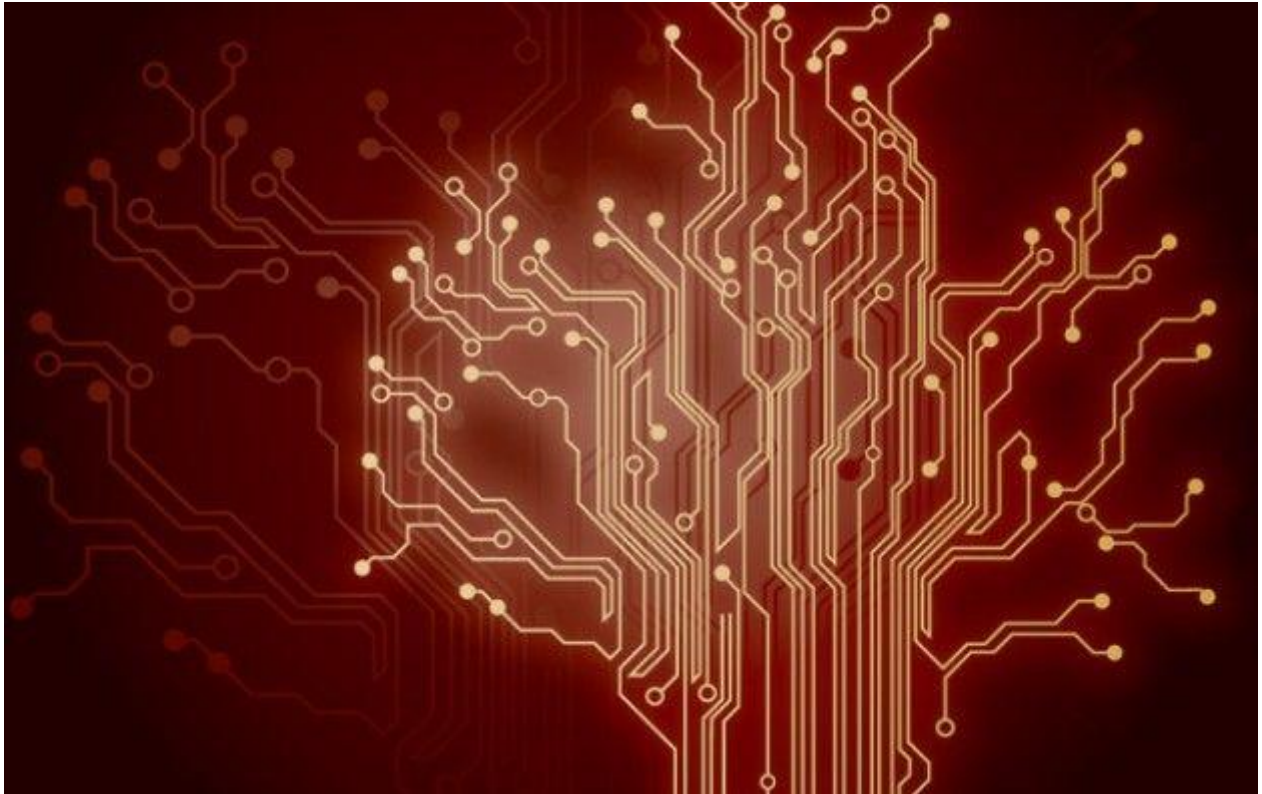


NETWORK LAB REPORT

CO6 : Use Cisco Packet Tracer software to do the following experiments.



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BCSE-III (2019-2023) 5th sem, Section: A-1,

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ASSIGNMENT-6

Use Cisco Packet Tracer software to do the following experiments

OVERVIEW

Cisco Packet Tracer is one of the most useful visual simulation programs for networking certifications. With this tool, students are able to experiment with network behaviour. As such, they're able to ask a wide range of questions and explore different scenarios for better results. Since Cisco Packet Tracer is an important part of the Networking Academy, it provides students with an extensive learning experience. Additionally, it offers several visualizations, simulation, assessment, collaboration, and authoring capabilities to facilitate hassle-free learning and teaching of complex IT concepts.

GOALS

Install the Cisco Packet Tracer in the local machine and simulate the different network configurations as given in the questions.

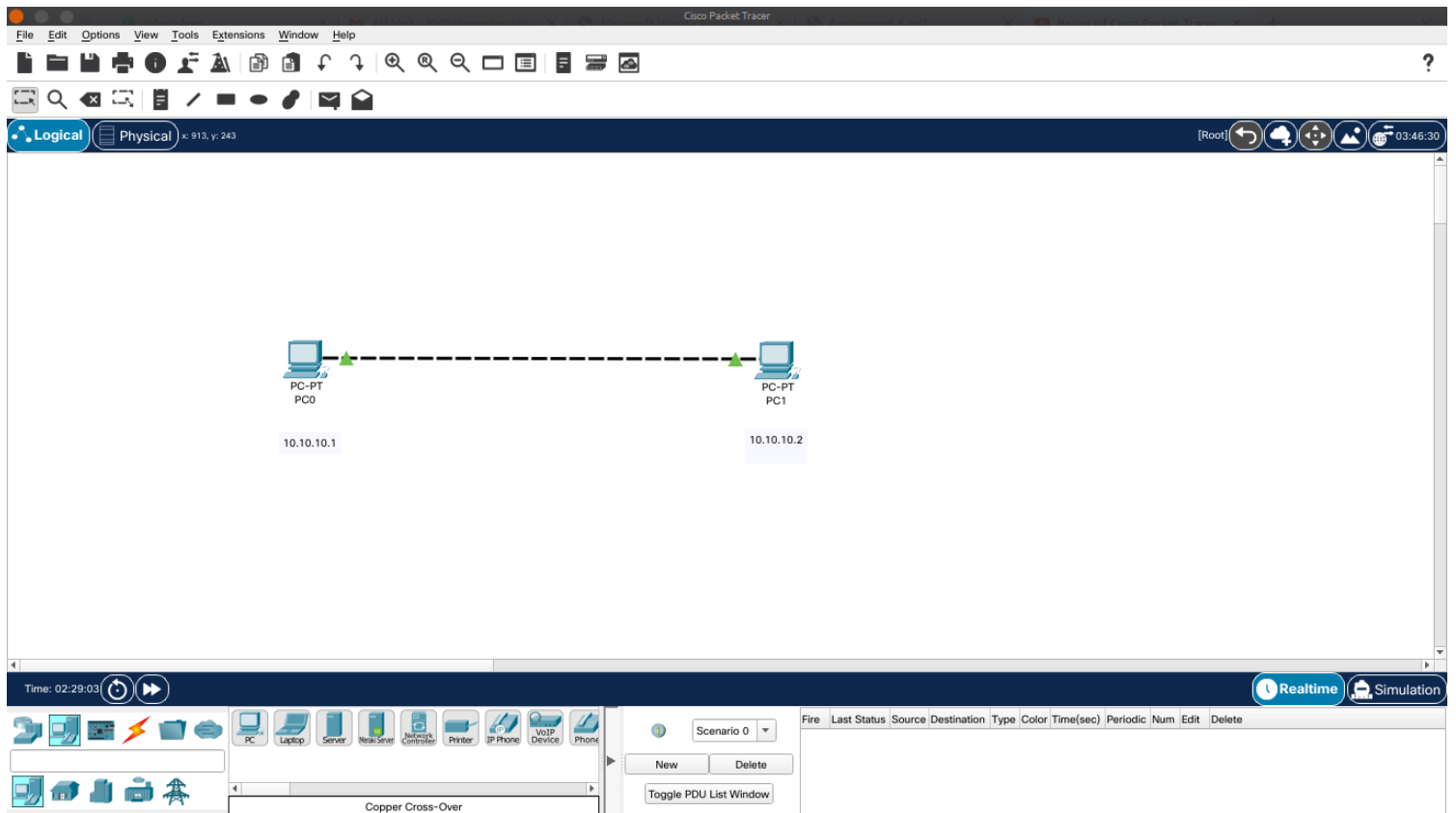
Specifications:

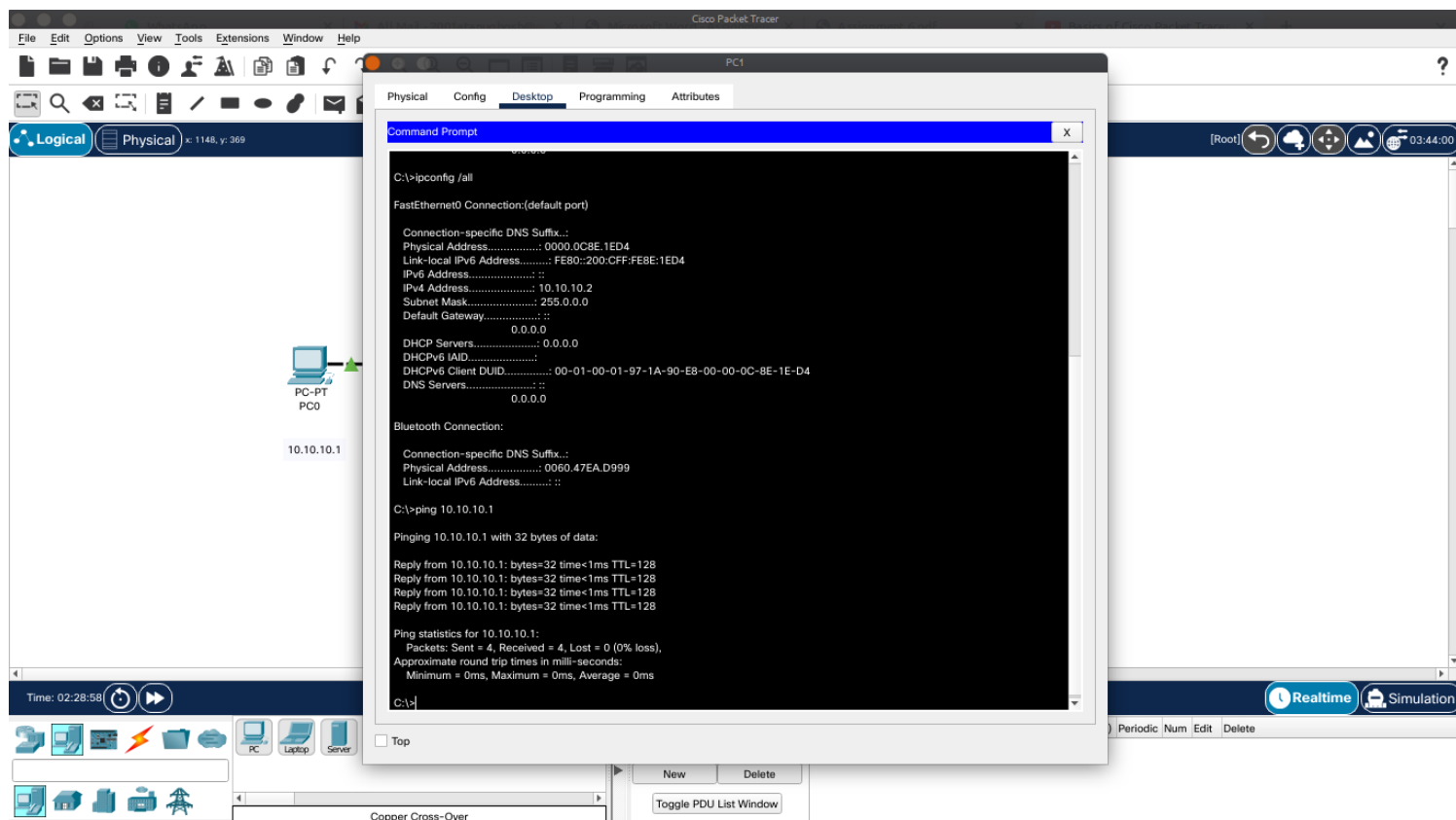
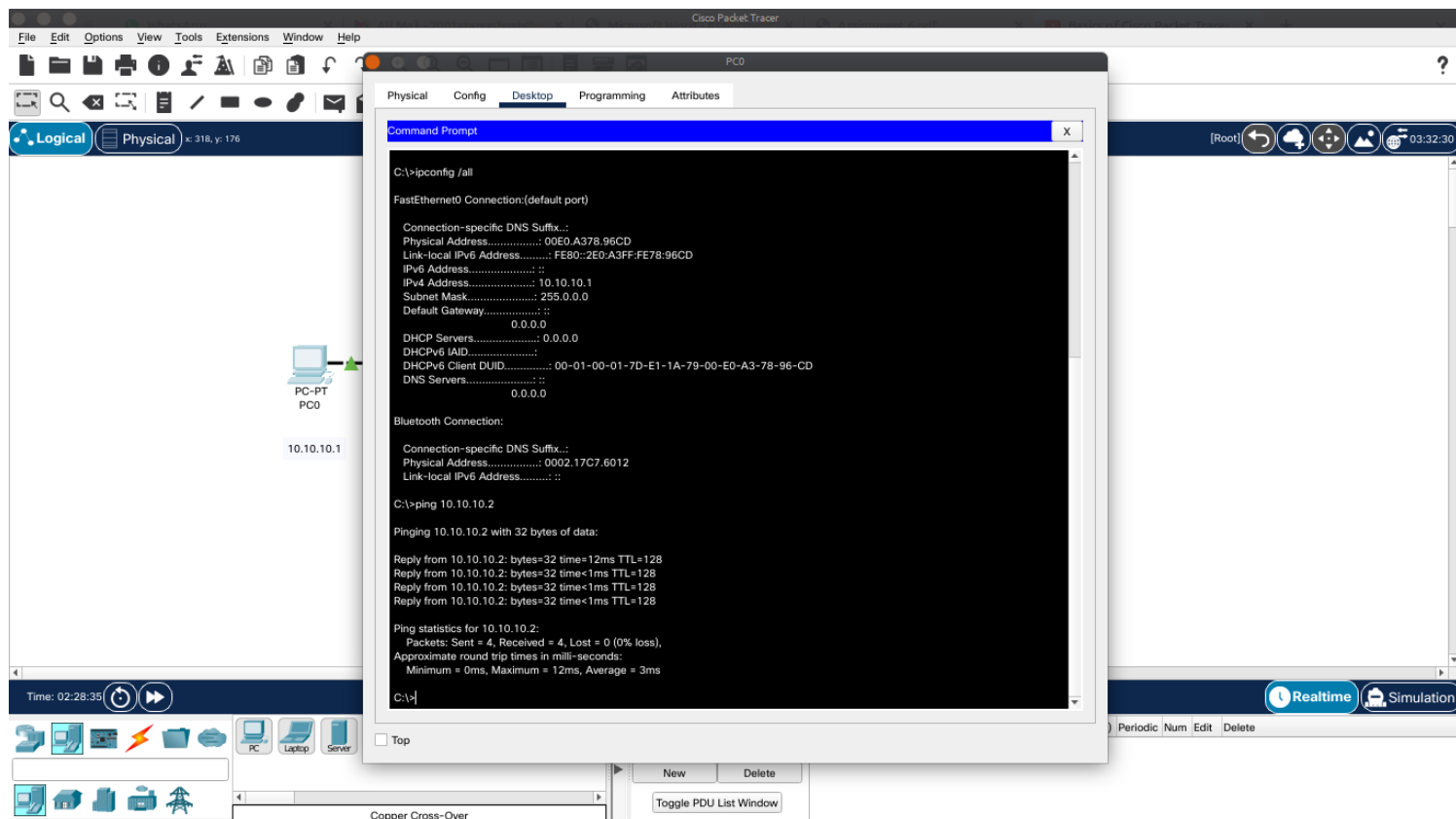
1. **OS** : Linux
2. **Distro** : Ubuntu 20.04 LTS
3. **Version** : PacketTracer 8.0.1

Questions and Solutions:

Q1. Connect two hosts back-to-back with a cross over cable. Assign IP addresses, and see whether they are able to ping each other.

