COMPUTER NETWORK LAB
EXPERIMENT NO.7

AIM: Design VPN and Configure RIP/OSPF using Packet tracer.

THEORY:

Routing Information Protocol (RIP) is a dynamic routing protocol which uses hop count

as a routing metric to find the best path between the source and the destination network. It is a distance vector routing protocol which has AD value 120 and works on the application layer of OSI model. RIP uses port number 520.

Hop Count: Hop count is the number of routers occurring in between the source and destination network. The path with the lowest hop count is considered as the best route to reach a network and therefore placed in the routing table. RIPprevents routing loops by limiting the number of hopes allowed in a path from source and destination. The maximum hop count allowed for RIP is 15 and hop count of 16 is considered as network unreachable.

Features of RIP:
1. Updates of the network are exchanged periodically.
2. Updates (routing information) are always broadcast.
3. Full routing tables are sent in updates.
4. Routers always trust on routing information received from neighbour routers. This is also known as Routing on rumours.

Steps for implementing RIP:

Step1:
Select Router 1 – select 1841 router and drag it to the screen (Router0).
Select Switches 1 – select 2950-24 and drag it below the Router0 (Switch0). Select End Device – select Generic and drag it below Switch0 (PC-PT PC0). Select End Device – select Generic and drag it below Switch0 (PC-PT PC1).

Select Router 2 – select 1841 and drag it to right of the Router0 (Router1).
Select Switches 2 – select 2950-24 and drag it below the Router1 (Switch1). Select End Device – select Generic and drag it below Switch1 (PC-PT PC2). Select End Device – select Generic and drag it below Switch1 (PC-PT PC3).

Select Router 3 – select 1841 and drag it to right of the Router0 (Router2).
Select Switches 3 – select 2950-24 and drag it below the Router2 (Switch2). Select End Device – select Generic and drag it below Switch0 (PC-PT PC4).
Select End Device – select Generic and drag it below Switch0 (PC-PT PC5).
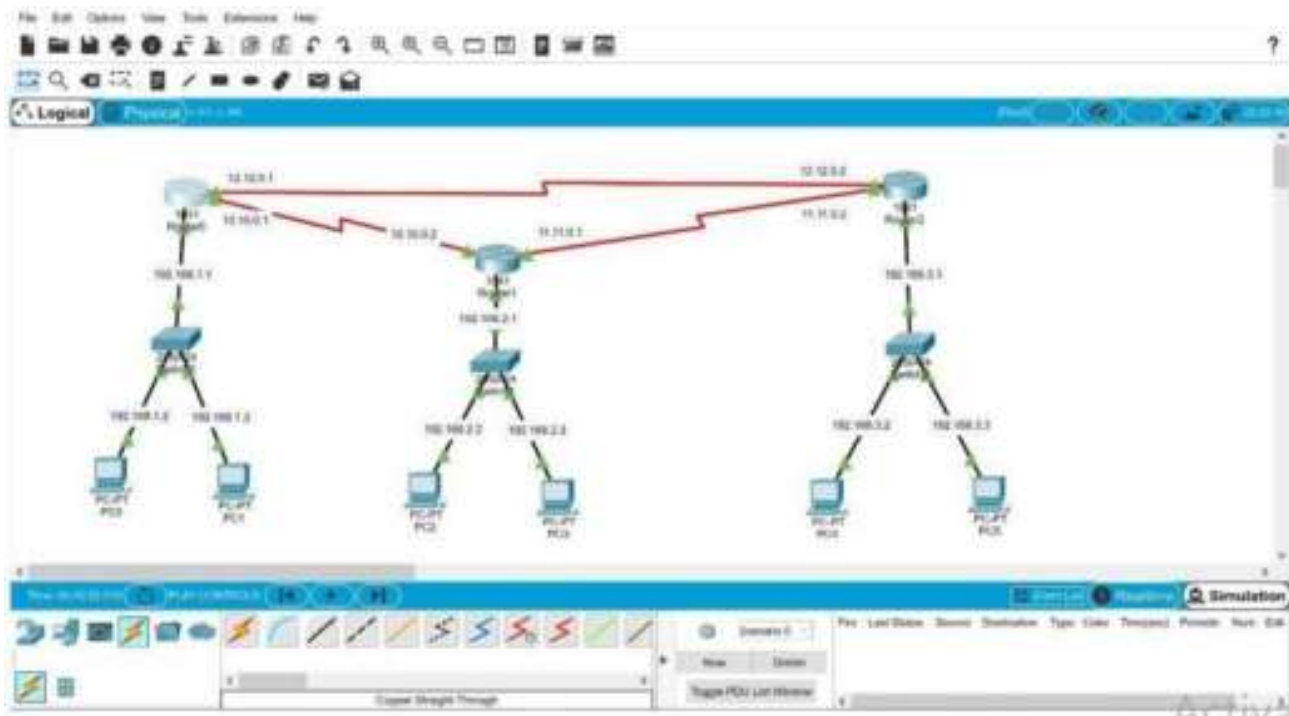
Select Connections – Connect routers, switches and PCs to each other.
(Router0->switch0->PC0,PC1 | Router1->switch1->PC2,PC3 |
Router2->switch2->PC4,PC5)

Step 2:

Click on PC0 and go to Desktop > IP Configuration
Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added
and displayed.
Add Default Gateway and close the window.

Step 3:

Click on PC1 and go to Desktop > IP Configuration
Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added
and displayed.
Add Default Gateway and close the window.

Step 4:

Click on Router0. Go to Config > FastEthernet0/0. Here,
add IP Address and On the Port Status.

Step: 5:

Click on PC2 and go to Desktop > IP Configuration
Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added and displayed.
Add Default Gateway and close the window.

Step 6:

Click on PC3 and go to Desktop > IP Configuration
Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added and displayed.
Add Default Gateway and close the window.

Step 7:

Click on Router1. Go to Config > FastEthernet0/0. Here,
add IP Address and On the Port Status.

Step: 8:

Click on PC4 and go to Desktop > IP Configuration
Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added and displayed.
Add Default Gateway and close the window.

Step 9:

Click on PC5 and go to Desktop > IP Configuration
Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added and displayed.
Add Default Gateway and close the window.

Step 10:

Click on Router2. Go to Config > FastEthernet0/0. Here,
add IP Address and On the Port Status.

