Experiment 7

Student Name: Deepak Saini **UID: 20BCS4066**
Branch: 20BCC1 **Section/Group: A**
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Subject Name: Computer Network Lab **Subject Code: 20CSP-342**

1. Aim/Overview of the practical:

Implement Router as DHCP server that can serve multiple VLAN's.

1. Use 3 VLANS HR, SALES, IT
2. Implement Router as DHCP server
3. Communicate among all the VLANs

2. Requirements:

PC, Cisco Packet Tracer.

3. Theory:

Virtual Local Area Network: Virtual LAN (VLAN) is a concept in which we can divide the devices logically on data Link Layer i.e. (Layer2). Generally, Network Layer (layer 3) devices divides broadcast domain and each broadcast domain can be divided by switches using the concept of VLAN.A broadcast domain is a network segment in which if a device broadcast a packet, then all the devices in the same network will receive it. However, due to limitations of switches packets don't send outside the broadcast network. To forward out the packets to different VLAN (from one VLAN to another) or broadcast domain, inter VLAN routing is needed. Through VLAN, different small size sub networks are created which are comparatively easy to handle.

- A **DHCP Server** is a network server that automatically provides and assigns IP addresses, default gateways and other network parameters to client devices.
- **Without it**, the network administrator must manually set up every client that joins the network, which can be cumbersome, especially in large networks

4. Steps for experiment:

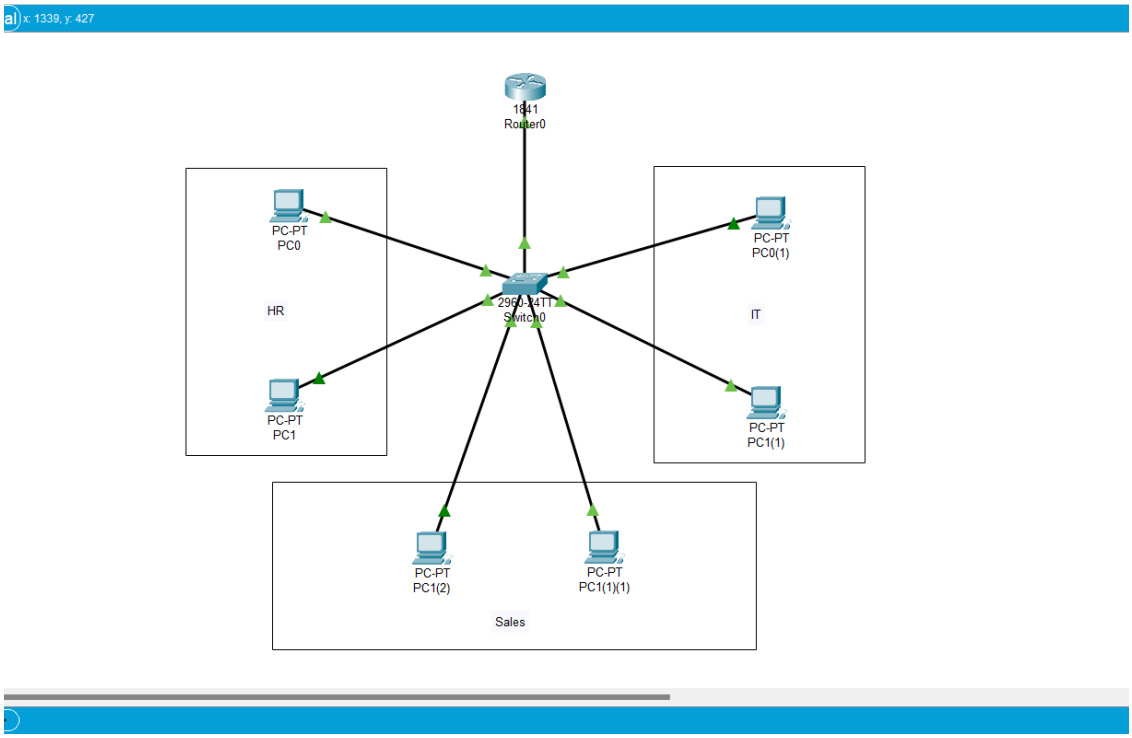
1. Select 6 end devices.
2. Now click on network devices and select 1 switch (Switch-2960).
3. Connect all the 4 PCs to the switch with the help of Auto Connect cable/ Copper straight through cable.
4. Now draw 3 regions to create difference between the PCs that is assigned to different departments.
5. Click on switch and move to CLI for the configuration of VLAN.
6. Configure the Switch and Router with the commands below.

```
switch# enable
switch# configure terminal
switch (config)#vlan 10
switch(config-vlan) #ame HR
switch (config)#vlan 20
switch(config-vlan) #ame SALES
switch (config)#vlan 30
switch(config-vlan)#name IT
Switch(config)#int range fa0/1-2
Switch(config-if-range) #switchport mode Access
Switch(config-if-range) #switchport access vlan 10
Switch(config-if-range) #exit

Switch(config)#int fa0/3-4
Switch(config-if-range) #switchport mode Access
Switch(config-if-range) #switchport access vlan 20
Switch(config-if-range) #exit

Switch(config)#int fa0/5-6
Switch(config-if-range) #switchport mode Access
Switch(config-if-range) #switchport access vlan 30
Switch(config-if-range) #exit

Switch(config)#int fa0/7
Switch(config-if) #switchport mode Trunk
```