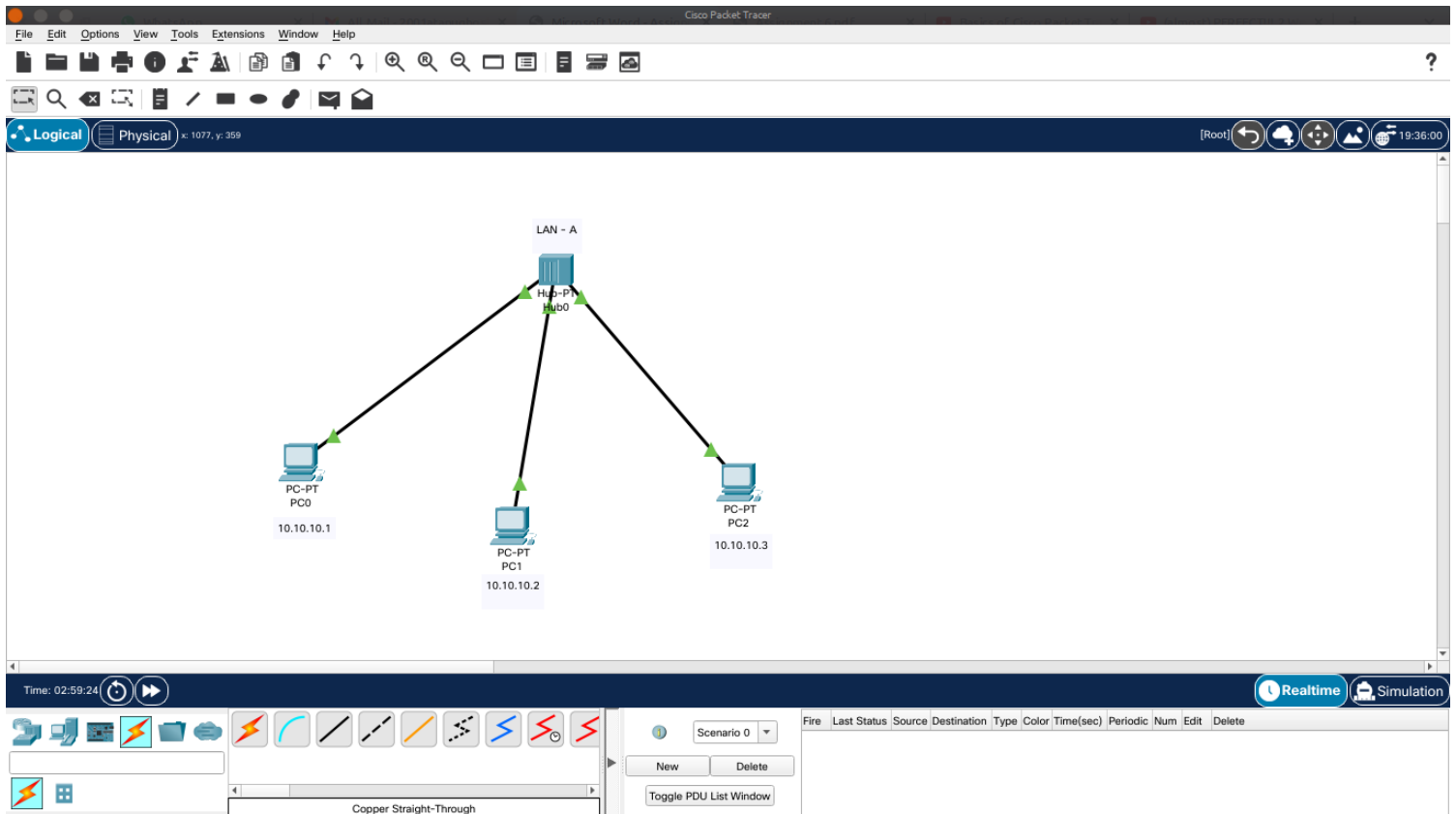
Two hosts were made and connected with a crossover cable. The IP addresses assigned to them were 10.10.10.1 and 10.10.10.2. The following results were obtained.





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

LAN-A was created using a hub and three hosts were connected to it using a straight-through cable. After activating the connection lines, the following results were obtained.



Physical Config Desktop Programming Attributes

Command Prompt

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 10.10.10.2

Pinging 10.10.10.2 with 32 bytes of data:

Reply from 10.10.10.2: bytes=32 time=119ms TTL=128

Reply from 10.10.10.2: bytes=32 time<1ms TTL=128

Reply from 10.10.10.2: bytes=32 time<1ms TTL=128

Reply from 10.10.10.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 119ms, Average = 29ms

C:\>ping 10.10.10.3

Pinging 10.10.10.3 with 32 bytes of data:

Reply from 10.10.10.3: bytes=32 time<1ms TTL=128

Reply from 10.10.10.3: bytes=32 time=4ms TTL=128

Reply from 10.10.10.3: bytes=32 time<1ms TTL=128

Reply from 10.10.10.3: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.3:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 4ms, Average = 1ms

C:\>

☐ Top

Physical Config **Desktop** Programming Attributes

Command Prompt

X

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 10.10.10.1

Pinging 10.10.10.1 with 32 bytes of data:

Reply from 10.10.10.1: bytes=32 time<1ms TTL=128

Reply from 10.10.10.1: bytes=32 time<1ms TTL=128

Reply from 10.10.10.1: bytes=32 time<1ms TTL=128

Reply from 10.10.10.1: bytes=32 time=10ms TTL=128

Ping statistics for 10.10.10.1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>ping 10.10.10.3

Pinging 10.10.10.3 with 32 bytes of data:

Reply from 10.10.10.3: bytes=32 time=21ms TTL=128

Reply from 10.10.10.3: bytes=32 time<1ms TTL=128

Reply from 10.10.10.3: bytes=32 time<1ms TTL=128

Reply from 10.10.10.3: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.3:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 21ms, Average = 5ms

C:\>

☐ Top

Physical Config **Desktop** Programming Attributes

Command Prompt

X

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 10.10.10.1

Pinging 10.10.10.1 with 32 bytes of data:

Reply from 10.10.10.1: bytes=32 time<1ms TTL=128

Reply from 10.10.10.1: bytes=32 time<1ms TTL=128

Reply from 10.10.10.1: bytes=32 time<1ms TTL=128

Reply from 10.10.10.1: bytes=32 time=42ms TTL=128

Ping statistics for 10.10.10.1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 42ms, Average = 10ms

C:\>ping 10.10.10.2

Pinging 10.10.10.2 with 32 bytes of data:

Reply from 10.10.10.2: bytes=32 time<1ms TTL=128

Reply from 10.10.10.2: bytes=32 time<1ms TTL=128

Reply from 10.10.10.2: bytes=32 time<1ms TTL=128

Reply from 10.10.10.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

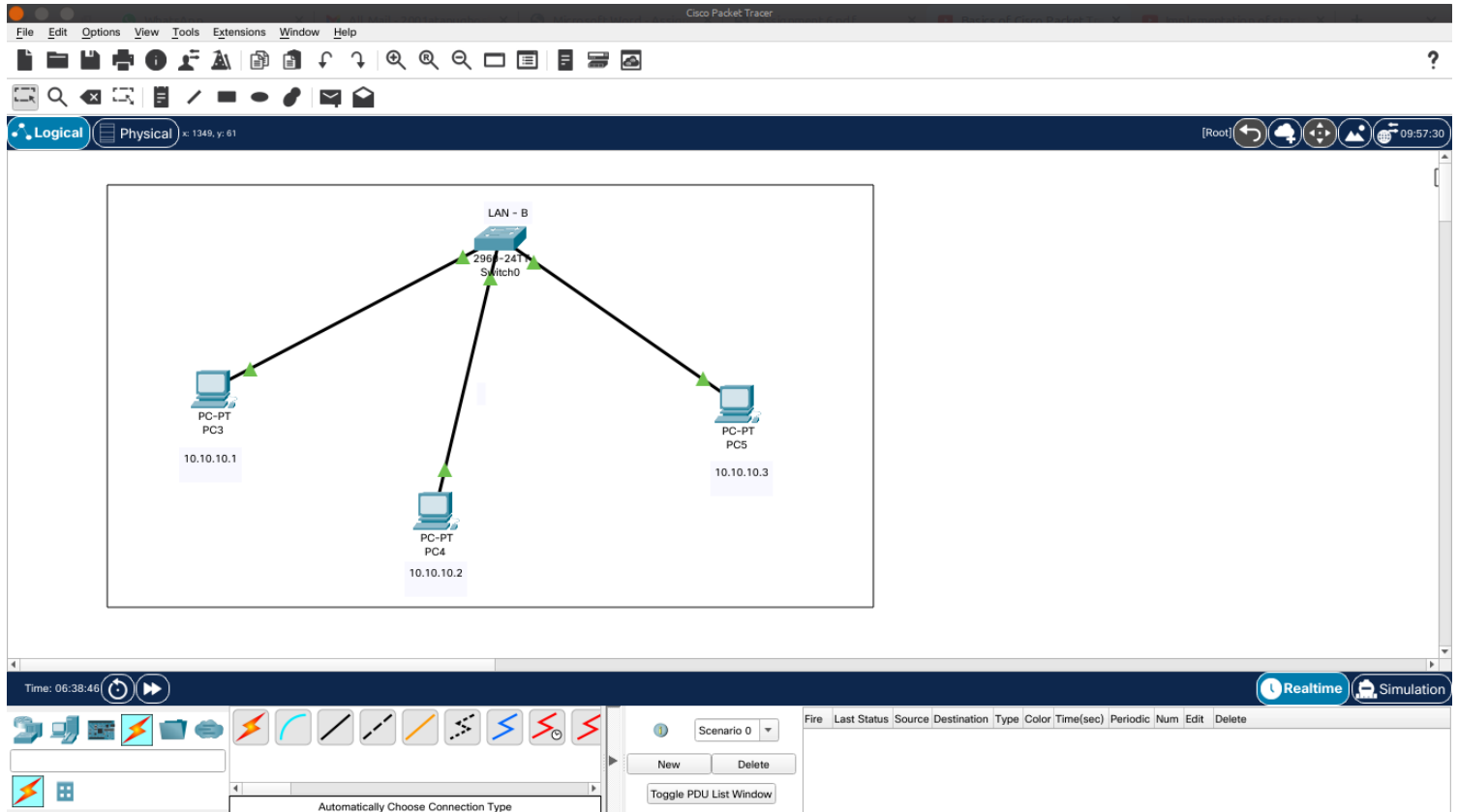
Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

