Task 10

a) Configure DHCP Server in the Network using packet tracer software.

DHCP server:

DHCP server (Dynamic Host Configuration Protocol server) is a network service that automatically assigns IP addresses and other network configuration details (like subnet mask, default gateway, and DNS servers) to devices on a network. This eliminates the need for manually configuring these settings for each device, simplifying network management and reducing the chances of configuration errors.

Key Features of a DHCP Server

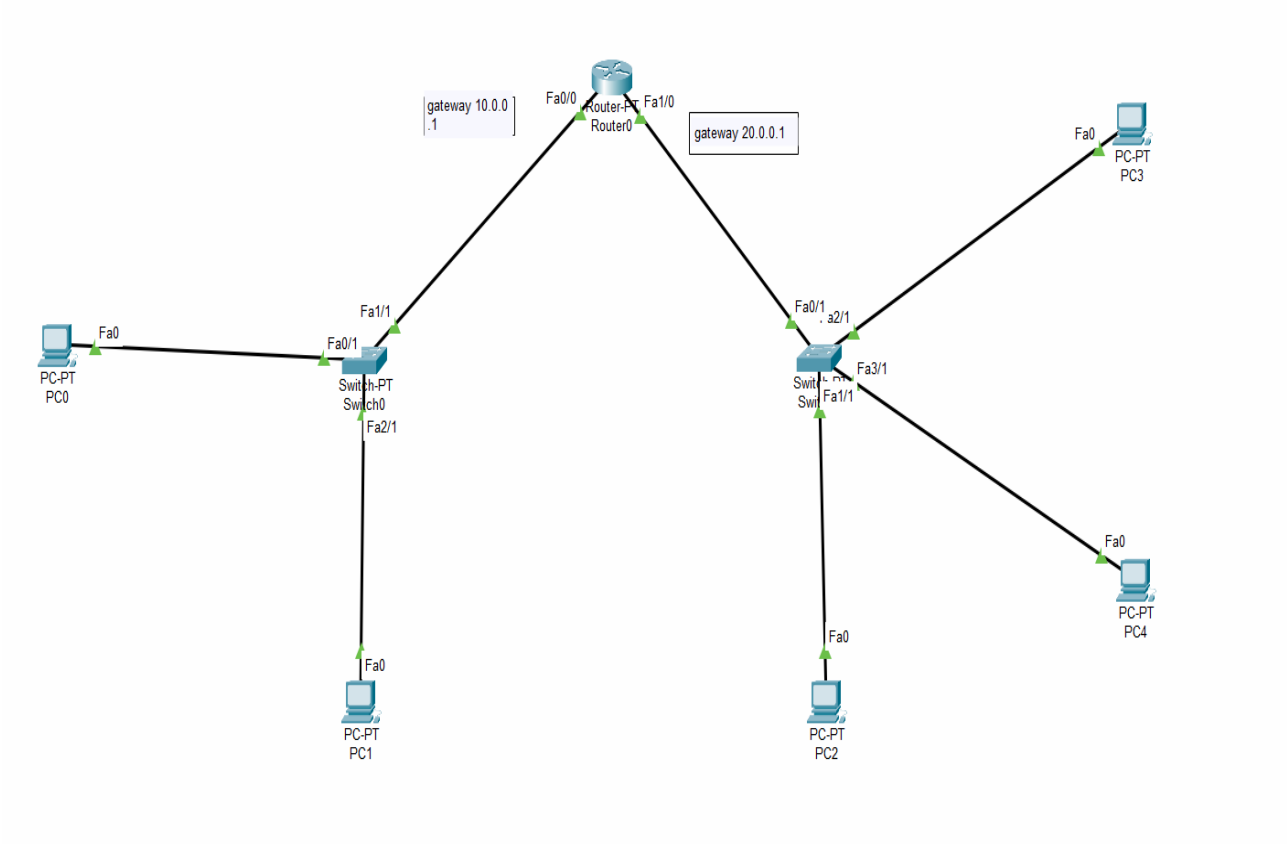
1. **Automatic IP Address Assignment**:
    - The DHCP server dynamically assigns IP addresses to devices (like computers, phones, printers) when they connect to the network.
    - Ensures that no two devices are assigned the same IP address, avoiding conflicts.
2. **Centralized Network Management**:
    - Administrators configure the IP address pool and other settings on the DHCP server, and all devices receive their configurations from it.
3. **Efficient Reuse of IP Addresses**:
    - DHCP leases IP addresses for a specific time period. When a device disconnects or doesn't renew its lease, the IP address is returned to the pool and can be reassigned.
4. **Provides Additional Configuration**:
    - In addition to IP addresses, a DHCP server can provide:
        - Subnet mask
        - Default gateway
        - DNS server addresses
        - Other parameters like NTP servers and domain names.
5. DHCP Pool
   DHCP pool refers to a range of IP addresses defined on a DHCP server that are available to be assigned dynamically to devices (clients) on a network. This pool ensures that the DHCP server can allocate unique IP addresses to devices that request them

Note:

DNS automatically assigns IP addresses so, **don't assign IP's to the PCs** in static way

Follow step-by-step instructions:

Step 1: Build network (**don't assign IP's to the PCs**)



Step 2: Configure the Router for DHCP

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.

// **Define DHCP Pools for Each Network**://

//For **10.0.0.0** network//

Router(config)#ip dhcp pool lan1

Router(dhcp-config)#network 10.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 10.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#

//For **20.0.0.0** network//

Router(dhcp-config)#ip dhcp pool lan2
Router(dhcp-config)#network 20.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 20.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#

//**Exclude Router IPs from DHCP Pool**: Prevent the router's interface IPs from being allocated by DHCP.//

Router(dhcp-config)#ip dhcp excluded-address 10.0.0.1
Router(config)#ip dhcp excluded-address 20.0.0.1
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr memory
Building configuration...
[OK]

Step 3: Configure Router Interfaces

Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.

//Assign IP addresses to the router interfaces://

Router(config)#int fa0/0
Router(config-if)#ip add 10.0.0.1 255.0.0.0
Router(config-if)#no shut

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

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

```
Router(config-if)#int fa1/0
Router(config-if)#ip add 20.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to
up

Router(config-if)#
Router(config-if)#ex
Router(config)#ex
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 4: Configure PCs to Use DHCP

1. Click on each PC (**PC0, PC1, PC2, etc.**).
2. Go to the **Desktop** tab.
3. Open the **IP Configuration** window.
4. Select **DHCP**. The PC should automatically receive an IP address from the router.

Step 5: Verify the Configuration

Go back to the router's CLI and verify DHCP bindings:
This will display the list of IPs leased to PCs.

```
Router#sh ip dhcp binding
IP address Client-ID/ Lease expiration Type
Hardware address
10.0.0.2 0060.2F70.9394 -- Automatic
10.0.0.3 0090.21AD.BB03 -- Automatic
20.0.0.2 00E0.F739.0313 -- Automatic
20.0.0.3 0003.E413.8ADD -- Automatic
20.0.0.4 0001.4237.29AD -- Automatic
Router#
```

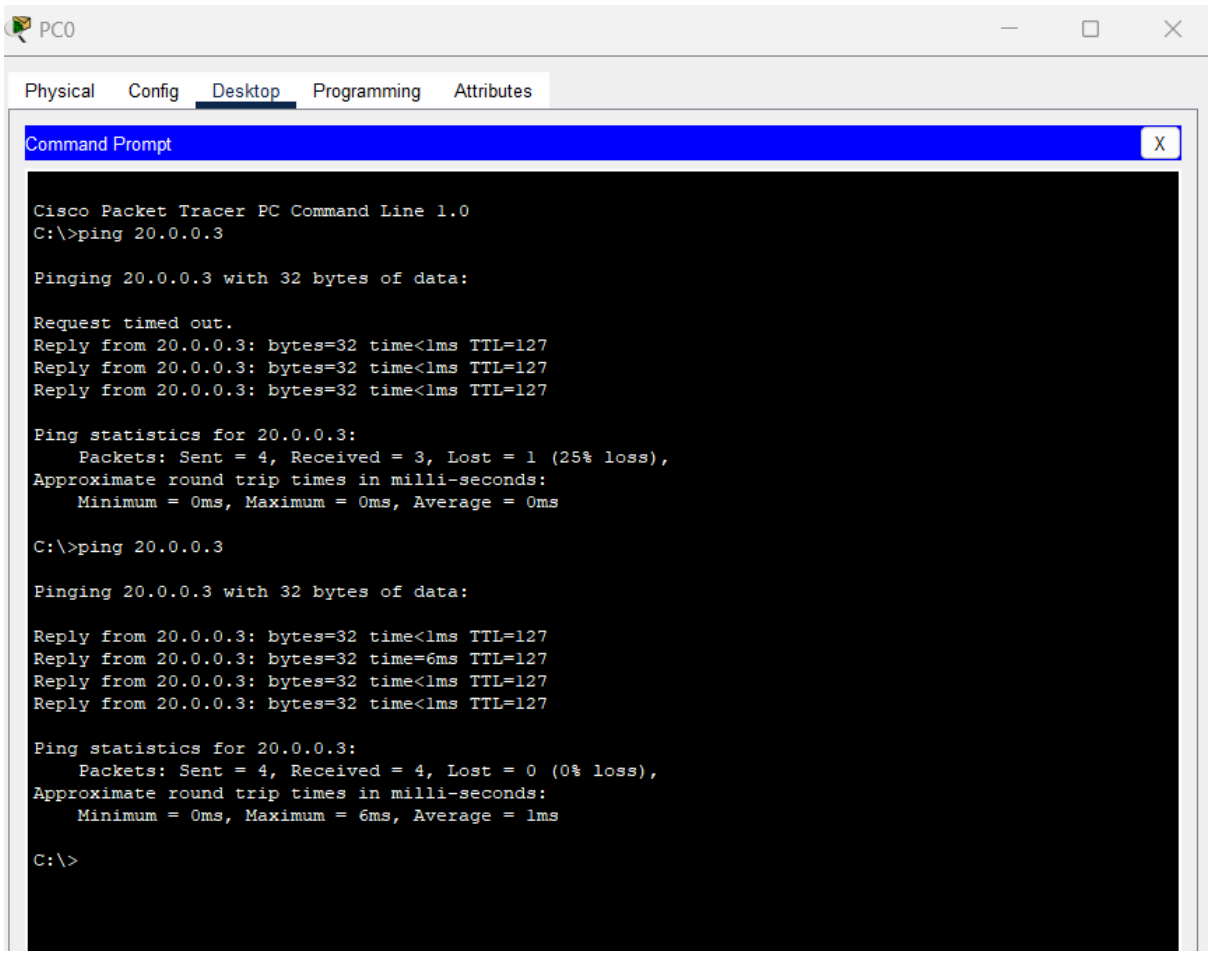
Router0

Physical Config CLI Attributes

```
Router(config)#ip dhcp pool lan1
Router(dhcp-config)#network 10.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 10.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#
Router(dhcp-config)#ip dhcp pool lan2
Router(dhcp-config)#network 20.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 20.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#
Router(dhcp-config)#ip dhcp excluded-address 10.0.0.1
Router(config)#ip dhcp excluded-address 20.0.0.1
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr memory
Building configuration...
[OK]
Router#
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip add 10.0.0.1 255.0.0.0
Router(config-if)#no shut

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

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

Router(config-if)#int fa1/0
Router(config-if)#ip add 20.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

Router(config-if)#
Router(config-if)#ex
Router(config)#ex
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#sh ip dhcp binding
IP address       Client-ID/              Lease expiration        Type
                 Hardware address
10.0.0.2         0060.2F70.9394           --                     Automatic
10.0.0.3         0090.21AD.BB03           --                     Automatic
20.0.0.2         00E0.F739.0313           --                     Automatic
20.0.0.3         0003.E413.8ADD           --                     Automatic
20.0.0.4         0001.4237.29AD           --                     Automatic
Router#
Router#
```

Step 6: Test Connectivity

ping 20.0.0.3 (from PC0)



Just for Reference network picture of PCs, IP s automatically assigned.