Step 11:

Click on Router0. Go to Config > Serial0/0/0 &
Serial0/0/1 . Here, add IP Address and On the Port
Status.

As you will see above, there is green dots which means connections are done successfully between Routers, Switches and PCs.
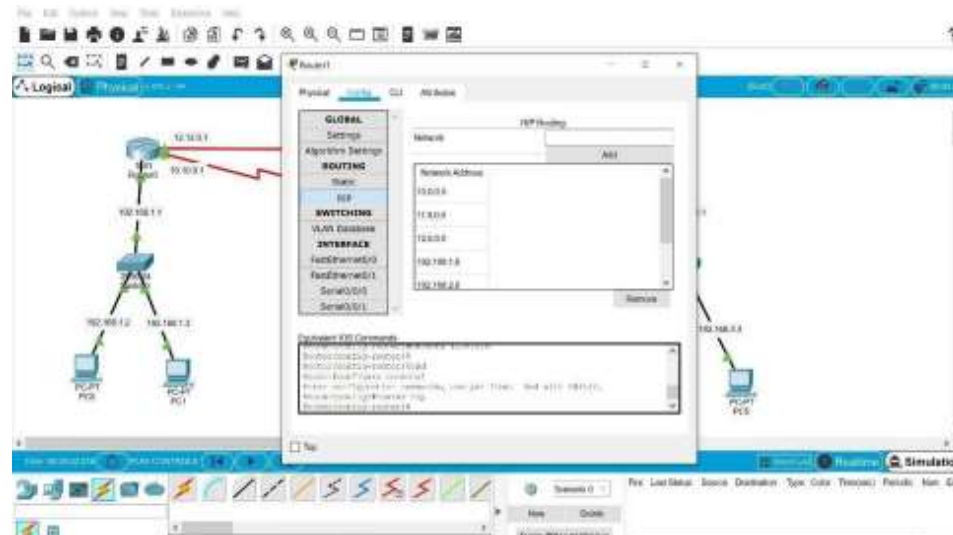
Step 12:

Click on Router1. Go to Config > Serial0/0/0 &
Serial0/0/1 . Here, add IP Address and On the Port
Status.

As you will see above, there is green dots which means connections are done successfully between Routers, Switches and PCs.

Step 13:

Click on Router2. Go to Config > Serial0/0/0 &
Serial0/0/1 . Here, add IP Address and On the Port
Status.

As you will see above, there is green dots which means connections are done successfully between Routers, Switches and PCs..

Step 14:

Click on Router0. Go to Config > RIP.

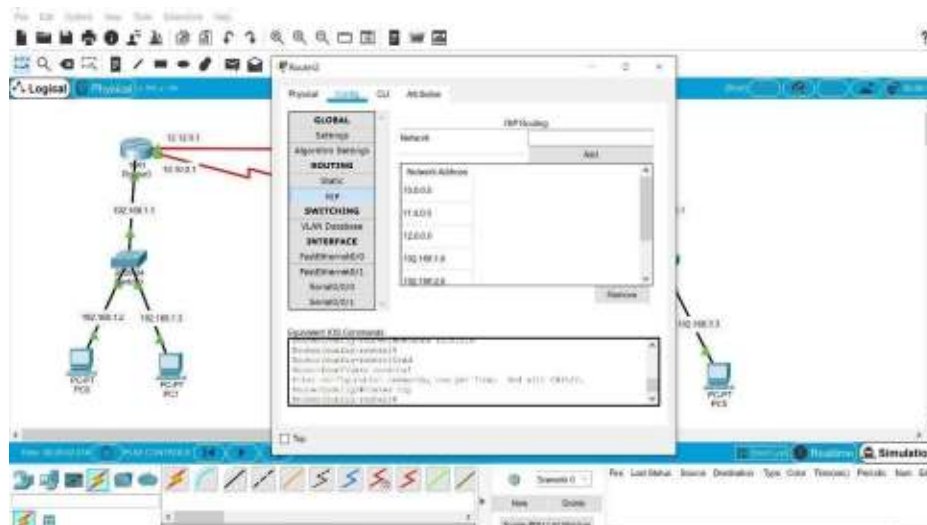Here, add the network address to connect router0 with switch0, PC0, PC1, router1 and router2 .
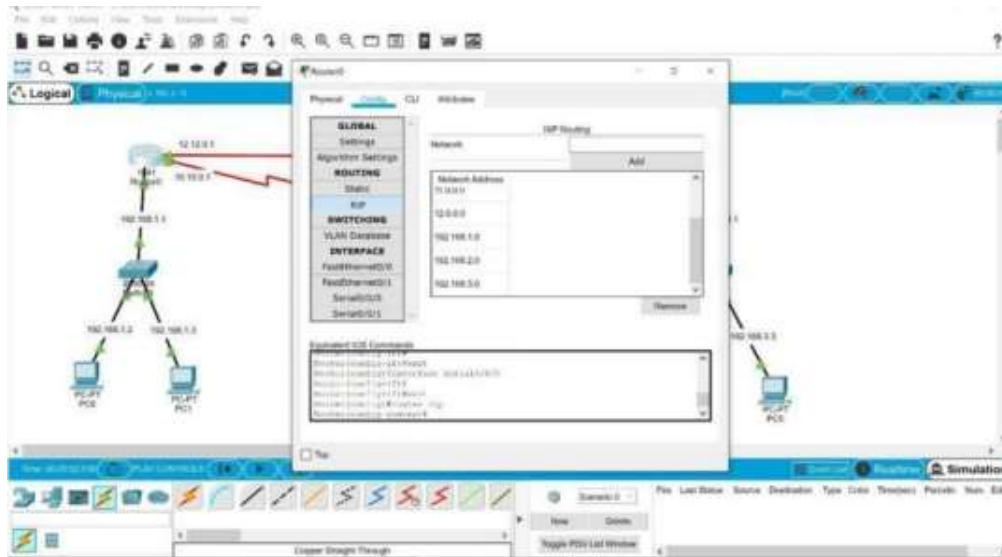
Step 15:

Click on Router1. Go to Config > RIP.