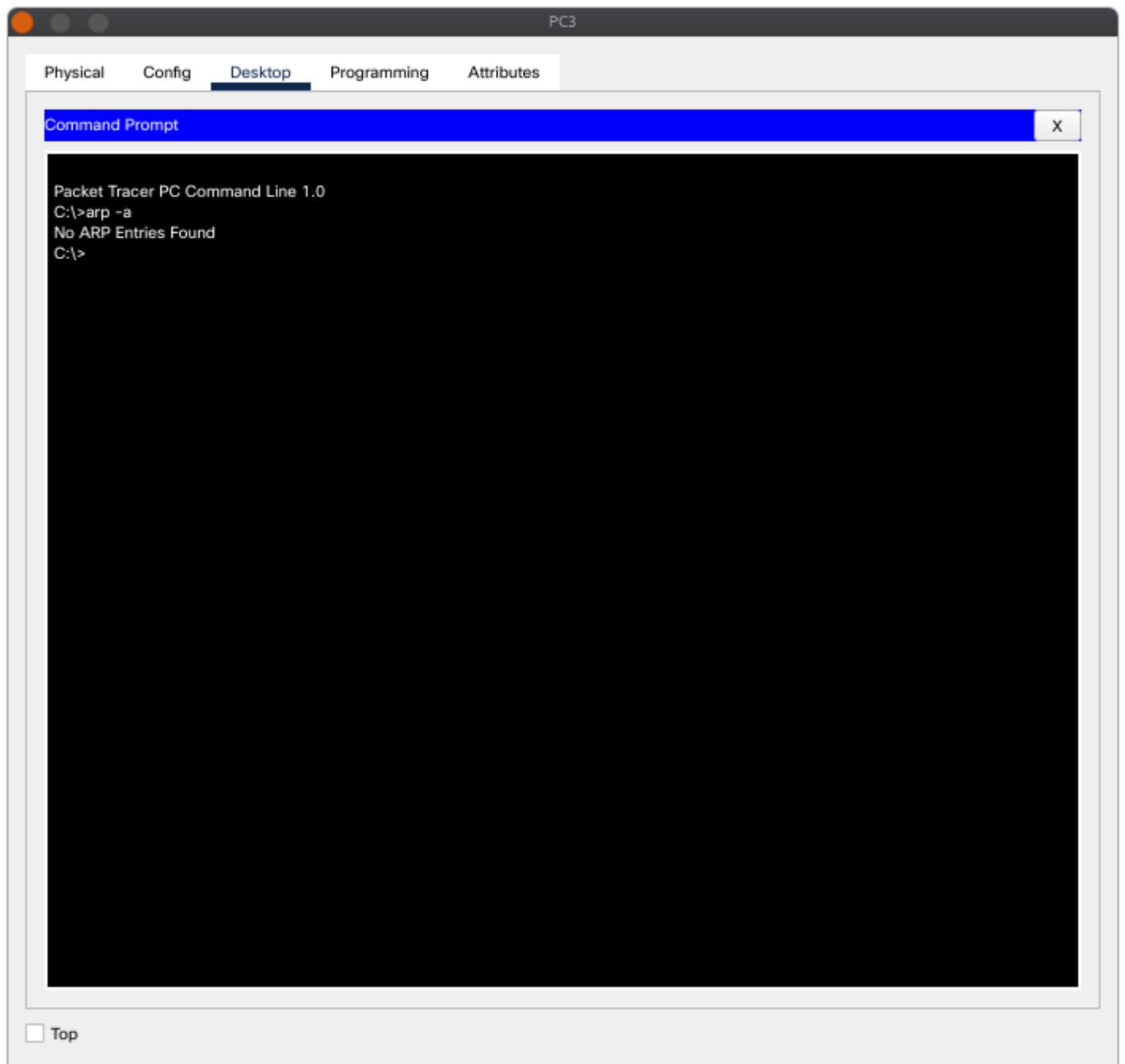
☐ Top

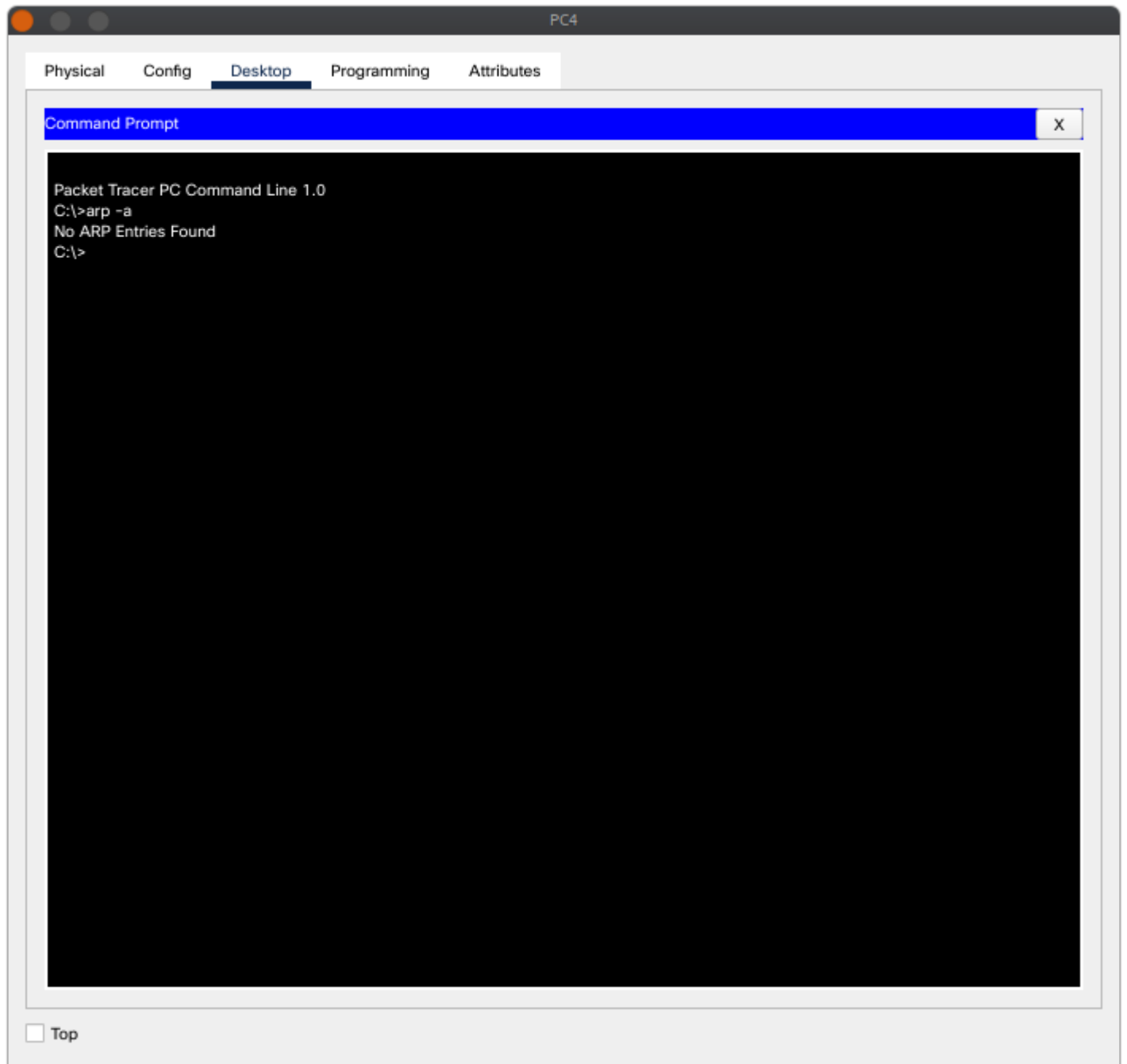
Q3. Create a LAN (named LAN-B) with 3 hosts using a switch. Record contents of the ARP Table of end hosts and the MAC Forwarding Table of the switch. Ping each pair of nodes. Now record the contents of the ARP Table of end hosts and the MAC Forwarding Table of the switch again.

