



S.I.W.S

**N.R SWAMY COLLEGE OF COMMERCE &
ECONOMICS AND SMT. THIRUMALAI COLLEGE
OF SCIENCE.**

PRACTICAL COMPONENT-I

Kaif Faiyaz Shaikh

MSC.CS – PART 1

YEAR 2024-2025



S.I.W.S

N.R SWAMY COLLEGE OF COMMERCE & ECONOMICS

AND

SMT. THIRUMALAI COLLEGE OF SCIENCE

Plot No. 337, Major R, Parmeshwaran Marg, Sewree Wadala Estate, Wadala,
Mumbai-400 031.

MSC. Computer Science(PART-1)

Semester I

CERTIFICATE

Class: MSC.CS

University Seat No: _____

Roll No: _____

This is to certify that the experiments entered in this journal is the work of
Mr./Ms. Kaif Faiyaz Shaikh in the Computer Science Department of S.I.W.S
Degree College during the year 2024-2025.

Teacher-In-Charge

Co-ordinator

Internal Examiner

External Examiner

Date:

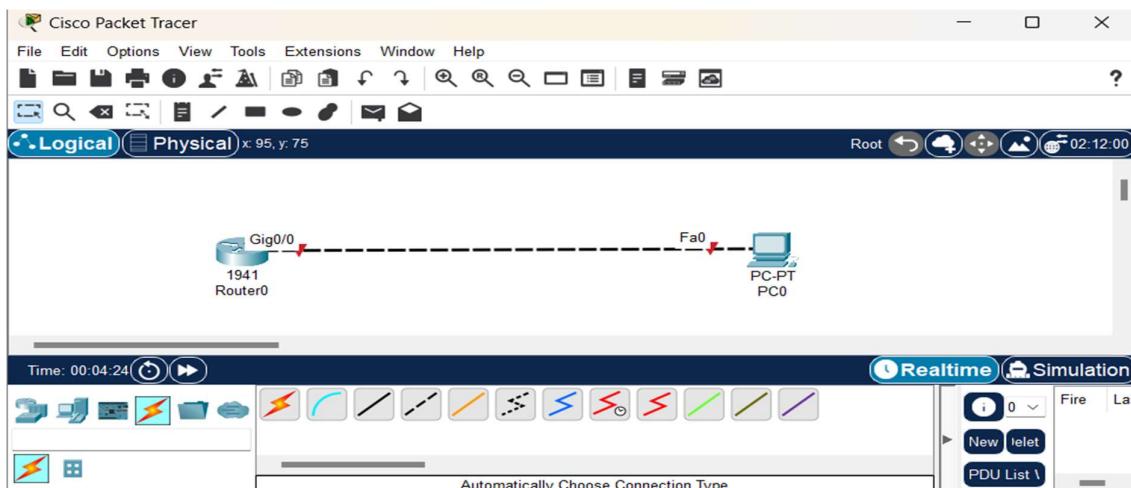
College Stamp

INDEX

SR.NO	PRACTICAL NAME	SIGNATURE
1.	CONFIGURATION AND LOGGING TO A CISCO AND INTRODUCTON TO THE BASIC USER INTERFACES.	
2.	BASIC ROUTER CONFIGURATION AND BASIC COMMANDS	
3.	DYNAMIC HOST CONFIGURATION PROTOCOL (DHCP)	
4.	TRANSMISSION CONTROL PROTOCOL(TCP)	
5.	DOMAIN NAME SERVER (DNS)	
6.	CONFIGURE HYPERTEXT TRANSFER PROTOCOL (HTTP)	
7.	A. USE TELNET TO LOGIN A REMOTE MACHINE B. CONNECT REMOTE MACHINE USING SECURE SHELL	
8.	STATIC ROUTING	

PROGRAM : (CONFIGURATION AND LOGGING TO A CISCO ROUTER AND INTRODUCTION TO THE BASIC USER INTERFACES.)

- Open Cisco Packet Tracer
- Create a New Project: Go to File > New to create a new project
- Select a Router: On the bottom left, find the devices toolbar. Click on the Router icon.
- Choose a Router Model: Drag a router (e.g., 2911, 1941) into the workspace.
- Add a PC
- Connect Devices: Click on the Connections icon (lightning bolt) and select the appropriate cable (usually copper straight-through or crossover)
- Click on the router, select the appropriate interface (e.g., GigabitEthernet0/0), and then click on the device you want to connect to.



- Click on the Router: This opens the device configuration window.
- Select the CLI Tab: This will take you to the command-line interface of the router.
- Enter Privileged EXEC Mode: Type enable and press Enter. This takes you to privileged EXEC mode.
- Enter Global Configuration Mode: Type configure terminal or conf t and press Enter.

```
Would you like to enter the initial configuration
dialog? [yes/no]: no

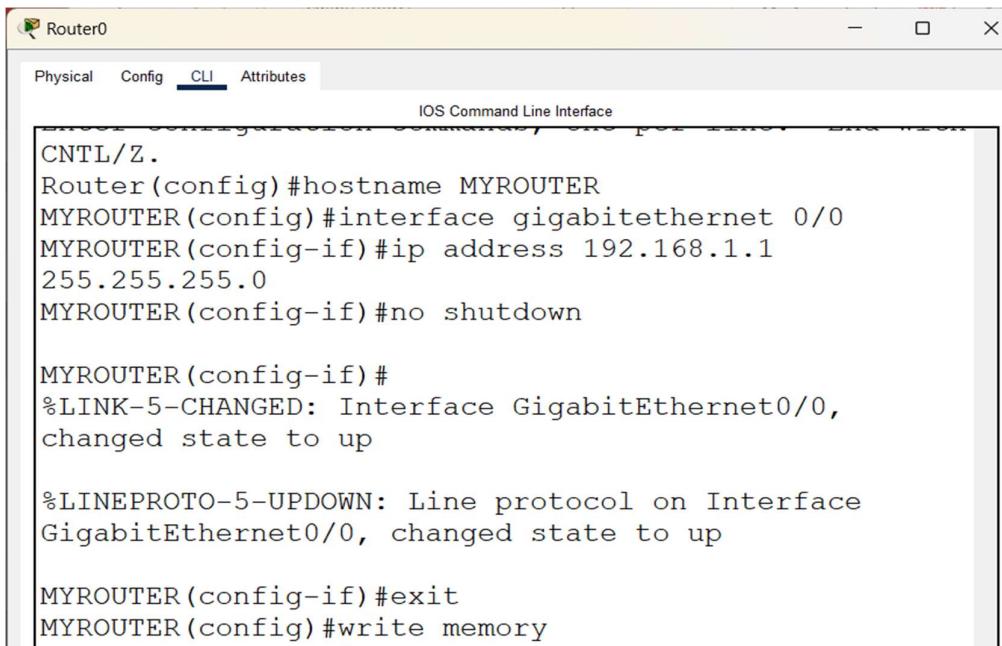
Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with
CNTL/Z.
Router(config)#
```

- Set the Router Hostname

```
Would you like to enter the initial configuration  
dialog? [yes/no]: no  
  
Press RETURN to get started!  
  
Router>enable  
Router#configure terminal  
Enter configuration commands, one per line. End with  
CNTL/Z.  
Router(config)#hostname MYROUTER  
MYROUTER(config)#[
```

- Select an Interface: For example, to configure the first GigabitEthernet interface.
- Assign an IP Address: Use the command to set an IP address and subnet mask.
- Activate the Interface: Enable the interface.
- Exit to Global Configuration Mode.
- Save the Configuration.



The screenshot shows a window titled "Router0" with tabs for "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is labeled "IOS Command Line Interface". The CLI session shows the following commands:

```
CNTL/Z.  
Router(config)#hostname MYROUTER  
MYROUTER(config)#interface gigabitethernet 0/0  
MYROUTER(config-if)#ip address 192.168.1.1  
255.255.255.0  
MYROUTER(config-if)#no shutdown  
  
MYROUTER(config-if)#  
%LINK-5-CHANGED: Interface GigabitEthernet0/0,  
changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface  
GigabitEthernet0/0, changed state to up  
  
MYROUTER(config-if)#exit  
MYROUTER(config)#write memory
```

- Enable Logging.
- Set Logging to Console.
- Set Logging to Buffer.

```
MYROUTER(config)#logging on  
MYROUTER(config)#logging console  
MYROUTER(config)#logging buffered 64000
```

- Verify Configuration.

- View the Configuration.

