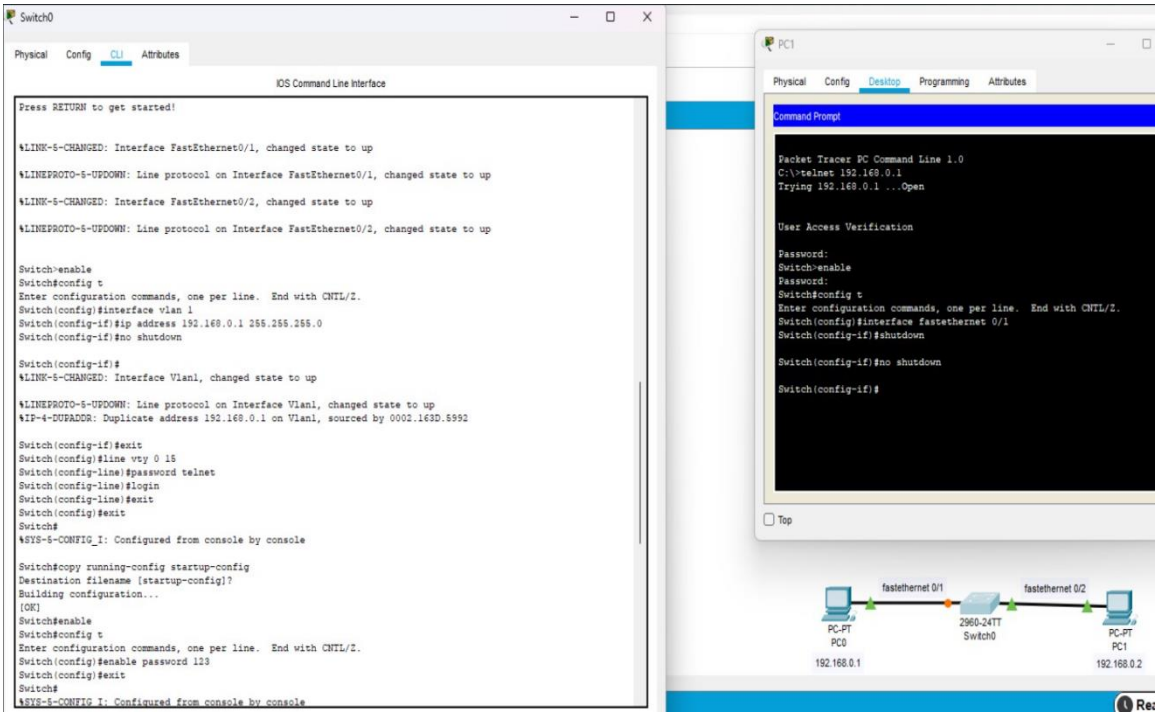
A **router** is a gateway that directs data between local area networks (LANs) using the Internet Protocol (IP). It sends IP packets containing data and addresses of the sender and destination. These packets include details like sender info, data type, size, and destination IP. Routers also enhance security with built-in firewalls and content filtering.





Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC0	Router0	ICMP		0.000	N	0
	Successful	PC0	PC1	ICMP		0.000	N	1
	Successful	PC1	PC0	ICMP		0.000	N	2

QUES 9: To perform remote desktop sharing within LAN connection.



Switch Configuration in CLI:

STEPS:

1) enable
2) config t
3) interface vlan 1
4) ip address <IP> <subnet>
5) no shutdown
6) exit
7) line vty 0 15
8) password ****
9) login
10) exit
11) enable password ****
12) exit
13) copy running-config startup-config

Interface vlan 1 is used to configure the switch's management interface. VLAN 1 is the default VLAN, and configuring it allows remote management using an IP address via Telnet, SSH, or ping. It's a virtual interface, not physical. For it to work, at least one port must be active on VLAN 1, and the interface must be enabled using the no shutdown command.
Line vty 0 15 command is used to configure virtual terminal (VTY) lines, which allow remote access to the device through protocols like Telnet or SSH. The range 0 to 15 refers to the 16 available VTY lines, meaning up to 16 simultaneous remote sessions can be managed. Inside this configuration mode, you can set login requirements, passwords, or enable SSH. It's essential for remote management of switches or routers.

```
Switch>ena
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface vlan 1
Switch(config-if)#ip address 192.168.0.1 255.255.255.0
Switch(config-if)#no shutdown

Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
%IP-4-DUPADDR: Duplicate address 192.168.0.1 on Vlan1, sourced by 0004.9AED.39CD

Switch(config-if)#exit
Switch(config)#line vty 0 15
Switch(config-line)#password telnet
Switch(config-line)#login
Switch(config-line)#enable password 1234
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Switch#
```