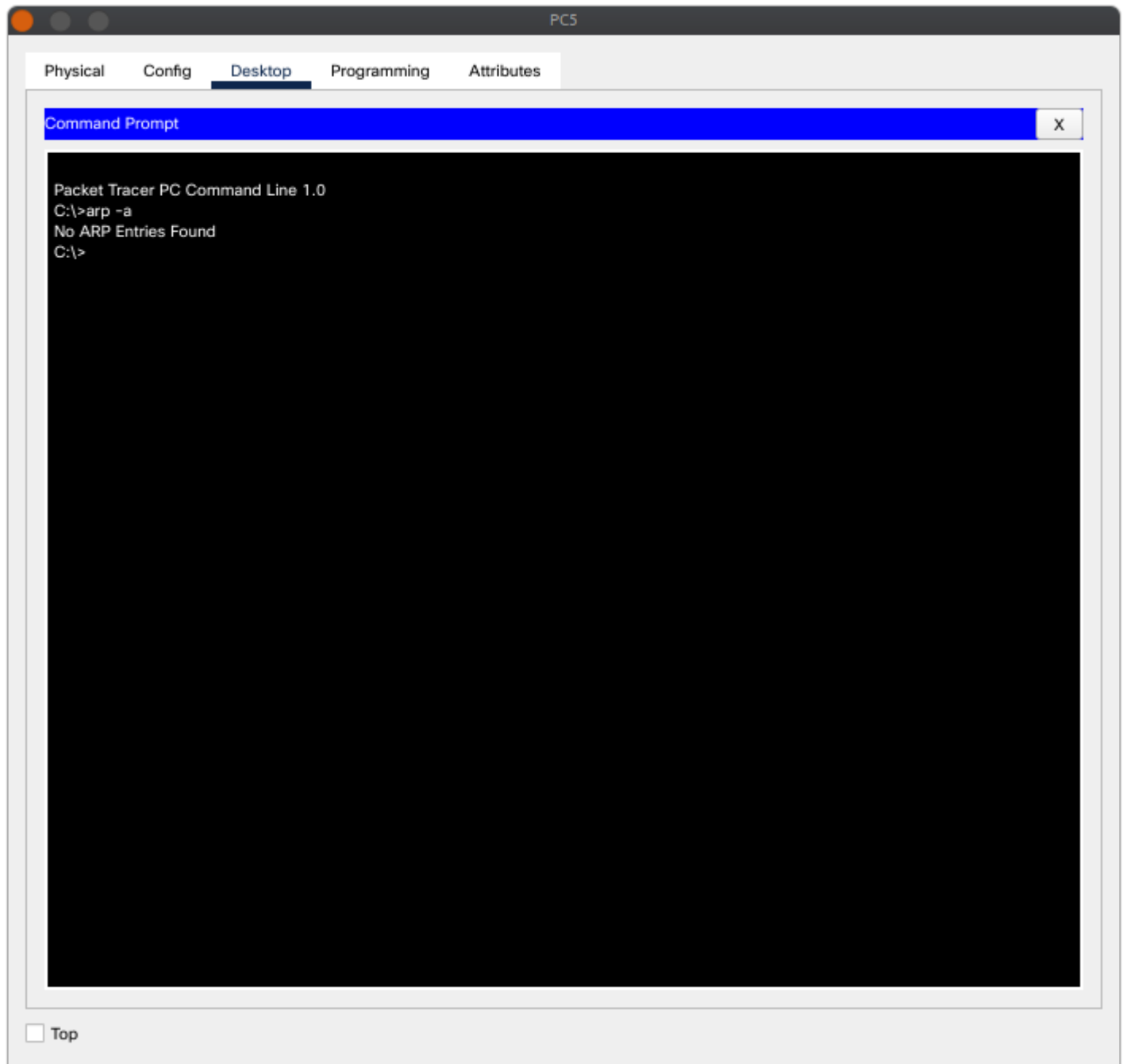
LAN-B was created using a switch (Cisco 2960) and three hosts were connected to it. After activating the connections, the following results were obtained.



Initially, before doing any ping:







Physical Config CLI Attributes

IOS Command Line Interface

Hardware Board Revision Number : 0x01

Switch Ports Model	SW Version	SW Image
* 1 26 WS-C2960-24TT-L	15.0(2)SE4	C2960-LANBASEK9-M

Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE4, RELEASE SOFTWARE (fc1)
 Technical Support: <http://www.cisco.com/techsupport>
 Copyright (c) 1986-2013 by Cisco Systems, Inc.
 Compiled Wed 26-Jun-13 02:49 by mnguyen

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%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#

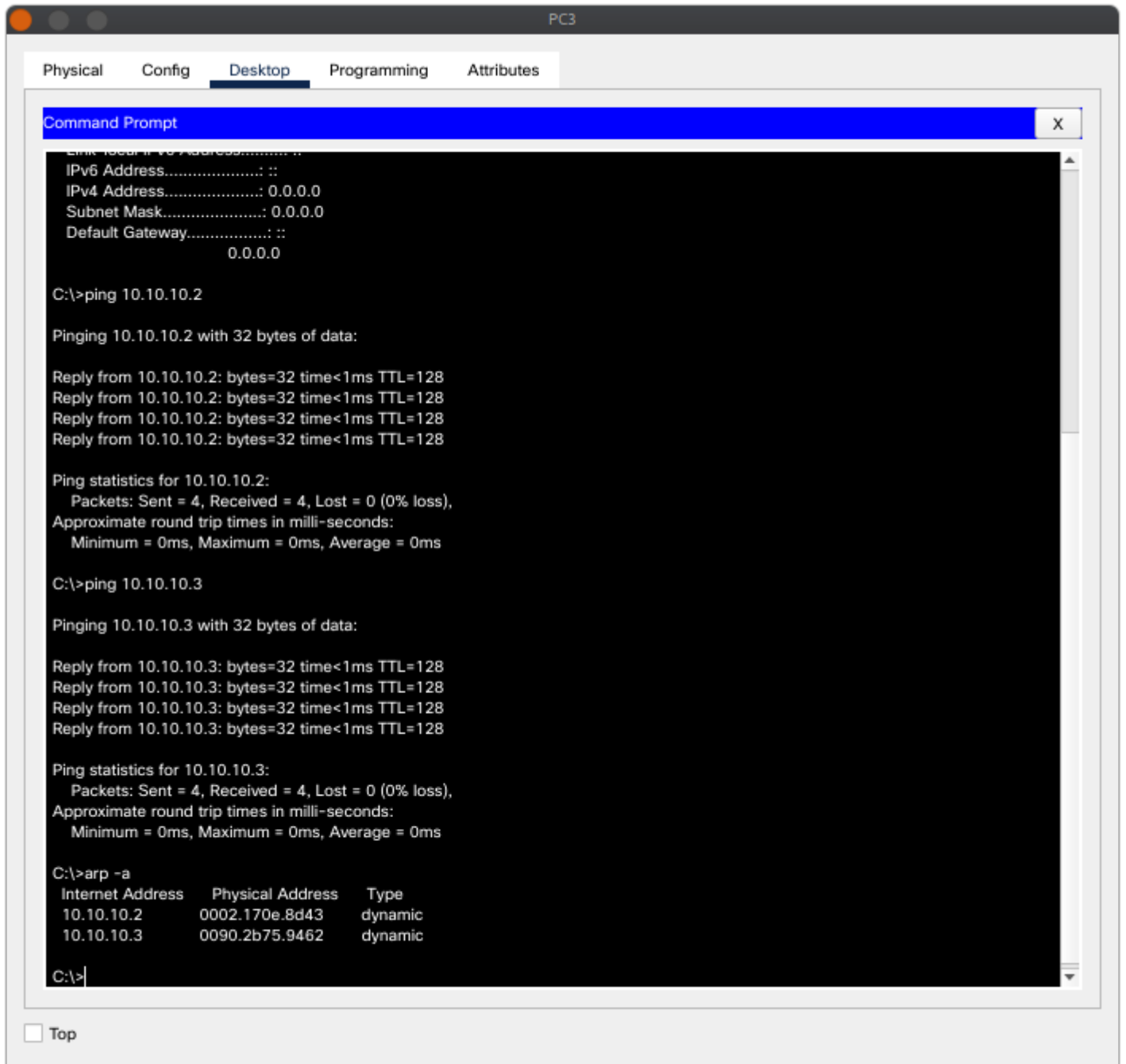
Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

After pinging each possible pair of nodes, the following were obtained:



The screenshot shows a PC3 Desktop window with a Command Prompt open. The Command Prompt displays the following output:

```
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 10.10.10.2

Pinging 10.10.10.2 with 32 bytes of data:

Reply from 10.10.10.2: bytes=32 time<1ms TTL=128
Reply from 10.10.10.2: bytes=32 time<1ms TTL=128
Reply from 10.10.10.2: bytes=32 time<1ms TTL=128
Reply from 10.10.10.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.10.10.3

Pinging 10.10.10.3 with 32 bytes of data:

Reply from 10.10.10.3: bytes=32 time<1ms TTL=128
Reply from 10.10.10.3: bytes=32 time<1ms TTL=128
Reply from 10.10.10.3: bytes=32 time<1ms TTL=128
Reply from 10.10.10.3: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.3:
    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
10.10.10.2            0002.170e.8d43        dynamic
10.10.10.3            0090.2b75.9462        dynamic

C:\>
```

At the bottom of the window, there is a checkbox labeled "Top" which is currently unchecked.