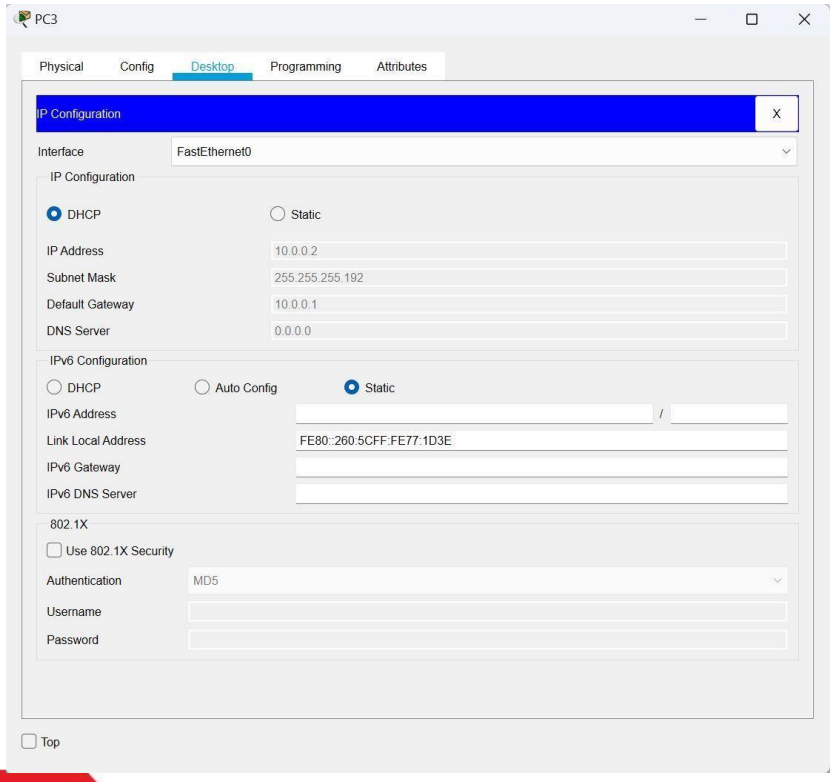
```
Router>en
Router#config t
Router(config)#int fa0/0
Router(config-if)#no shutdown
Router(config-if)#int fa 0/0.10
Router(config-subif)#
Router(config-subif)#encapsulation dot1q 10
Router(config-subif)#ip add 10.0.0.1 255.255.255.192
Router(config-subif)#int fa 0/0.20
Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip add 10.0.0.65 255.255.255.192
Router(config-subif)#int fa 0/0.30
Router(config-subif)#encapsulation dot1q 30
Router(config-subif)#ip add 10.0.0.129 255.255.255.192
Router(config-subif)#exit

Router(config)#ip dhcp pool VLAN10
Router(dhcp-config)#network 10.0.0.0 255.255.255.192
Router(dhcp-config)#default-router 10.0.0.1
Router(dhcp-config)#ip dhcp excluded-address 10.0.0.1
Router(config)#ip dhcp pool VLAN20
Router(dhcp-config)#ip dhcp pool VLAN20
Router(dhcp-config)#network 10.0.0.64 255.255.255.192
Router(dhcp-config)#default-router 10.0.0.65
Router(dhcp-config)#ip dhcp excluded-address 10.0.0.65
Router(config)#ip dhcp pool VLAN30
Router(dhcp-config)#network 10.0.0.128 255.255.255.192
Router(dhcp-config)#default-router 10.0.0.129
Router(dhcp-config)#ip dhcp excluded-address 10.0.0.129
Router(config)#exit
Router#sh ip dhcp pool
```

