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Class : BCSE III
Assignment No : 6
Subject : Computer Network
Group : A1

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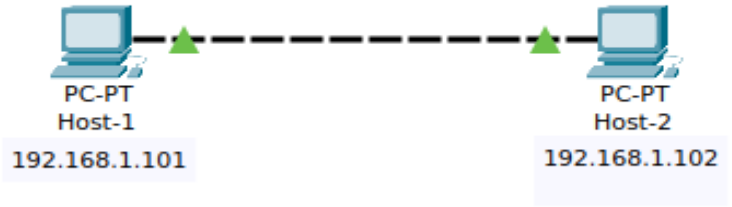
1. Connect two hosts back-to-back with a crossover cable. Assign IP addresses, and see whether they are able to ping each other.



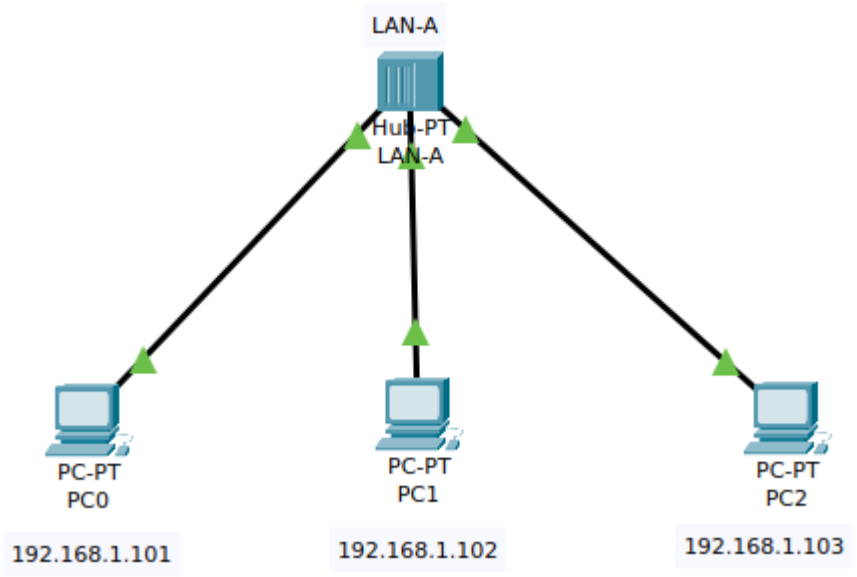
Host-1 pings Host-2

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.102

Pinging 192.168.1.102 with 32 bytes of data:

Reply from 192.168.1.102: bytes=32 time<1ms TTL=128
Reply from 192.168.1.102: bytes=32 time<1ms TTL=128
Reply from 192.168.1.102: bytes=32 time<1ms TTL=128
Reply from 192.168.1.102: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Host-2 pings Host-1

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:

Reply from 192.168.1.101: bytes=32 time<1ms TTL=128
Reply from 192.168.1.101: bytes=32 time<1ms TTL=128
Reply from 192.168.1.101: bytes=32 time<1ms TTL=128
Reply from 192.168.1.101: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