Physical Config Desktop Programming Attributes

Command Prompt

X

```
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 10.10.10.1

Pinging 10.10.10.1 with 32 bytes of data:

Reply from 10.10.10.1: bytes=32 time<1ms TTL=128
Reply from 10.10.10.1: bytes=32 time<1ms TTL=128
Reply from 10.10.10.1: bytes=32 time<1ms TTL=128
Reply from 10.10.10.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.10.10.3

Pinging 10.10.10.3 with 32 bytes of data:

Reply from 10.10.10.3: bytes=32 time<1ms TTL=128
Reply from 10.10.10.3: bytes=32 time<1ms TTL=128
Reply from 10.10.10.3: bytes=32 time<1ms TTL=128
Reply from 10.10.10.3: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.3:
    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
10.10.10.1            0060.7097.eb7a        dynamic
10.10.10.3            0090.2b75.9462        dynamic

C:\>
```

☐ Top

Physical Config **Desktop** Programming Attributes

Command Prompt

X

```
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 10.10.10.1

Pinging 10.10.10.1 with 32 bytes of data:

Reply from 10.10.10.1: bytes=32 time<1ms TTL=128
Reply from 10.10.10.1: bytes=32 time<1ms TTL=128
Reply from 10.10.10.1: bytes=32 time<1ms TTL=128
Reply from 10.10.10.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.10.10.2

Pinging 10.10.10.2 with 32 bytes of data:

Reply from 10.10.10.2: bytes=32 time<1ms TTL=128
Reply from 10.10.10.2: bytes=32 time<1ms TTL=128
Reply from 10.10.10.2: bytes=32 time<1ms TTL=128
Reply from 10.10.10.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.2:
    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
10.10.10.1            0060.7097.eb7a        dynamic
10.10.10.2            0002.170e.8d43        dynamic

C:\>
```

☐ Top

Physical Config **CLI** Attributes

IOS Command Line Interface

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%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	0002.170e.8d43	DYNAMIC	Fa0/2
1	0060.7097.eb7a	DYNAMIC	Fa0/1
1	0090.2b75.9462	DYNAMIC	Fa0/3