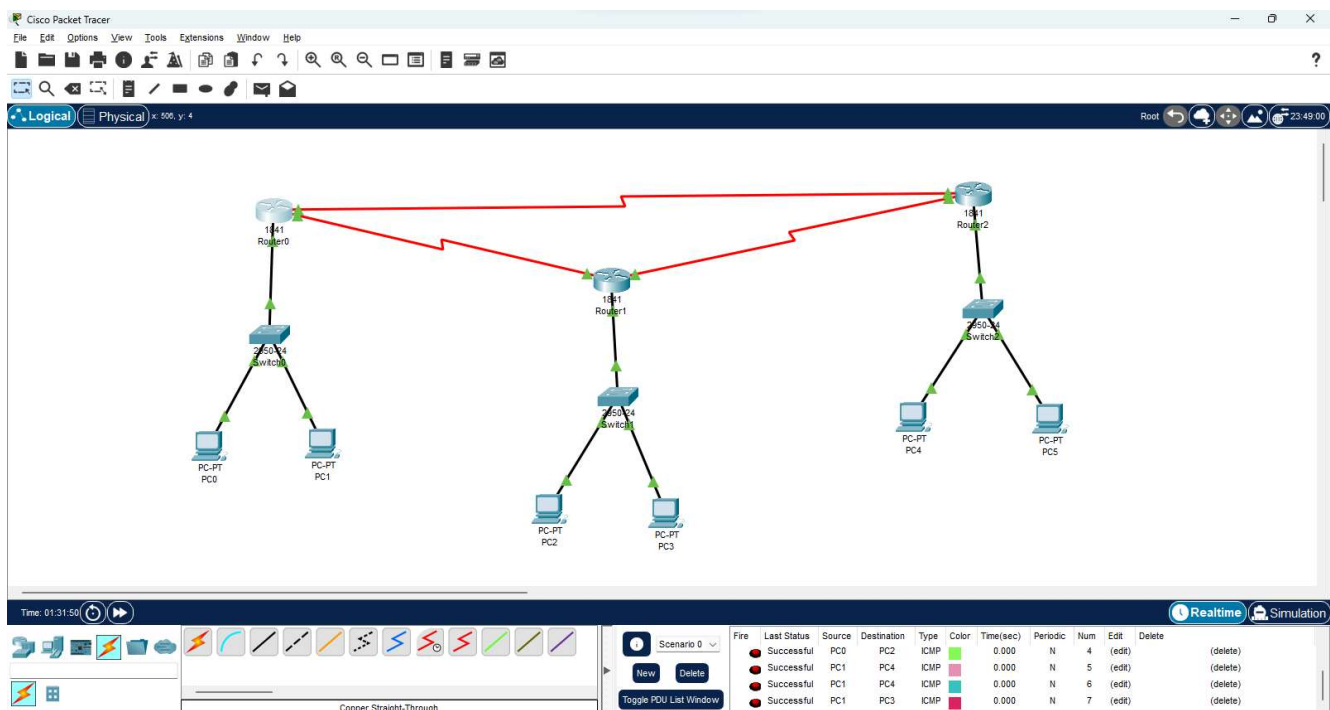Here, add the network address to connect router1 with switch1, PC2, PC3, router0 and router2.

Step 16:

Click on Router2. Go to Config > RIP.

Here, add the network address to connect router2 with switch2, PC4, PC5, router0 and router1.

Now, all the connections are done successfully.

Final Output :

So, Routing Information Protocol is done

Steps for implementing VLAN:

Step1:
Select Router – select 1841 router and drag it to the screen (Router0).
Select another Router – select 1841 and drag it to right of the Router0
(Router1). Select Switches – select 2950-24 and drag it below the Router0
(Switch0).
Select Switches – select 2950-24 and drag it below the Router1 (Switch1).
Select End Device – select Generic and drag it below Switch0 (PC-PT
PC0). Select End Device – select Generic and drag it below Switch1
(PC-PT PC1). Select End Device – select Generic and drag it below
Switch1 (PC-PT PC2). Select Connections – Connect routers, switches and
PCs to each other.
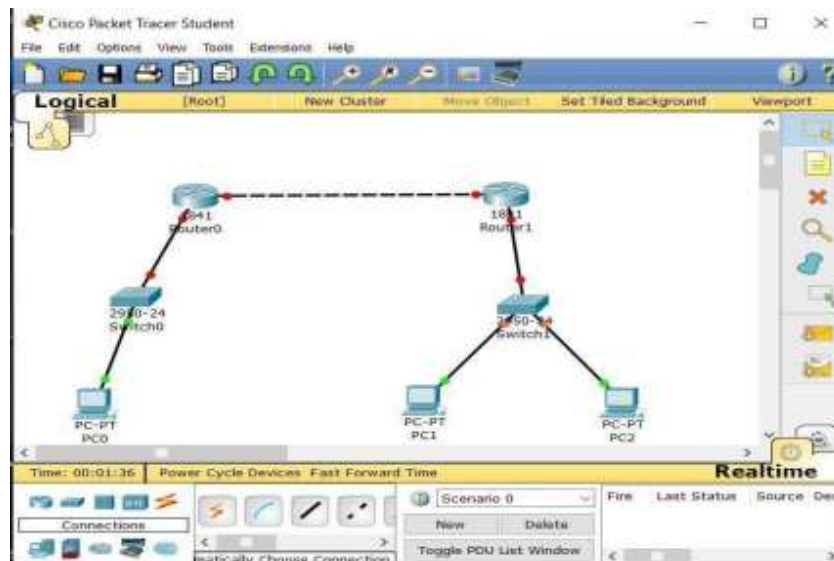
Step 2:
Click on PC0 and go to Desktop > IP Configuration
Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added
and displayed.
Add Default Gateway and close the window.
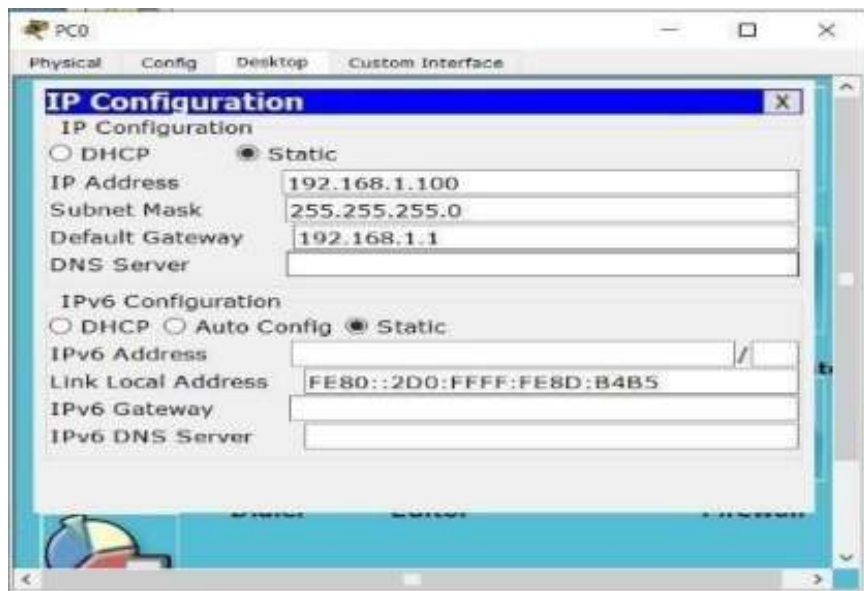
Step 3:

Click on PC1 and go to Desktop > IP Configuration

Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added and displayed.

Add Default Gateway and close the window.
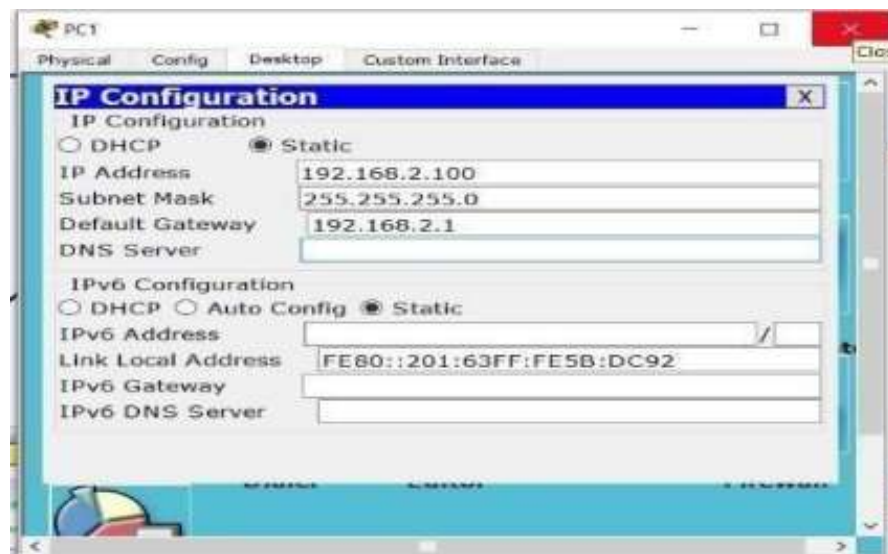
Step 4:

Click on PC2 and go to Desktop > IP Configuration

Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added and displayed.

Add Default Gateway and close the window.
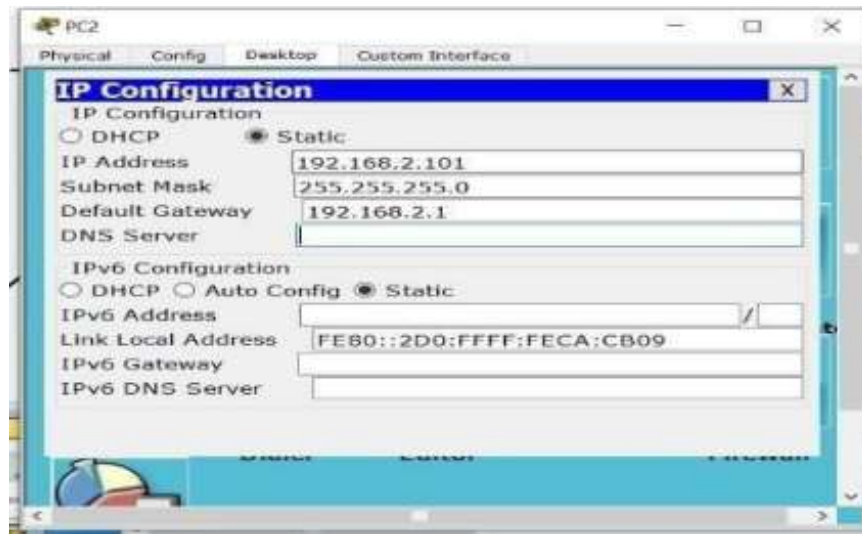
Step 5:

Click on Router0. Go to Config > FastEthernet0/0.

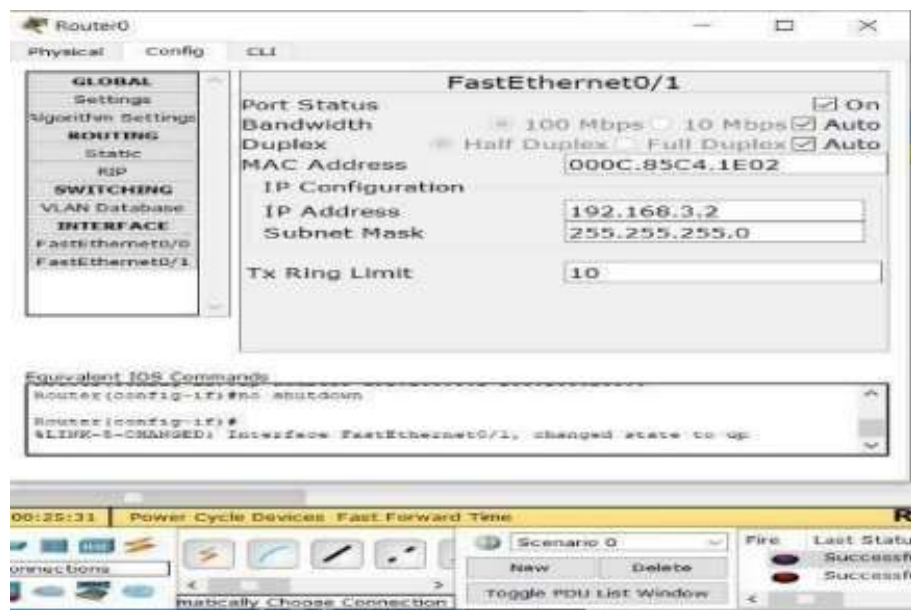Here, add IP Address and On the Port Status.
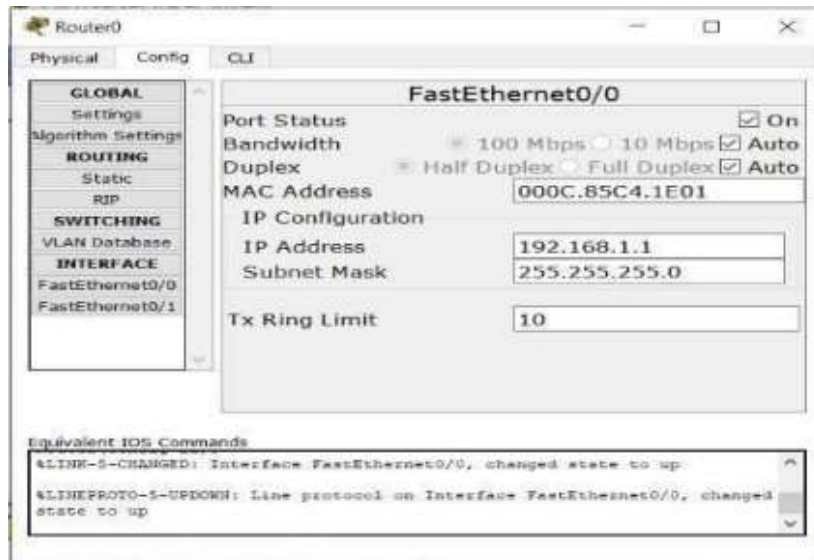
Step 6:

Click on Router1. Go to Config > FastEthernet0/1. Here,
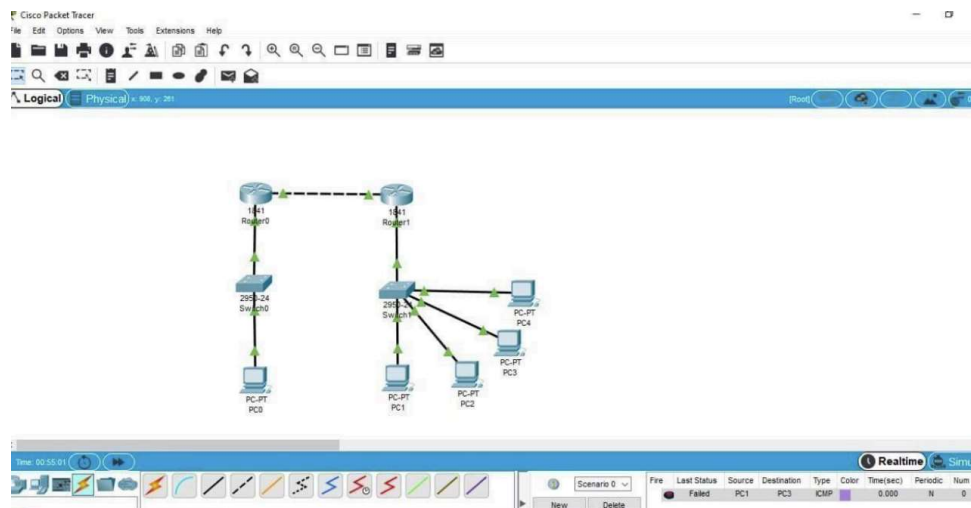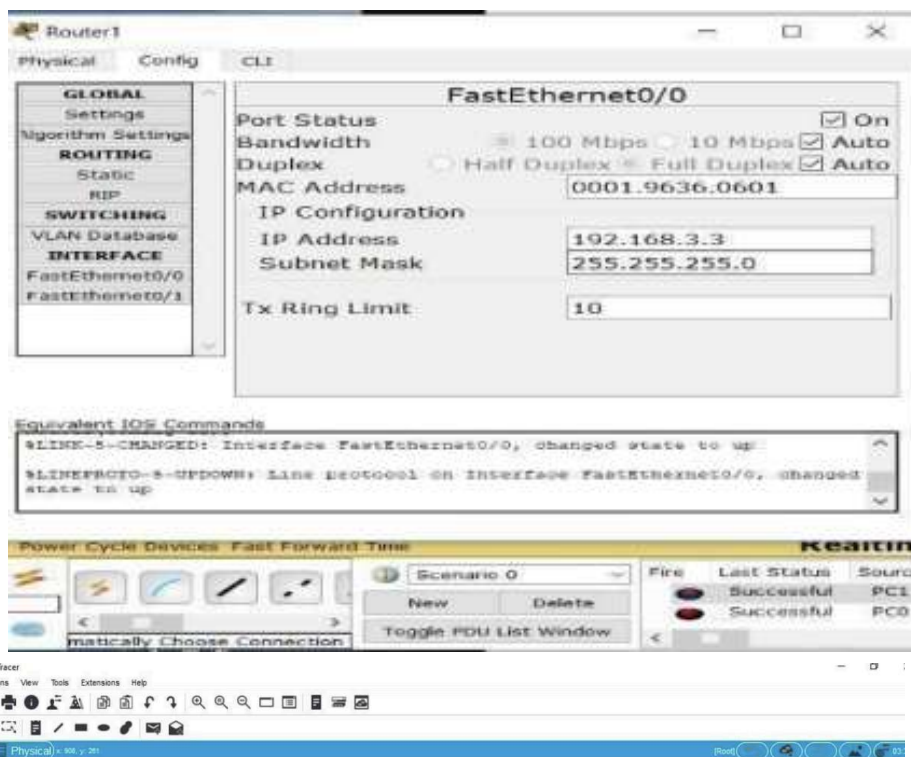add IP Address and On the Port Status.
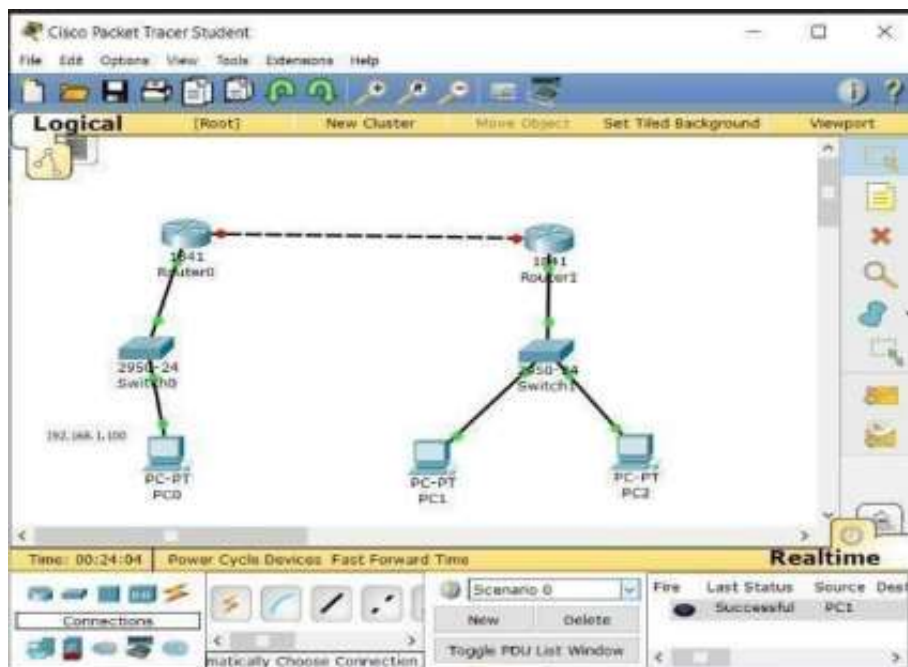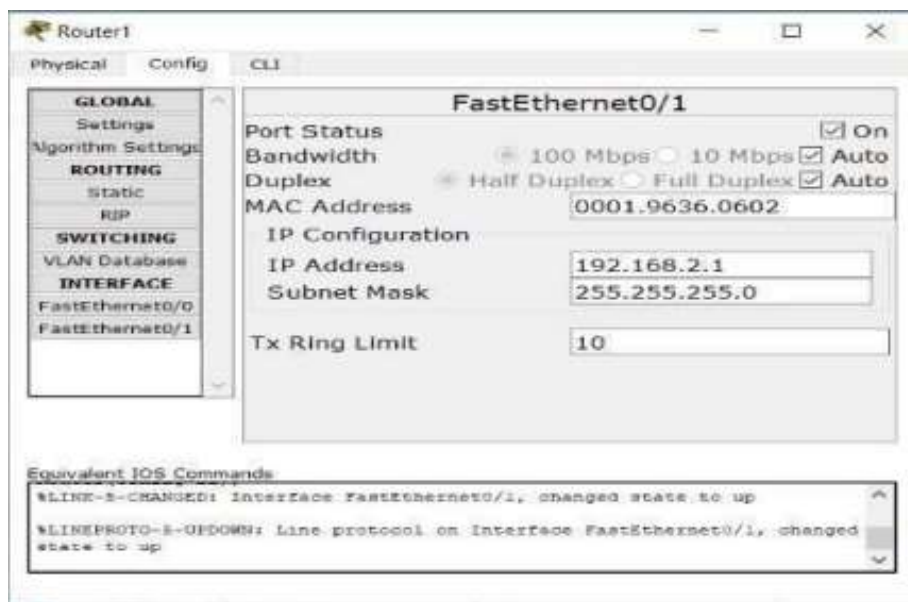
As you will see above, there is green dots which means connections are done successfully between Router, Switches and PCs.

