Department of Computer Science and Engineering
Islamic University of Technology (IUT)
A subsidiary organ of OIC

Laboratory Report

CSE 4412 : Data Communication and Networking Lab

Name	:Nazia Karim Khan Oishee
Student ID	:200042137
Section	:1A
Semester	:Summer
Academic Year	:2021-2022
Date of Submission	:04.04.2023
Lab No	:09

Title: Inter VLAN routing and configuring DHCP service.

Objective:
1. Inter VLAN routing
2. Configuration of DHCP

Devices Used in the Cisco Packet Tracers:

1.CISCO Packet Tracer

Theory:

Inter VLAN Routing:

Explain the procedure of routing a packet within three different user groups i.e. three different vlan situated in three different levels of an office building.

Ans: For routing a packet within three different user groups in three different levels of an office building, we need to follow the following steps:
1. First, create three different VLAN and assign names to different VLANs.
2. Assign ports to each VLAN.
3. Connect the ports with PCs and assign IP addresses to each PCs.
4. Connect the VLANs of different levels through a switch via a trunk port.
5. Connect a router with the switch
6. Configure a port of the router by dividing it into 3 parts.
7. Assign default gateways in PC.

DHCP Service:

Advantage of DHCP Service:

There are many advantages of DHCP service such as:
1. DHCP is easy to implement and flexible.
2. DHCP assigns IP addresses automatically and dynamically.

3. The possibilities of occurring errors while assigning IP addresses manually is reduced to a great extent in DHCP service.

Disadvantage of DHCP Service:

There are many advantages of DHCP service such as:

1. DHCP is complex to configure.
2. Although DHCP reduces the possibilities of conflicts in IP addresses, they can still occur.
3. As DHCP server assigns IP addresses to other end systems, if the DHCP server fails the whole network could be disrupted.

Exclusion of Addresses in DHCP Services:

In DHCP we can reserve an IP address or a range of addresses so that they are not assigned to DHCP clients. We do so by excluding them from DHCP.
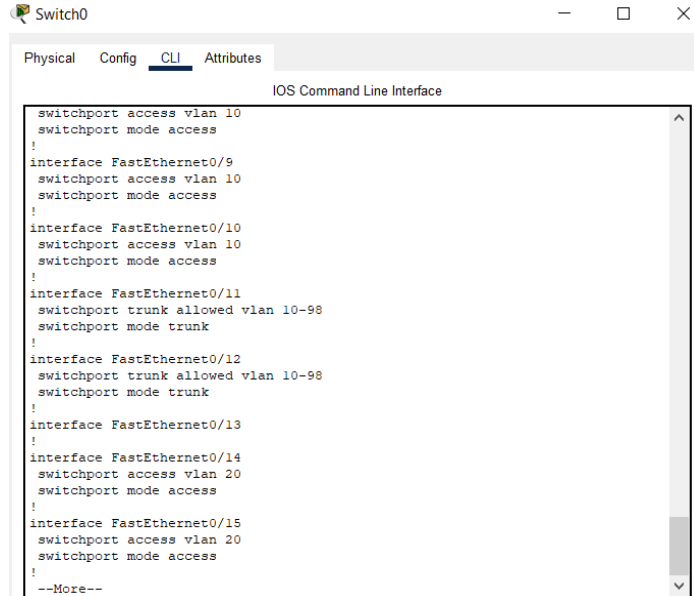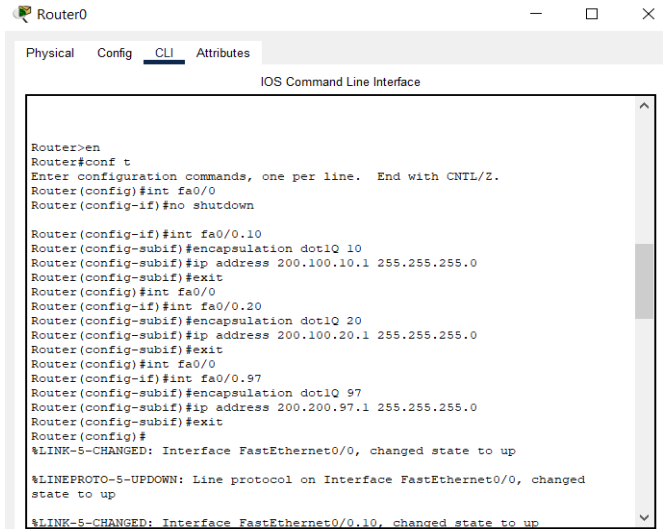
Diagram of the experiment:
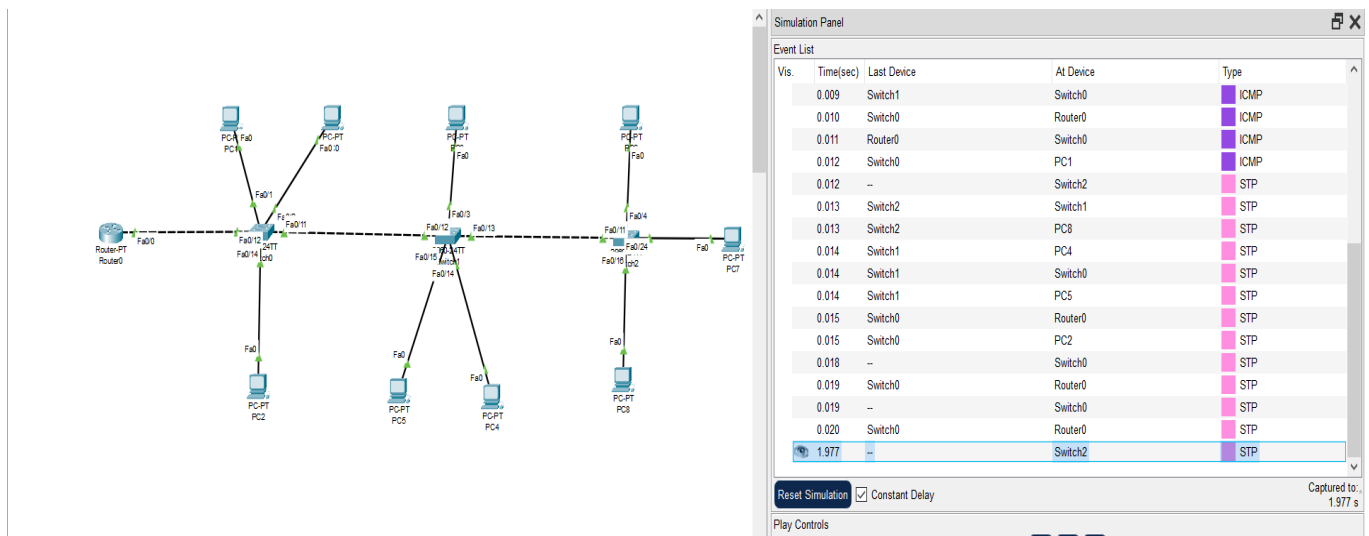
Configuration of Routers:

Commands for configuring VLAN:

At first I configured the switches. I created VLANs named Student,Faculties and Management. Then I assigned ports to the VLAN. After that I configured the ports which were connecting switches and routers among themselves and set their mode as trunk. I connected switch0 with the router via interface fa0/12 of switch and interface fa0/0 of the router and set the mode of switch's interface as trunk.

```
Switch0                                    —  □  ×

Physical   Config   CLI   Attributes
                    IOS Command Line Interface
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/9
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/10
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/11
 switchport trunk allowed vlan 10-98
 switchport mode trunk
!
interface FastEthernet0/12
 switchport trunk allowed vlan 10-98
 switchport mode trunk
!
interface FastEthernet0/13
!
interface FastEthernet0/14
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/15
 switchport access vlan 20
 switchport mode access
!
 --More--
```

```
Router0                                      —  □  ×

Physical   Config   CLI   Attributes
                    IOS Command Line Interface

Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#no shutdown

Router(config-if)#int fa0/0.10
Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#ip address 200.100.10.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int fa0/0
Router(config-if)#int fa0/0.20
Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip address 200.100.20.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int fa0/0
Router(config-if)#int fa0/0.97
Router(config-subif)#encapsulation dot1Q 97
Router(config-subif)#ip address 200.200.97.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

%LINK-5-CHANGED: Interface FastEthernet0/0.10, changed state to up
```

After that for Inter VLAN routing I configured the router using following commands:
Enable → conf t → int fa0/0 → no shutdown → int fa0/0.10 → encapsulation dot1Q 10 → ip address 200.100.10.1 255.255.255.0→ exit
Here 200.100.10.1 is the default gateway of PC's under Student VLAN and 255.255.255.0 is the subnet mask of the gateway.
Similarly, I encapsulated for the other two VLANs.
After that I assigned default gateways in the PCs.

Commands for configuring DHCP:
For configuring DHCP service I went to the CLI of the router and entered the following commands:
ip dhcp excluded-address 200.100.10.1 200.100.10.100
ip dhcp excluded-address 200.100.20.1 200.100.20.10
ip dhcp excluded-address 200.100.97.1 200.100.97.10