Switch#

Ctrl+F6 to exit CLI focus

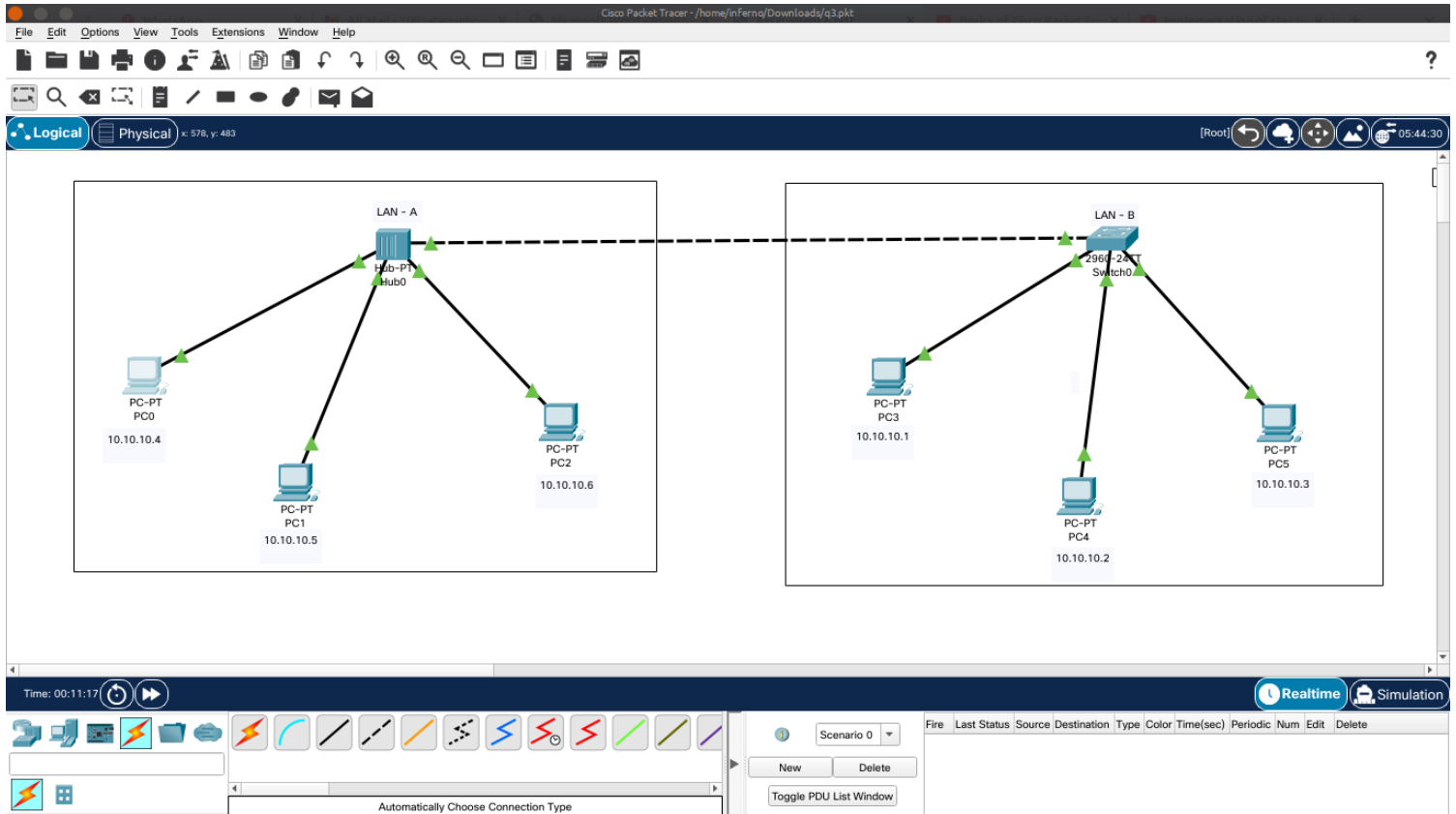
Copy

Paste

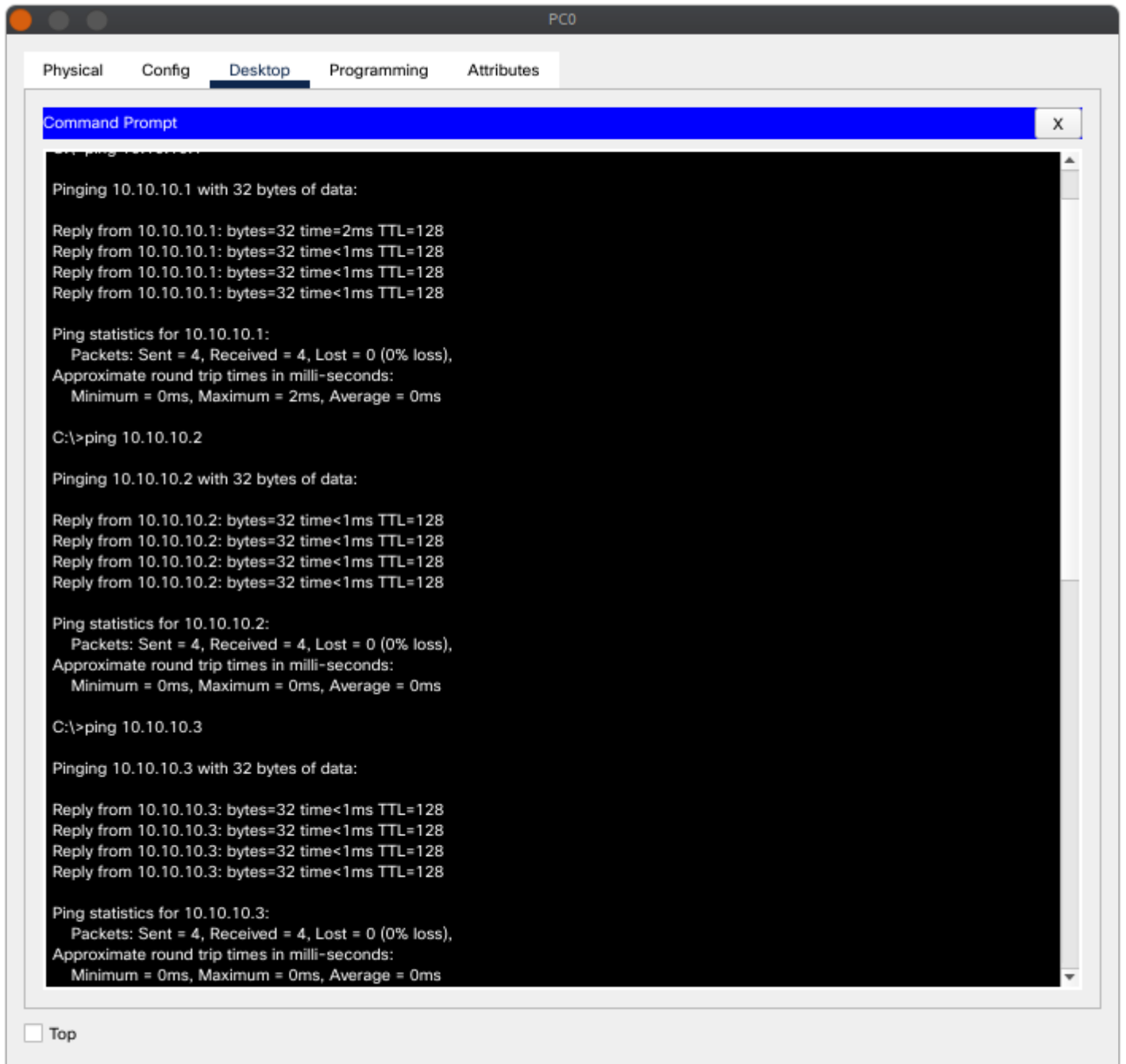
☐ Top

Q4. Connect LAN-A and LAN-B by connecting the hub and switch using a cross-over 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-A and LAN-B are connected by using a crossover cable. After that, each possible pair of nodes is pinged again. The following results were obtained.



ARP tables of the end hosts of both LAN A and LAN B:



Physical Config **Desktop** Programming Attributes

Command Prompt

X

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

C:\>ping 10.10.10.4

Pinging 10.10.10.4 with 32 bytes of data:

Reply from 10.10.10.4: bytes=32 time<1ms TTL=128
Reply from 10.10.10.4: bytes=32 time<1ms TTL=128
Reply from 10.10.10.4: bytes=32 time<1ms TTL=128
Reply from 10.10.10.4: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.4:

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

C:\>ping 10.10.10.6

Pinging 10.10.10.6 with 32 bytes of data:

Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.6:

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
10.10.10.1	0060.7097.eb7a	dynamic
10.10.10.2	0002.170e.8d43	dynamic
10.10.10.3	0090.2b75.9462	dynamic
10.10.10.4	0002.1628.d277	dynamic
10.10.10.6	000c.cfe3.2018	dynamic

C:\>

☐ Top

Physical Config **Desktop** Programming Attributes

Command Prompt

X

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

C:\>ping 10.10.10.4

Pinging 10.10.10.4 with 32 bytes of data:

Reply from 10.10.10.4: bytes=32 time<1ms TTL=128
Reply from 10.10.10.4: bytes=32 time<1ms TTL=128
Reply from 10.10.10.4: bytes=32 time<1ms TTL=128
Reply from 10.10.10.4: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.4:

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

C:\>ping 10.10.10.5

Pinging 10.10.10.5 with 32 bytes of data:

Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.5:

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
10.10.10.1	0060.7097.eb7a	dynamic
10.10.10.2	0002.170e.8d43	dynamic
10.10.10.3	0090.2b75.9462	dynamic
10.10.10.4	0002.1628.d277	dynamic
10.10.10.5	00d0.5861.4673	dynamic

C:\>

☐ Top

Physical Config **Desktop** Programming Attributes

Command Prompt

X

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

C:\>ping 10.10.10.5

Pinging 10.10.10.5 with 32 bytes of data:

Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.5:

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

C:\>ping 10.10.10.6

Pinging 10.10.10.6 with 32 bytes of data:

Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.6:

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
10.10.10.2	0002.170e.8d43	dynamic
10.10.10.3	0090.2b75.9462	dynamic
10.10.10.4	0002.1628.d277	dynamic
10.10.10.5	00d0.5861.4673	dynamic
10.10.10.6	000c.cfe3.2018	dynamic

C:\>

☐ Top

Physical Config **Desktop** Programming Attributes

Command Prompt

X

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

C:\>ping 10.10.10.5

Pinging 10.10.10.5 with 32 bytes of data:

Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time=9ms TTL=128
Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time=1ms TTL=128

Ping statistics for 10.10.10.5:

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

C:\>ping 10.10.10.6

Pinging 10.10.10.6 with 32 bytes of data:

Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.6:

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
10.10.10.1	0060.7097.eb7a	dynamic
10.10.10.3	0090.2b75.9462	dynamic
10.10.10.4	0002.1628.d277	dynamic
10.10.10.5	00d0.5861.4673	dynamic
10.10.10.6	000c.cfe3.2018	dynamic

C:\>

☐ Top

Physical Config **Desktop** Programming Attributes

Command Prompt

X

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

C:\>ping 10.10.10.5

Pinging 10.10.10.5 with 32 bytes of data:

Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time=1ms TTL=128
Reply from 10.10.10.5: bytes=32 time<1ms TTL=128
Reply from 10.10.10.5: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.5:

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

C:\>ping 10.10.10.6

Pinging 10.10.10.6 with 32 bytes of data:

Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128
Reply from 10.10.10.6: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.6:

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

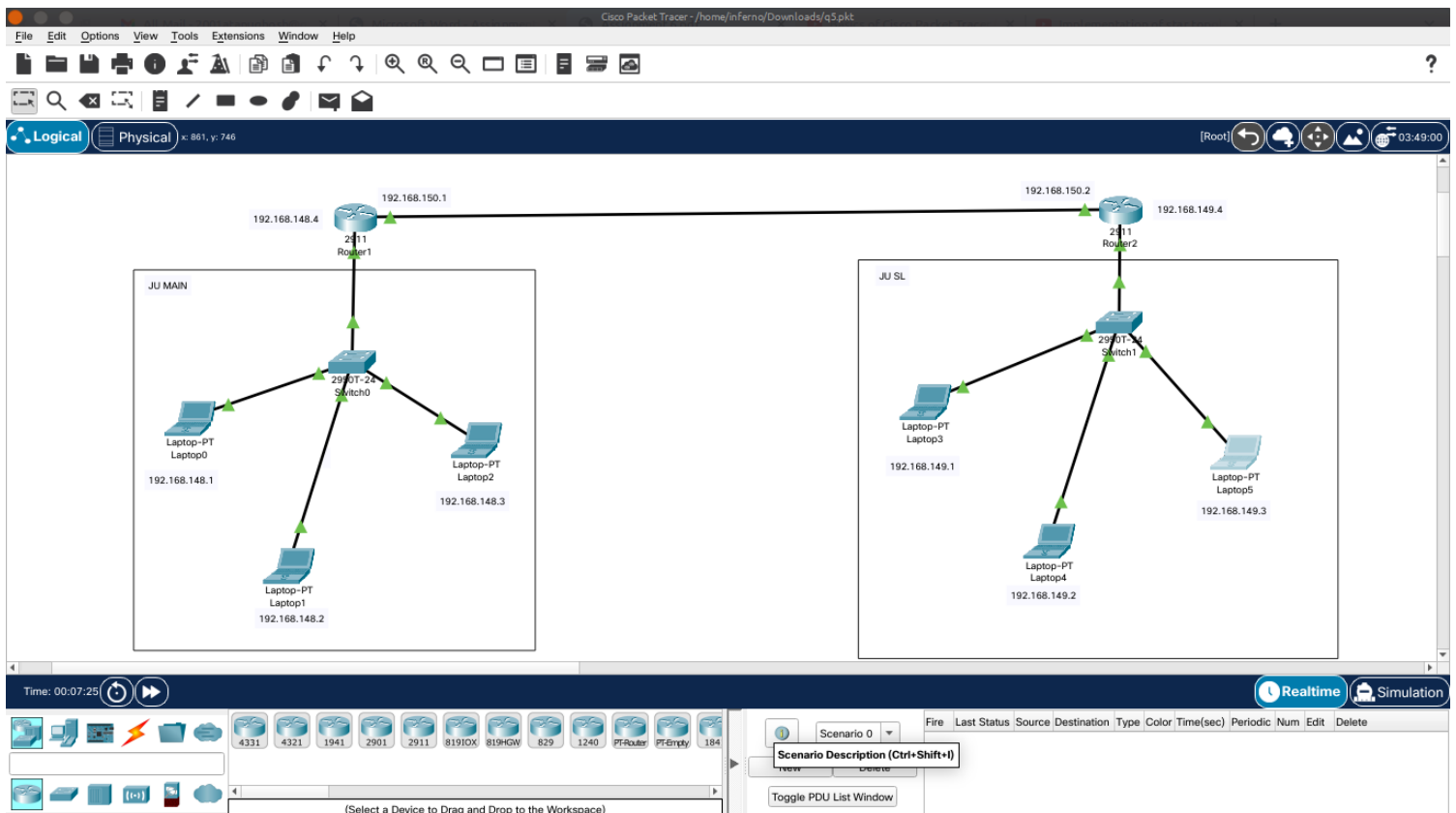
Internet Address	Physical Address	Type
10.10.10.1	0060.7097.eb7a	dynamic
10.10.10.2	0002.170e.8d43	dynamic
10.10.10.4	0002.1628.d277	dynamic
10.10.10.5	00d0.5861.4673	dynamic
10.10.10.6	000c.cfe3.2018	dynamic

