

CISCO PACKET TRACER TESTING

ASSIGNMENT 6

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Overview

Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit. The software is mainly focused towards Certified Cisco Network Associate Academy students as an educational tool for helping them learn fundamental CCNA concepts. Previously students enrolled in a CCNA Academy program could freely download and use the tool free of charge for educational use.

Specifications

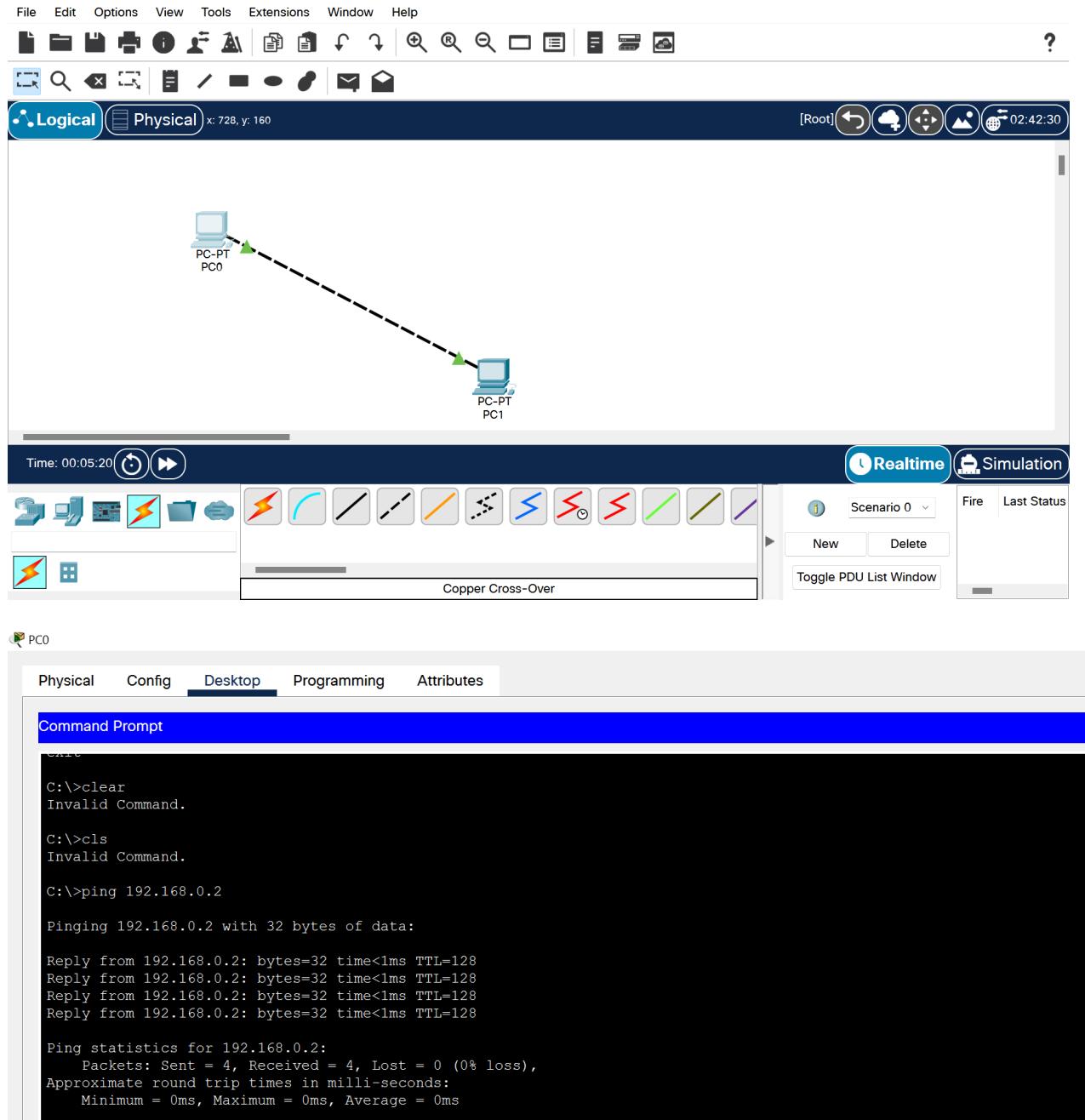
- 1.Windows 10
- 2.Cisco Packet Tracer (Version 8.0.3)

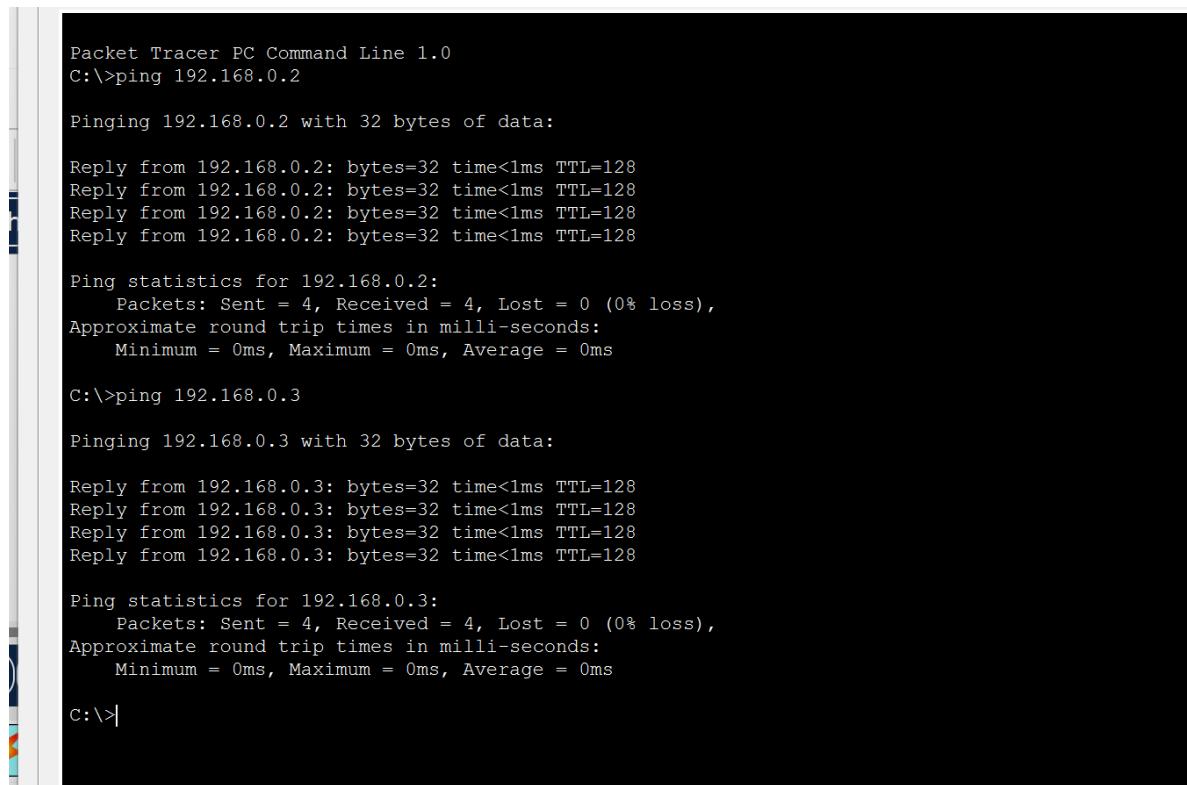
Tasks

Using Cisco Packet Tracer software to do the following experiments and network simulation.

Questions and Solutions

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





```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

Reply from 192.168.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:

Reply from 192.168.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

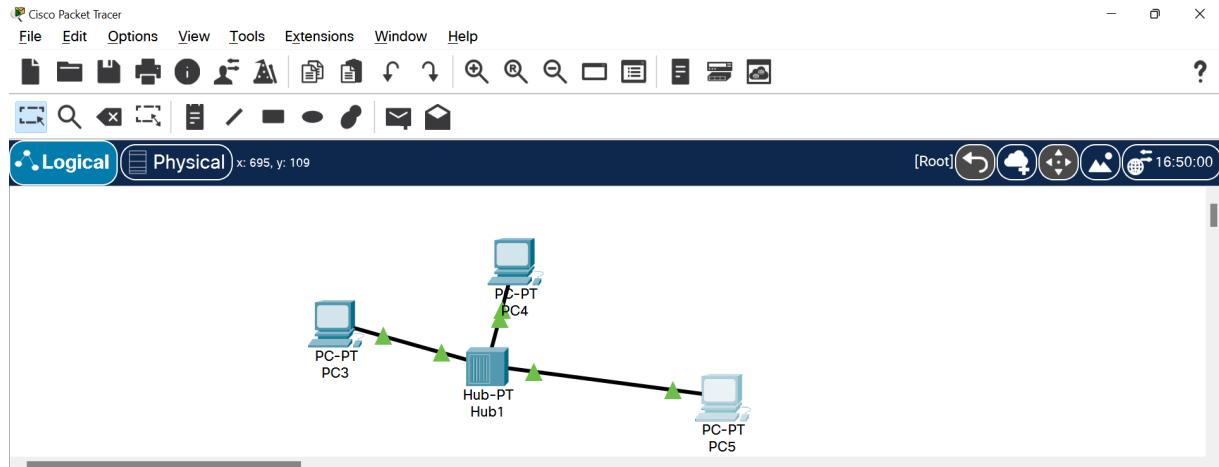
C:\>
```

We can see that the two hosts are connected end-to-end by a cross-over cable and are pinged by each other , successful transmission of packets can be seen .

Q2. Create a LAN (named LAN-A) with 3 hosts using a hub. Ping each pair of nodes.

Three PCs have been connected together using a HUB to create LAN A.