2. Create a LAN (named LAN-A) with 3 hosts using a hub. Ping each pair of nodes.



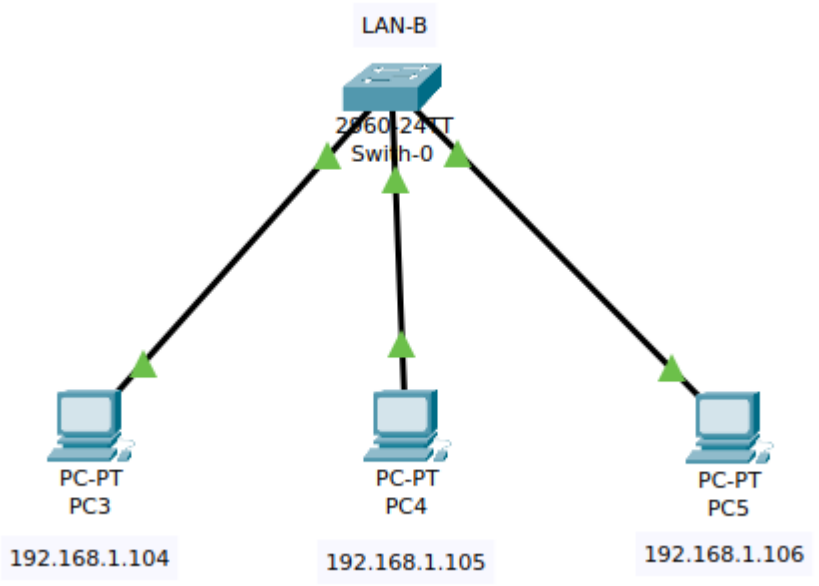
PC0 pings PC1

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.102

Pinging 192.168.1.102 with 32 bytes of data:

Reply from 192.168.1.102: bytes=32 time<1ms TTL=128
Reply from 192.168.1.102: bytes=32 time<1ms TTL=128
Reply from 192.168.1.102: bytes=32 time<1ms TTL=128
Reply from 192.168.1.102: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

PC0 pings PC2

```
C:\>ping 192.168.1.103

Pinging 192.168.1.103 with 32 bytes of data:

Reply from 192.168.1.103: bytes=32 time<1ms TTL=128
Reply from 192.168.1.103: bytes=32 time<1ms TTL=128
Reply from 192.168.1.103: bytes=32 time<1ms TTL=128
Reply from 192.168.1.103: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.103:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

3. Create a LAN (named LAN-B) with 3 hosts using a switch. Record contents of the ARP Table of end hosts and the MAC Forwarding Table of the switch. Ping each pair of nodes. Now record the contents of the ARP Table of end hosts and the MAC Forwarding Table of the switch again.



Before pinging

Arp table of PC3

```
C:\>arp -a
No ARP Entries Found
```

Arp table of PC4

```
C:\>arp -a
No ARP Entries Found
```

Arp table of PC5

```
C:\>arp -a
No ARP Entries Found
```

Arp table of Switch-0

```
Switch>show arp
```

PC3 will ping PC5

```
C:\>ping 192.168.1.106

Pinging 192.168.1.106 with 32 bytes of data:

Reply from 192.168.1.106: bytes=32 time<1ms TTL=128
Reply from 192.168.1.106: bytes=32 time<1ms TTL=128
Reply from 192.168.1.106: bytes=32 time<1ms TTL=128
Reply from 192.168.1.106: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.106:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

After pinging

ARP table of PC3

```
C:\>arp -a
  Internet Address      Physical Address      Type
  192.168.1.106         0001.c9e4.2512        dynamic
```

ARP table of PC4

```
C:\>arp -a
No ARP Entries Found
C:\>
```

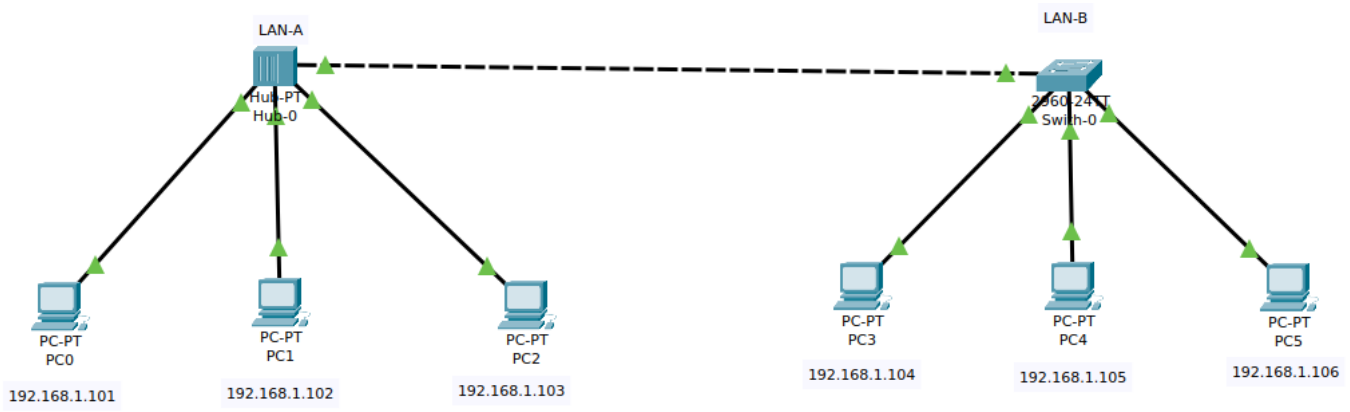
ARP table of PC5

```
C:\>arp -a
  Internet Address      Physical Address      Type
  192.168.1.104         0006.2a16.4617        dynamic
```