Step 7:
Click on Router0. Go to Config > FastEthernet0/1. Here,
add IP Address and On the Port Status.

Step 8:

Click on Router1. Go to Config > FastEthernet0/0. Here,
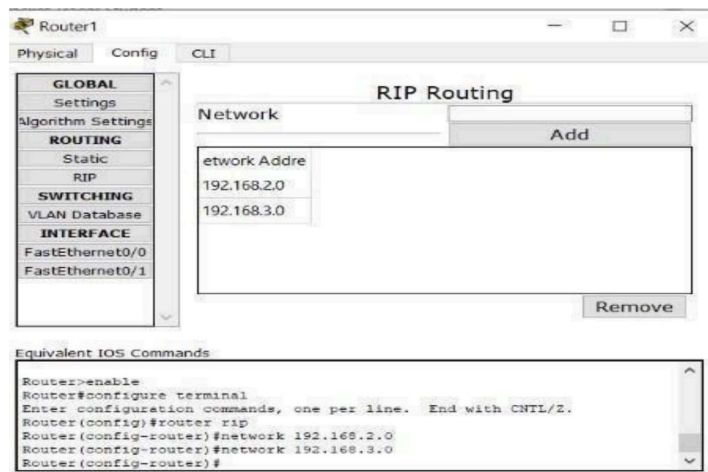add IP Address and On the Port Status.

As you can see above, connection is done between both the Routers successfully.

Step 9:

Click on Router1. Go to Config > RIP.

   Here, add the network address to connect router1 with switch1, PC1, PC2 and router0.
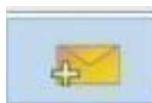

Step 10:

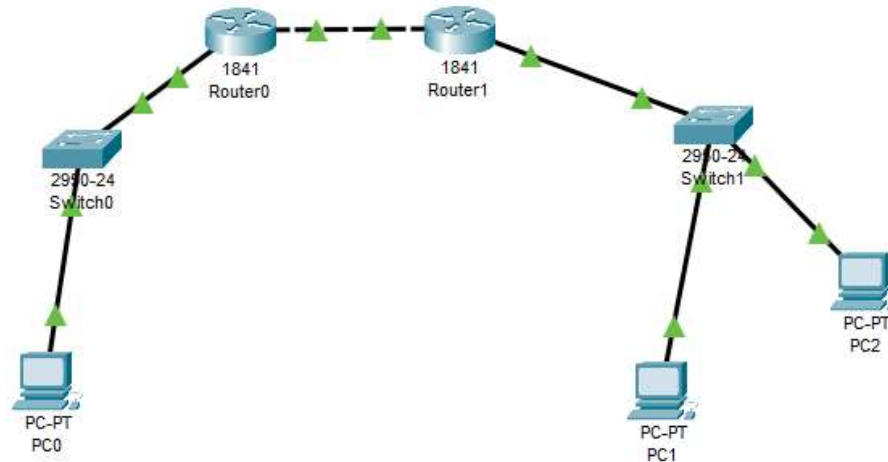Click on Router0. Go to Config > RIP.

    Here, add the network address to connect router0 with switch0, PC0 and router1.