Each of them has been assigned a unique IP address .



```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

Reply from 192.168.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:

Reply from 192.168.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix.:
    Link-local IPv6 Address.....: FE80::260:3EFF:FEAA:ABB0
    IPv6 Address.....: ::
    IPv4 Address.....: 192.168.0.1
    Subnet Mask.....: 255.255.255.0
```

```
Bluetooth Connection:

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....:::
IPv6 Address.....:::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....:::
                                0.0.0.0

C:\>ping 192.168.0.1

Pinging 192.168.0.1 with 32 bytes of data:

Reply from 192.168.0.1: bytes=32 time<1ms TTL=128
Reply from 192.168.0.1: bytes=32 time=9ms TTL=128
Reply from 192.168.0.1: bytes=32 time<1ms TTL=128
Reply from 192.168.0.1: bytes=32 time<1ms TTL=128

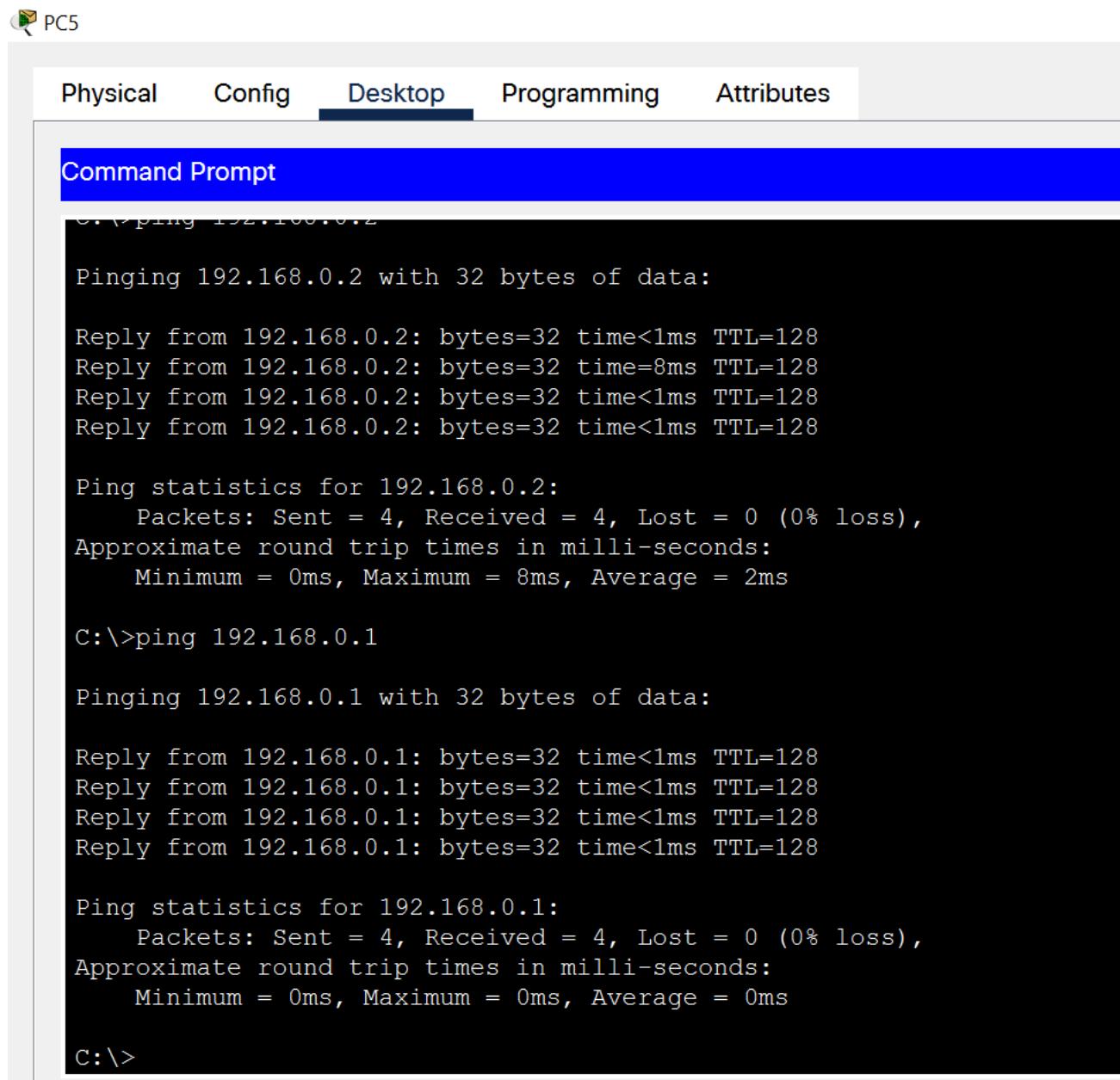
Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 9ms, Average = 2ms

C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:

Reply from 192.168.0.3: bytes=32 time<1ms TTL=128
Reply from 192.168.0.3: bytes=32 time=8ms TTL=128
Reply from 192.168.0.3: bytes=32 time=8ms TTL=128
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 8ms, Average = 4ms
```



PC5

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

Reply from 192.168.0.2: bytes=32 time<1ms TTL=128
Reply from 192.168.0.2: bytes=32 time=8ms TTL=128
Reply from 192.168.0.2: bytes=32 time<1ms TTL=128
Reply from 192.168.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 8ms, Average = 2ms

C:\>ping 192.168.0.1

Pinging 192.168.0.1 with 32 bytes of data:

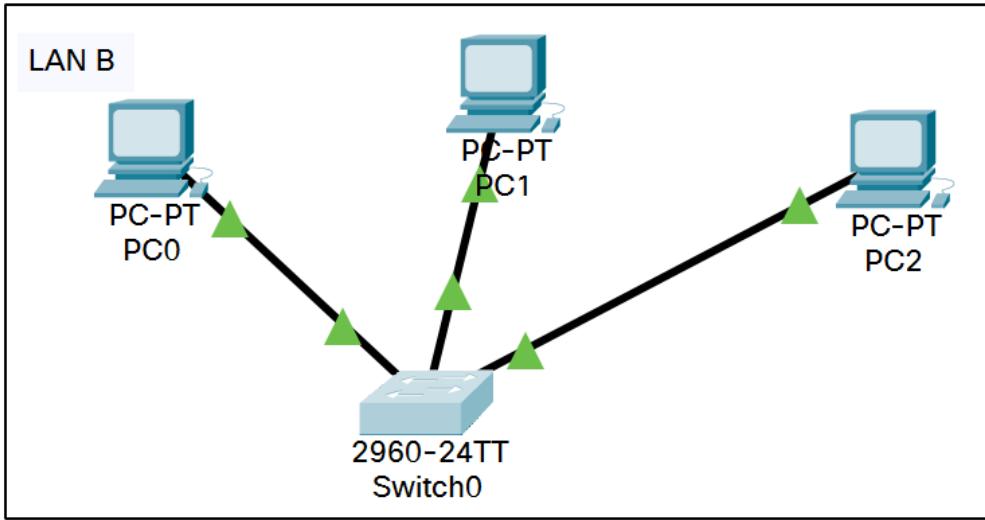
Reply from 192.168.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

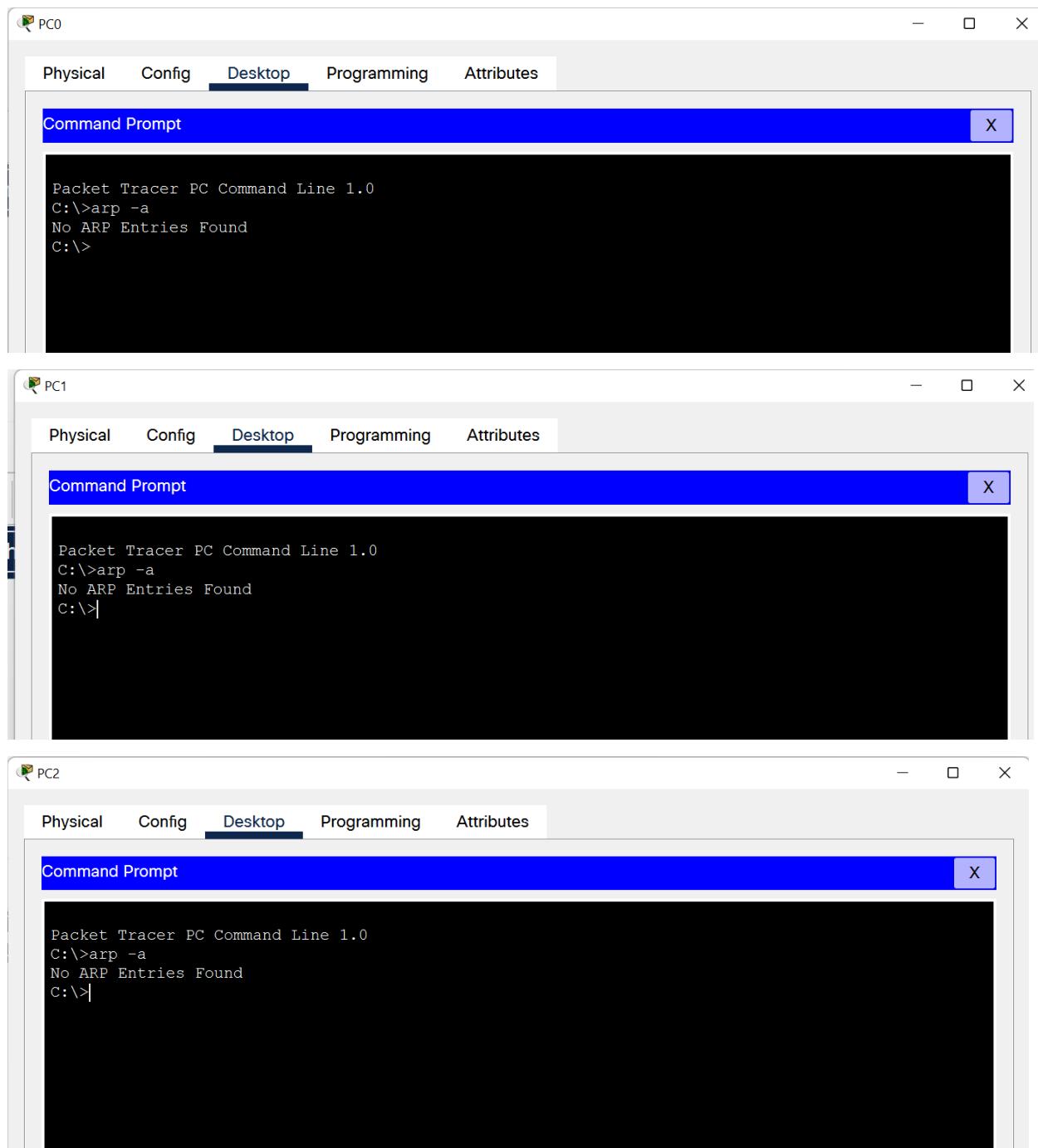
It can be seen that three PCs have been connected using a HUB and are pinged by each other to check the connection by transfer of packets amongst each other.