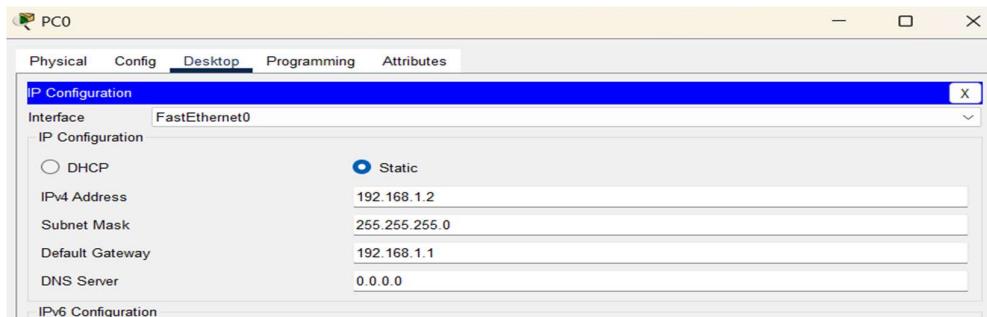
```
MYROUTER(config) # do show running-config
Building configuration...

Current configuration : 623 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname MYROUTER
!
```

- Check Interface Status.

```
MYROUTER(config) # do show ip interface brief
Interface          IP-Address      OK? Method
Status            Protocol
GigabitEthernet0/0 192.168.1.1    YES manual up
up
GigabitEthernet0/1 unassigned      YES unset
administratively down down
Vlan1             unassigned      YES unset
administratively down down
```

- Provide ip address ,subnet and default gateway to pc



To check the connectivity ping pc to router

```
C:\>ping 192.168.1.1

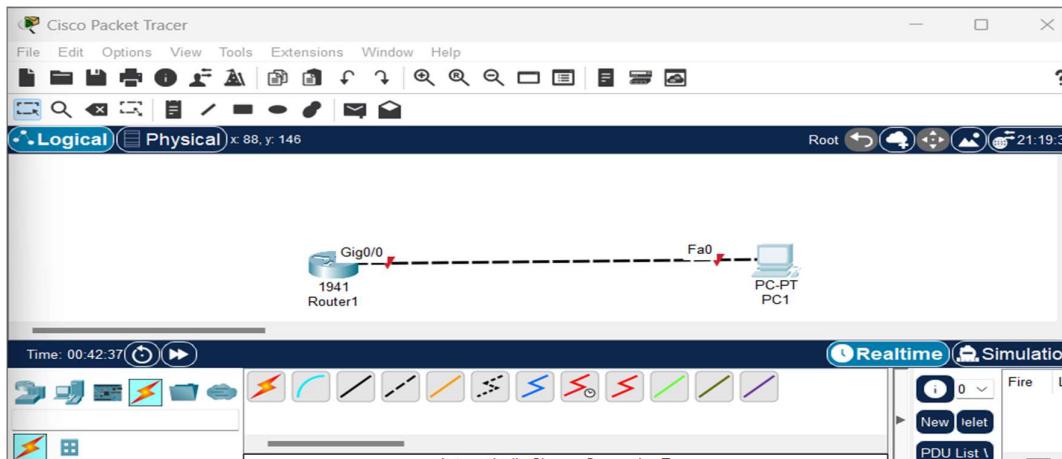
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

CONCLUSION: THE ABOVE PROGRAM HAS BEEN EXECUTED SUCCESSFULLY.

PROGRAM: (INTRODUCTION TO THE BASIC ROUTER CONFIGURATION AND BASIC COMMANDS.)

- Open Cisco Packet Tracer: Start the application on your computer.
- Create a New Project: Go to File > New to create a new project.
- Select the Router: Click on the Router icon from the devices toolbar at the bottom left.
- Choose a Router Model: Drag a router model (e.g., 2911, 1941) into the workspace.
- Add a PC or Switch.
- Click on the Connections icon (lightning bolt) and choose the appropriate cable (usually copper straight-through for PC to switch or switch to router).
- Click on the router's interface (e.g., GigabitEthernet0/0) and then on the device you want to connect.



- **Click on the Router:** This opens the device configuration window.
- **Select the CLI Tab:** This will take you to the command-line interface of the router.
- Enter Privileged EXEC Mode.
- Enter Global Configuration Mode.
- **Set the Router Hostname**

Would you like to enter the initial configuration dialog? [yes/no] : no

Press RETURN to get started!

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with
CNTL/Z.
Router(config)#hostname MYROUTER
```

- Configure Interfaces
- Assign an IP Address
- Activate the Interface
- Exit to Global Configuration Mode

```

MYROUTER(config)#interface gigabitethernet 0/0
MYROUTER(config-if)#ip address 192.168.1.1
255.255.255.0
MYROUTER(config-if)#no shutdown

MYROUTER(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0,
changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0, changed state to up

MYROUTER(config-if)#exit

```

- Save Configuration

```

MYROUTER(config)#do write memory
Building configuration...
[OK]
MYROUTER(config)#

```

- Verify Configuration
- View the Configuration: Use the following command to check your configurations

```

MYROUTER#show running-config
Building configuration...

Current configuration : 623 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname MYROUTER
!

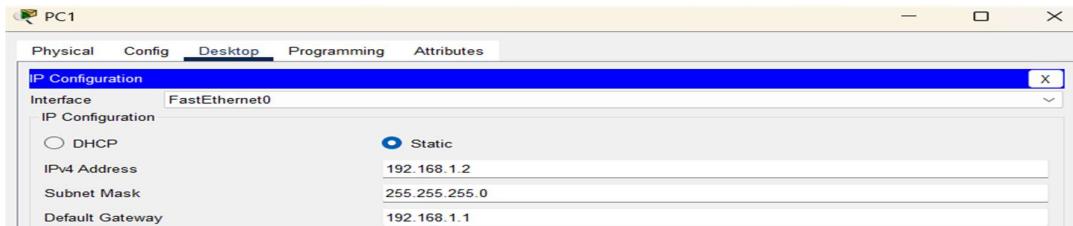
spanning-tree mode pvst
!
!
!
!
interface GigabitEthernet0/0
  ip address 192.168.1.1 255.255.255.0
  duplex auto
  speed auto
!
interface GigabitEthernet0/1
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface Vlan1
  no ip address
  shutdown
.

```

Check Interface Status: You can check interface statuses with

```
MYROUTER#show ip interface brief
Interface          IP-Address      OK? Method
Status            Protocol
GigabitEthernet0/0 192.168.1.1    YES manual up
up
GigabitEthernet0/1 unassigned     YES unset
administratively down down
Vlan1             unassigned     YES unset
administratively down down
MYROUTER#
```

- Basic Router Commands
- Show Running Configuration: MyRouter# show running-config
- Show Startup Configuration: MyRouter# show startup-config
- Show Interface Status: MyRouter# show ip interface brief
- Ping a Host: To check connectivity to another device, use: MyRouter# ping 192.168.1.2



```
MYROUTER#ping 192.168.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.2,
timeout is 2 seconds:
.!!!!!
Success rate is 80 percent (4/5), round-trip min/avg/
max = 0/0/3 ms
```

- Traceroute to a Host: To find the path to a specific destination: MyRouter# traceroute 8.8.8.8

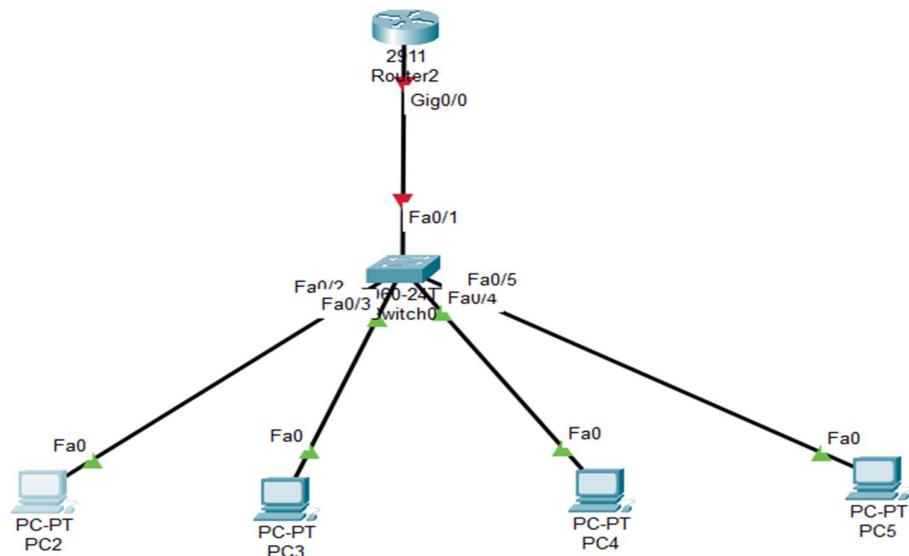
```
MYROUTER#traceroute 192.168.1.2
Type escape sequence to abort.
Tracing the route to 192.168.1.2
  1  192.168.1.2      0 msec      0 msec      0 msec
MYROUTER#traceroute 192.168.1.1
Type escape sequence to abort.
Tracing the route to 192.168.1.1
  1  192.168.1.1      8 msec      4 msec      0 msec
```

Clear the Screen: To clear the CLI screen: MyRouter# clear

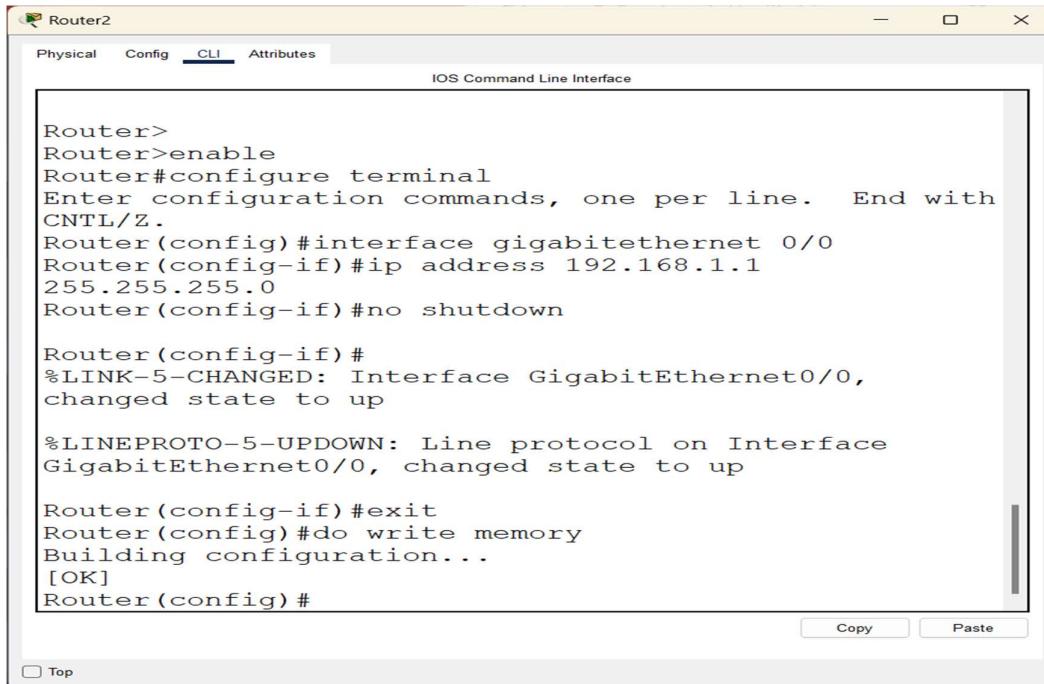
CONCLUSION: THE ABOVE PROGRAM HAS BEEN EXECUTED SUCCESSFULLY.

PROGRAM: (CONFIGURE A DHCP SERVER TO SERVE CONTIGUOUS IP ADDRESSES TO A POOL OF FOUR IP DEVICES WITH A DEFAULT GATEWAY AND A DEFAULT DNS ADDRESS. INTEGRATE THE DHCP SERVER WITH A BOOTP DEMON TO AUTOMATICALLY SERVE WINDOWS AND LINUX OS BINARIES BASED ON CLIENT MAC ADDRESS.)

- Launch Cisco Packet Tracer
- Open Cisco Packet Tracer: Start the application on your computer.
- Create a New Project: Go to File > New to create a new project.
- Add Devices to the Workspace
- Add a Router:
 - Select the Router icon from the bottom left device panel.
 - Drag a router (e.g., 2911 or 1941) into the workspace.
- Add a Switch:
 - Click on the Switch icon and drag a switch (e.g., 2960) into the workspace.
- Add PCs:
 - Click on the End Devices icon and drag four PCs into the workspace.
- Connect the Devices
- Connect the Router to the Switch:
 - Click on the Connections icon (lightning bolt).
 - Select Copper Straight-Through cable.
 - Click on the router, choose an interface (e.g., GigabitEthernet0/0), then click on the switch and choose any interface (e.g., FastEthernet0/1).
- Connect the PCs to the Switch:
 - Use the same Copper Straight-Through cable to connect:
 - PC1 to FastEthernet0/2 on the switch.
 - PC2 to FastEthernet0/3 on the switch.
 - PC3 to FastEthernet0/4 on the switch.
 - PC4 to FastEthernet0/5 on the switch.



- Configure the Router



```

Router>
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gigabitethernet 0/0
Router(config-if)#ip address 192.168.1.1
255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0,
changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0, changed state to up

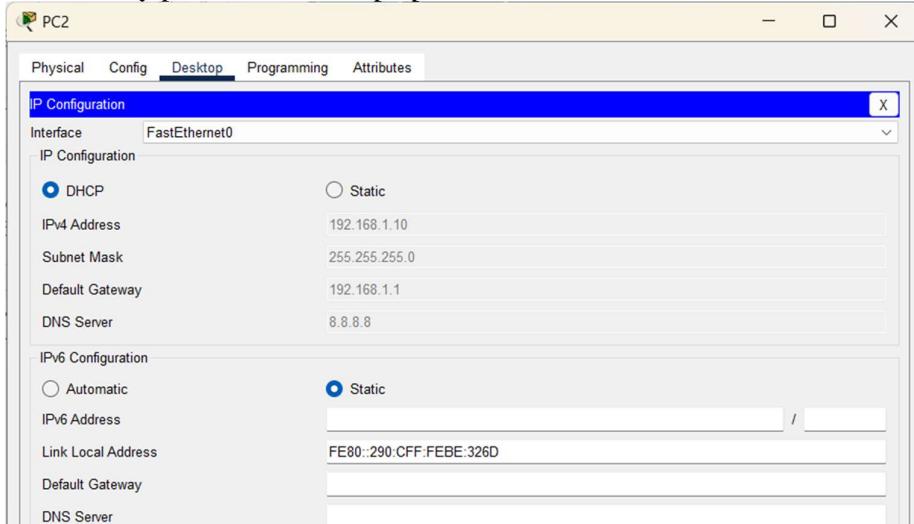
Router(config-if)#exit
Router(config)#do write memory
Building configuration...
[OK]
Router(config)#

```

Top

Copy Paste

- Go on every pc and on the dhcp option



- Configure the DHCP Server

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#service dhcp
Router(config)#ip dhcp pool MyDHCPPool
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ip dhcp excluded-address 192.168.1.1 192.168.1.9
Router(config)#ip dhcp excluded-address 192.168.1.14 192.168.1.255
Router(config)#

```

- Configure BOOTP for OS Binaries
- Click on each PC>DESKTOP>PING the router from each pc

The image displays three separate windows from the Cisco Packet Tracer software, each titled with a computer icon and a name (PC2, PC3, or PC4). Each window has a menu bar with tabs: Physical, Config, Desktop, Programming, and Attributes. The 'Desktop' tab is selected in all three windows. Below the menu bar is a blue command prompt window titled 'Command Prompt'. Each window contains the following text output:

```

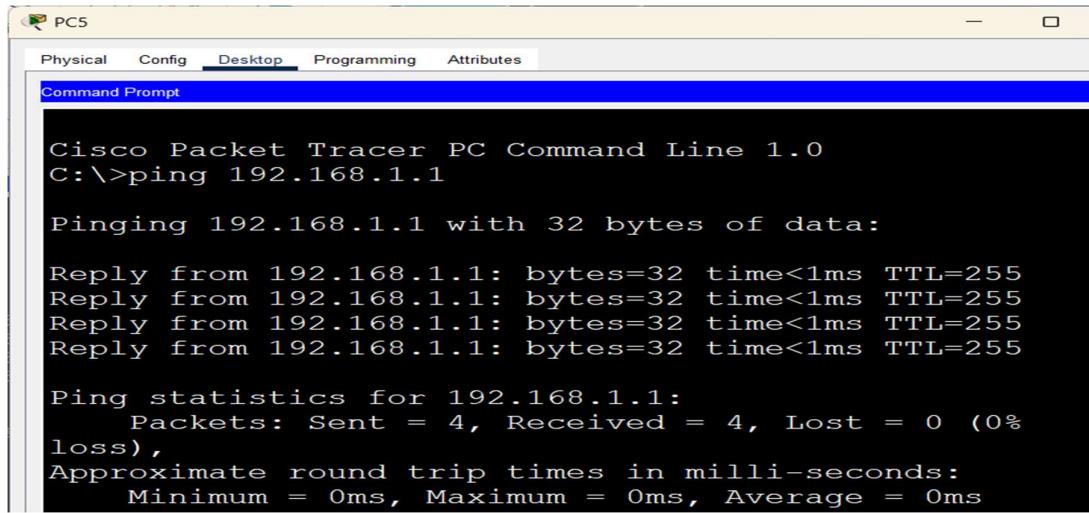
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=6ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 1ms
  
```

The text is identical in all three windows, indicating successful pings from each PC to the same target IP address.



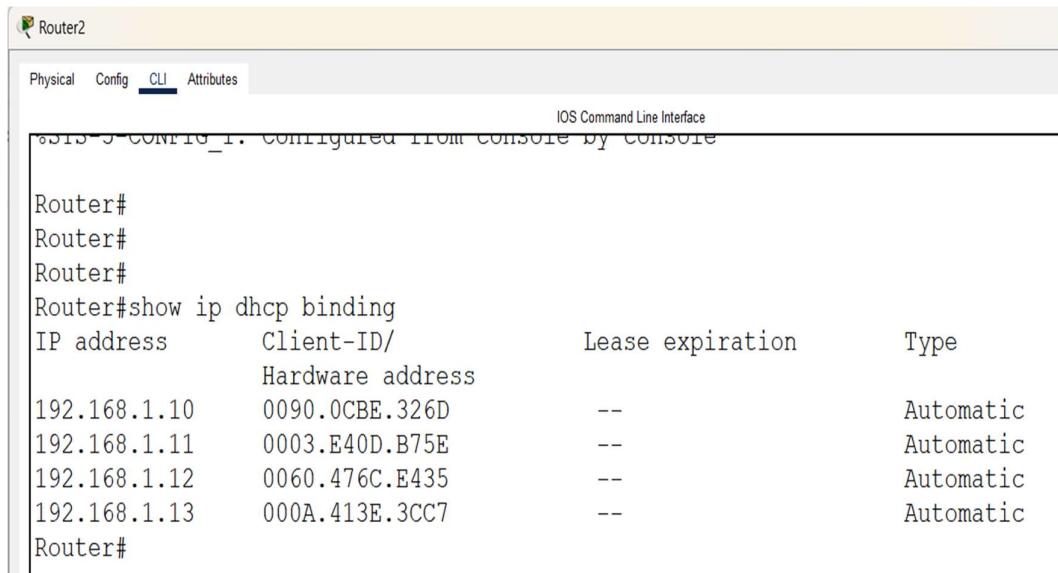
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms

- Click on router >go to CLI mode >show ip dhcp binding

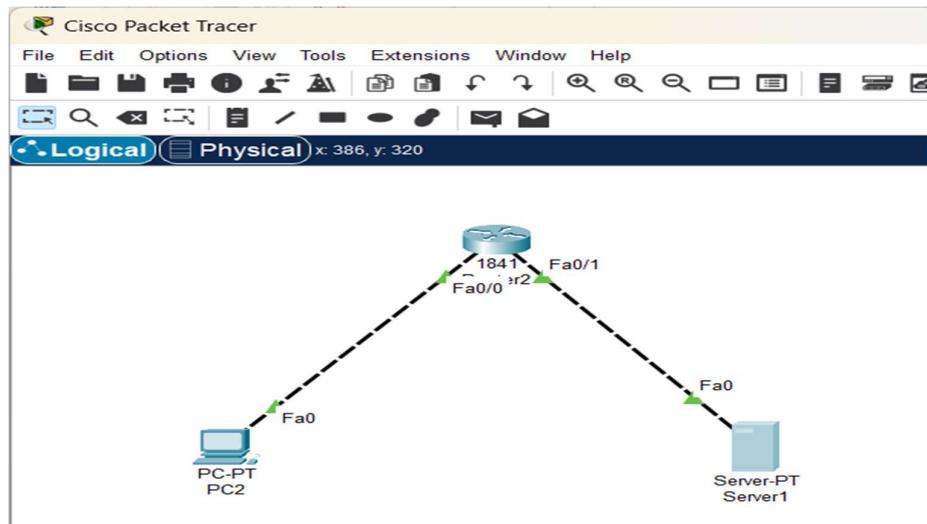


Router#
Router#
Router#
Router#show ip dhcp binding
IP address Client-ID/ Lease expiration Type
Hardware address
192.168.1.10 0090.0CBE.326D -- Automatic
192.168.1.11 0003.E40D.B75E -- Automatic
192.168.1.12 0060.476C.E435 -- Automatic
192.168.1.13 000A.413E.3CC7 -- Automatic
Router#

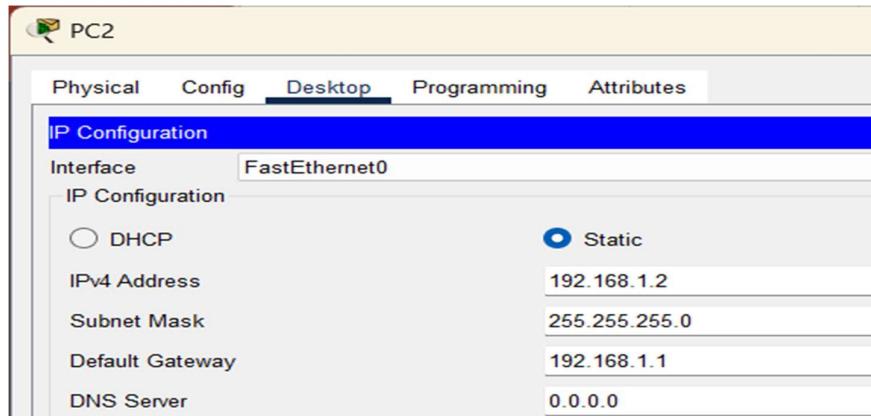
CONCLUSION: THE ABOVE PROGRAM HAS BEEN EXECUTED SUCCESSFULLY.

PROGRAM: (CONFIGURE TRANSMISSION CONTROL PROTOCOL(TCP) USING RELEVANT SOFTWARE.)

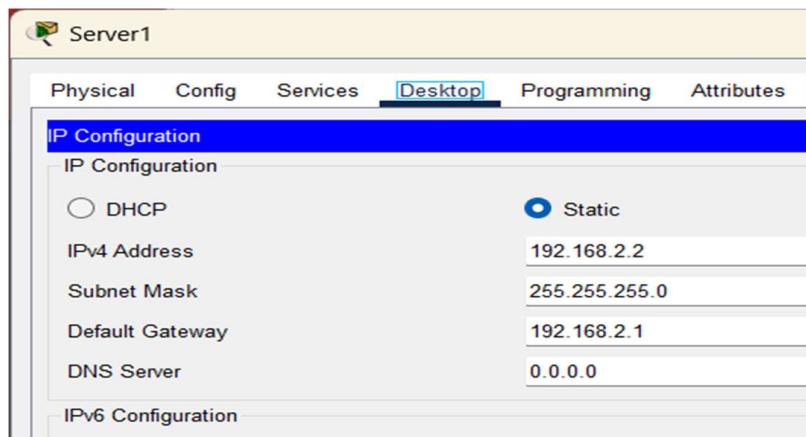
- Configuring TCP-Based Communication Between a PC and a Server Using a Router
- Steps:
- Devices Needed:
 - 1 Router (e.g., Cisco 1841)
 - 1 PC
 - 1 Server (Generic Server)
 - Copper Straight-Through cables
- Step-by-Step Configuration:
 - Step 1: Add Devices to the Workspace
 - Open Cisco Packet Tracer.
- Drag and drop the following devices from the End Devices and Network Devices sections:
 - 1 PC
 - 1 Server
 - 1 Router
- Use Copper Straight-Through cables to connect:
 - PC to Router's FastEthernet 0/0 port.
 - Server to Router's FastEthernet 0/1 port.



- Step 2: Assign IP Addresses
- Configure the PC:
 - Click on the PC.
 - Go to the Desktop tab and select IP Configuration.
 - Set the following:
 - IP Address: 192.168.1.2
 - Subnet Mask: 255.255.255.0
 - Default Gateway: 192.168.1.1 (Router interface address)



- Configure the Server:
- Click on the Server.
- Go to the Desktop tab and select IP Configuration.
- Set the following:
 - IP Address: 192.168.2.2
 - Subnet Mask: 255.255.255.0
 - Default Gateway: 192.168.2.1 (Router interface address)



- Configure the Router:
- Click on the Router and go to the CLI tab.
- Enter the following commands to configure the router interfaces:

Router> enable

Router# configure terminal

! Configure FastEthernet 0/0 (connected to PC)

Router(config)# interface FastEthernet 0/0

Router(config-if)# ip address 192.168.1.1 255.255.255.0

```
Router(config-if)# no shutdown
```

```
! Configure FastEthernet 0/1 (connected to Server)
```

```
Router(config)# interface FastEthernet 0/1
```

```
Router(config-if)# ip address 192.168.2.1 255.255.255.0
```

```
Router(config-if)# no shutdown
```

```
! Exit interface configuration
```

```
Router(config-if)# exit
```

- Step 3: Verify Connectivity
- Ping between the PC and Server:
 - On the PC, go to the Command Prompt (from Desktop tab) and type: ping 192.168.2.2
 - If the ping is successful, the basic IP configuration between the PC, Router, and Server is working.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.1368..2.1
Ping request could not find host 192.1368..2.1. Please check the name and try again.
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

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
```

- Step 4: Configure and Test TCP Communication (HTTP)
 - On the Server:
 - Click on the Server, go to the Services tab.
 - Select HTTP and ensure it is enabled (by default, it is ON).

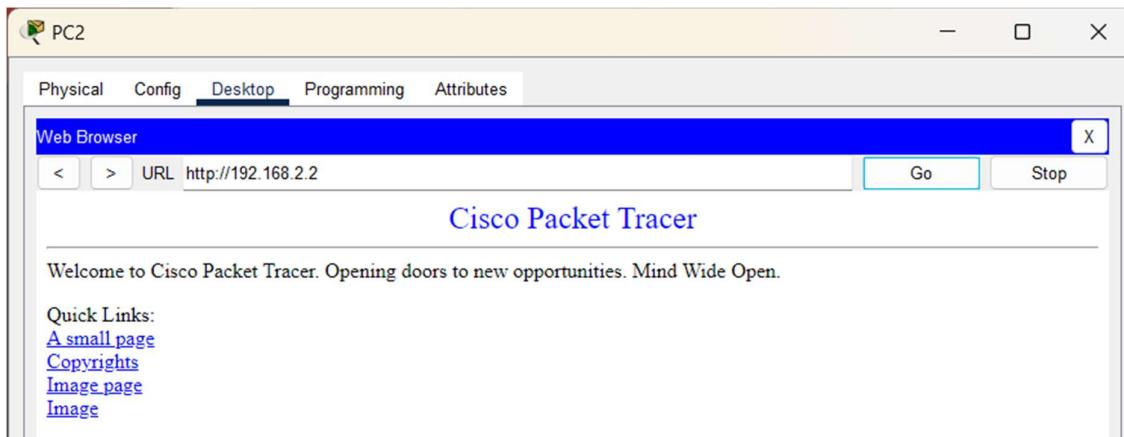


On the PC:

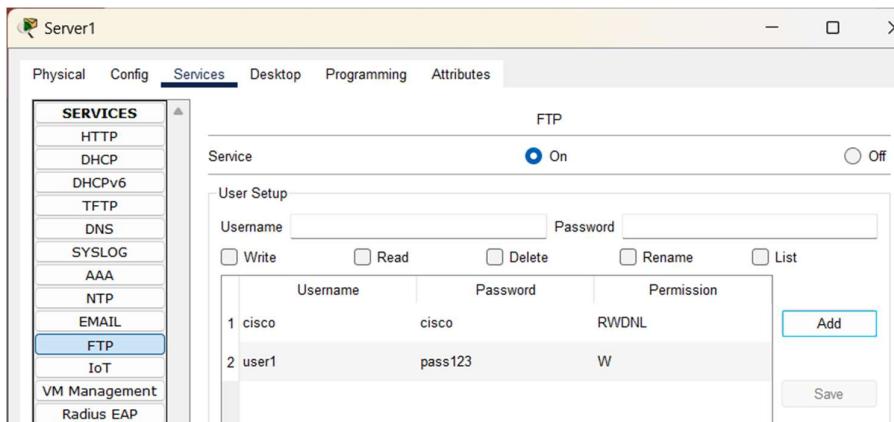
Click on the PC, go to the Desktop tab, and open the Web Browser.

In the web browser, type the server's IP address (e.g., <http://192.168.2.2>).

If the TCP communication is working, the server's default webpage will load, confirming that the TCP handshake has been established and communication is successful.



- Step 5: Optional – Test TCP Using FTP
- On the Server:
- Go to the Services tab and select FTP.
- Ensure that FTP is enabled.
- Add a user for FTP access (e.g., username: user1 and password: pass123).



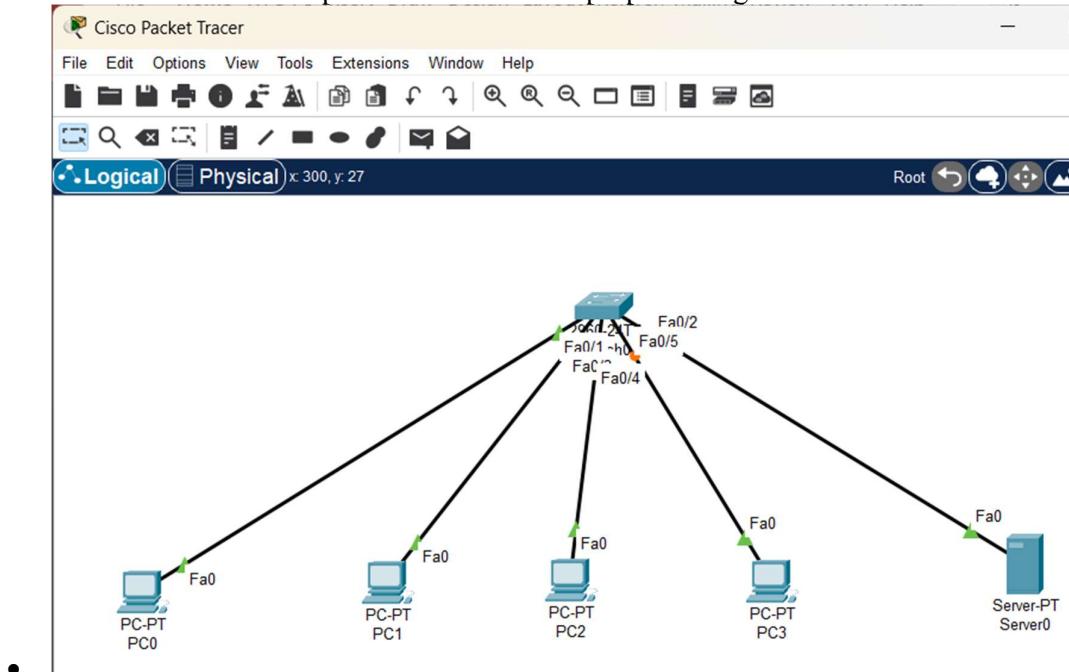
- On the PC:
- Open the Command Prompt in the Desktop tab of the PC.
- Type the following command to initiate an FTP session: <ftp 192.168.2.2>
- Enter the username and password when prompted.
- Once authenticated, you can use FTP commands like put (to upload a file) or get (to download a file) to test TCP-based file transfer.

```
C:\>ftp 192.168.2.2
Trying to connect...192.168.2.2
Connected to 192.168.2.2
220- Welcome to PT Ftp server
Username:user1
331- Username ok, need password
Password:
230- Logged in
      (passive mode On)
ftp>put?
      Invalid or non supported command.
ftp>put
      local filename not specified
ftp>
```

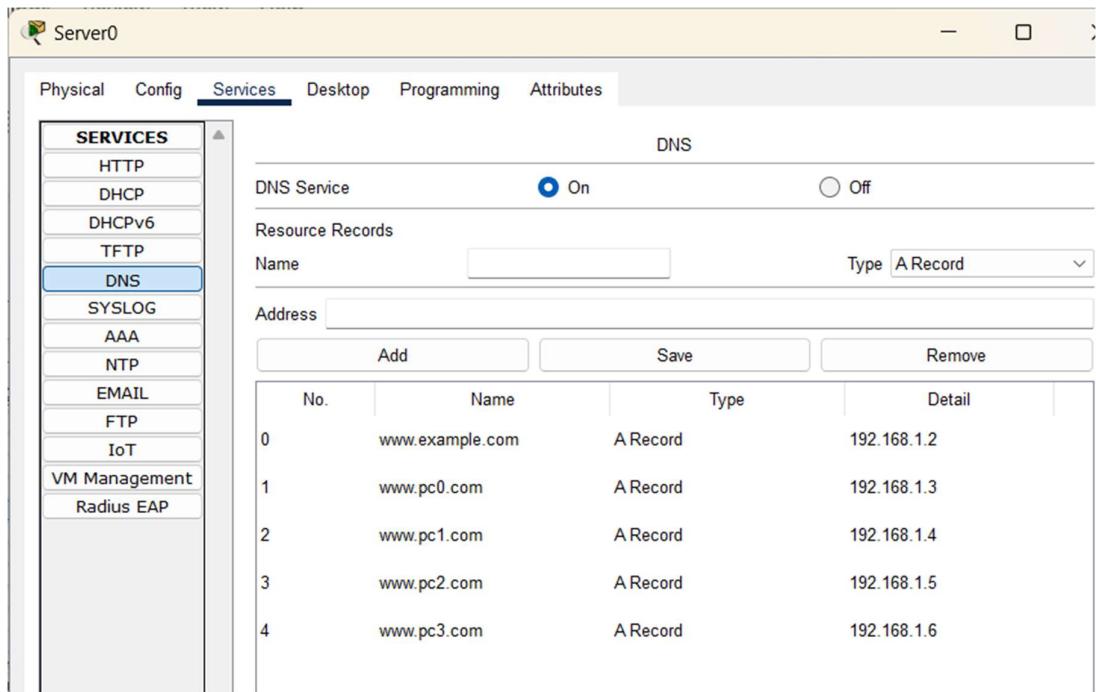
CONCLUSION: THE ABOVE PROGRAM HAS BEEN EXECUTED SUCCESSFULLY.

PROGRAM: (CONFIGURE DOMAIN NAME SERVER (DNS) USING RELEVANT SOFTWARE.)

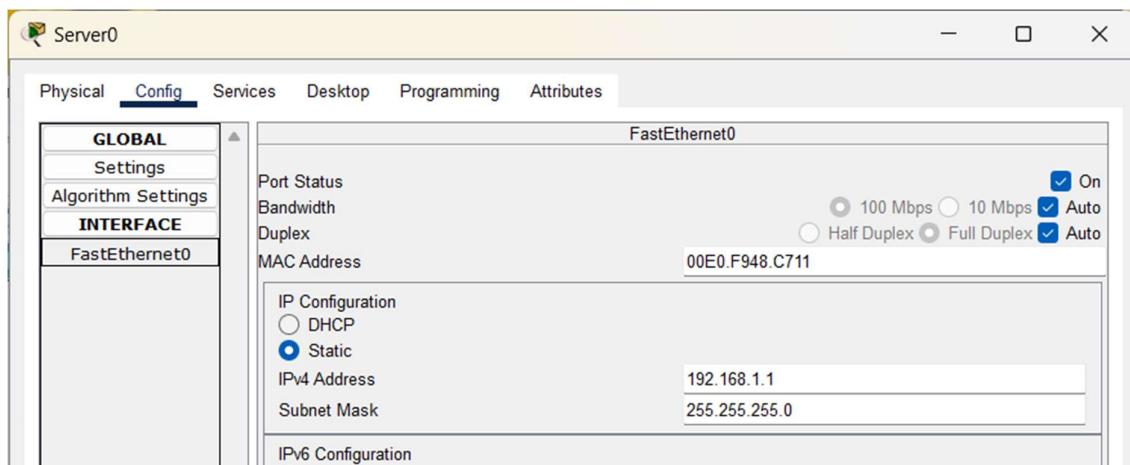
- Set up the Network:
- Open Cisco Packet Tracer.
- Add the necessary devices: PC, Switch, and a Server from the available device categories.
- Connect the Devices:
- Use the copper straight-through cable to connect the PCs, Server, and any other devices to the Switch.
- Ensure all devices are powered on and have proper configurations.



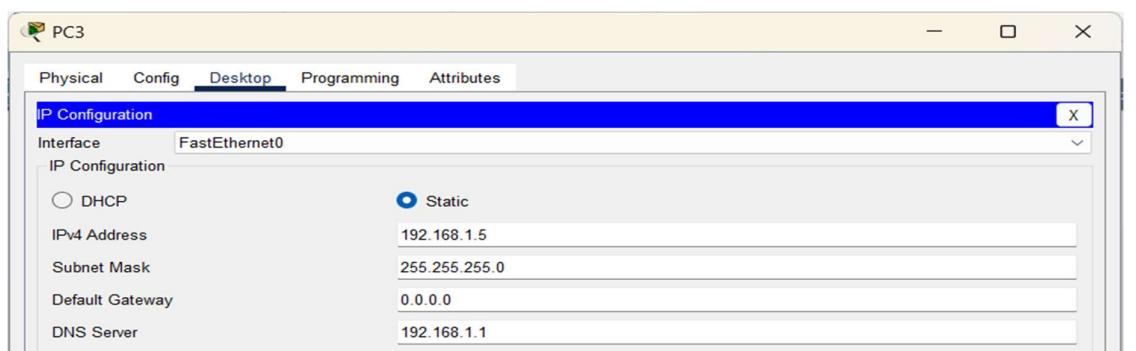
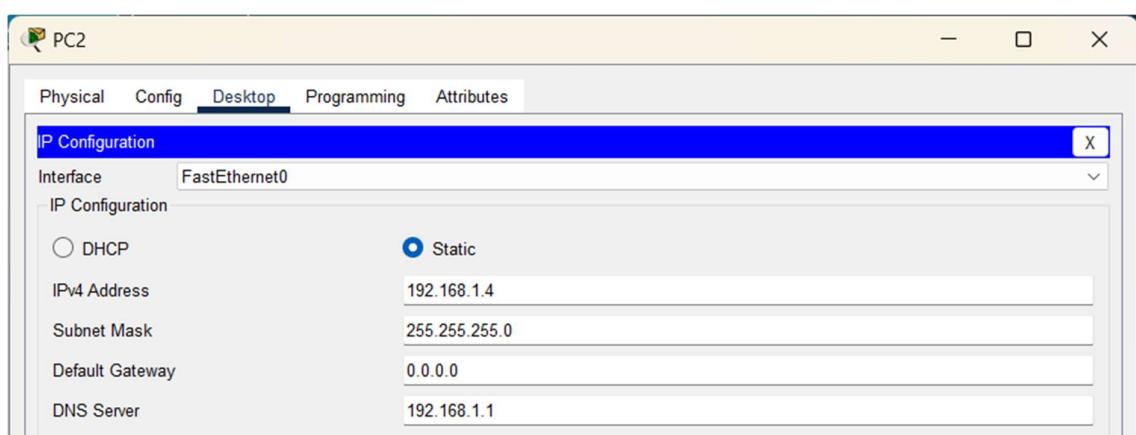
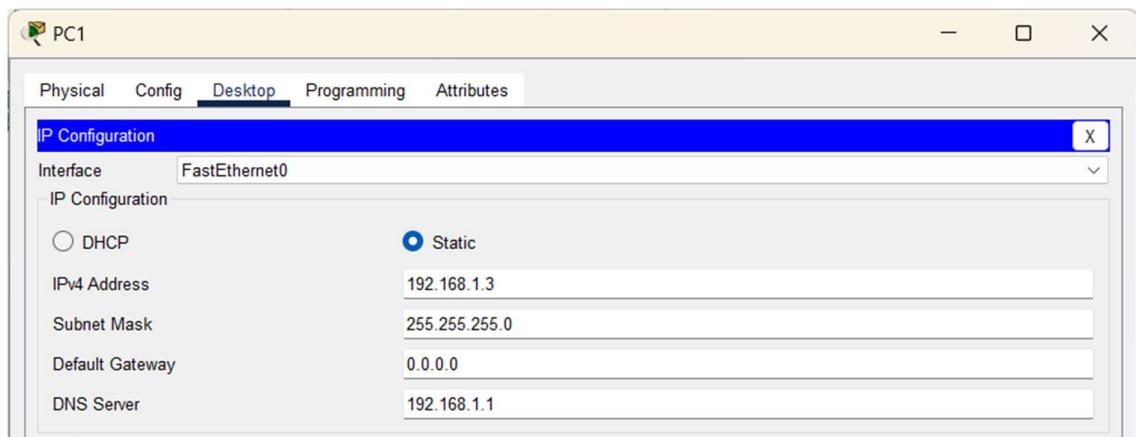
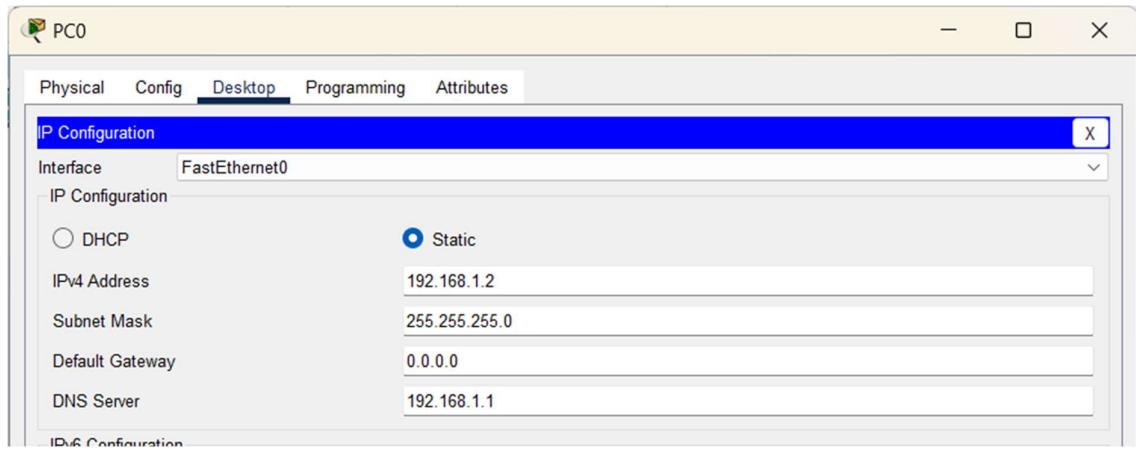
- Configure the Server:
 - Drag and drop a Server onto the workspace.
 - Click on the server to open its configuration menu.
 - Go to the Config tab, then click on the DNS option in the left menu.
 - Turn on the DNS Service by selecting On.
 - Add the Host Name and the corresponding IP Address mappings (A records). For example:
 - Host Name: www.example.com
 - IP Address: 192.168.1.2
 - Repeat for additional domain names if needed.
 - For 4 PCs 4 domain names



- Assign IP Address to the Server:
- In the same Config tab, go to FastEthernet0 under the INTERFACE section.
- Assign the server a Static IP Address (e.g., 192.168.1.1).
- Set the Subnet Mask (e.g., 255.255.255.0).



- Configure the PCs:
- Drag and drop a PC onto the workspace.
- Open the PC and go to the Desktop tab.
- Click on IP Configuration.
- Set the IP Address (e.g., 192.168.1.1), Subnet Mask (255.255.255.0), and DNS Server IP as the IP Address of the DNS server (e.g., 192.168.1.1).
- Follow same for other pcs.



- Optionally, configure the Default Gateway.
- Test the Configuration:
- Go to the PC and open the Command Prompt from the Desktop tab.
- Use the ping command to test connectivity (e.g., ping www.example.com).
- You can also use the Web Browser in the PC to access www.example.com to verify that the DNS is correctly resolving the domain name to the IP address.

```
C:\>ping www.example.com

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=3ms TTL=128
Reply from 192.168.1.2: bytes=32 time=4ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms

C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=128
Reply from 192.168.1.1: bytes=32 time<1ms TTL=128
Reply from 192.168.1.1: bytes=32 time<1ms TTL=128
Reply from 192.168.1.1: bytes=32 time=2ms TTL=128

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
CISCO Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping www.example.com

Pinging 192.168.1.2 with 32 bytes of data:

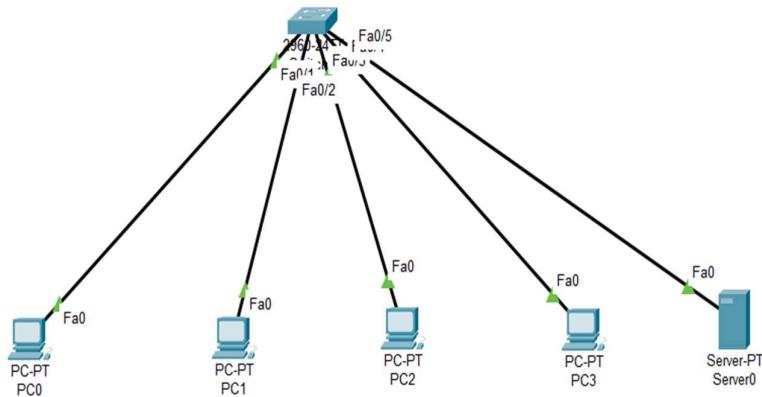
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
```

CONCLUSION: THE ABOVE PROGRAM HAS BEEN EXECUTED SUCCESSFULLY.

PROGRAM: CONFIGURE HYPERTEXT TRANSFER PROTOCOL (HTTP) USING RELEVANT SOFTWARE

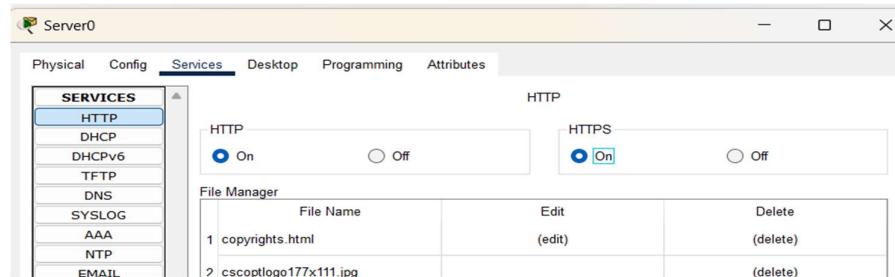
1. Set Up the Network:

- Open Cisco Packet Tracer.
- Add a Server, several PCs, and a Switch to your workspace.
- Connect all devices using copper straight-through cables.



2. Configure the Server:

- Click on the Server to open its configuration menu.
- Go to the Config tab, then click on HTTP in the left menu.
- Enable the HTTP Service by selecting On.



- Optionally, add a Web Page:
 - You can customize the web page by adding text or HTML content. For instance, you can enter a simple HTML snippet like:

```
html
Copy code
<html>
<head>
<title>Welcome to My Server</title>
</head>
```

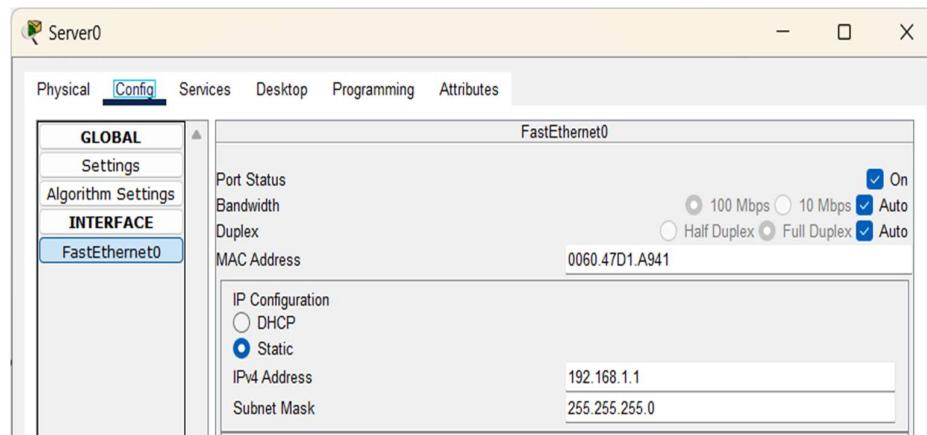
```

<body>
<h1>Hello, World!</h1>
<p>This is a simple web server setup.</p>
</body>
</html>

```



- Assign an IP Address to the server:
 - Go to the FastEthernet0 section in the Config tab.
 - Set the IP Address (e.g., 192.168.1.1) and the Subnet Mask (e.g., 255.255.255.0).



3. Configure the PCs:

- For each PC:
 1. Click on the PC to open its configuration menu.
 2. Go to the Desktop tab.
 3. Click on IP Configuration.
 4. Assign a unique IP Address to each PC, ensuring they are in the same subnet (e.g.):
 - PC1: 192.168.1.2
 - PC2: 192.168.1.3
 - PC3: 192.168.1.4
 - PC4: 192.168.1.5
 5. Set the Default Gateway to the IP Address of the server (192.168.1.1).
 6. You can leave the DNS Server blank for this configuration.

The image displays four separate windows, each representing a different computer (PC0, PC1, PC2, and PC3). Each window shows the 'IP Configuration' tab of a network configuration interface. The 'Interface' is consistently set to 'FastEthernet0'. The 'IP Configuration' section includes fields for 'IPv4 Address', 'Subnet Mask', 'Default Gateway', and 'DNS Server'. In all four cases, the 'Static' radio button is selected. The specific values are as follows:

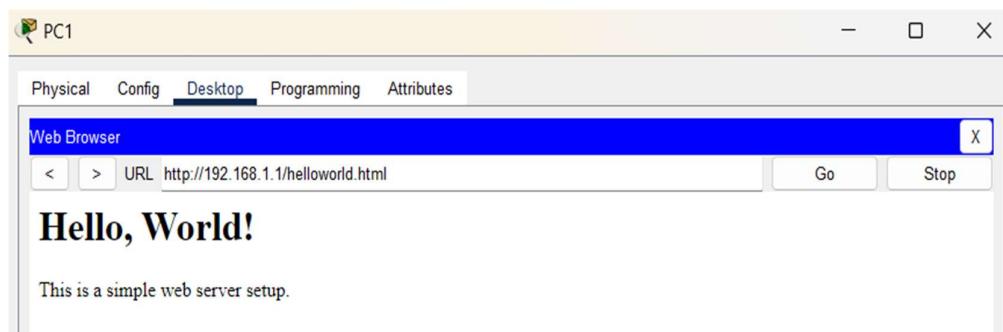
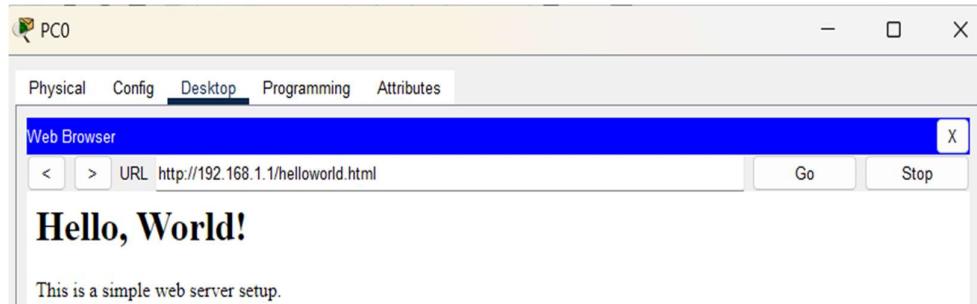
Computer	IPv4 Address	Subnet Mask	Default Gateway	DNS Server
PC0	192.168.1.2	255.255.255.0	192.168.1.1	0.0.0.0
PC1	192.168.1.3	255.255.255.0	192.168.1.1	0.0.0.0
PC2	192.168.1.4	255.255.255.0	192.168.1.1	0.0.0.0
PC3	192.168.1.5	255.255.255.0	192.168.1.1	0.0.0.0

4. Connect Devices:

- Ensure all devices are properly connected to the Switch with copper straight-through cables.

5. Test the Configuration:

1. Open a Web Browser on one of the PCs (e.g., PC1):
 - o Go to the Desktop tab and click on Web Browser.
 - o In the address bar, enter the server's IP address: <http://192.168.1.1>.
2. Check for the Web Page:
 - o You should see the HTML content you set up earlier (e.g., "Hello, World!").



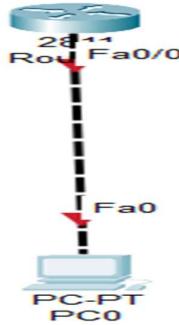
CONCLUSION: THE ABOVE PROGRAM HAS BEEN EXECUTED SUCCESSFULLY.

PROGRAM: (A. USE TELNET TO LOGIN A REMOTE MACHINE B. CONNECT REMOTE MACHINE USING SECURE SHELL)

Part 1: Telnet Configuration

Step 1: Configure the Router for Telnet Access

1. Open Packet Tracer and create a new project.
2. Add a Router and a PC to the workspace.
3. Connect the PC to the Router using a copper straight-through cable:
 - o Click the PC and connect it to the router's FastEthernet0/0 port.



4. Configure the Router's interface:
 - o Click on the Router and go to the CLI tab.
 - o Use the following commands to configure the IP address on the router and enable Telnet:

Enable

configure terminal

interface FastEthernet0/0

ip address 192.168.1.1 255.255.255.0

no shutdown

exit

```

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with
CTRL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 192.168.1.1
255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed
state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up

Router(config-if)#exit

```

Configure Telnet on the router:

- Still in the Router CLI, configure Telnet on the vty lines:

```

line vty 0 4
password cisco
login
exit
enable password cisco

```

```

Router(config)#line vty 0 4
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#exit
Router(config)#enable password cisco
Router(config)#

```

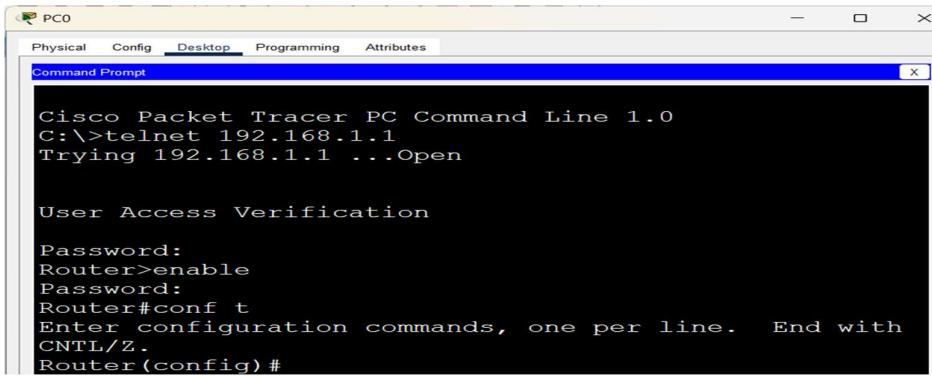
Step 2: Configure the PC for Telnet Access

- Click on the PC and go to the Desktop tab.
- Select the IP Configuration option.
 - Set the IP address to 192.168.1.2 and Subnet Mask to 255.255.255.0.
 - Set the Default Gateway to 192.168.1.1.



Step 3: Access the Router using Telnet from the PC

- On the PC, go to the Desktop tab and open the Command Prompt.
- Use the following command to connect to the router via Telnet: telnet 192.168.1.1
- When prompted, enter the Telnet password (cisco).
- To enter privileged EXEC mode, type enable and then enter the enable password (cisco).



The screenshot shows a window titled "Cisco Packet Tracer PC Command Line 1.0". The menu bar includes "Physical", "Config", "Desktop", "Programming", and "Attributes". A tab labeled "Command Prompt" is selected. The main window displays the following text:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>telnet 192.168.1.1
Trying 192.168.1.1 ...Open

User Access Verification

Password:
Router>enable
Password:
Router#conf t
Enter configuration commands, one per line. End with
CTRL/Z.
Router(config) #
```

Part 2: SSH Configuration

Step 1: Configure the Router for SSH Access

1. Use the same Router as in the Telnet example. If it's not already configured, repeat Step 1 from the Telnet section to set up the basic interface and IP address.
2. In the Router CLI, use the following commands to configure SSH:

```
enable
configure terminal
hostname Router1
ip domain-name example.com
crypto key generate rsa
# When prompted for key size, type 1024
username admin privilege 15 secret adminpass
line vty 0 4
transport input ssh
login local
exit
```

```

Router>enable
Password:
Password:
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Router1
Router1(config)#ip domain-name example.com
Router1(config)#crypto key generate rsa
The name for the keys will be: Router1.example.com
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

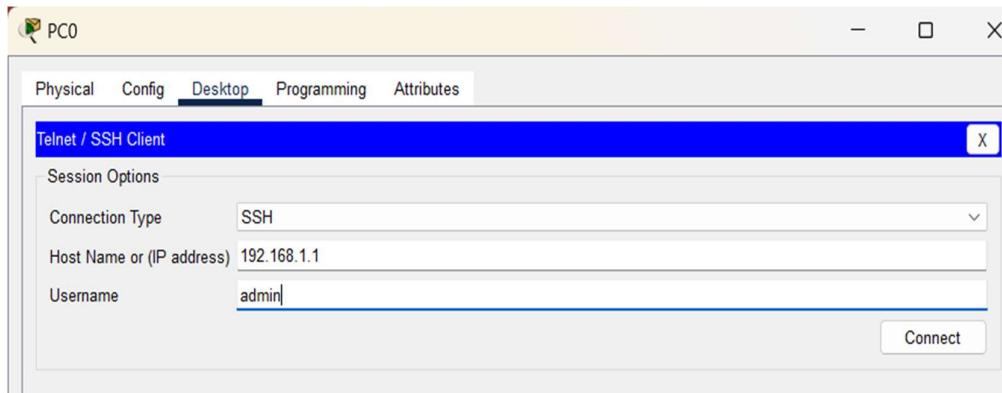
How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

Router1(config)#username admin privilege 15 secret adminpass
*Mar 1 0:16:42.480: %SSH-5-ENABLED: SSH 1.99 has been enabled
Router1(config)#line vty 0 4
Router1(config-line)#transport input ssh
Router1(config-line)#login local
Router1(config-line)#exit

```

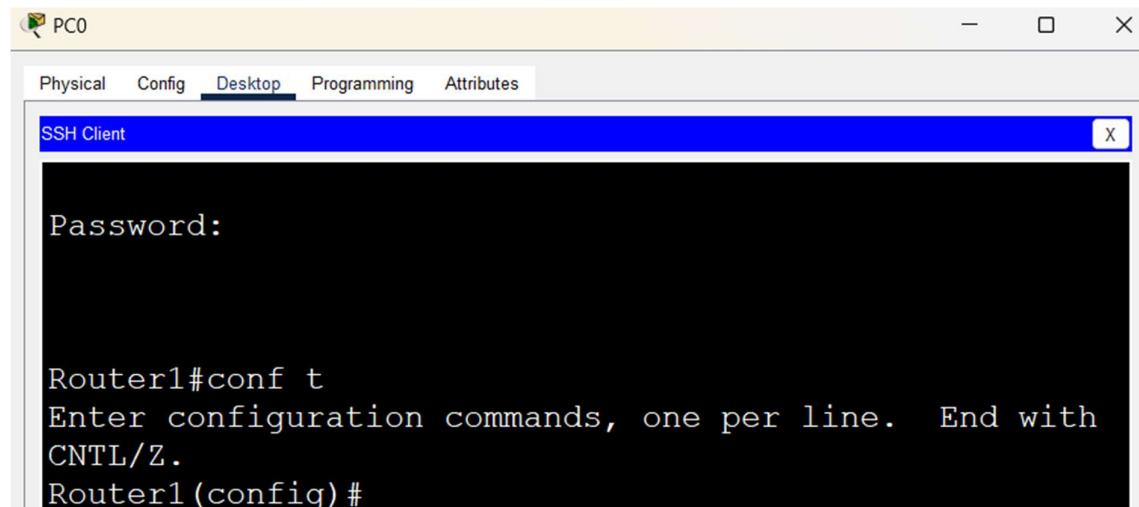
Step 2: Configure the PC for SSH Access

1. On the PC, go to the Desktop tab.
2. Open the SSH Client tool.
 - o For the Host, enter the IP address of the router (192.168.1.1).
 - o For the Username, enter admin.
 - o For the Password, enter adminpass.
3. Click Connect.



Step 3: Access the Router using SSH from the PC

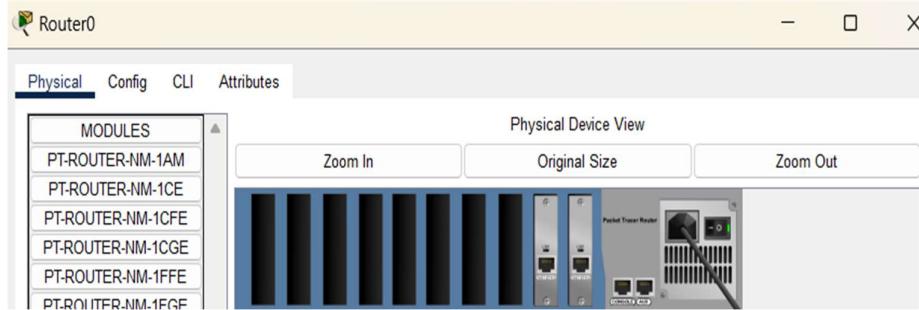
1. Once connected, you can manage the router remotely using SSH.
2. If needed, type enable to access privileged EXEC mode.



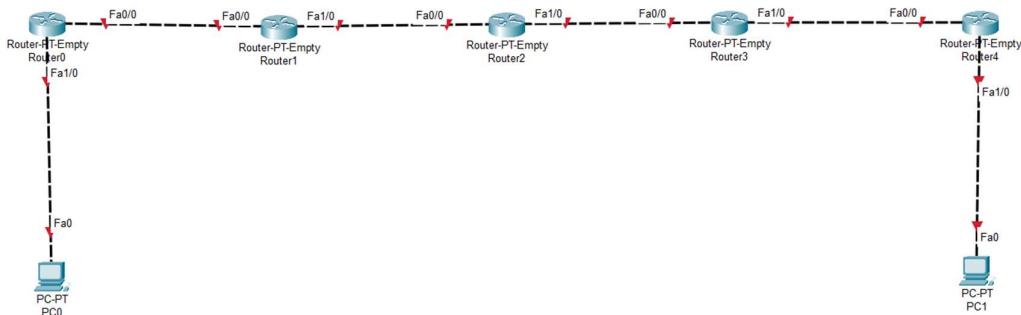
CONCLUSION: THE ABOVE PROGRAM HAS BEEN EXECUTED SUCCESSFULLY.

**PROGRAM: (CONFIGURE, IMPLEMENT AND DEBUG THE FOLLOWING:
USE OPEN SOURCE TOOLS FOR DEBUGGING AND DIAGNOSTICS, A. STATIC
ROUTES (CHECK USING NETSTAT))**

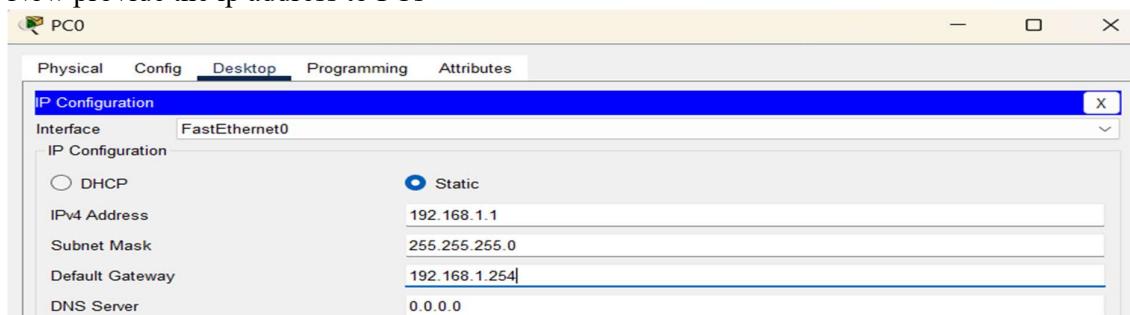
- Open cisco packet tracer
- Add a several routers, PCs, and a Switch to your workspace.
- Connect all devices using copper straight-through cables.
- Here we are using PT-Empty router—select router OFF the power button>drag and drop PT-ROUTER-NM-1CFE>Turn ON the power button(repeat for every router)

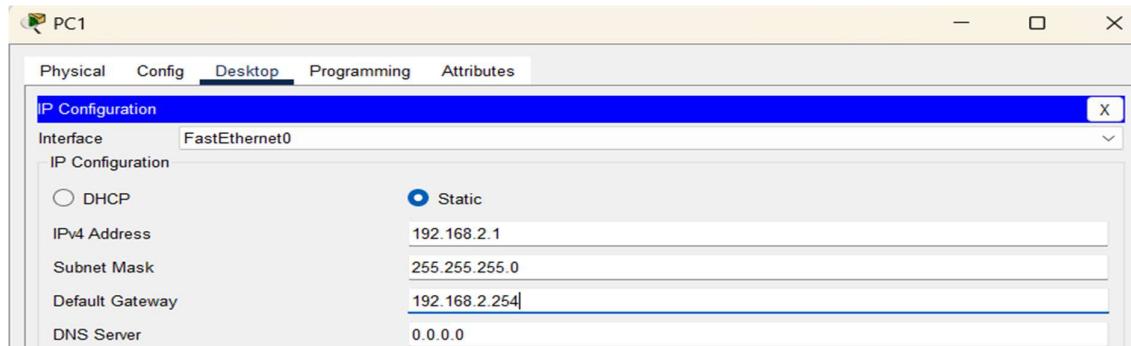


- Now connect all the router and PCs



- Now provide the ip address to PCs





- Now configure the routers . provide the ip interface to every fastethernet connection.

Router 0

```

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet 1/0
Router(config-if)#ip address 192.168.1.245 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

Router(config-if)#exit
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 200.1.61.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

Router(config-if)#exit

```

Router 1

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 200.1.61.2 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#interface fastethernet 1/0
Router(config-if)#ip address 200.1.15.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

Router(config-if)#exit
Router(config)#do write memory
Building configuration...
[OK]
Router(config)#

```

Router 2

Router 2

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 200.1.15.2 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#interface fastethernet 1/0
Router(config-if)#ip address 200.1.54.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

Router(config-if)#exit
Router(config)#do write memory
Building configuration...
[OK]
Router(config)#

```

Router 3

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 200.1.54.2 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#interface fastethernet 1/0
Router(config-if)#ip address 200.1.41.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

Router(config-if)#exit
Router(config)#do write memory
Building configuration...
[OK]
Router(config)#

```

Router 4

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 200.1.41.2 255.255.255.0
Router(config-if)#
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#interface fastethernet 1/0
Router(config-if)#ip address 192.168.2.254 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

Router(config-if)#exit
Router(config)#do write memory
Building configuration...
[OK]

```

- Configure Static Routes on Routers:
- Router 0
 - | Router(config)#ip route 192.168.2.0 255.255.255.0 200.1.61.2
- Router 1

- | Router(config)#ip route 192.168.2.0 255.255.255.0 200.1.15.2
- Router 2
 - | Router(config)#ip route 192.168.2.0 255.255.255.0 200.1.54.2
- Router 3
 - | Router(config)#ip route 192.168.2.0 255.255.255.0 200.1.41.2
- Router 4
 - | Router(config)#ip route 192.168.1.0 255.255.255.0 200.1.41.1
- Router 3
 - | Router(config)#ip route 192.168.1.0 255.255.255.0 200.1.54.1
- Router 2
 - | Router(config)#ip route 192.168.1.0 255.255.255.0 200.1.15.1
- Router 1
 - | Router(config)#ip route 192.168.1.0 255.255.255.0 200.1.61.1
- Now ping pc1 to pc2

CONCLUSION: THE ABOVE PROGRAM HAS BEEN EXECUTED SUCCESSFULLY.

