

Computer Networks (CS303)

Assignment - 10

U19CS012

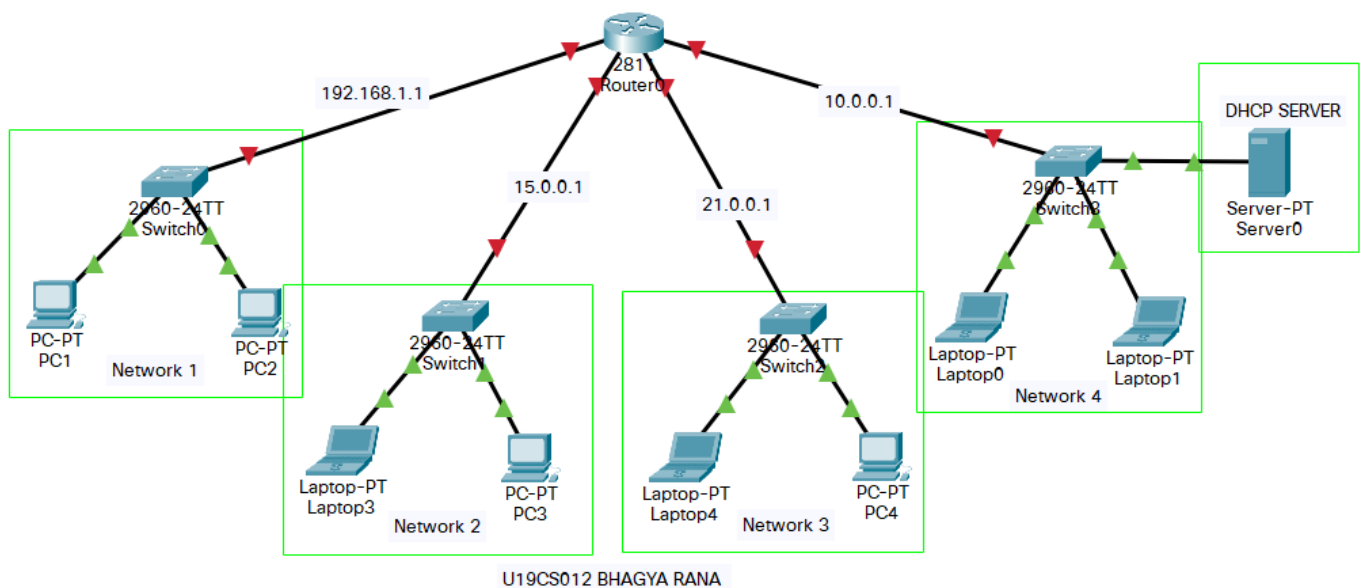
Problem Statement:

- (a) Create Manual to create Network Topology.
- (b) Minimum **3 Networks** should be connected to **One Router** and **DHCP Server** should be responsible for assigning IP address to all the systems in topology.
- (c) Perform one transmission between two systems belonging to different networks

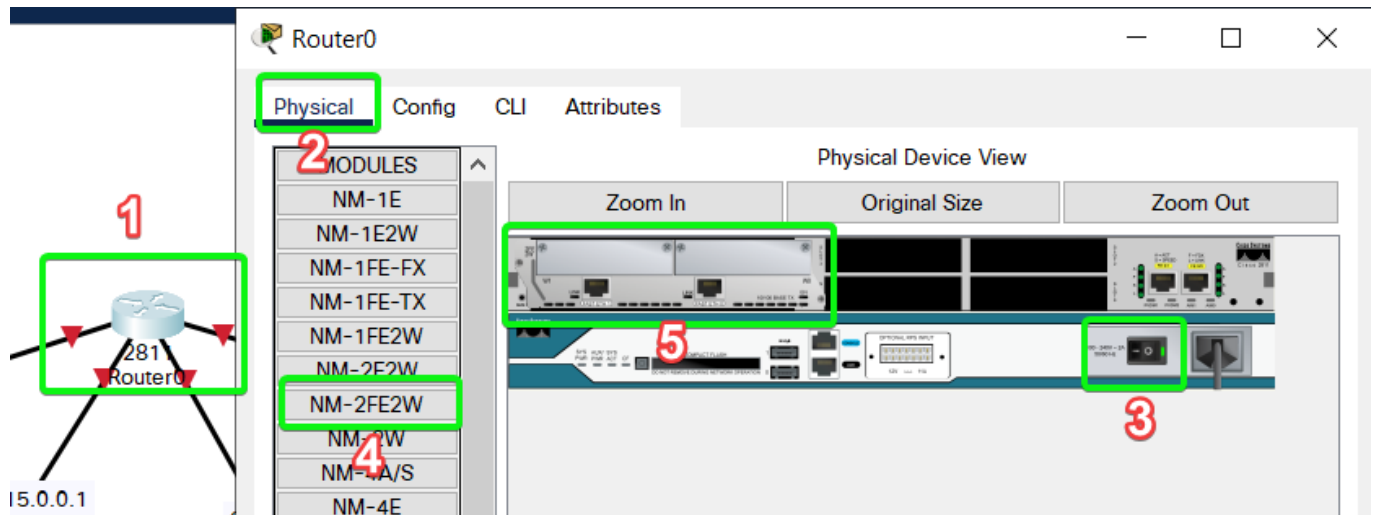
Step 1 : LAYOUT

Create a network shown below using:

- (1) 1 Router
- (2) 4 Switches
- (3) 4 PC's
- (4) 4 Laptop's
- (5) 1 DHCP Server



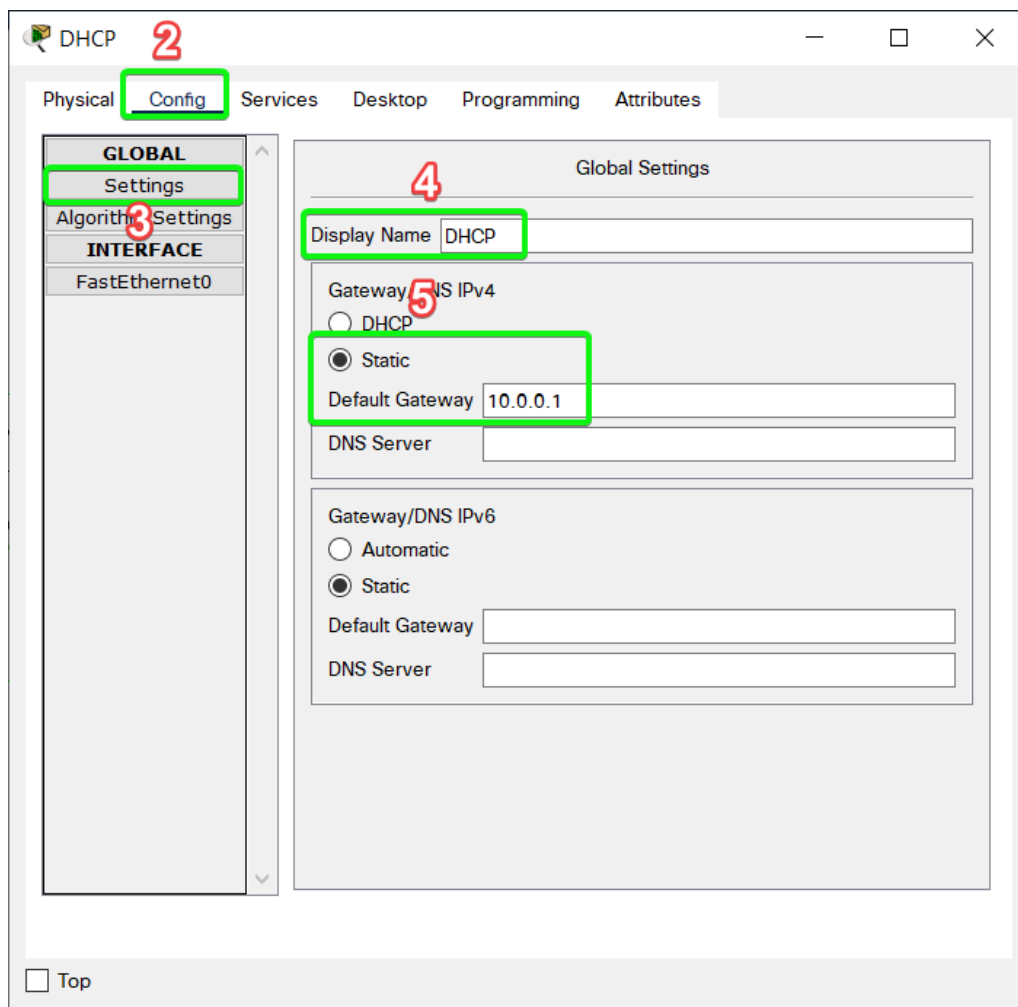
In order to connect more than 2 Networks with Route, We need to Add Modules to it. Here, I am using Router 2811, therefore go to the **Physical Configuration** and add module "NM-2FE2W" which enables two more Fast-Ethernet Ports.



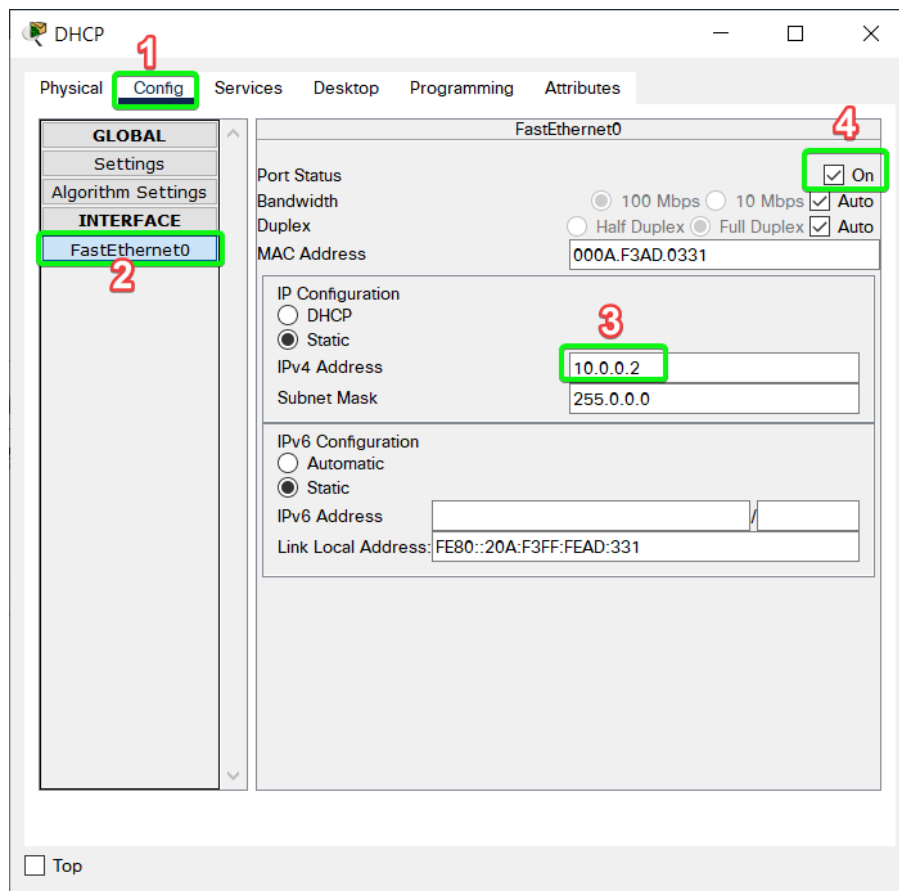
Once this is Complete, you should be able to add 4 different networks to the Router.

Step 2 : DHCP SERVER CONFIGURATION

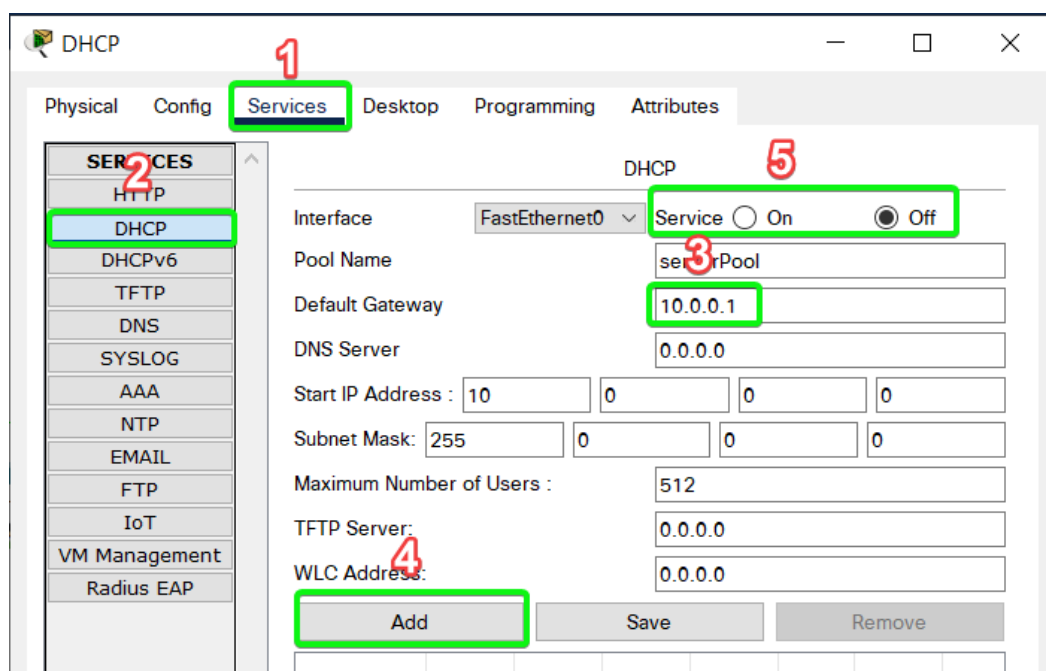
Select the **Server** to open up its **Configuration** terminal and then select **setting** and set it to static with default gateway as "10.0.0.1" (the network server is connected to).



Then Select **FastEthernet0** and set the IPv4 address to **10.0.0.2** with Subnet Mask **255.0.0.0** {automatically appear} which is also in static. Then set the port status to "ON".



Now select **Services** from top bar and then select **DHCP** and now set the starting IP of each network. Here we would set for 4 networks "192.168.1.1", "15.0.0.1", "21.0.0.1", "10.0.0.1".



DHCP

PhysicalConfigServicesDesktopProgrammingAttributes

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

DHCP

InterfaceFastEthernet0ServiceOnOff

Pool NamePool192

Default Gateway192.168.1.1

DNS Server0.0.0.0

Start IP Address :19216814

Subnet Mask:2552552550

Maximum Number of Users :30

TFTP Server:0.0.0.0

WLC Address:0.0.0.0

AddSaveRemove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
Pool192	192.1...	0.0.0.0	192.1...	255.2...	30	0.0.0.0	0.0.0.0
serverPool	10.0.0.1	0.0.0.0	10.0.0.0	255.0...	512	0.0.0.0	0.0.0.0

DHCP

PhysicalConfigServicesDesktopProgrammingAttributes

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

DHCP

InterfaceFastEthernet0ServiceOnOff

Pool NamePool15

Default Gateway15.0.0.1

DNS Server0.0.0.0

Start IP Address :15000

Subnet Mask:255000

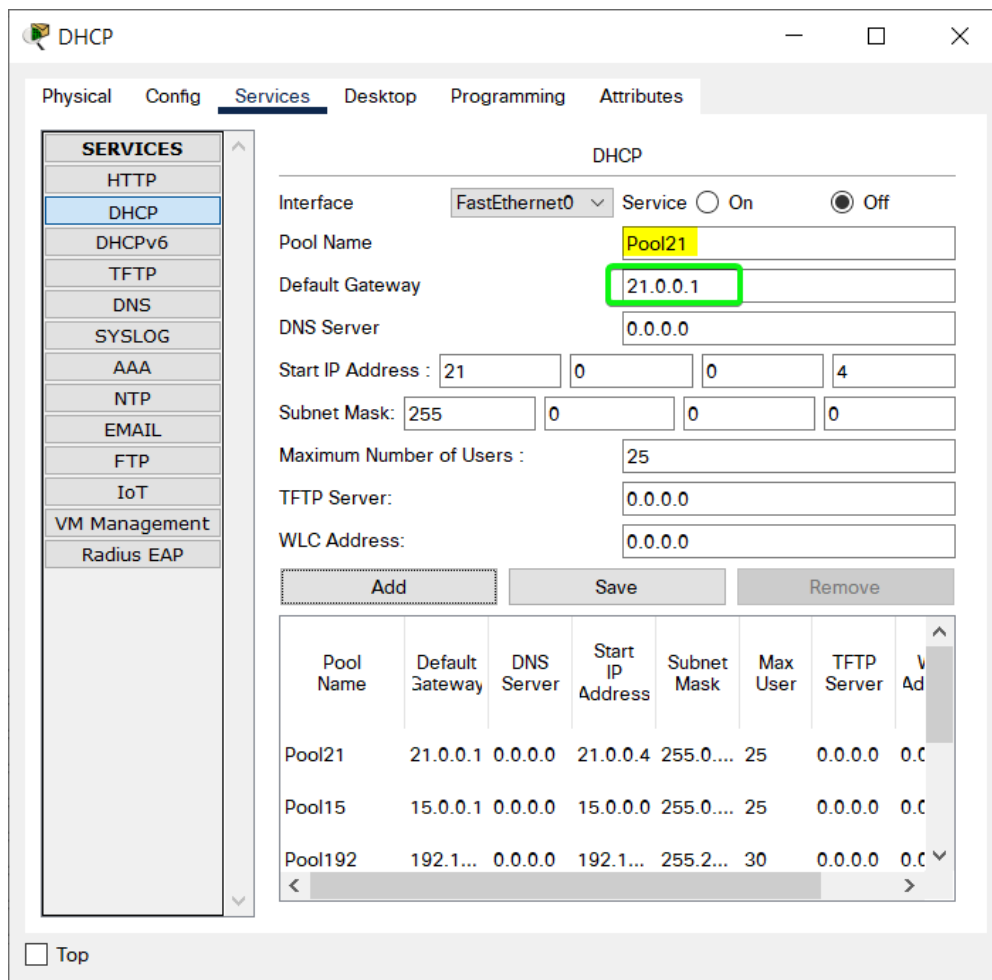
Maximum Number of Users :25

TFTP Server:0.0.0.0

WLC Address:0.0.0.0

AddSaveRemove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
Pool15	15.0.0.1	0.0.0.0	15.0.0.0	255.0...	25	0.0.0.0	0.0.0.0
Pool192	192.1...	0.0.0.0	192.1...	255.2...	30	0.0.0.0	0.0.0.0
serverPool	10.0.0.1	0.0.0.0	10.0.0.0	255.0...	512	0.0.0.0	0.0.0.0



The DHCP configuration window shows the 'Services' tab selected. In the left sidebar, 'DHCP' is highlighted. The main area is titled 'DHCP' and contains the following fields:

- Interface: FastEthernet0
- Service: ☐ On ☒ Off
- Pool Name: Pool21
- Default Gateway: 21.0.0.1
- DNS Server: 0.0.0.0
- Start IP Address: 21 0 0 4
- Subnet Mask: 255 0 0 0
- Maximum Number of Users: 25
- TFTP Server: 0.0.0.0
- WLC Address: 0.0.0.0

Below these fields are 'Add', 'Save', and 'Remove' buttons. A table lists existing DHCP pools:

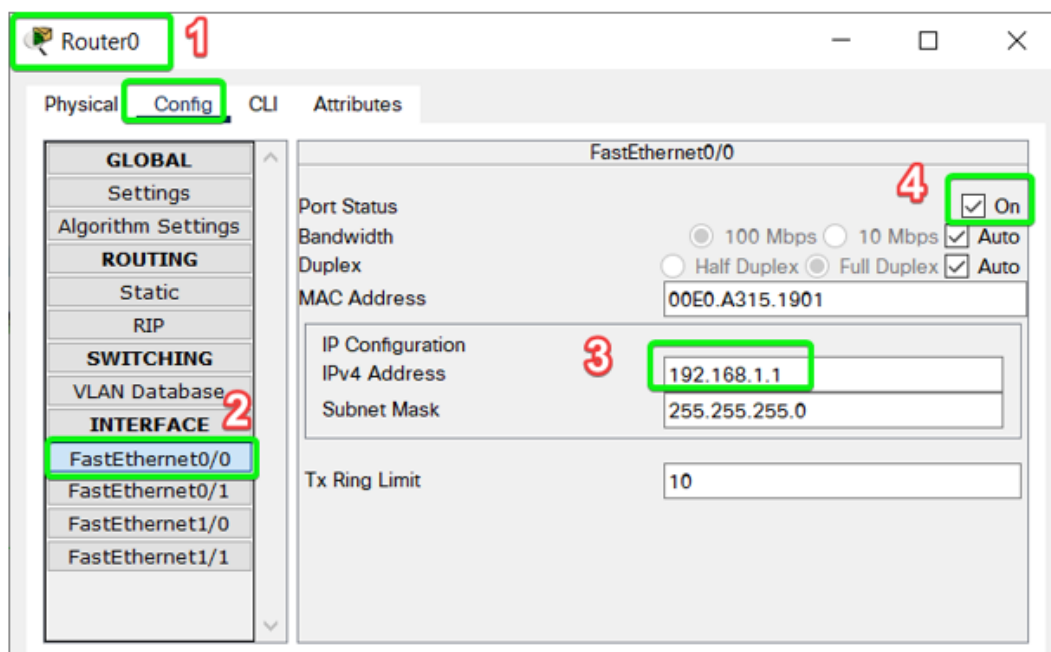
Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
Pool21	21.0.0.1	0.0.0.0	21.0.0.4	255.0.0.0	25	0.0.0.0	0.0.0.0
Pool15	15.0.0.1	0.0.0.0	15.0.0.0	255.0.0.0	25	0.0.0.0	0.0.0.0
Pool192	192.1.1.1	0.0.0.0	192.1.1.1	255.255.255.0	30	0.0.0.0	0.0.0.0

A 'Top' button is located at the bottom left.

After all the DHCP pools are created, set the service status to "ON"

Step 3 : ROUTER CONFIGURATION

Now that the server is set, we need to **configure out router** accordingly so first, set the IP's of each port according to figure in Layout above. Do the same to all ports as shown below.



The Router0 configuration window shows the 'Config' tab selected. In the left sidebar, 'FastEthernet0/0' is highlighted under the 'INTERFACE' section. The main area is titled 'FastEthernet0/0' and contains the following fields:

- Port Status: ☒ On
- Bandwidth: 100 Mbps
- Duplex: Full Duplex
- MAC Address: 00E0.A315.1901
- IP Configuration:
 - IPv4 Address: 192.168.1.1
 - Subnet Mask: 255.255.255.0
- Tx Ring Limit: 10

Red numbers 1, 2, 3, and 4 are used as annotations: 1 points to the Router0 icon, 2 points to the FastEthernet0/0 interface in the sidebar, 3 points to the IPv4 Address field, and 4 points to the Port Status checkbox.

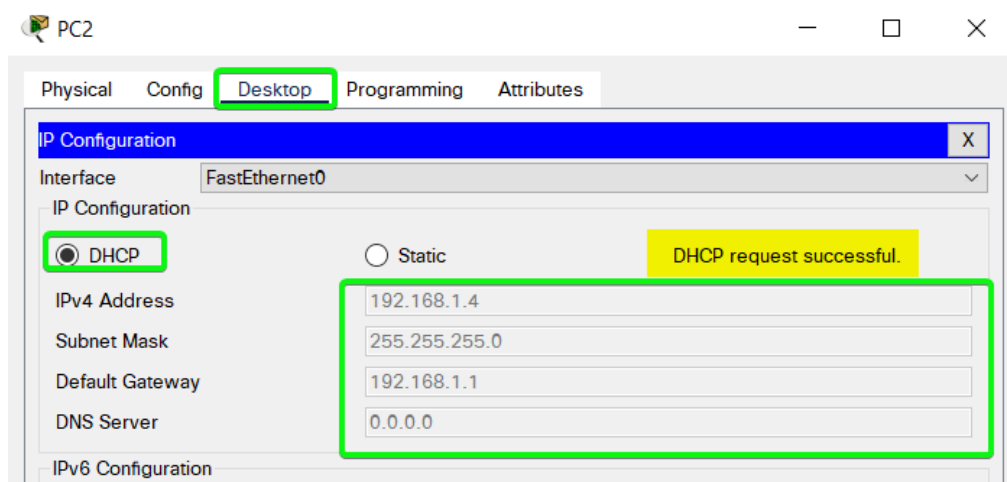
Now, Open CLI and Run the Following Command:

```
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#int fa0/0
Router(config-if)#ip help
Router(config-if)#ip helper-address 10.0.0.2
Router(config-if)#no shutdown
Router(config-if)#do write
Building configuration...
[OK]
Router(config-if)#int fa0/1
Router(config-if)#ip help
Router(config-if)#ip helper-address 10.0.0.2
Router(config-if)#no shutdown
Router(config-if)#do write
Building configuration...
[OK]
Router(config-if)#int fa1/0
Router(config-if)#ip help
Router(config-if)#ip helper-address 10.0.0.2
Router(config-if)#no shutdown
Router(config-if)#do write
Building configuration...
[OK]
Router(config-if)#int fa1/1
Router(config-if)#ip help
Router(config-if)#ip helper-address 10.0.0.2
Router(config-if)#no shutdown
Router(config-if)#do write
Building configuration...
[OK]
Router(config-if)#
```

This should make any DHCP IP request from any network to go directly to the server.

Step 4: END DEVICE CONFIGURATION

Set the **IP Config** mode from Static to DHCP as shown.

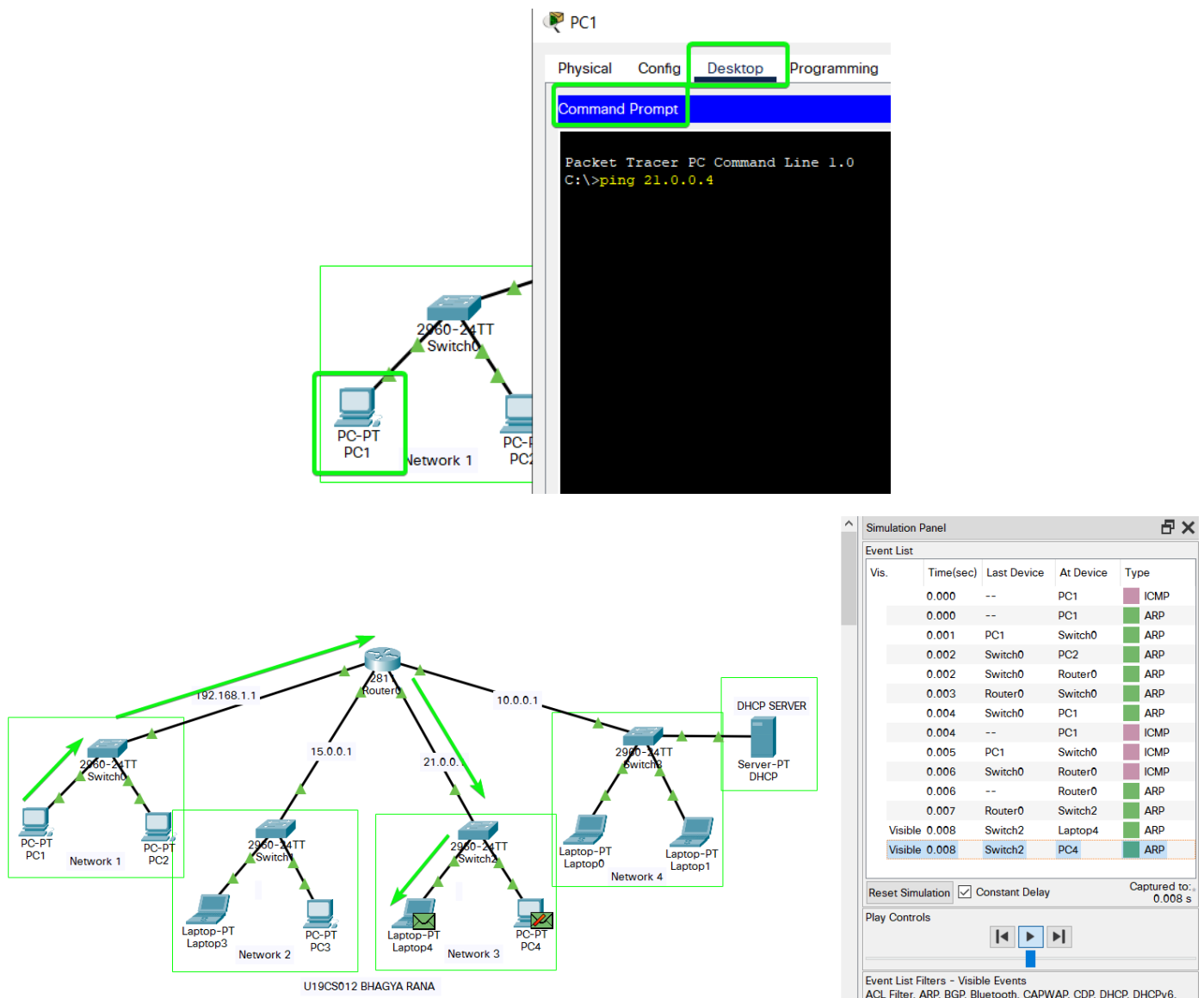


Do Similar Step for All the End Devices {PC's & Laptop's}.

After few seconds it should get assigned a unique IP. Do this to all the end devices.

Step 5: SIMULATION

From PC1 with IP 192.168.1.5 we would ping Laptop4 with IP 21.0.0.4.



```
C:\>ping 21.0.0.4

Pinging 21.0.0.4 with 32 bytes of data:

Reply from 21.0.0.4: bytes=32 time=8ms TTL=127
Reply from 21.0.0.4: bytes=32 time=8ms TTL=127
Reply from 21.0.0.4: bytes=32 time=8ms TTL=127
Reply from 21.0.0.4: bytes=32 time=8ms TTL=127

Ping statistics for 21.0.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 8ms, Maximum = 8ms, Average = 8ms

C:\>
```

SUBMITTED BY:

U19CS012

BHAGYA VINOD RANA