Thus I excluded the addresses or reserved them to abstain the DHCP service from assigning them to any PC.
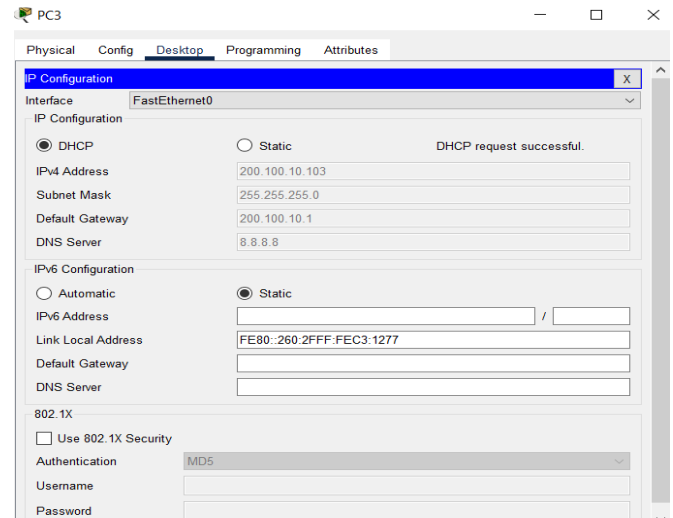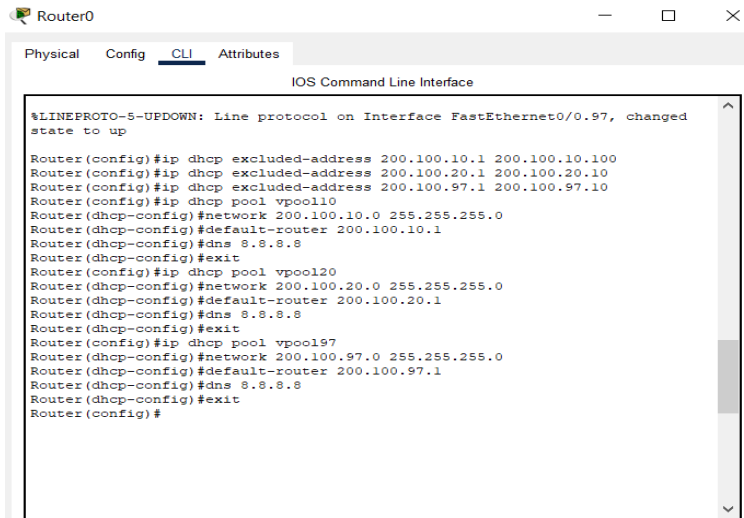
After that I created three consecutive DHCP pool by following these commands:

ip dhcp pool vpool10

network 200.100.10.0 255.255.255.0
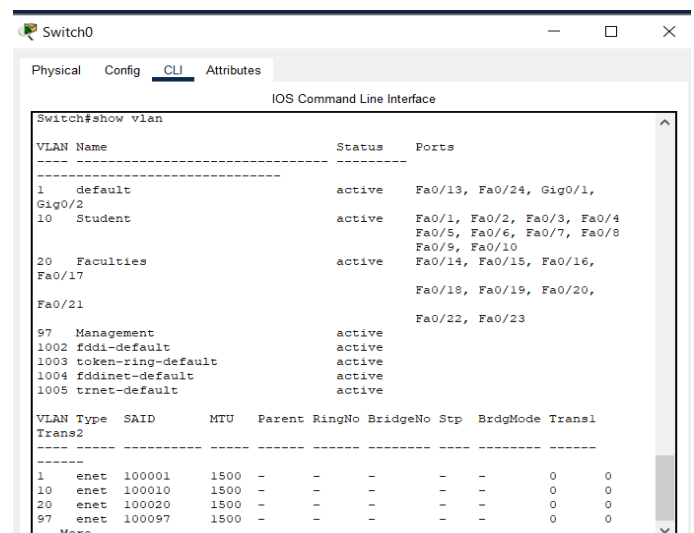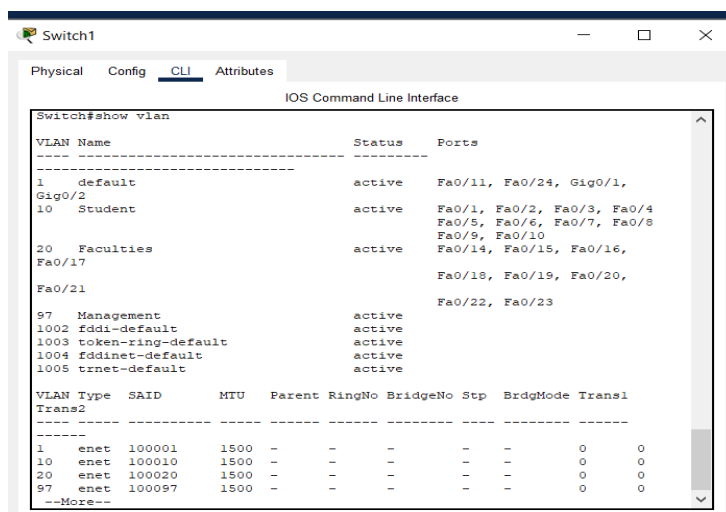
default-router 200.1000.10.1

dns 8.8.8.8

exit

In the same way I created two other pools named vpool20 and vpool97.

And then I turned on the DHCP mode of each PC from the IP configuration mode of the PC.

Observation:

The screenshots of *show vlan* command in two switches are shown below:

Challenges:

In this task, I faced difficulties while configuring the router to set the DHCP service. After turning on the DHCP mode on the PC, it took quite some time to obtain an IP address. Initially DHCP requests failed multiple times.