Now, all the connections are done successfully, you can check it by clicking on this symbol

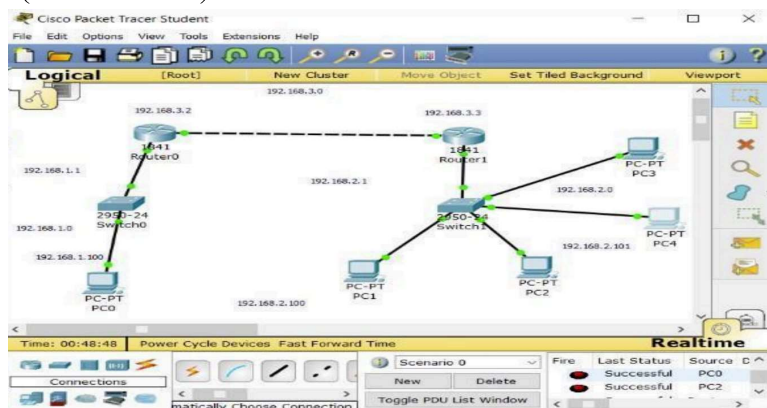And then, click on any two PCs , you will get the status as successful.

So till now, Routing Information Protocol is done. Now, we will start with implementing VLAN.
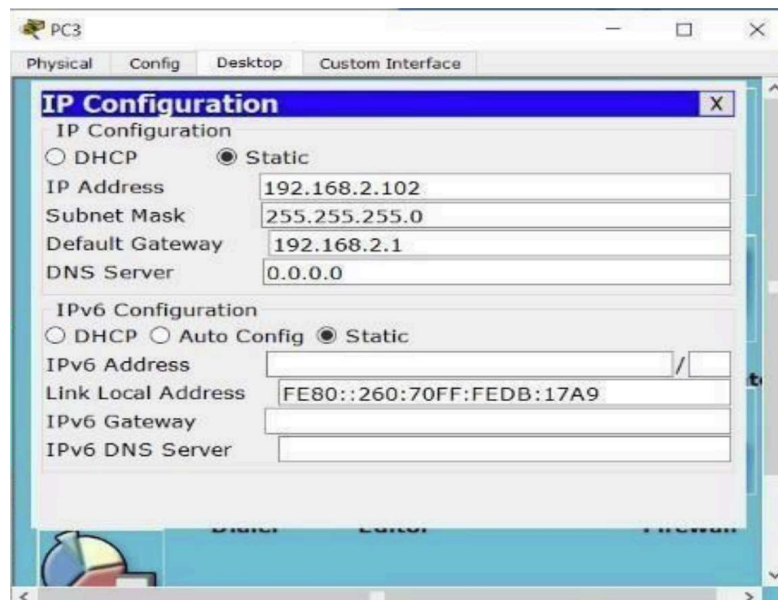
Step 11:
Add two PC (PC 3 and PC4) and connect it with switch.

Step 12:

Click on PC3 and go to Desktop > IP Configuration
Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added and displayed.

Add Default Gateway and close the window.

Step 13:
Click on PC3 and go to Desktop > IP Configuration
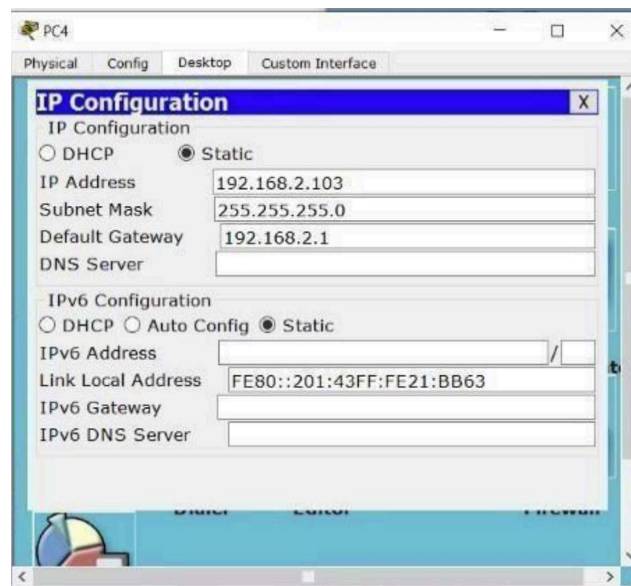Add IP Address, as you will add the IP Address, Subnet Mask will be automatically added and displayed.
Add Default Gateway and close the window.

Step 14:
Click on Switch1 and go to CLI
Add type the VLAN code –
VLAN CODE:

VLAN

enable config t
vlan 20 name
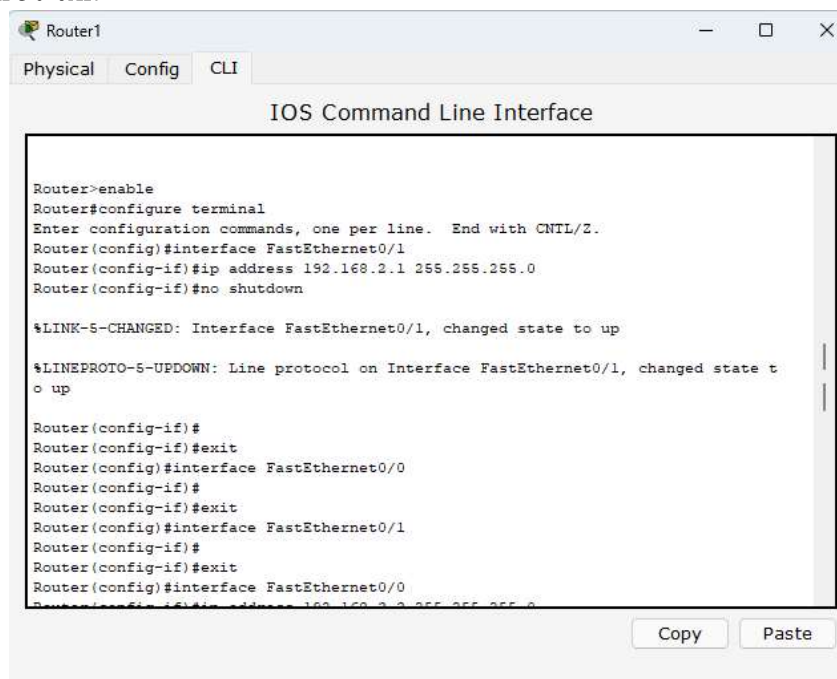purchase exit
vlan 30 name
sales exit