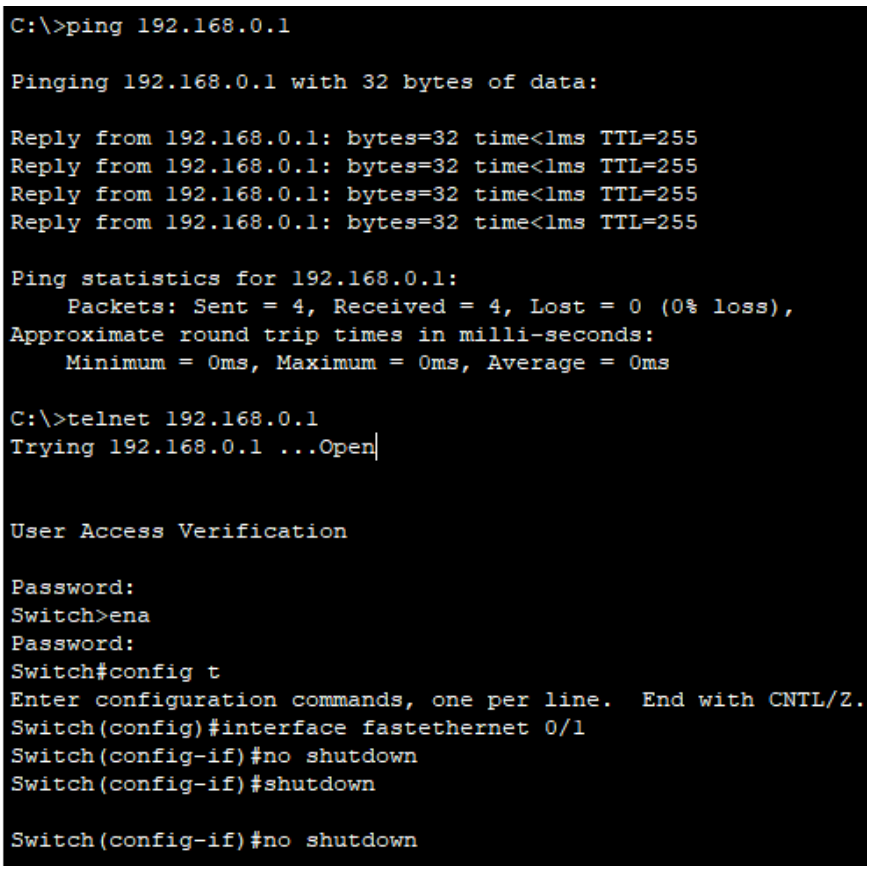
PC1 command prompt:

STEPS:

1) ping <ip>

2) telnet <host_ip>
3) enable
4) config t
5) interface fastethernet 0/1
6) shutdown
7) no shutdown

Telnet: In the client PC's command prompt, try to connect to the target PC's IP address using the command: telnet <target_IP> [port] [keyword], where port is a decimal TCP port number and both port and keyword are optional. Interface fastethernet 0/1 command is used to access and configure a specific physical port. Once in this mode, you can set the port's IP settings (on routers), enable or disable it (no shutdown), assign it to a VLAN (on switches), or control speed, duplex, and security settings



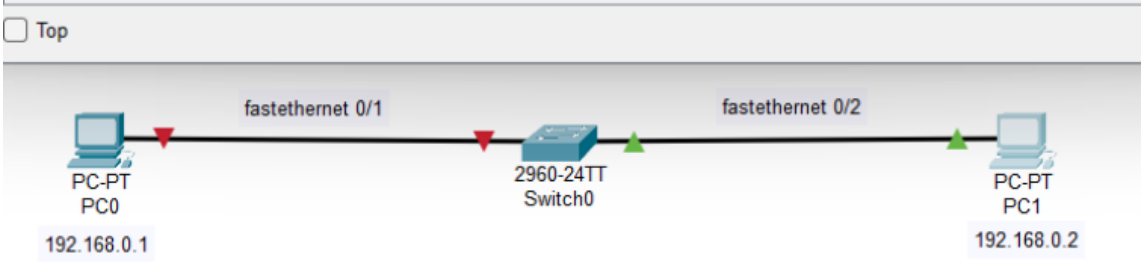
OUTPUT 1:

```
C:\>telnet 192.168.0.1
Trying 192.168.0.1 ...Open


User Access Verification

Password:
Switch>ena
Password:
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface fastethernet 0/1
Switch(config-if)#no shutdown
Switch(config-if)#shutdown

Switch(config-if)#
```



OUTPUT 2:

```
User Access Verification

Password:
Switch>ena
Password:
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface fastethernet 0/1
Switch(config-if)#no shutdown
Switch(config-if)#shutdown

Switch(config-if)#no shutdown

Switch(config-if)#
```