Q3. 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.



The three PCs have now been connected via a switch .

Initially the ARP tables of the PCs and the MAC table of the switch is empty as can be seen below .After the ping , the tables get modified and contains the details of the other connected devices to it .



The screenshot shows a software interface for managing a network device, likely a Cisco switch. The top navigation bar includes tabs for Physical, Config, CLI (which is selected), and Attributes. Below the tabs is a title bar for 'IOS Command Line Interface'. A message at the top of the terminal window says 'Press RETURN to get started!'. The terminal displays several log messages indicating link changes: '%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up' and '%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up'. It also shows protocol status: '%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up' and '%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up'. The user then enters the command 'Switch>en' followed by 'Switch#show mac-address-table', which displays the Mac Address Table:

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

The command prompt ends with 'Switch#'. At the bottom of the terminal window, there are 'Copy' and 'Paste' buttons. A checkbox labeled 'Top' is located just below the terminal window.

```
Packet Tracer PC Command Line 1.0
C:\>arp -a
No ARP Entries Found
C:\>ping 192.168.0.3

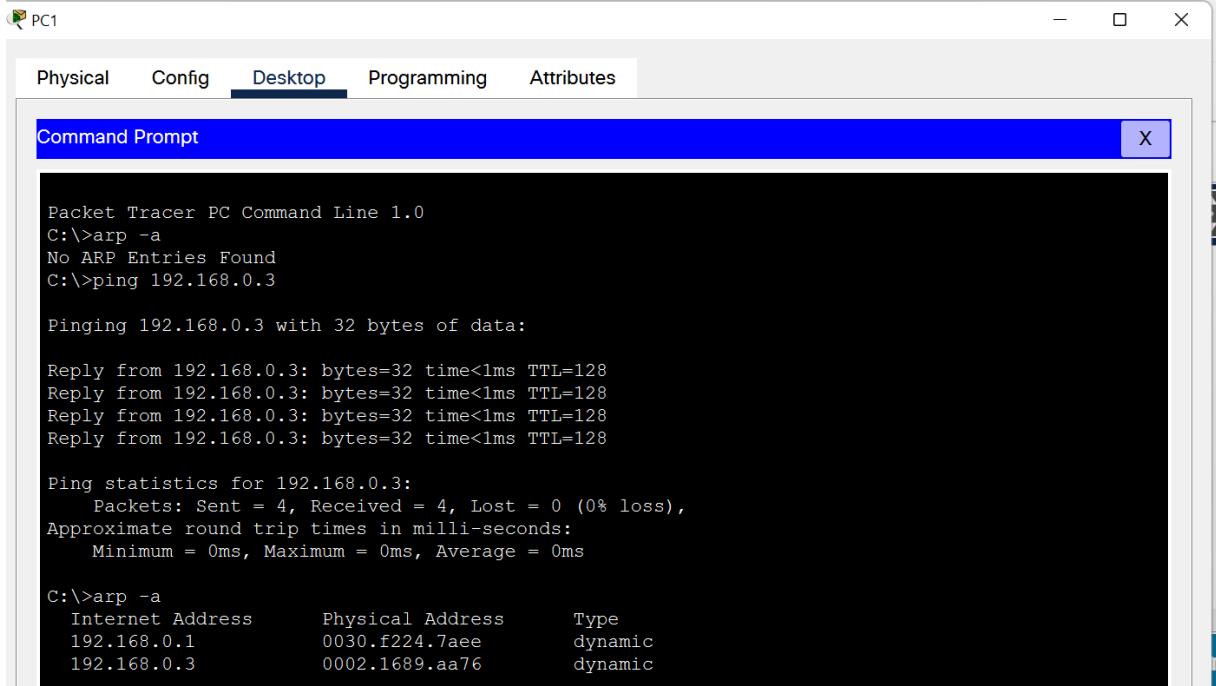
Pinging 192.168.0.3 with 32 bytes of data:

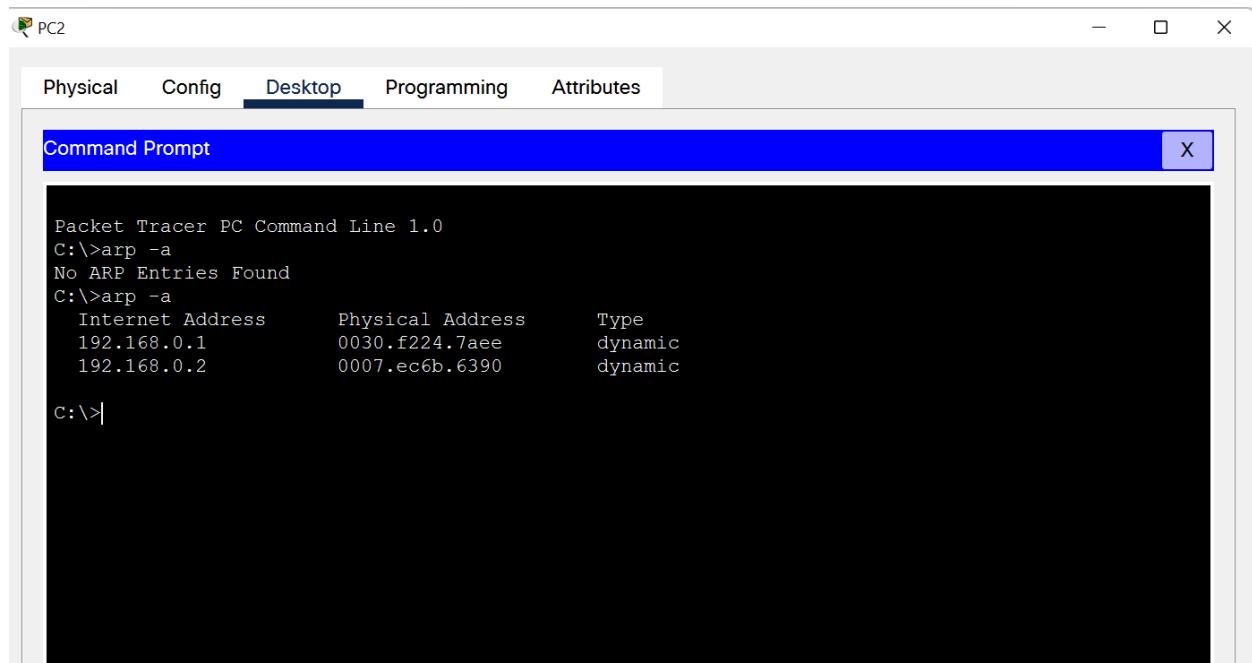
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>arp -a
   Internet Address      Physical Address      Type
   192.168.0.1            0030.f224.7aee      dynamic
   192.168.0.3            0002.1689.aa76      dynamic

C:\>|
```





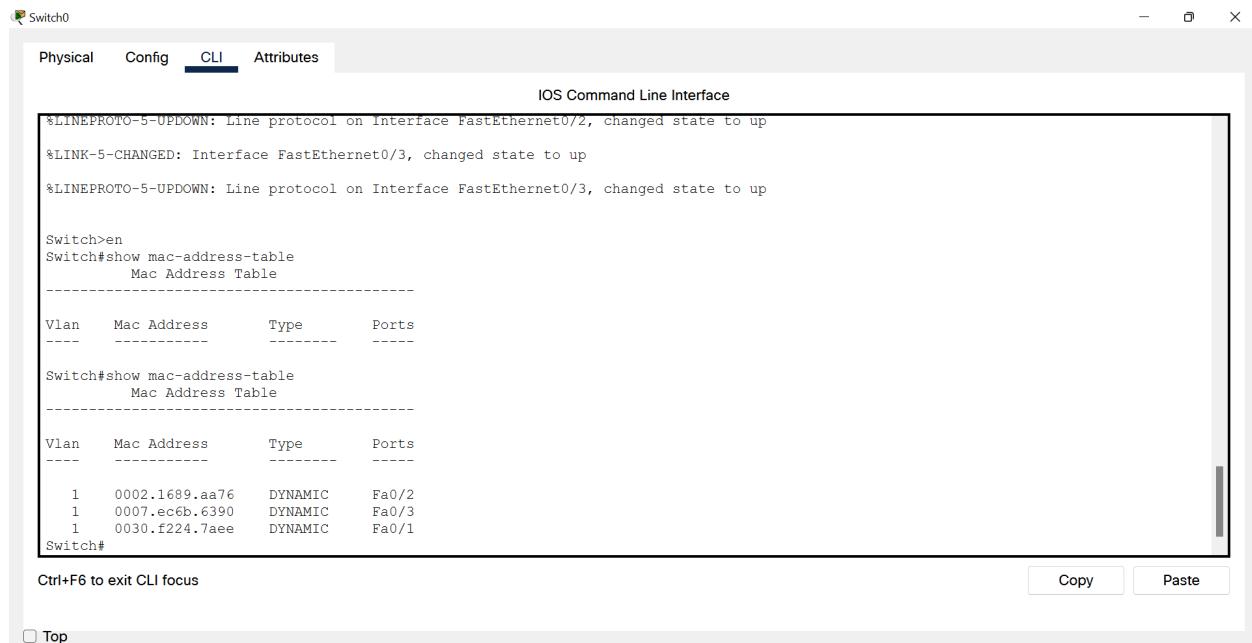
PC2

Physical Config Desktop Programming Attributes

Command Prompt X

```
Packet Tracer PC Command Line 1.0
C:\>arp -a
No ARP Entries Found
C:\>arp -a
  Internet Address      Physical Address      Type
  192.168.0.1            0030.f224.7aee    dynamic
  192.168.0.2            0007.ec6b.6390    dynamic

C:\>
```



Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
*LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