ARP table of Switch-0

```
Switch>show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.c9e4.2512    DYNAMIC     Fa0/3
   1    0006.2a16.4617    DYNAMIC     Fa0/1
```

4. Connect LAN-A and LAN-B by connecting the hub and switch using a crossover cable. Ping between each pair of hosts of LAN-A and LAN-B. Now record the contents of the ARP Table of end hosts and the MAC Forwarding Table of the switch again.



PC0 pings PC5

```
C:\>ping 192.168.1.106

Pinging 192.168.1.106 with 32 bytes of data:

Reply from 192.168.1.106: bytes=32 time=20ms TTL=128
Reply from 192.168.1.106: bytes=32 time<1ms TTL=128
Reply from 192.168.1.106: bytes=32 time=28ms TTL=128
Reply from 192.168.1.106: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.106:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 28ms, Average = 12ms
```

ARP table for PC0

```
C:\>arp -a
  Internet Address      Physical Address      Type
  192.168.1.102         0004.9ae8.880c        dynamic
  192.168.1.103         0001.631a.7462        dynamic
  192.168.1.106         0001.c9e4.2512        dynamic
```

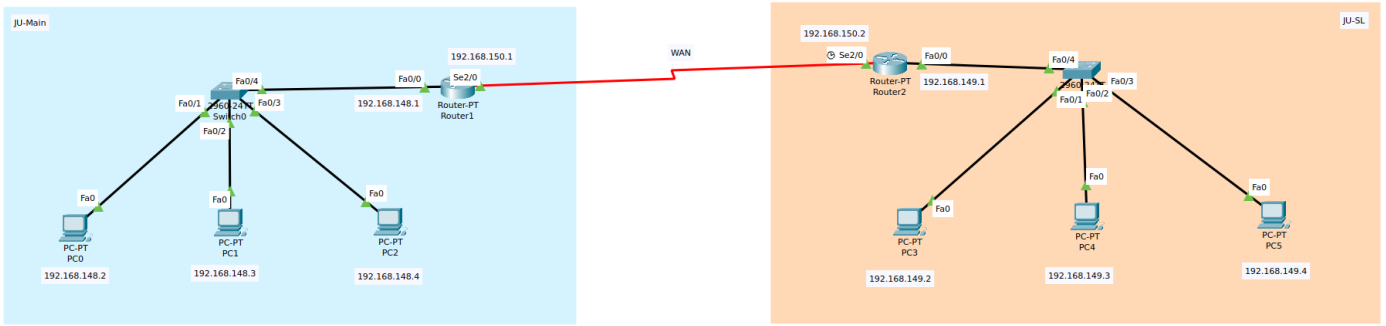
ARP table of PC5

```
C:\>arp -a
  Internet Address      Physical Address      Type
  192.168.1.101         0002.4aee.6722        dynamic
  192.168.1.104         0006.2a16.4617        dynamic
```

ARP table of Switch-0

```
Switch#show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.c9e4.2512    DYNAMIC     Fa0/3
   1    0002.4aee.6722    DYNAMIC     Fa0/4
```

5. Create a LAN (named JU-Main) with three hosts connected via a layer-2 switch (Cisco 2950 switch PC-LAB1-Switch). Connect the switch to a router (Cisco 1818). Assign IP addresses to all the hosts and the router interface connected to this LAN from network 192.168.148.0/24. Configure the default gateway of each host as the IP address of the interface of the router which is connected to the LAN. Create another LAN (named JU-SL) with three hosts connected via a layer-2 switch (Cisco 2950 switch PC-LAB2-Switch). Connect this switch to another router (Cisco 1818). Assign IP addresses to all the hosts and the router interface connected to this LAN from network 192.168.149.0/24. Configure the default gateway of each host as the IP address of the interface of the router which is connected to the LAN. Connect the two routers through appropriate WAN interfaces. Assign IP addresses to the WAN interfaces from network 192.168.150.0/24. Add static route in both of the routers to route packets between two LANs.



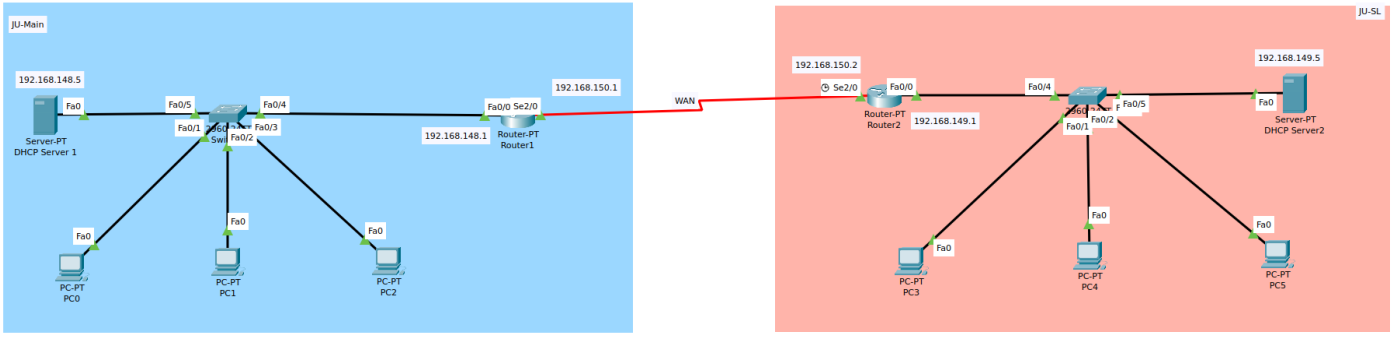
PC-0 and PC-1 is in JU-Main LAN
PC-0 pinging PC-1 : *Successful*

```
Pinging 192.168.148.3 with 32 bytes of data:

Reply from 192.168.148.3: bytes=32 time<1ms TTL=128
Reply from 192.168.148.3: bytes=32 time<1ms TTL=128
Reply from 192.168.148.3: bytes=32 time<1ms TTL=128
Reply from 192.168.148.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.148.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

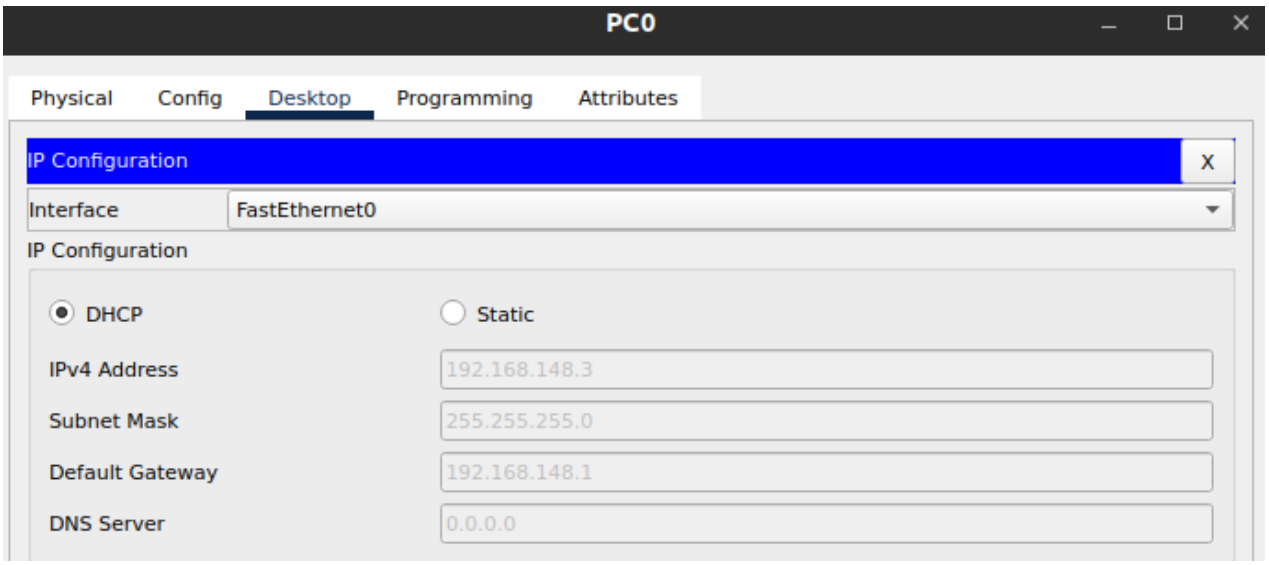
PC-0 is in JU-Main LAN and PC-4 is in JU-SL LAN
PC-0 [192.168.148.2] pinging PC-4[192.168.149.3] : *Successful*

```
Pinging 192.168.149.3 with 32 bytes of data:

Reply from 192.168.149.3: bytes=32 time=1ms TTL=126
Reply from 192.168.149.3: bytes=32 time=2ms TTL=126
Reply from 192.168.149.3: bytes=32 time=1ms TTL=126
Reply from 192.168.149.3: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.149.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

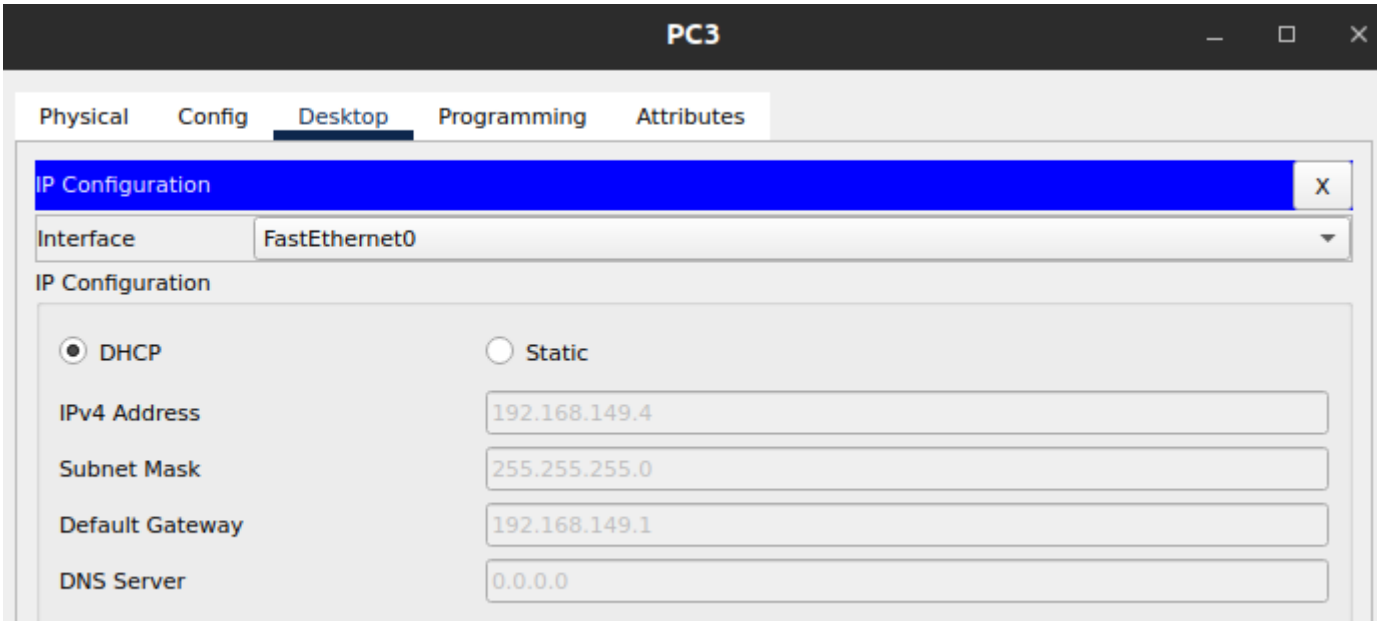
6. Add servers to the individual LANs (in problem 5) and configure them as a DHCP server. Configure the hosts in the individual LAN to obtain IP addresses and address of the default gateway via this DHCP server.



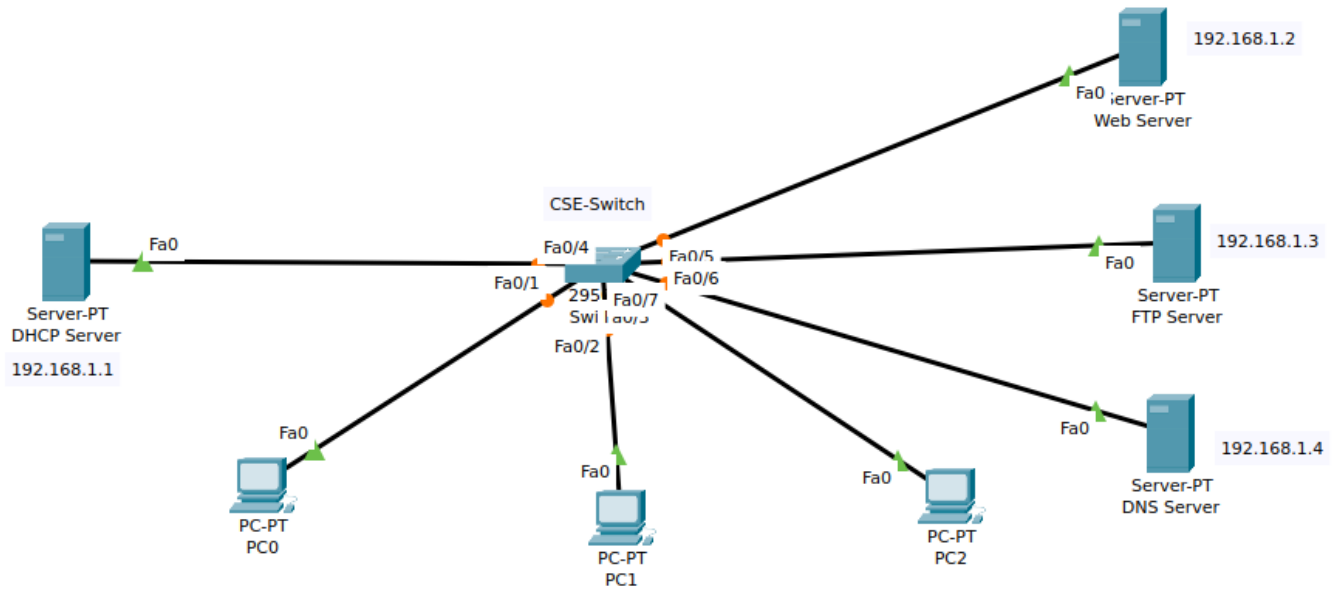
DHCP Server 1 is working. Here is a proof of working. DHCP Server has allocated ip 192.168.148.3 to PC0.



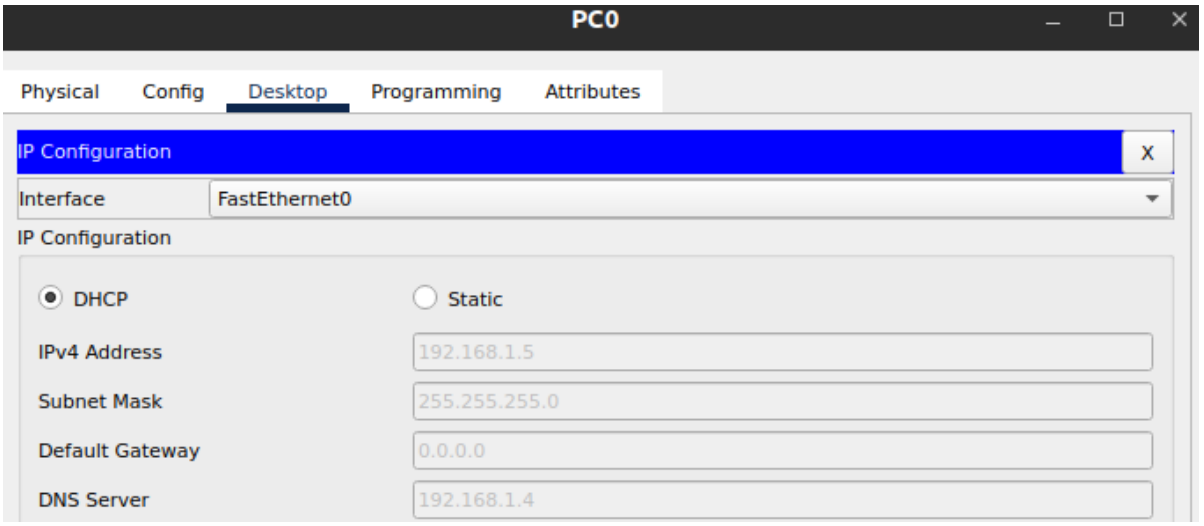
DHCP Server 2 is also working. DHCP Server 2 has allocated ip 192.168.149.4 to PC3.



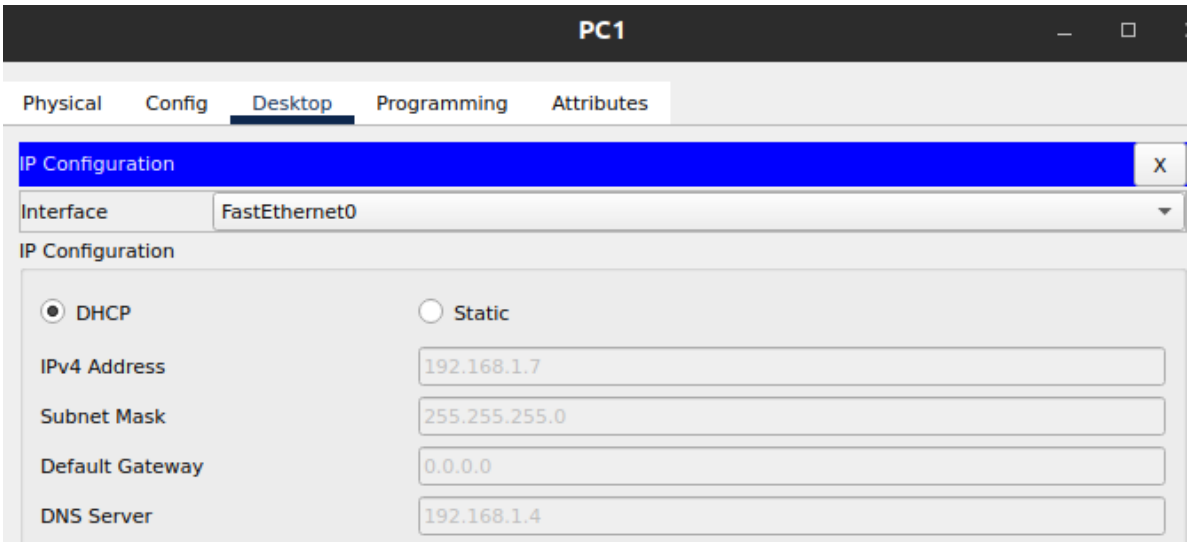
7. Create a LAN (CSE) with three hosts connected via a layer-2 switch (Cisco 2950 switch CSE-Switch). Also add a web server and a ftp server to this LAN. The hosts dynamically get their IP addresses from a local DHCP server. Servers are assigned fixed IP addresses. Configure the individual hosts to use the local DNS server for name resolution. Add a Domain Name Server (DNS) to this LAN. Create appropriate records in the DNS server for the individual servers in the LAN. The domain name of the LAN is cse.myuniv.edu. Configure the individual hosts to use the local DNS server for name resolution.



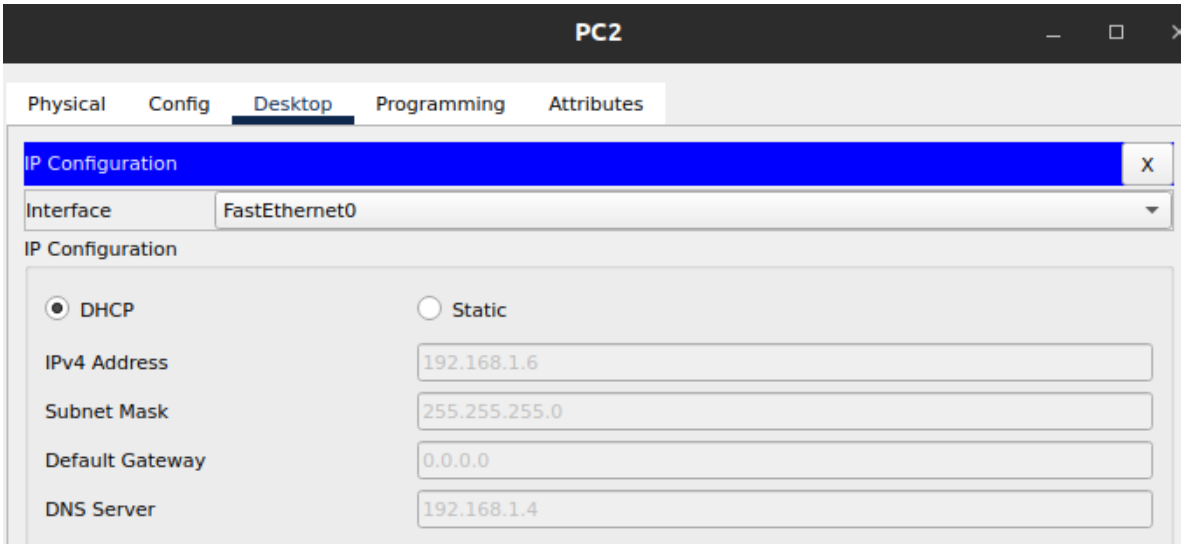
DHCP Server has allocated 192.168.1.5 to PC0



DHCP Server has allocated 192.168.1.7 to PC1

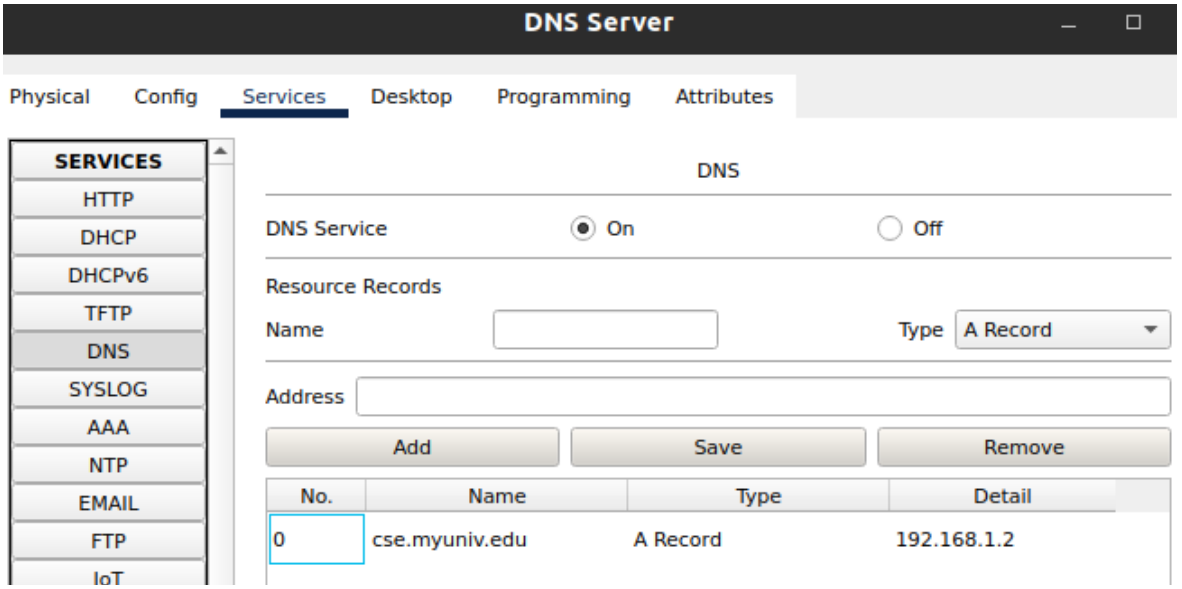


DHCP Server has allocated 192.168.1.5 to PC2



DNS Server : 192.168.1.4
FTP Server : 192.168.1.3
Web Server : 192.168.1.2

DNS Server Config



From PC0 accessing ***cse.myuniv.edu***