

**PES UNIVERSITY EC CAMPUS, BANGALORE**  
**COMPUTER NETWORK LABORATORY**  
**WEEK #6**

**AIM:** Designing and Simulation of Network Topology using Cisco Packet Tracer

**Objectives:**

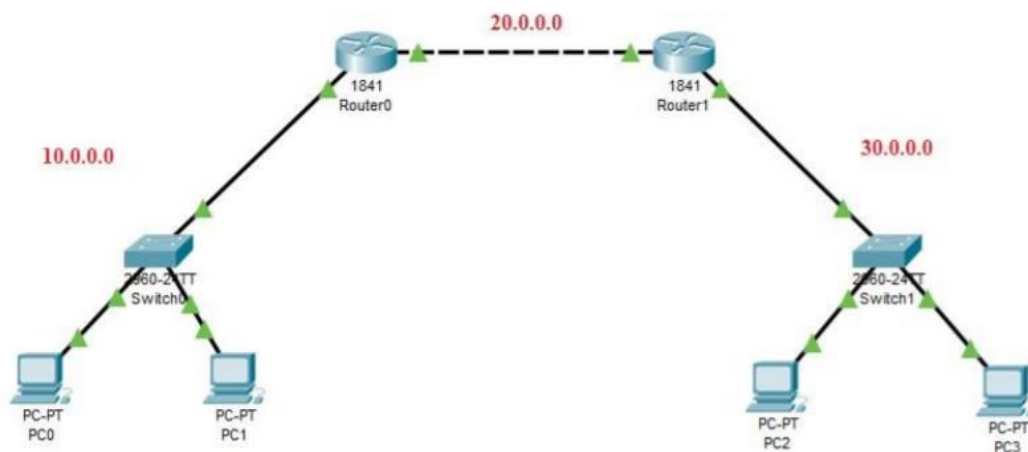
- To understand the purpose of Cisco Packet Tracer.
- To navigate, choose network and end devices and customize them.
- To interconnect devices and configure them using simple interface.
- To become familiar with building topologies in Packet Tracer.
- To simulate data interactions traveling through a network.

**Prerequisites:**

This lab assumes some understanding of the building blocks of communication networks and internet. At this point, we haven't discussed other protocols but you may use Packet Tracer in later labs to discuss those as well. Several types of devices and network connections can be used. For this experiment we will keep it simple by using end devices, switches, routers, and connections.

**TASK 1: Demo Network Topology**

Replicate the given scenario, create a topology in packet tracer, as shown in following image:



**PC & Router Configuration Details:**

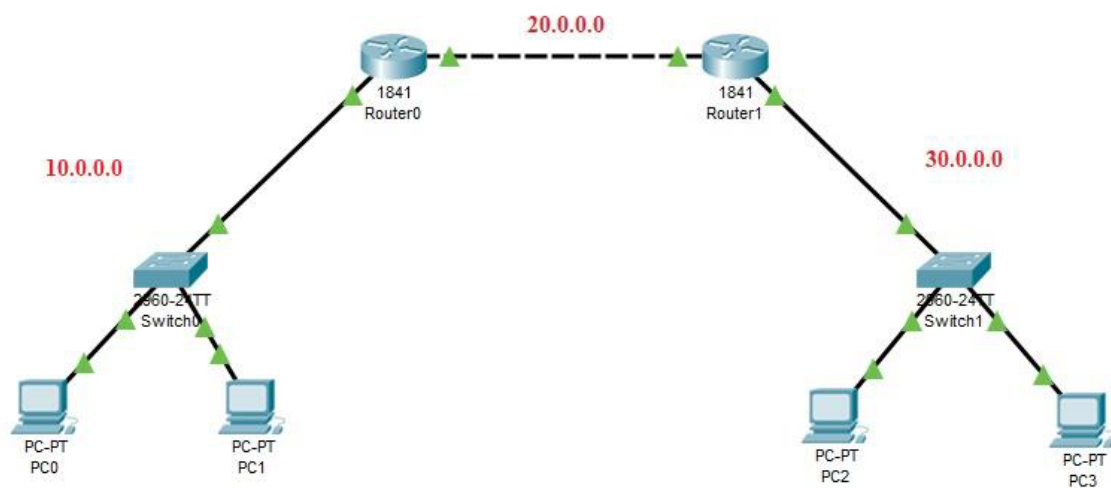
DEVICE	IP ADDRESS	GATEWAY
PC0	10.0.0.1	10.0.0.3
PC1	10.0.0.2	10.0.0.3
ROUTER 0	FastEthernet0/0 -> 10.0.0.3 FastEthernet0/1 -> 20.0.0.1	-
ROUTER 1	FastEthernet0/0 -> 20.0.0.2 FastEthernet0/1 -> 30.0.0.1	-
PC2	30.0.0.2	30.0.0.1
PC3	30.0.0.3	30.0.0.1