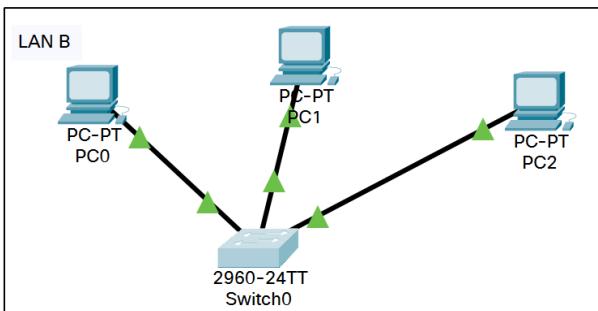
Switch>en
Switch#show mac-address-table
  Mac Address Table
  -----
  Vlan   Mac Address      Type      Ports
  ----  -----          -----     -----
  Switch#show mac-address-table
  Mac Address Table
  -----
  Vlan   Mac Address      Type      Ports
  ----  -----          -----     -----
  1     0002.1689.aa76  DYNAMIC   Fa0/2
  1     0007.ec6b.6390  DYNAMIC   Fa0/3
  1     0030.f224.7aee  DYNAMIC   Fa0/1

Switch#
```

Ctrl+F6 to exit CLI focus Copy Paste

Top

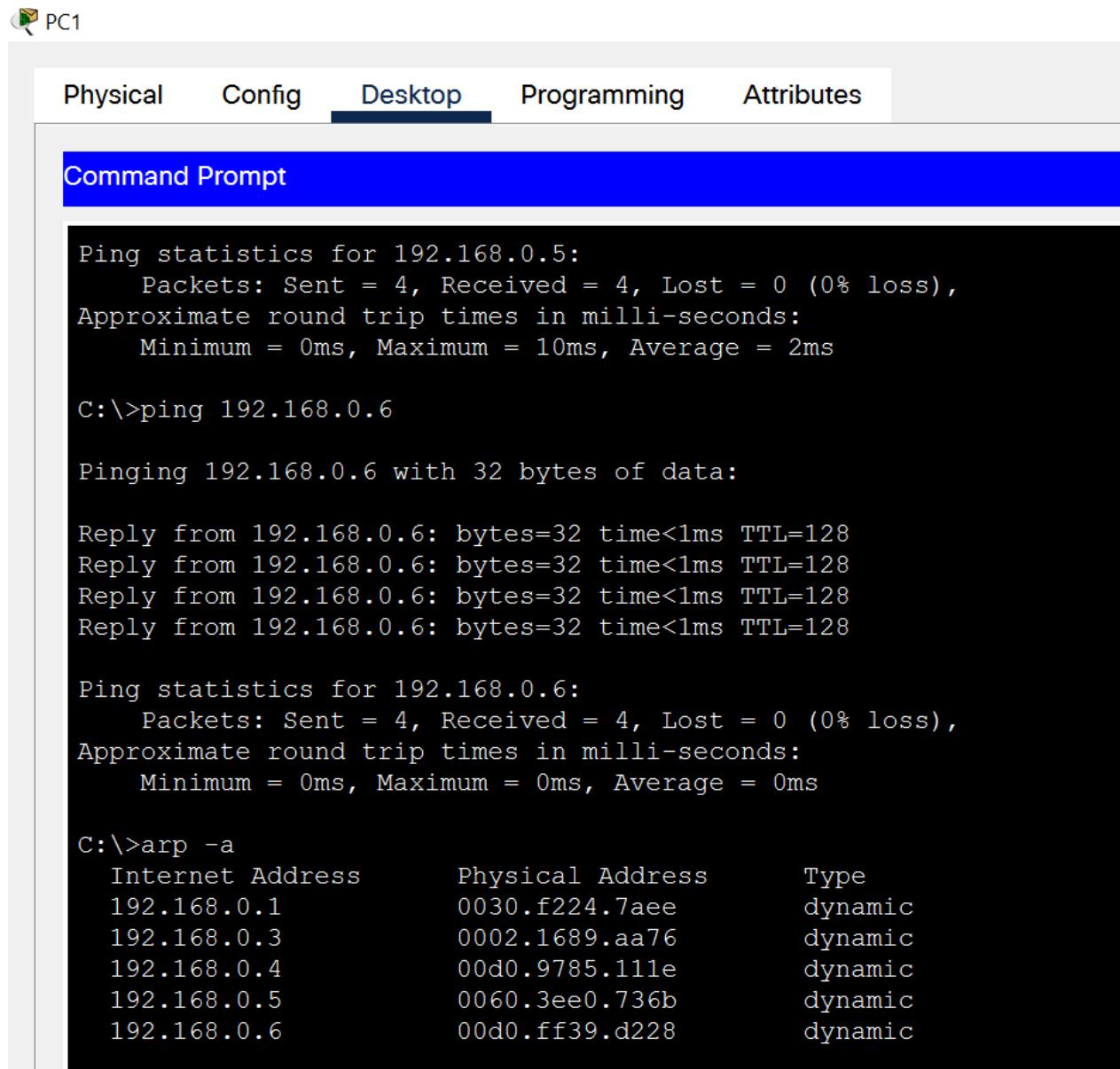
Q4. Connect LAN-A and LAN-B by connecting the hub and switch using a crossover cable. Ping between each pair of hosts of LAN-A and LAN-B. Now record the contents of the ARP Table of end hosts and the MAC Forwarding Table of the switch again



Lan B created

PC0

Physical	Config	Desktop	Programming	Attributes
Command Prompt				
<pre> Ping statistics for 192.168.0.5: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 0ms, Average = 0ms C:\>ping 192.168.0.6 Pinging 192.168.0.6 with 32 bytes of data: Reply from 192.168.0.6: bytes=32 time<1ms TTL=128 Ping statistics for 192.168.0.6: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 0ms, Average = 0ms C:\>arp -a Internet Address Physical Address Type 192.168.0.2 0007.ec6b.6390 dynamic 192.168.0.3 0002.1689.aa76 dynamic 192.168.0.4 00d0.9785.111e dynamic 192.168.0.5 0060.3ee0.736b dynamic 192.168.0.6 00d0.ff39.d228 dynamic </pre>				



PC1

Physical Config **Desktop** Programming Attributes

Command Prompt

```
Ping statistics for 192.168.0.5:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 0ms, Maximum = 10ms, Average = 2ms  
  
C:\>ping 192.168.0.6  
  
Pinging 192.168.0.6 with 32 bytes of data:  
  
Reply from 192.168.0.6: bytes=32 time<1ms TTL=128  
  
Ping statistics for 192.168.0.6:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 0ms, Maximum = 0ms, Average = 0ms  
  
C:\>arp -a  
Internet Address      Physical Address        Type  
192.168.0.1           0030.f224.7aee      dynamic  
192.168.0.3           0002.1689.aa76      dynamic  
192.168.0.4           00d0.9785.111e      dynamic  
192.168.0.5           0060.3ee0.736b      dynamic  
192.168.0.6           00d0.ff39.d228      dynamic
```

PC2

Physical Config **Desktop** Programming Attributes

Command Prompt

```
Ping statistics for 192.168.0.5:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 2ms, Average = 0ms  
  
C:\>ping 192.168.0.6  
  
Pinging 192.168.0.6 with 32 bytes of data:  
  
Reply from 192.168.0.6: bytes=32 time<1ms TTL=128  
Reply from 192.168.0.6: bytes=32 time<1ms TTL=128  
Reply from 192.168.0.6: bytes=32 time=1ms TTL=128  
Reply from 192.168.0.6: bytes=32 time=1ms TTL=128  
  
Ping statistics for 192.168.0.6:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 1ms, Average = 0ms  
  
C:\>arp -a  
   Internet Address          Physical Address          Type  
192.168.0.1                0030.f224.7aee        dynamic  
192.168.0.2                0007.ec6b.6390        dynamic  
192.168.0.4                00d0.9785.111e        dynamic  
192.168.0.5                0060.3ee0.736b        dynamic  
192.168.0.6                00d0.ff39.d228        dynamic  
  
C:\>
```



Physical Config **Desktop** Programming Attributes

Command Prompt

```
IPv4 Address.....: ..
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::

C:\>ping 192.168.0.5

Pinging 192.168.0.5 with 32 bytes of data:

Reply from 192.168.0.5: bytes=32 time<1ms TTL=128
Reply from 192.168.0.5: bytes=32 time<1ms TTL=128
Reply from 192.168.0.5: bytes=32 time<1ms TTL=128
Reply from 192.168.0.5: bytes=32 time=11ms TTL=128

Ping statistics for 192.168.0.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 2ms

C:\>arp -a
   Internet Address        Physical Address        Type
   192.168.0.1              0030.f224.7aee      dynamic
   192.168.0.2              0007.ec6b.6390      dynamic
   192.168.0.3              0002.1689.aa76      dynamic
   192.168.0.4              00d0.9785.111e      dynamic
   192.168.0.5              0060.3ee0.736b      dynamic
```

PC4

Physical Config Desktop **Programming** Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:>arp -a
  Internet Address      Physical Address      Type
  192.168.0.1            0030.f224.7aee    dynamic
  192.168.0.2            0007.ec6b.6390    dynamic
  192.168.0.3            0002.1689.aa76    dynamic
  192.168.0.4            00d0.9785.111e    dynamic
  192.168.0.6            00d0.ff39.d228    dynamic

C:>|
```