5. Result/Output:

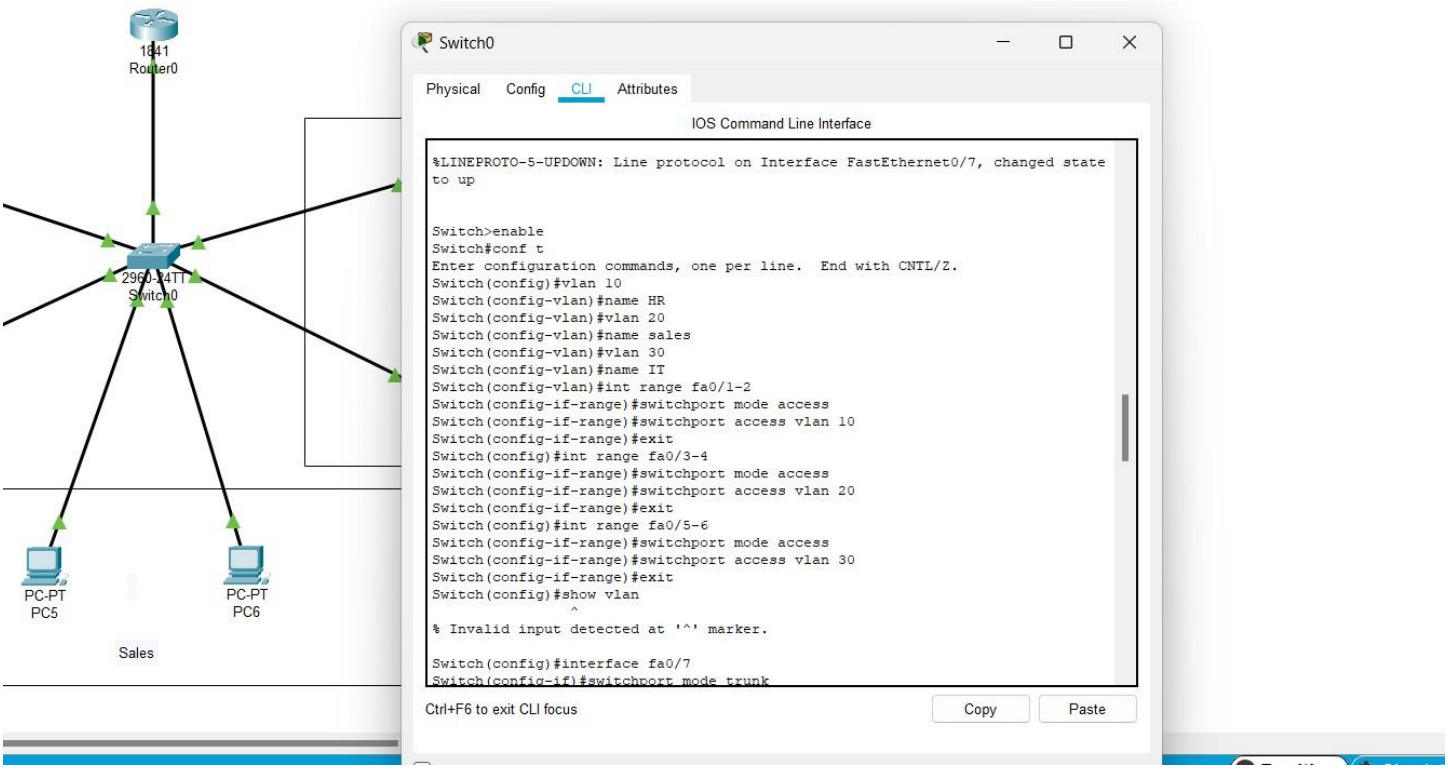
Connect all the devices

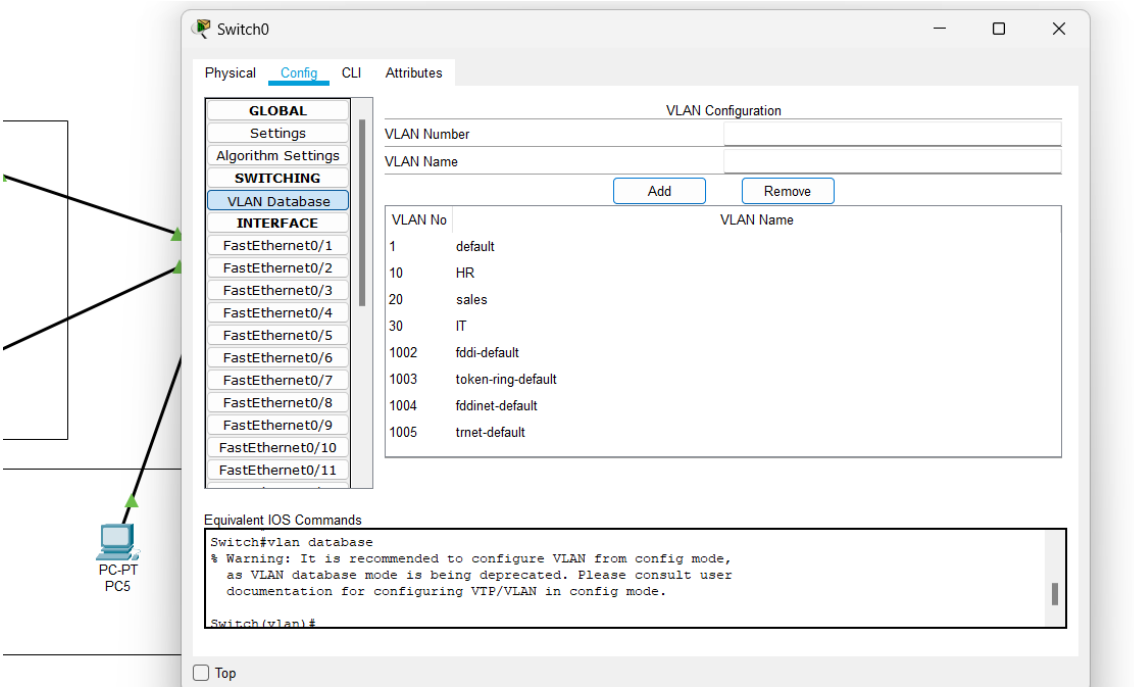


Enable dhcp in every end device. It will automatically assign IP address and gateway.

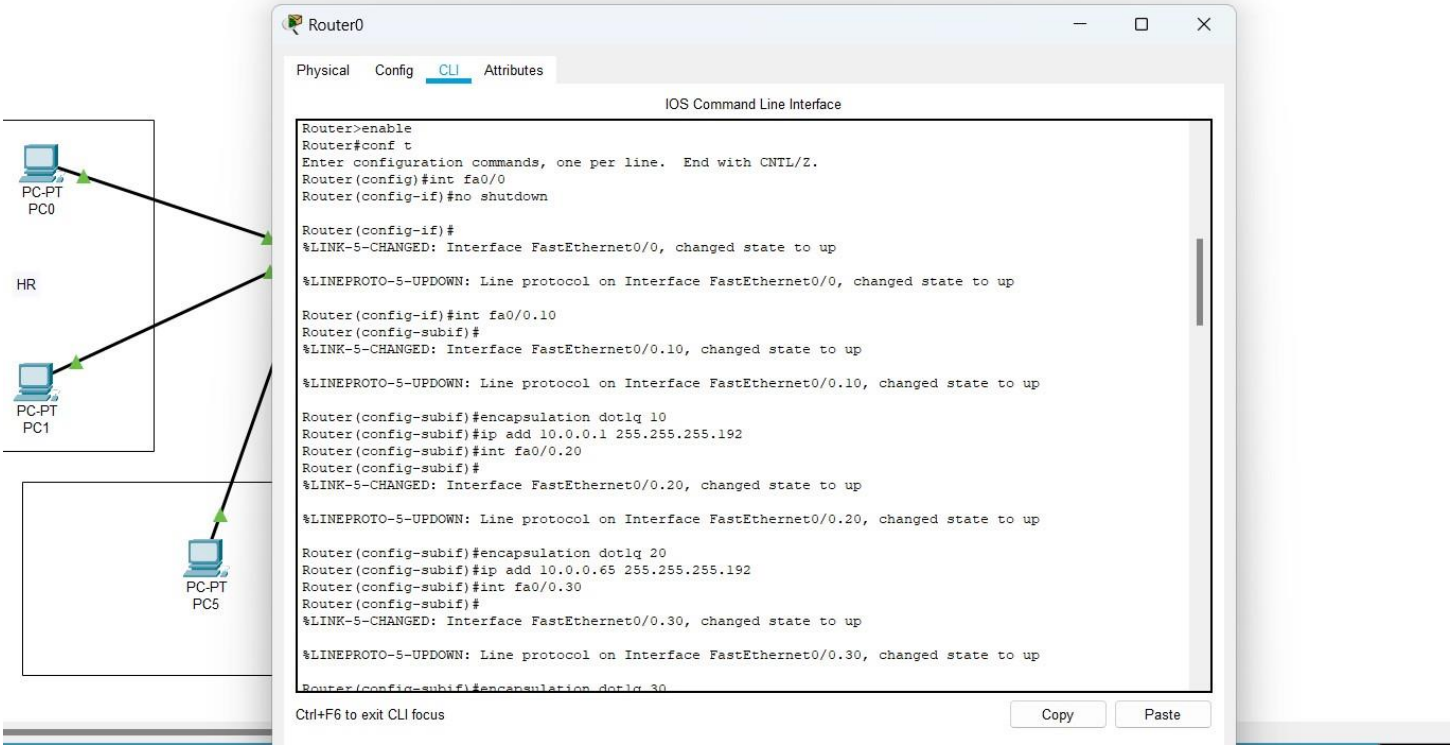


Configured the Switch with given commands

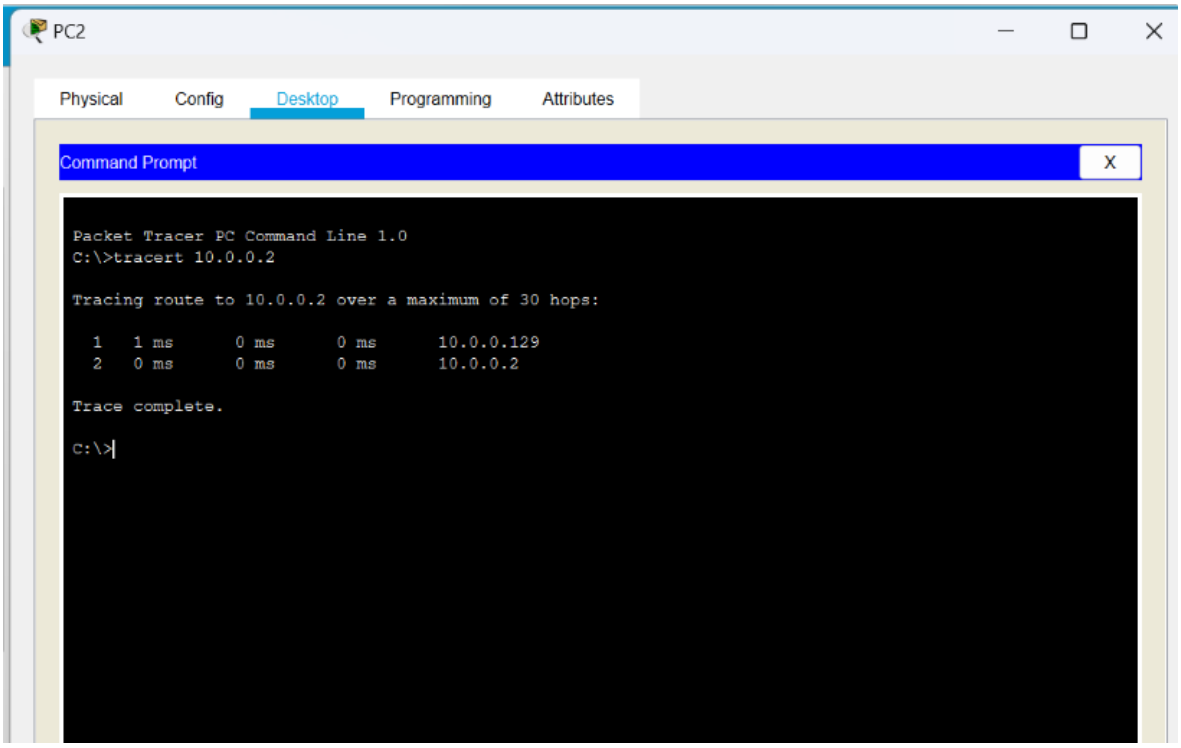




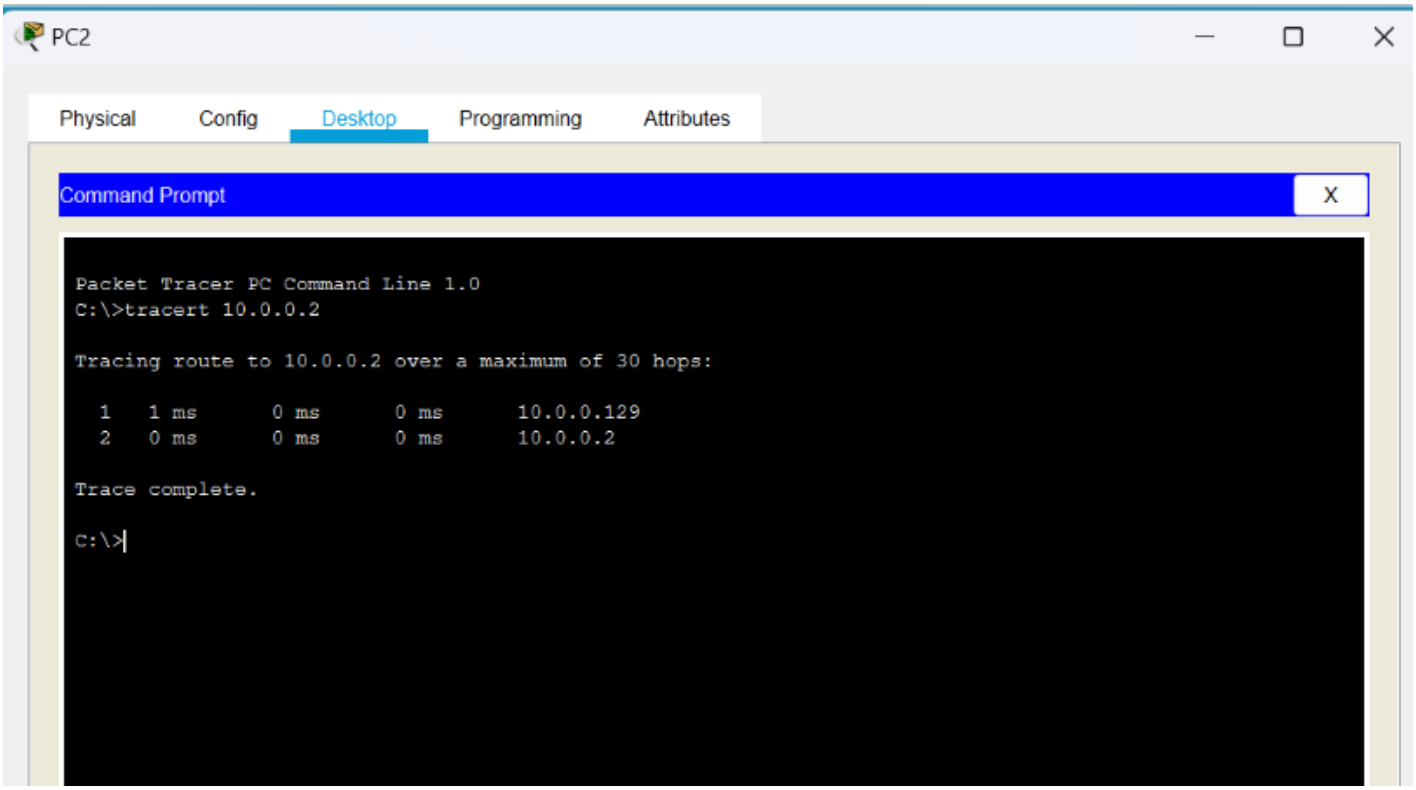
Configured the router with given commands to enable VLAN and as DHCP server



Ping the message with the help of ‘ping’ command on Command Prompt



Used command ‘tracert’ to route the path of communication between two end devices



Learning outcomes (What I have learnt):

- Leant how VLAN is created using simple connection.
- Learnt that how a router can be used as a dhcp server with the help of certain commands.
- How to troubleshoot the network.
- Learnt to route the different networks.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			