int fa0/2 switchport
access vlan 20 exit

int fa0/3 switchport
access vlan 20

exit

int fa0/4 switchport
access vlan 30 exit

int fa0/5 switchport
access vlan 30 exit

```
Router1                                              —    □    ×

Physical   Config   CLI

               IOS Command Line Interface

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state t
o up

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

                                              Copy      Paste
```
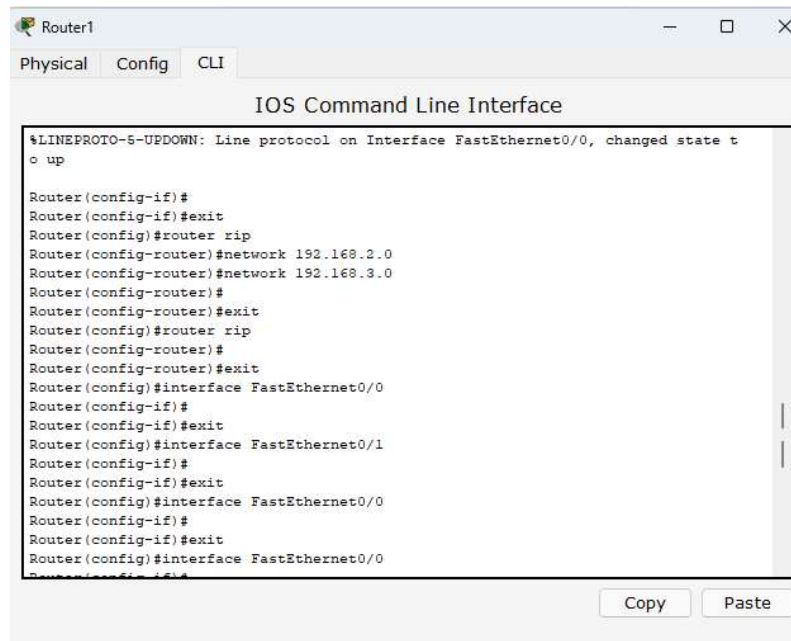
```
Router1                                              —    □    ×

Physical   Config   CLI
               IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t
o up

Router(config-if)#
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 192.168.2.0
Router(config-router)#network 192.168.3.0
Router(config-router)#
Router(config-router)#exit
Router(config)#router rip
Router(config-router)#
Router(config-router)#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 FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0

                                              Copy      Paste
```
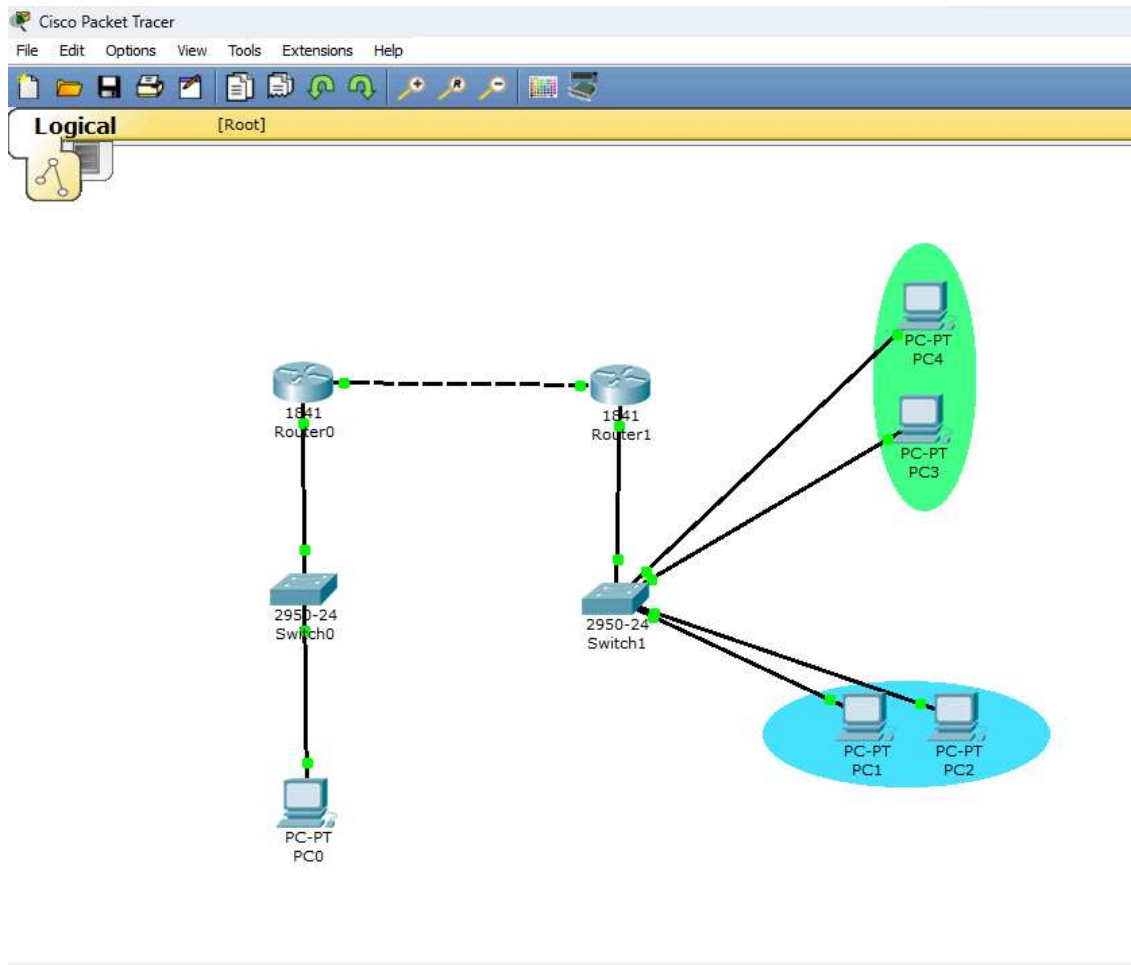
```
Switch>enable
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 20
Switch(config-vlan)#name purchase
Switch(config-vlan)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name sales
Switch(config-vlan)#exit
Switch(config)#int fa0/2
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#int fa0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#int fa0/4
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
Switch(config)#int fa0/5
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
Switch(config)#
```

Final Output:

Now, PC1, PC2 are not connected to PC3 and PC4.

CONCLUSION: