Lab 4(B)
Introduction to DHCP

Design a topology for DHCP through which PC would be able to get IP'S dynamically.

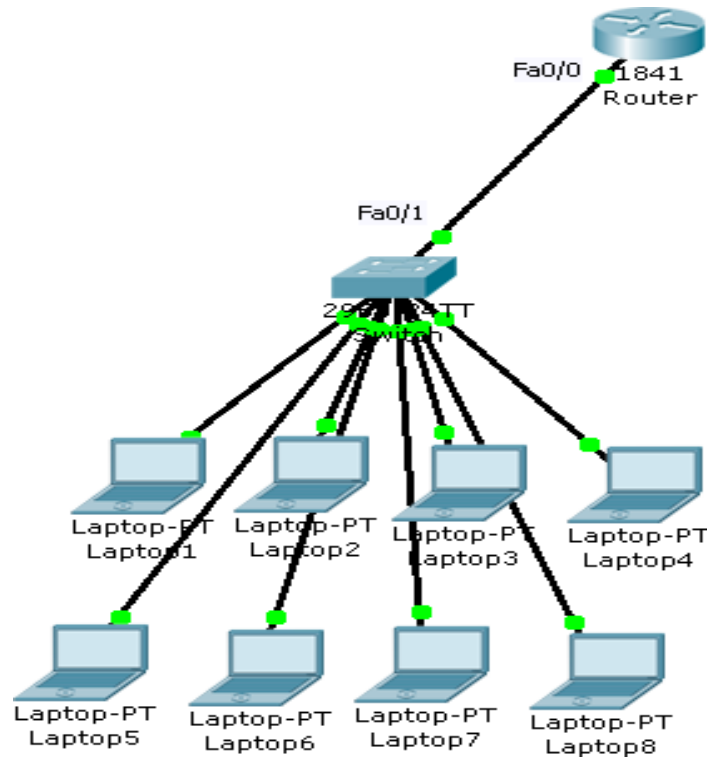

Figure 1:

What is DHCP?

Dynamic Host Configuration Protocol (DHCP) is a network protocol that enables a server to automatically assign an IP address to a computer from a defined range of numbers (that is, a scope) configured for a given network.

How DHCP assigns IP addresses

DHCP assigns an IP address when a system is started, for example:

1. A user turns on a computer with a DHCP client.
2. The client computer sends a broadcast request (called a DISCOVER or DHCPDISCOVER), looking for a DHCP server to answer.
3. The router directs the DISCOVER packet to the correct DHCP server.
4. The server receives the DISCOVER packet. Based on availability and usage policies set on the server, the server determines an appropriate address (if any) to give to the client.

The server then temporarily reserves that address for the client and sends back to the client an OFFER (or DHCPOFFER) packet, with that address information. The server also configures the client's DNS servers, WINS servers, NTP servers, and sometimes other services as well.

5. The client sends a REQUEST (or DHCPREQUEST) packet, letting the server know that it intends to use the address.
6. The server sends an ACK (or DHCPACK) packet, confirming that the client has been given a lease on the address for a server-specified period of time.
7. A DHCP lease is a temporary assignment of an IP address to a device on the network.

Static IP addresses

When a computer uses a static IP address, it means that the computer is manually configured to use a specific IP address. One problem with static assignment, which can result from user error or inattention to detail, occurs when two computers are configured with the same IP address. This creates a conflict that results in loss of service. Using DHCP to dynamically assign IP addresses minimizes these conflicts.

Refer to figure 1,

Task-1, Router IP

Configure the interface of a router with a correct IP address

```
Router>enable
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/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)#exit
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
```

Task-2, Configuring DHCP

```
Router(config)#ip dhcp excluded-address 192.168.1.2 192.168.1.10
Router(config)#ip dhcp pool Network1
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#exit
```

Task-3, PC get automatic IP

When selecting the IP address to the PC. The pc would be able to get the IP assigned automatically. (See figure 2)

Tasks

1) Design a Ring network which consists of 4 routers. Attach 4 PC's with each router. At the end of the configuration, all the attached devices should be able to get IPs from DHCP. Pool name should be on student name and ID.

2) Design a network topology, which consists of a switch (2950-24) and a server. Attach 3 PC's with the switch and connect the switch with the server. Configure the end devices PCs with different IP addresses. At the end of the configuration, check the connectivity status by sending a simple PDU for one device to another or simply ping the assigned IP addresses of different devices on the command prompt.