Switch0

Physical Config **CLI** Attributes

IOS Command Line Inter

```
PRESS RETURN to get started.
```

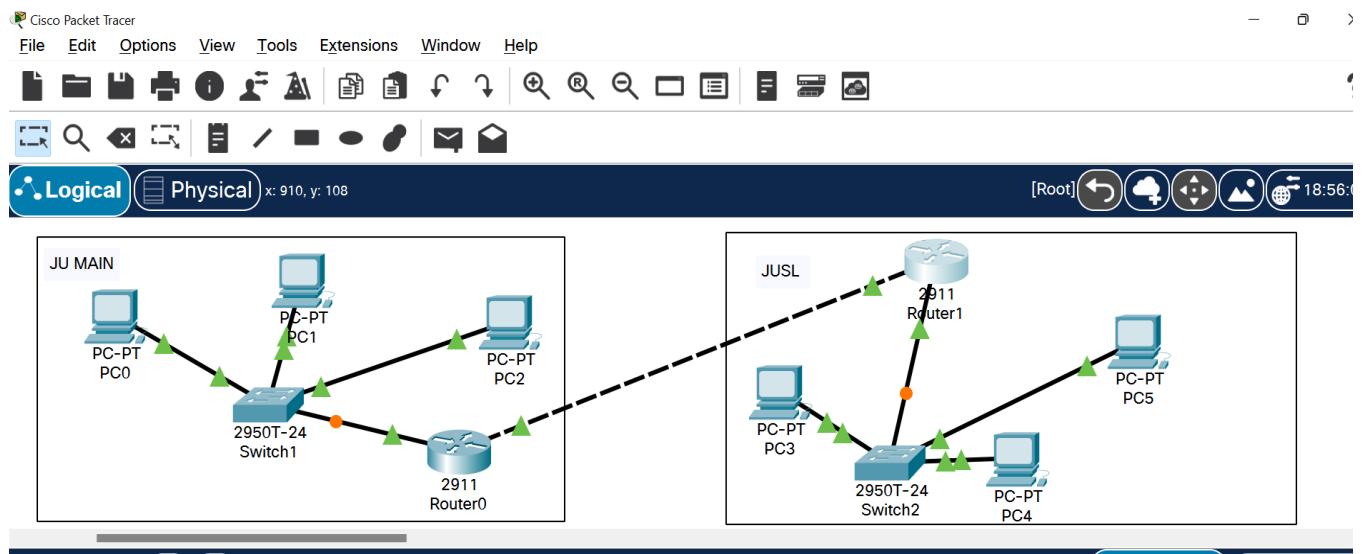
```
Switch>en
Switch#show mac-address-table
  Mac Address Table
-----
Vlan      Mac Address          Type      Ports
----      -----
  1        00d0.9785.111e    DYNAMIC   Fa0/4
  1        00d0.ff39.d228    DYNAMIC   Fa0/4
  1        00e0.8f48.eb04    DYNAMIC   Fa0/4
Switch#|
```

Q5. 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 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 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.

The two networks JU MAIN and JUSL have been connected using routers .The routers have been connected among themselves and assigned the given IP addresses and the host from one of the network is pinged from the other as can be seen below.



Press RETURN to get started.

```
Router>enable
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
      * - candidate default, U - per-user static route, o - ODR
      P - periodic downloaded static route

Gateway of last resort is not set

      192.168.148.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.148.0/24 is directly connected, GigabitEthernet0/0
L        192.168.148.4/32 is directly connected, GigabitEthernet0/0
S        192.168.149.0/24 [1/0] via 192.168.150.2
          192.168.150.0/24 is variably subnetted, 2 subnets, 2 masks
C          192.168.150.0/24 is directly connected, GigabitEthernet0/1
L          192.168.150.1/32 is directly connected, GigabitEthernet0/1

Router#
```

Press RETURN to get started.

```
Router>enable
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
      * - candidate default, U - per-user static route, o - ODR
      P - periodic downloaded static route

Gateway of last resort is not set

S   192.168.148.0/24 [1/0] via 192.168.150.1
    192.168.149.0/24 is variably subnetted, 2 subnets, 2 masks
C     192.168.149.0/24 is directly connected, GigabitEthernet0/0
L     192.168.149.4/32 is directly connected, GigabitEthernet0/0
    192.168.150.0/24 is variably subnetted, 2 subnets, 2 masks
C     192.168.150.0/24 is directly connected, GigabitEthernet0/1
L     192.168.150.2/32 is directly connected, GigabitEthernet0/1
```

PC2

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 192.168.149.3

Pinging 192.168.149.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.149.3: bytes=32 time<1ms 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

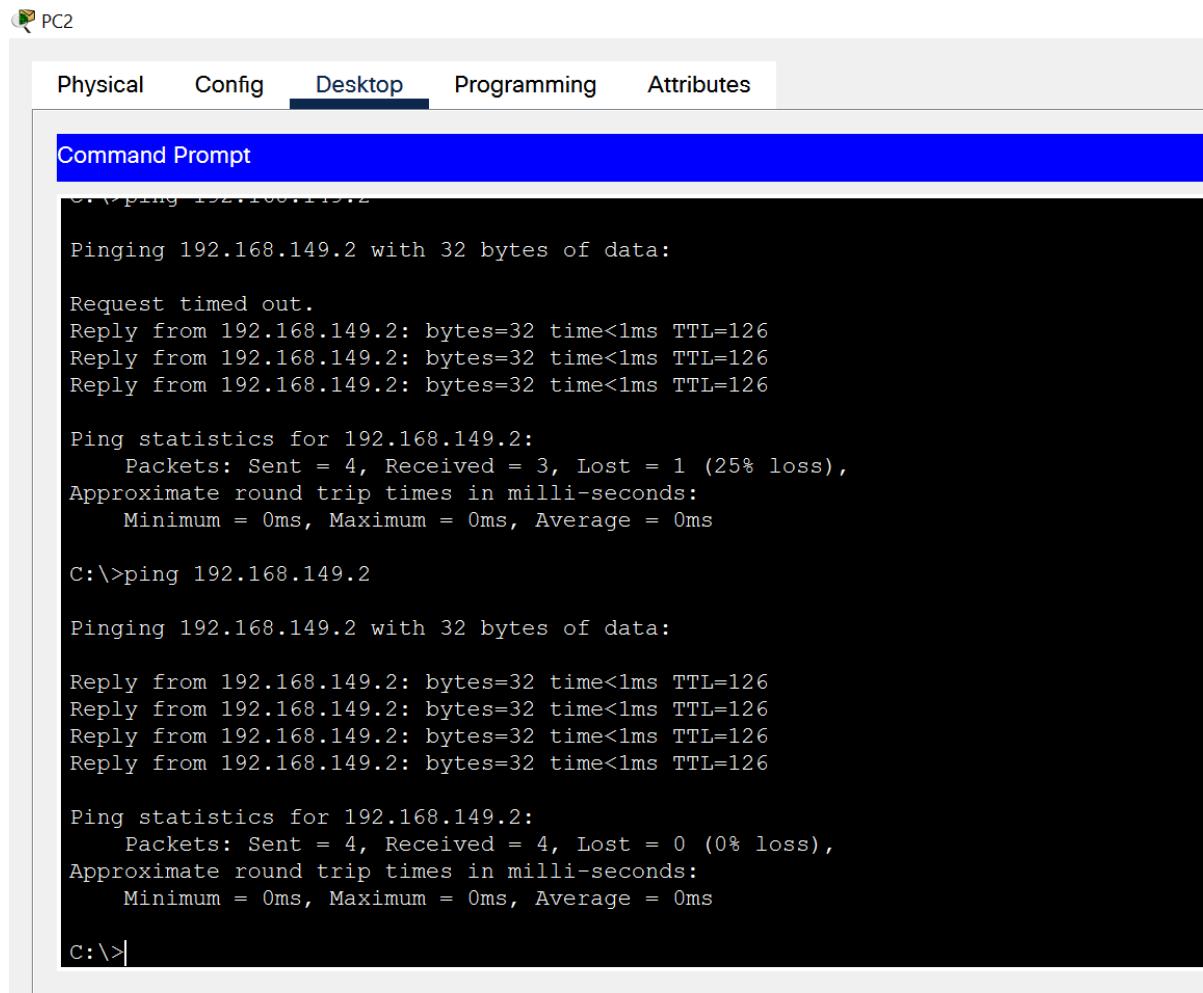
Ping statistics for 192.168.149.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.149.3

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<1ms 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 = 0ms, Maximum = 1ms, Average = 0ms
```



The screenshot shows a network management interface with a tab bar at the top: Physical, Config, Desktop (selected), Programming, Attributes. Below the tabs is a blue header bar labeled "Command Prompt". The main area contains a terminal window displaying the output of a ping command. The terminal output is as follows:

```
C:\>ping 192.168.149.2

Pinging 192.168.149.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.149.2: bytes=32 time<1ms TTL=126
Reply from 192.168.149.2: bytes=32 time<1ms TTL=126
Reply from 192.168.149.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.149.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.149.2

Pinging 192.168.149.2 with 32 bytes of data:

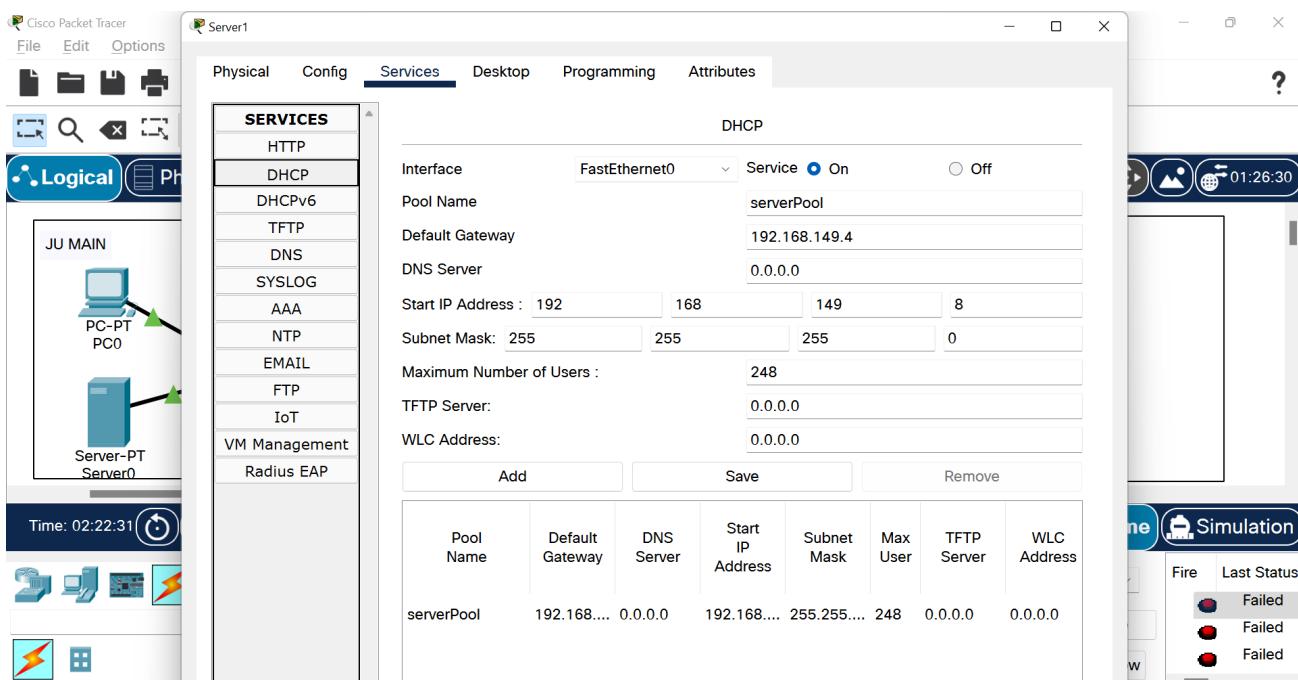
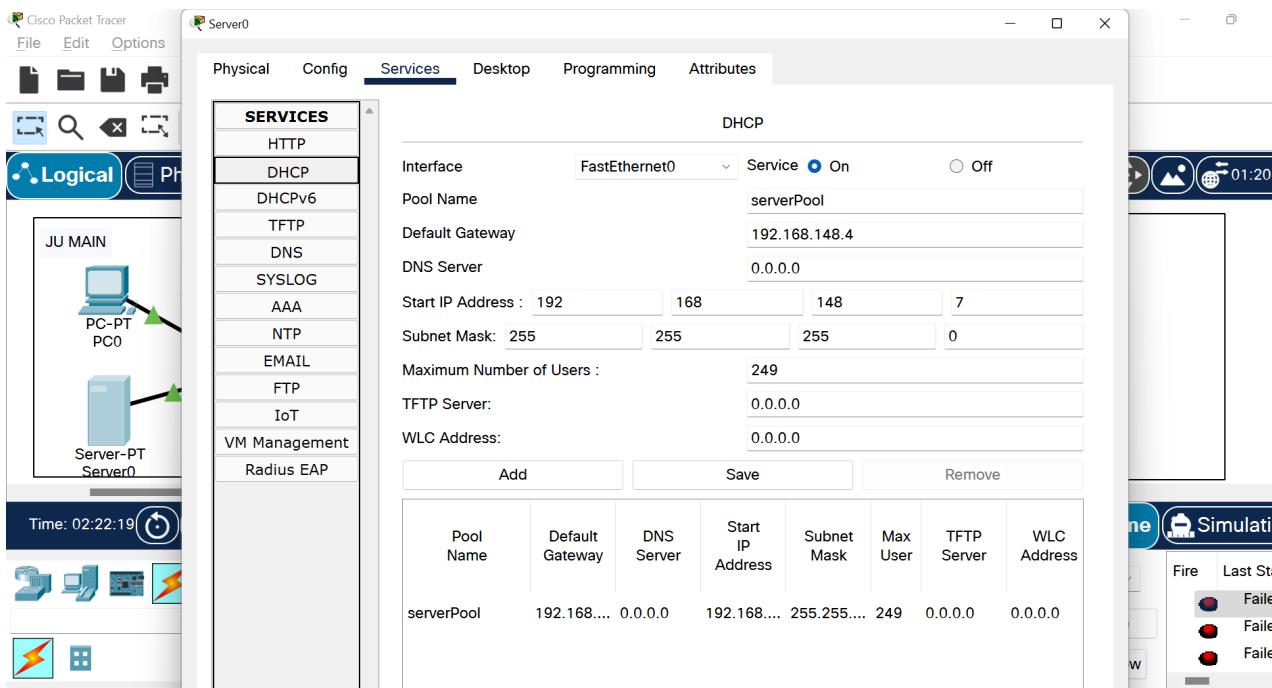
Reply from 192.168.149.2: bytes=32 time<1ms TTL=126

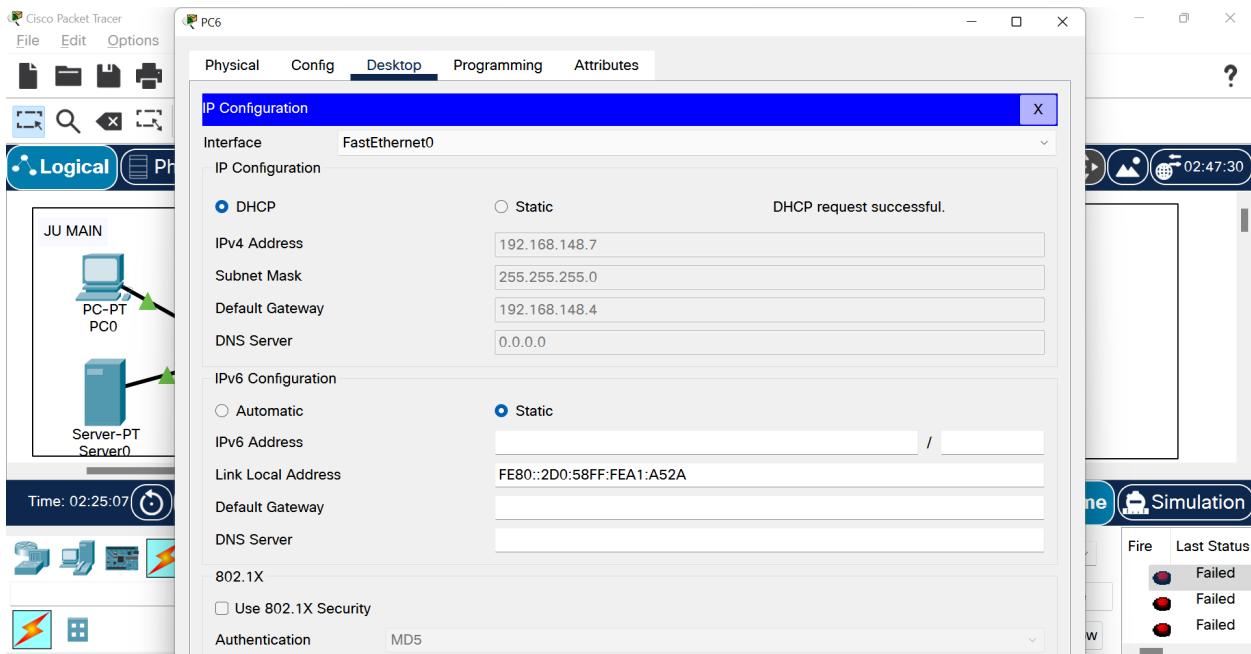
Ping statistics for 192.168.149.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>|
```

Q6. 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 addresses of the default gateway via this DHCP server.

Adding one DHCP server in each of the networks so that any new host can be dynamically assigned an IP address from it .



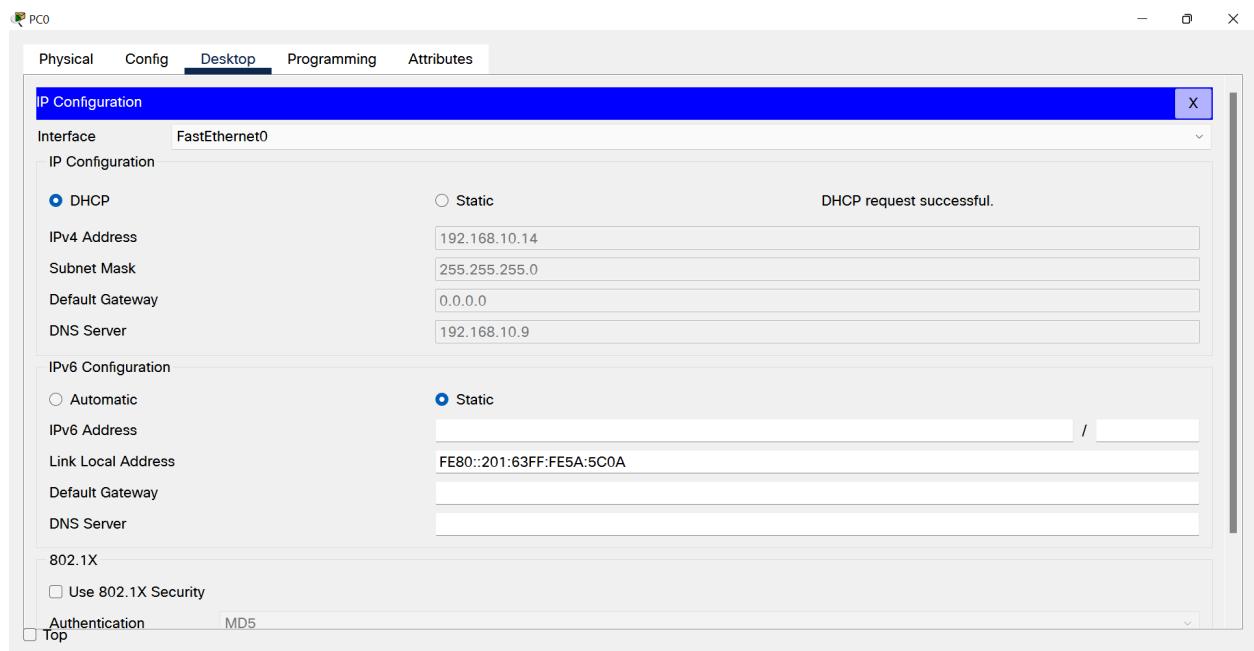
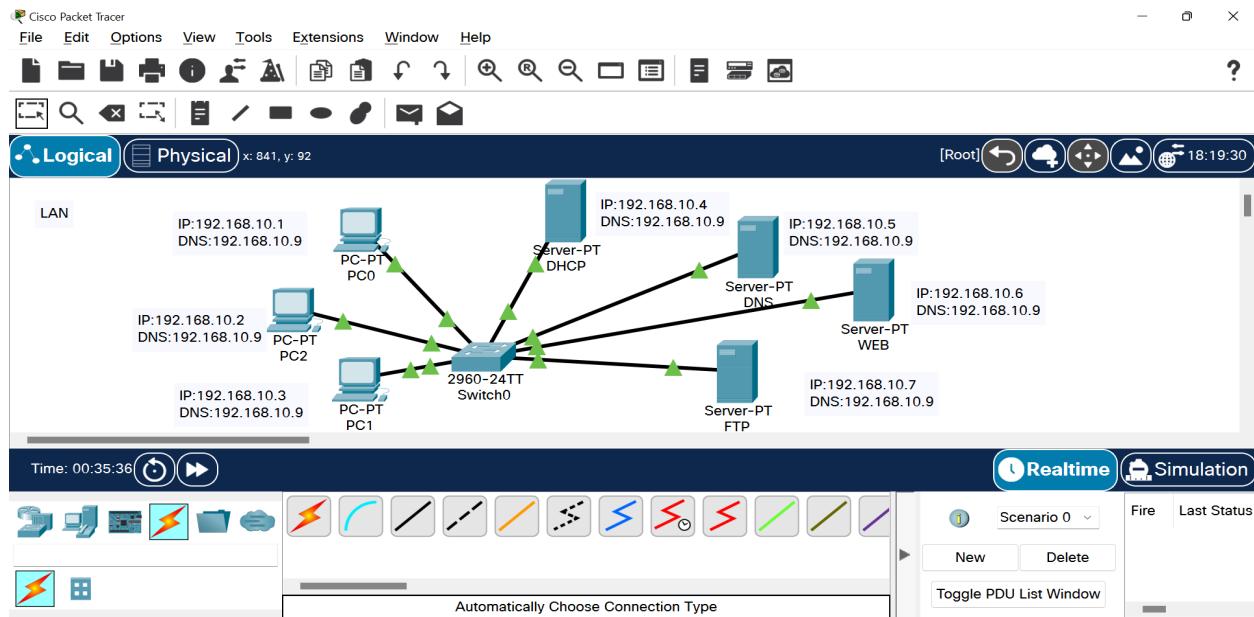


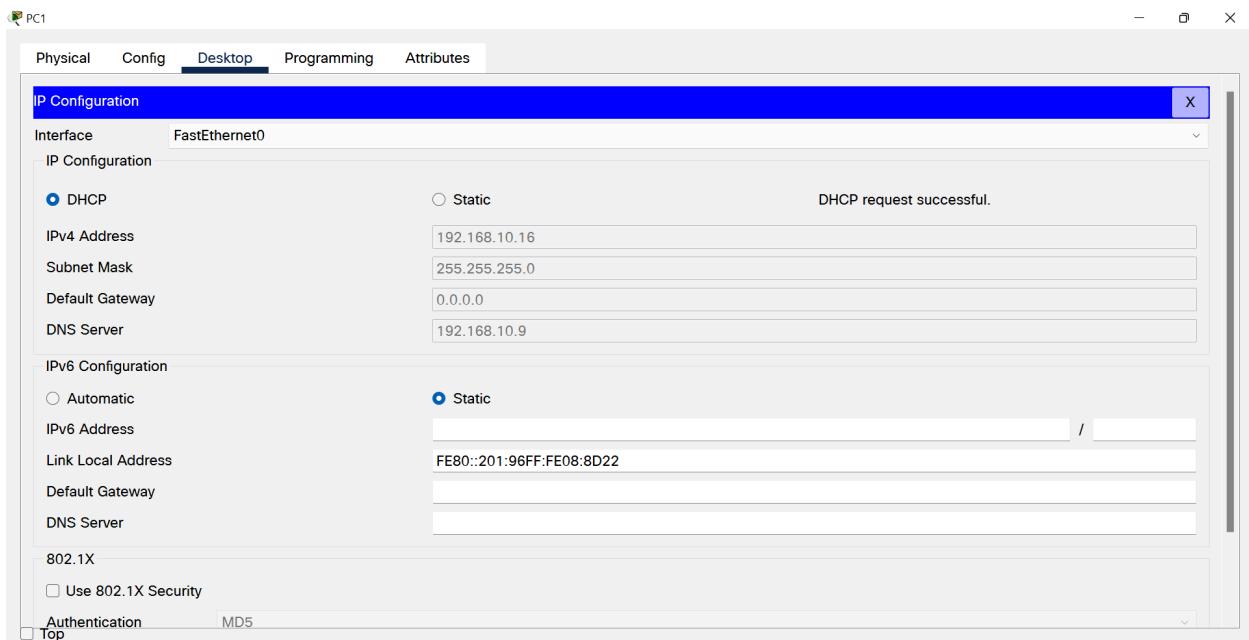
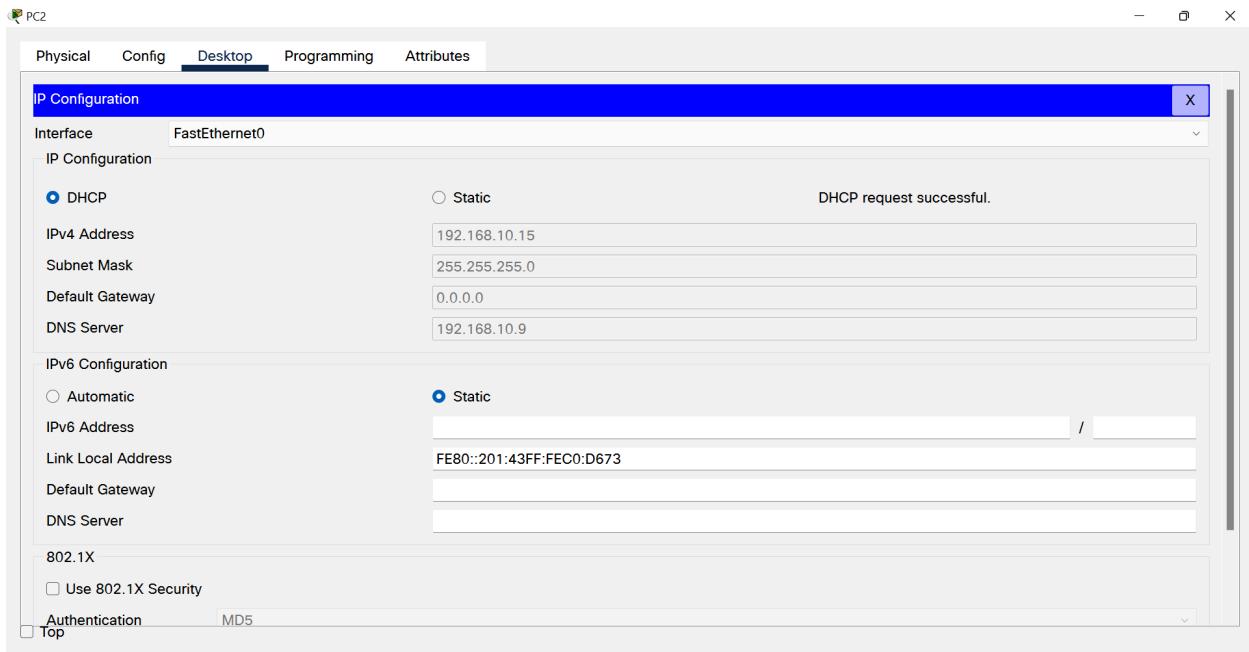
The above clip shows that PC6 has been assigned the address by the DHCP server which was added in the network to serve the purpose. The assigned IP address value is 192.168.148.7 assigned to the PC by the DHCP server present in its network.

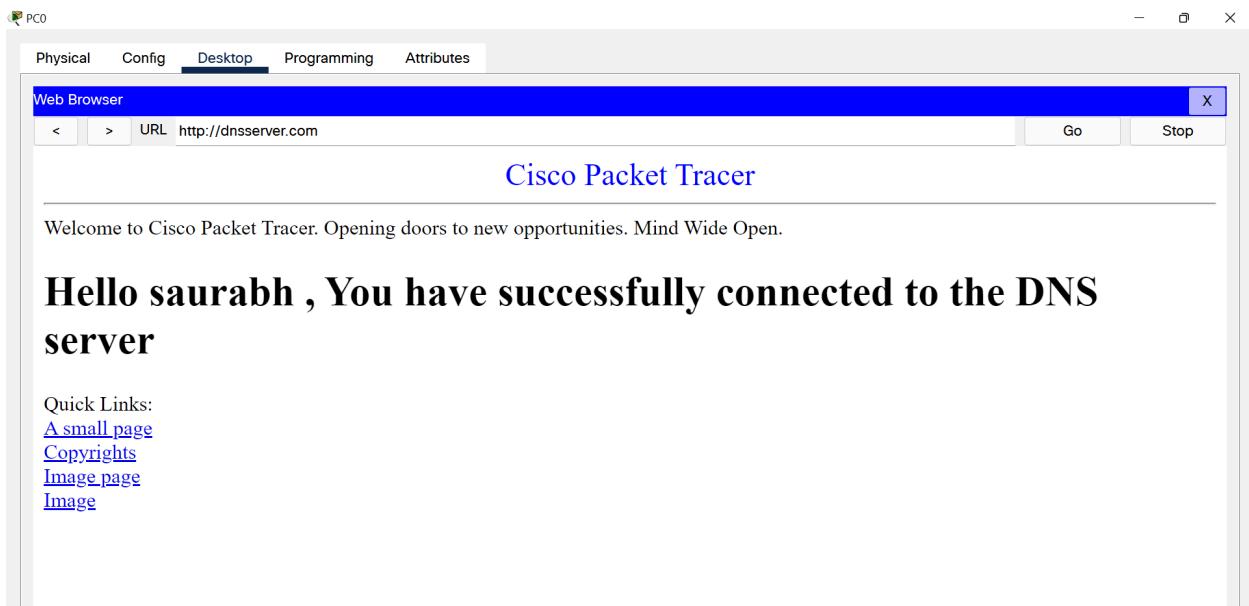
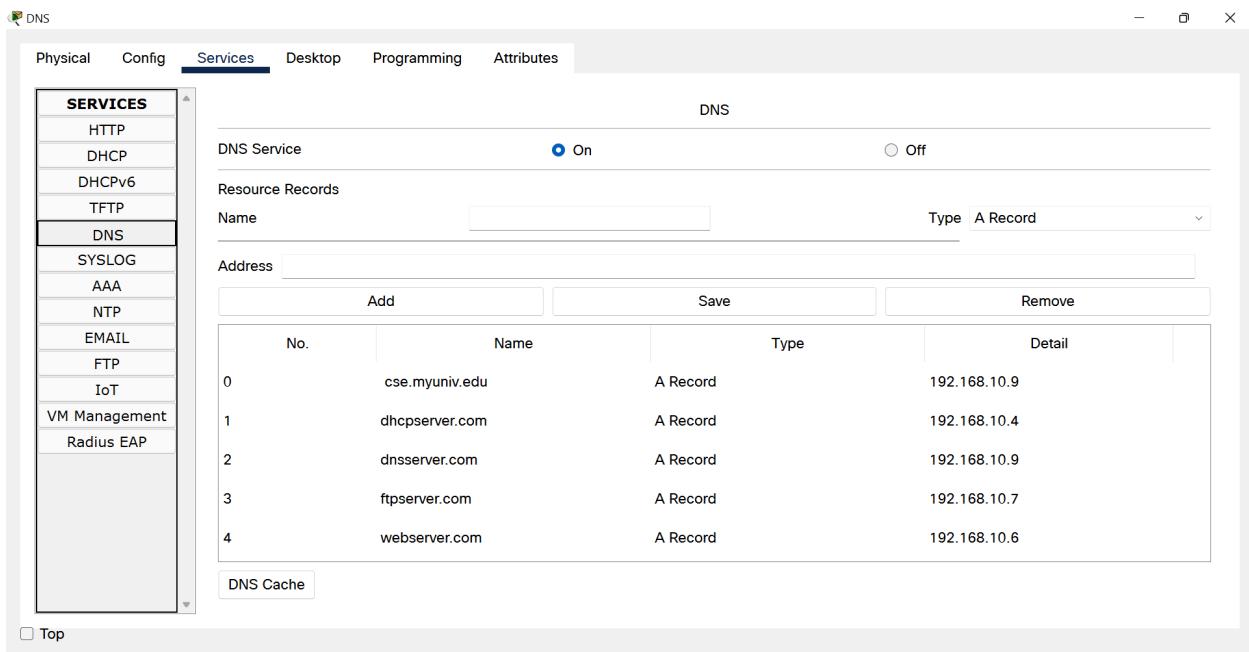
Q7. Create a LAN (CSE) with three hosts connected via a layer-2 switch (Cisco 2950 switch CSE-Switch). Also add a web server and a ftp server to this LAN. The hosts dynamically get their IP addresses from a local DHCP server. Servers are assigned fixed IP addresses. Configure the individual hosts to 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.

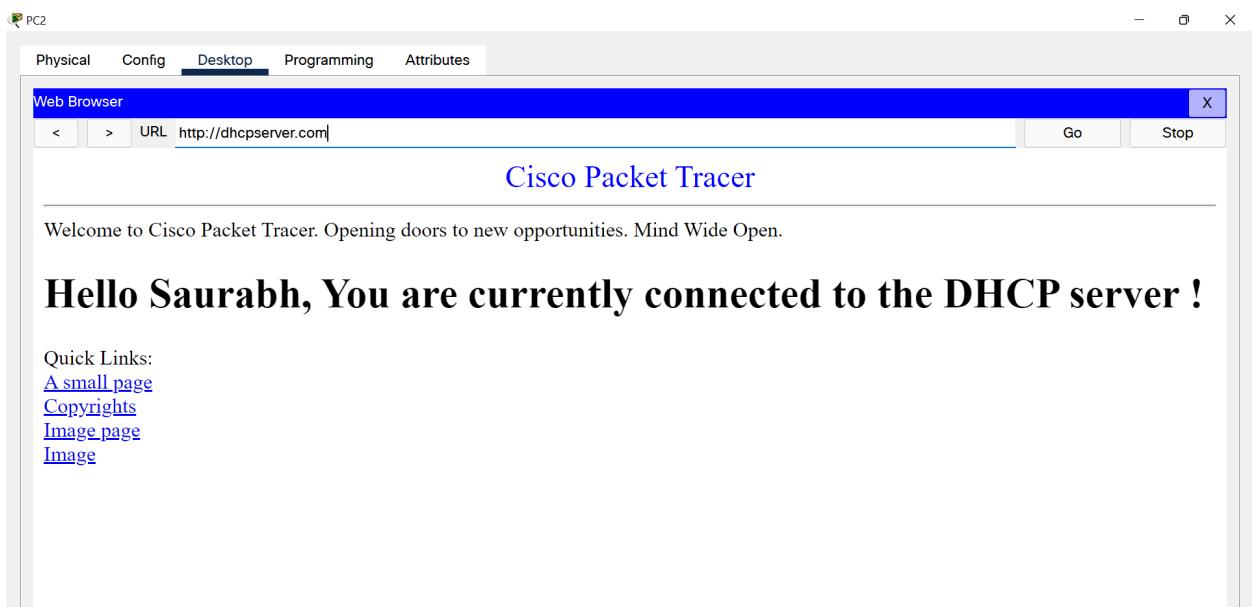
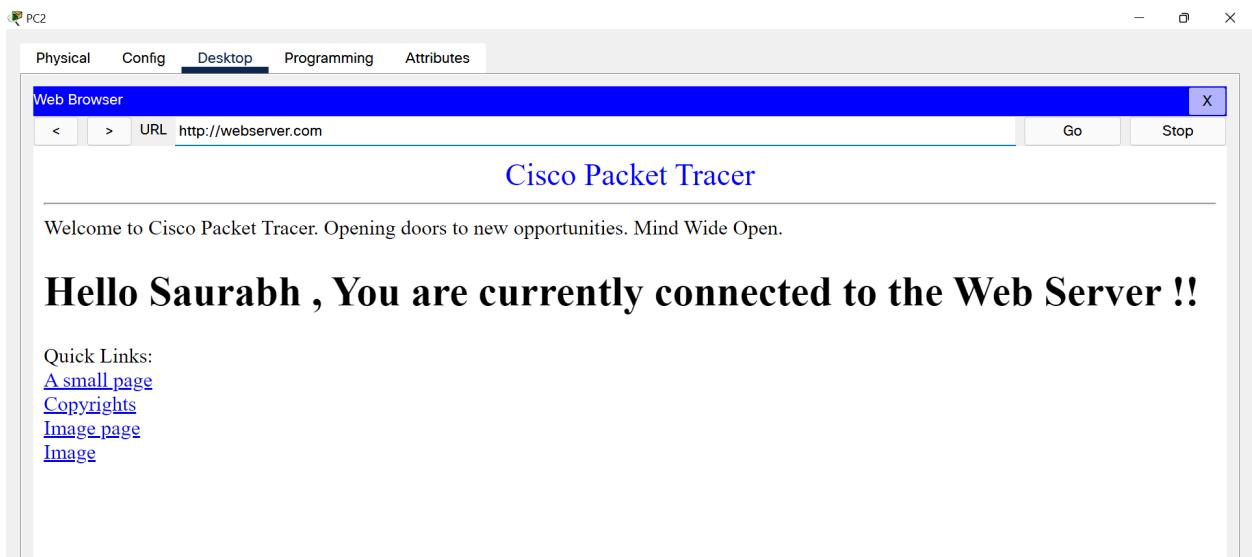
The servers are assigned a fixed IP address. The hosts are assigned IP address by connecting through the DHCP server in the network. The DNS server resolves the IP addresses for the other servers present in the network so that

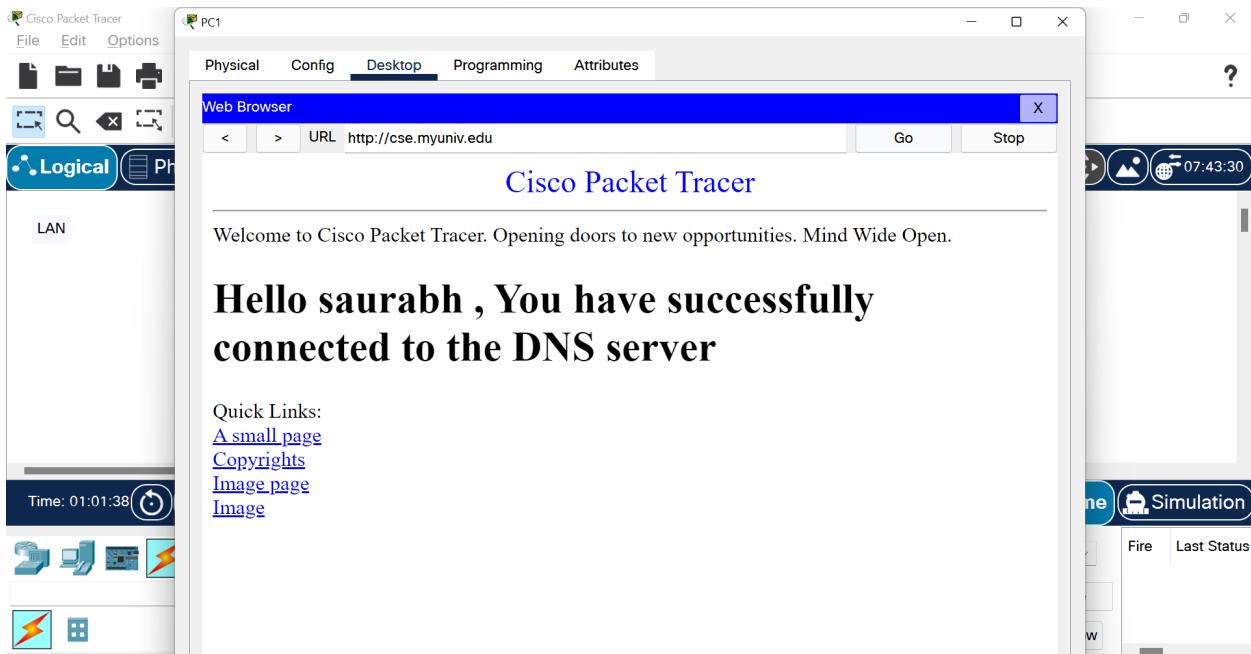
any HTTP request maps the corresponding url to the correct IP address and sends the page to the client (the host computer)requesting the page.











Acknowledgement

This was one of the most informative assignment I ever got to do in Computer Networks .I learned how to use the CISCO PACKET TRACER SOFTWARE and learnt to simulate networks on our computer .All the fundamental concepts were cleared by a visual experience using the software .