#### Routing Table Entries:

ROUTER	NETWORK	NEXT HOP
ROUTER 0	30.0.0.0	20.0.0.2
ROUTER 1	10.0.0.0	20.0.0.1

#### Execution Procedure:

Task 1: Design a network topology with desktops, switches and routers similar to the network depicted in the above diagram.



**Task 2:** Configure the PCs and routers with the details provided above.

PC0

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

Interface

FastEthernet0

IP Configuration

DHCP

Static

IPv4 Address

10.0.0.1

Subnet Mask

255.0.0.0

Default Gateway

10.0.0.3

DNS Server

0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address

/

Link Local Address

FE80::260:47FF:FE3E:22ED

Default Gateway

DNS Server

802.1X

Use 802.1X Security

Authentication

MD5

Top

PC1

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

Interface

FastEthernet0

IP Configuration

DHCP

Static

IPv4 Address

10.0.0.2

Subnet Mask

255.0.0.0

Default Gateway

10.0.0.3

DNS Server

0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address

/

Link Local Address

FE80::202:16FF:FE58:97B

Default Gateway

DNS Server

802.1X

Use 802.1X Security

Authentication

MD5

Top

PC2

PhysicalConfigDesktopProgrammingAttributes

IP ConfigurationX

InterfaceFastEthernet0

IP Configuration

DHCP

Static

IPv4 Address30.0.0.2

Subnet Mask255.0.0.0

Default Gateway0.0.0.0

DNS Server0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address/

Link Local AddressFE80::290:CFF:FE71:61E

Default Gateway

DNS Server

802.1X

Use 802.1X Security

AuthenticationMD5

Top

PC3

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 30.0.0.3

Subnet Mask 255.0.0.0

Default Gateway 0.0.0.0

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::260:3EFF:FE43:CDB7

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

☐ Top

**Task 3:** Send a simple PDU from any PC on network 10.0.1.0 to any other PC on other network 10.0.3.0 and vice-versa.

Router0

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet0/0

Port Status

On

Bandwidth

100 Mbps 10 Mbps

Half Duplex Full Duplex

Duplex

Auto

MAC Address0001.C7C8.5C01

IP Configuration

IPv4 Address10.0.0.3

Subnet Mask255.0.0.0

Tx Ring Limit10

Equivalent IOS Commands

Router (config-if) #

Router (config-if) #exit

Router (config) #interface FastEthernet0/1

Router (config-if) #

Router (config-if) #exit

Router (config) #interface FastEthernet0/0

Router (config-if) #

Top

Router0

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet0/1

Port Status

Bandwidth

Duplex

MAC Address

IP Configuration

IPv4 Address

Subnet Mask

Tx Ring Limit

FastEthernet0/1

Port Status

Bandwidth

Duplex

MAC Address

IP Configuration

IPv4 Address

Subnet Mask

Tx Ring Limit

Equivalent IOS Commands

Router(config-if) #

Router(config-if) #exit

Router(config) #interface FastEthernet0/1

Router(config-if) #

Router(config-if) #exit

Router(config) #interface FastEthernet0/1

Router(config-if) #

Top



Router0

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Static Routes

Network

30.0.0.0

Mask

255.0.0.0

Next Hop

20.0.0.2

Add

Network Address

30.0.0.0/8 via 20.0.0.2

Remove

Equivalent IOS Commands

Router(config-if)#

Router(config-if)#exit

Router(config)#

Router(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2

Router(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2

Router(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2

Router(config)#

☐ Top

Router1

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Static Routes

Network10.0.0.0

Mask255.0.0.0

Next Hop20.0.0.1

Add

Network Address

10.0.0.0/8 via 20.0.0.1

Remove

Equivalent IOS Commands

```
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
```

☐ Top

Router1

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet0/0

Port Status

Bandwidth

☐ 100 Mbps

☐ 10 Mbps

☒ Auto

Duplex

☐ Half Duplex

☐ Full Duplex

☒ Auto

MAC Address0060.4719.1501

IP Configuration

IPv4 Address20.0.0.2

Subnet Mask255.0.0.0

Tx Ring Limit

10

Equivalent IOS Commands

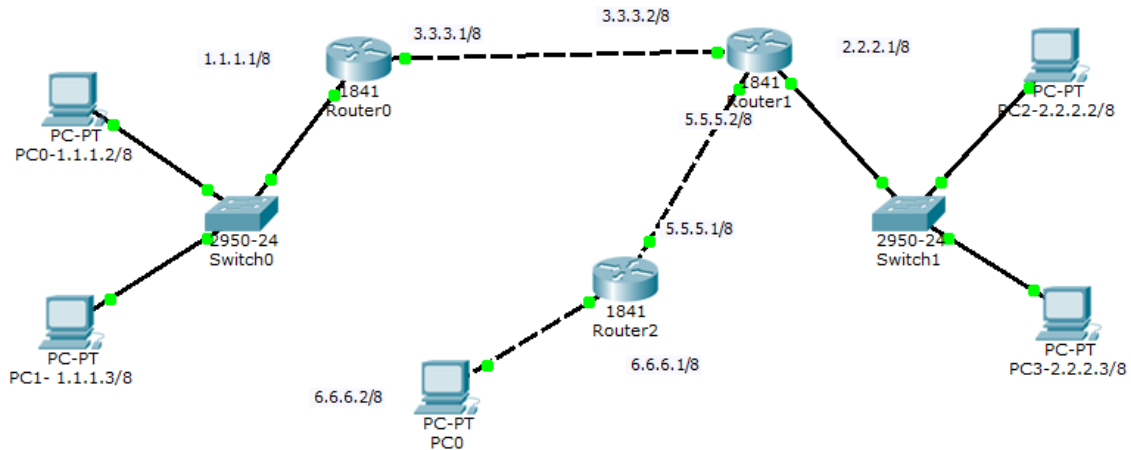
```
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#interface FastEthernet0/0
Router(config-if)#
```

☐ Top



## TASK 2: Network Topology (Mandatory)

Replicate the given scenario, create a topology in packet tracer, as shown in following image:



### PC & Router Configuration Details:

\*\*Assuming the PC device PC0 with IP 6.6.6.2 is renamed as PC4

DEVICE	IP ADDRESS	GATEWAY
PC0	1.1.1.2	1.1.1.1
PC1	1.1.1.3	1.1.1.1
ROUTER 0	FastEthernet0/0 -> 1.1.1.1 FastEthernet0/1 -> 3.3.3.3	-
ROUTER 1	FastEthernet0/0 -> 3.3.3.2 FastEthernet0/1 -> 5.5.5.2 Ethernet0/1/0 -> 2.2.2.1	-
ROUTER 2	FastEthernet0/0 -> 5.5.5.1 FastEthernet0/1 -> 6.6.6.1	-
PC4 (PC0)	6.6.6.2	6.6.6.1
PC2	2.2.2.2	2.2.2.1
PC3	2.2.2.3	2.2.2.1

### Routing Table Entries:

ROUTER	NETWORK	NEXT HOP
ROUTER 0	1.1.1.1	3.3.3.1
ROUTER 1	2.2.2.1	5.5.5.2 3.3.3.2

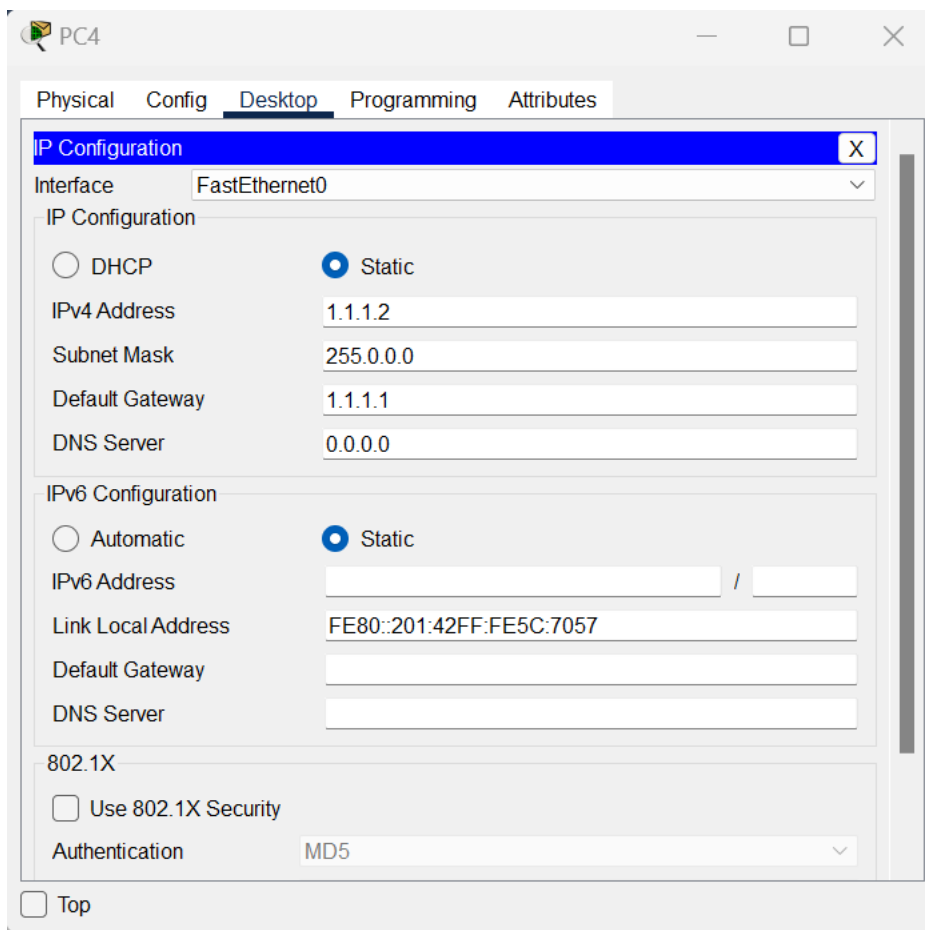
<b>ROUTER 2</b>	6.6.6.6	5.5.5.1
-----------------	---------	---------

### Execution Procedure:

**Task 1:** Design a network topology with desktops, switches and routers similar to the network depicted in the above diagram.

**Task 2:** Configure the PCs and routers with the details provided above in the table. Take help of the screenshots given below.

#### IP address and gateway of PC0



The screenshot shows the configuration window for PC4, specifically the 'Desktop' tab. The 'IP Configuration' section is active, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected for IP Configuration. The IPv4 Address is set to 1.1.1.2, Subnet Mask to 255.0.0.0, Default Gateway to 1.1.1.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section shows 'Static' selected, with a Link Local Address of FE80::201:42FF:FE5C:7057. The 802.1X section shows 'Use 802.1X Security' unchecked and 'Authentication' set to MD5. A 'Top' button is at the bottom left.

Interface	FastEthernet0
IP Configuration	Static
IPv4 Address	1.1.1.2
Subnet Mask	255.0.0.0
Default Gateway	1.1.1.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::201:42FF:FE5C:7057
Default Gateway	
DNS Server	
802.1X	
Use 802.1X Security	<input type="checkbox"/>
Authentication	MD5

#### IP address and gateway of PC1

PC5

Physical Config **Desktop** Programming Attributes

**IP Configuration** [X]

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 1.1.1.3

Subnet Mask: 255.0.0.0

Default Gateway: 1.1.1.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::201:63FF:FE73:8A41

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

☐ Top

## Router 0 Interfaces

Router2

Physical
Config
CLI
Attributes

**GLOBAL**

Settings

Algorithm Settings

**ROUTING**

Static

RIP

**SWITCHING**

VLAN Database

**INTERFACE**

FastEthernet0/0

FastEthernet0/1

Ethernet0/1/0

FastEthernet0/0

Port Status

☒ On

Bandwidth

☒ 100 Mbps
☐ 10 Mbps

Duplex

☐ Half Duplex
☒ Full Duplex

MAC Address

0001.C761.A301

IP Configuration

IPv4 Address

1.1.1.1

Subnet Mask

255.0.0.0

Tx Ring Limit

10

Equivalent IOS Commands

```

Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#interface FastEthernet0/0
Router(config-if)#

```

☐ Top

Configure the IP address of both interfaces FastEthernet0/0 and FastEthernet0/1. Don't forget to toggle the on switch on the to right.

### Router 1 Interfaces

Router3

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Ethernet0/1/0

FastEthernet0/0

Port Status

100 Mbps10 Mbps

☒

On

Bandwidth

Half Duplex

☒

Full Duplex

☒

Auto

Duplex

Half Duplex

☒

Full Duplex

☒

Auto

MAC Address0090.0C0C.EC01

IP Configuration

IPv4 Address3.3.3.2

Subnet Mask255.0.0.0

Tx Ring Limit10

Equivalent IOS Commands

Router(config-if)#ip address 3.3.3.2 255.0.0.0

Router(config-if)#ip address 3.3.3.2 255.0.0.0

Router(config-if)#

Router(config-if)#

Router(config-if)#exit

Router(config)#interface FastEthernet0/0

Router(config-if)#

☐ Top

Similarly fill FastEthernet0/1 and Ethernet0/1/0 like this



<b>GLOBAL</b>	FastEthernet0/1	
Settings		
Algorithm Settings		
<b>ROUTING</b>		
Static		
RIP		
<b>SWITCHING</b>		
VLAN Database		
<b>INTERFACE</b>		
FastEthernet0/0		
<b>FastEthernet0/1</b>		
Ethernet0/1/0		

Port Status	<input checked="" type="checkbox"/> On
Bandwidth	<input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto
Duplex	<input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto
MAC Address	0090.0C0C.EC02
IP Configuration	
IPv4 Address	2.2.2.1
Subnet Mask	255.0.0.0
Tx Ring Limit	10

## Equivalent IOS Commands

```
Router(config)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Ethernet0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 2.2.2.1 255.0.0.0
Router(config-if)#ip address 2.2.2.1 255.0.0.0
Router(config-if)#
```

Router3

Physical Config CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Ethernet0/1/0

Ethernet0/1/0

Port Status

Bandwidth

Duplex

MAC Address

IP Configuration

IPv4 Address

Subnet Mask

Tx Ring Limit

10 Mbps

Auto

Half Duplex

Full Duplex

On

Auto

Auto

00E0.B0D0.211E

5.5.5.2

255.0.0.0

10

Equivalent IOS Commands

```

Router(config)#
Router(config-if)#exit
Router(config)#interface Ethernet0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 2.2.2.1 255.0.0.0
Router(config-if)#ip address 2.2.2.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Ethernet0/1/0
Router(config-if)#ip address 5.5.5.2 255.0.0.0
Router(config-if)#ip address 5.5.5.2 255.0.0.0
Router(config-if)#

```

☐ Top

## Router 2 Interfaces

Router4

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Ethernet0/1/0

FastEthernet0/0

Port Status

On

Bandwidth

100 Mbps

10 Mbps

Duplex

Half Duplex

Full Duplex

MAC Address00D0.FF8D.1901

IP Configuration

IPv4 Address5.5.5.1

Subnet Mask255.0.0.0

Tx Ring Limit10

Equivalent IOS Commands

```
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Ethernet0/1/0
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Ethernet0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1/0, changed state to up

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

Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 5.5.5.1 255.0.0.0
Router(config-if)#ip address 5.5.5.1 255.0.0.0
Router(config-if)#
```

☐ Top

Router4

Physical
Config
CLI
Attributes

**GLOBAL**

Settings

Algorithm Settings

**ROUTING**

Static

RIP

**SWITCHING**

VLAN Database

**INTERFACE**

FastEthernet0/0

FastEthernet0/1

Ethernet0/1/0

FastEthernet0/1

Port Status

☒ On

Bandwidth

☒ 100 Mbps
☐ 10 Mbps

Duplex

☐ Half Duplex
☒ Full Duplex

MAC Address

00D0.FF8D.1902

IP Configuration

IPv4 Address

6.6.6.1

Subnet Mask

255.0.0.0

Tx Ring Limit

10

Equivalent IOS Commands

```

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Ethernet0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1/0, changed state to up

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

Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 5.5.5.1 255.0.0.0
Router(config-if)#ip address 5.5.5.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 6.6.6.1 255.0.0.0
Router(config-if)#ip address 6.6.6.1 255.0.0.0
Router(config-if)#

```

☐ Top

IP address and gateway of PC4 (PC0)

PC6

Physical Config **Desktop** Programming Attributes

**IP Configuration** X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 6.6.6.2

Subnet Mask 255.0.0.0

Default Gateway 6.6.6.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::202:16FF:FE90:1D00

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

IP address and gateway of PC2

PC7

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 2.2.2.2

Subnet Mask 255.0.0.0

Default Gateway 2.2.2.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::260:3EFF:FE22:3365

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

IP address and gateway of PC3

PC8

Physical Config **Desktop** Programming Attributes

**IP Configuration** X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 2.2.2.3

Subnet Mask 255.0.0.0

Default Gateway 2.2.2.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::206:2AFF:FE71:7C6

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

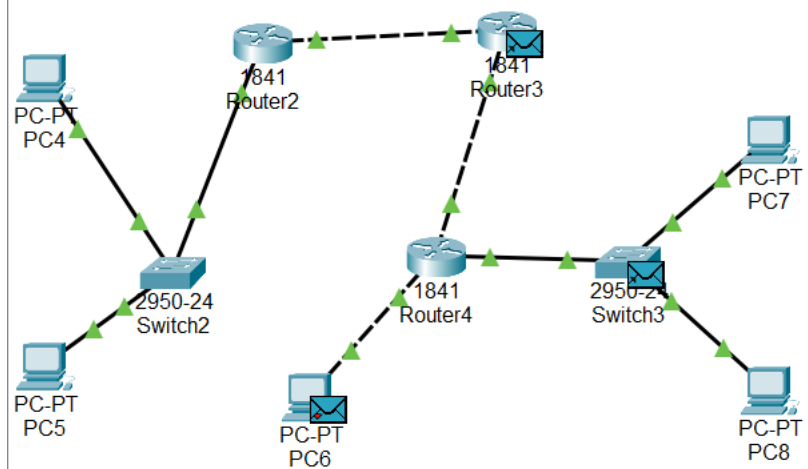
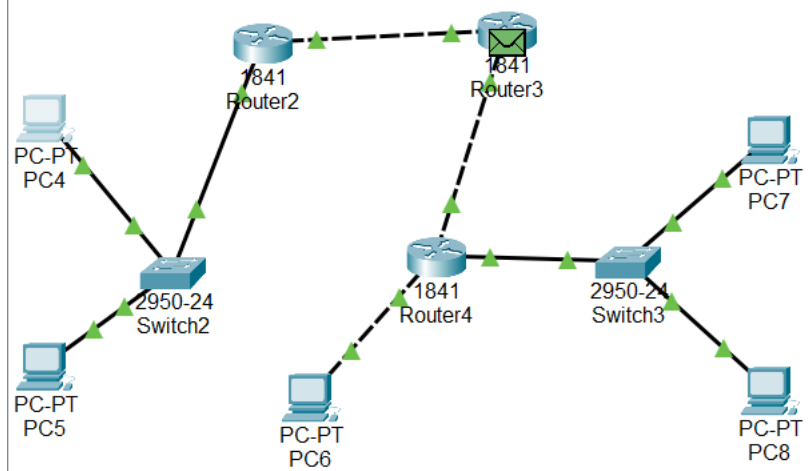
Username

Password

☐ Top

**Task 3:** Send a simple PDU from any PC on network 10.0.1.0 to any other PC on other network 10.0.3.0 and vice-versa.

**Task 4:** Simulate the network and observe the packet flow from one network to other.



Name: Atharva Menkudle  
 Sem:4<sup>th</sup>  
 Sec :B  
 SRN: PES2UG21CS104