C:\>

☐ Top

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 hosts 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 hosts 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.

Two separate LANs were created using a switch and three hosts per LAN. Now, both the LANs are connected to one router each. The routers are further connected using a straight-through cable. The IP addresses were set according to the given question. Now, a static route is added between the two routers for communication. After that, ping requests were successfully made between the two different LANs.



IP Route of router 1 (JU MAIN) :

Router1

PhysicalConfigCLIAttributes

IOS Command Line Interface

```
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#sh 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#
```

Ctrl+F6 to exit CLI focus

CopyPaste

☐ Top

IP Route of router 2 (JU SL) :

The screenshot shows a web-based interface for a router named 'Router2'. The 'CLI' tab is selected, displaying the 'IOS Command Line Interface'. The command 'Router#sh ip route' has been entered, and the output is displayed below. The output lists the routing table contents, including static and connected routes. A legend explains the codes used in the output. At the bottom, there are buttons for 'Copy' and 'Paste', and a 'Top' link.

```
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#sh 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

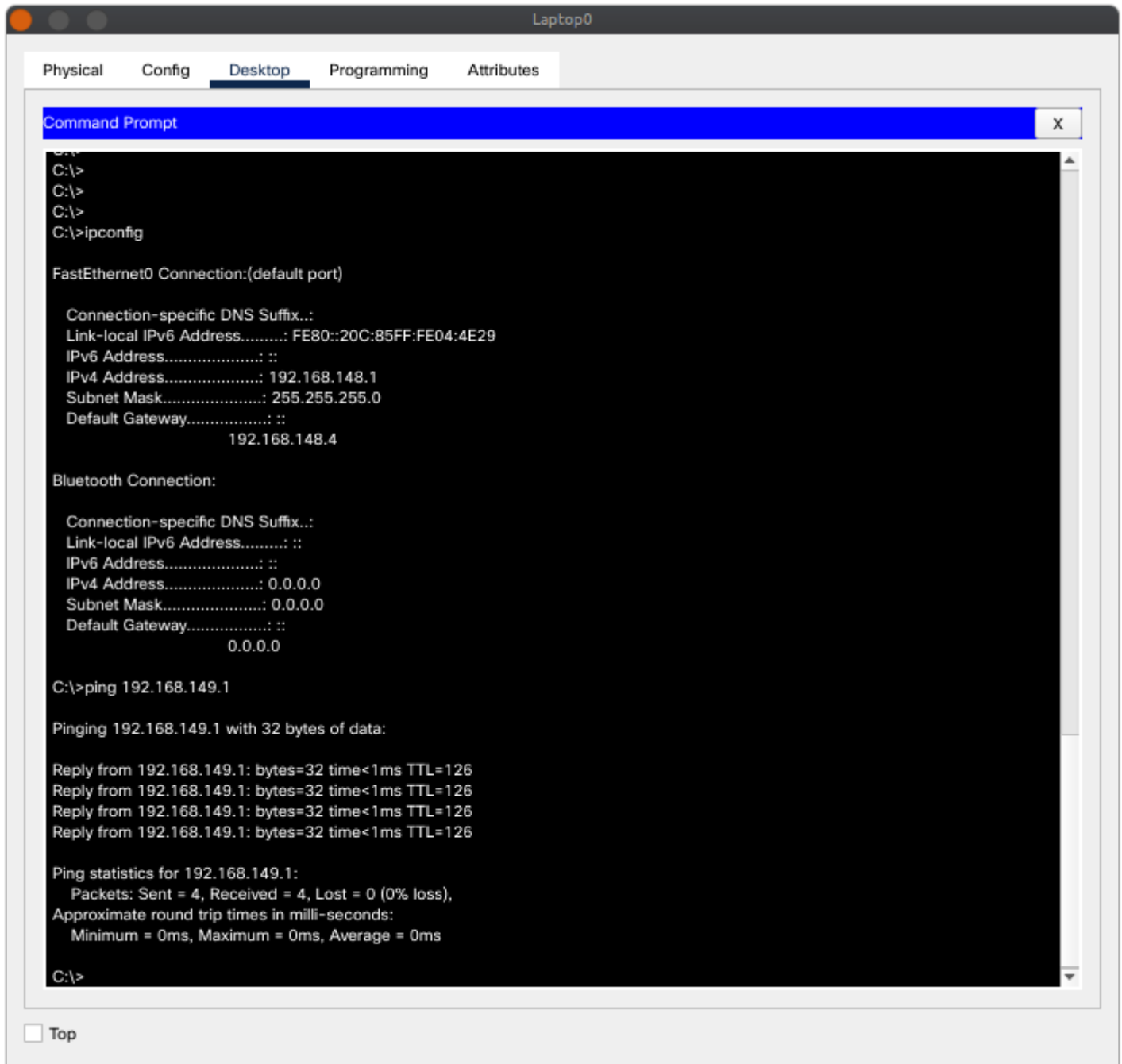
Router#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

Samples of PING executed between the two LANs:



The screenshot shows a laptop window titled "Laptop0" with tabs for Physical, Config, Desktop, Programming, and Attributes. The "Desktop" tab is active, displaying a "Command Prompt" window. The command prompt shows the execution of the "ipconfig" command, displaying network configuration for "FastEthernet0" and "Bluetooth". The "FastEthernet0" configuration shows an IPv4 address of 192.168.148.1 and a default gateway of 192.168.148.4. The "Bluetooth" configuration shows an IPv4 address of 0.0.0.0. Following this, the command "ping 192.168.149.1" is executed, showing four successful replies with 0% loss and 0ms round trip times.

```
C:\>
C:\>
C:\>
C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address.....: FE80::20C:85FF:FE04:4E29
    IPv6 Address.....: ::
    IPv4 Address.....: 192.168.148.1
    Subnet Mask.....: 255.255.255.0
    Default Gateway.....: ::
                        192.168.148.4

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 192.168.149.1

Pinging 192.168.149.1 with 32 bytes of data:

Reply from 192.168.149.1: bytes=32 time<1ms TTL=126
Reply from 192.168.149.1: bytes=32 time<1ms TTL=126
Reply from 192.168.149.1: bytes=32 time<1ms TTL=126
Reply from 192.168.149.1: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.149.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

☐ Top

Physical Config **Desktop** Programming Attributes

Command Prompt

X

Packet Tracer PC Command Line 1.0

C:\>ipconfig

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix...:

Link-local IPv6 Address.....: FE80::20C:CFFF:FECA:25B1

IPv6 Address.....: ::

IPv4 Address.....: 192.168.149.3

Subnet Mask.....: 255.255.255.0

Default Gateway.....: ::

192.168.149.4

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 192.168.148.3

Pinging 192.168.148.3 with 32 bytes of data:

Request timed out.

Reply from 192.168.148.3: bytes=32 time<1ms TTL=126

Reply from 192.168.148.3: bytes=32 time<1ms TTL=126

Reply from 192.168.148.3: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.148.3:

Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),

Approximate round trip times in milli-seconds:

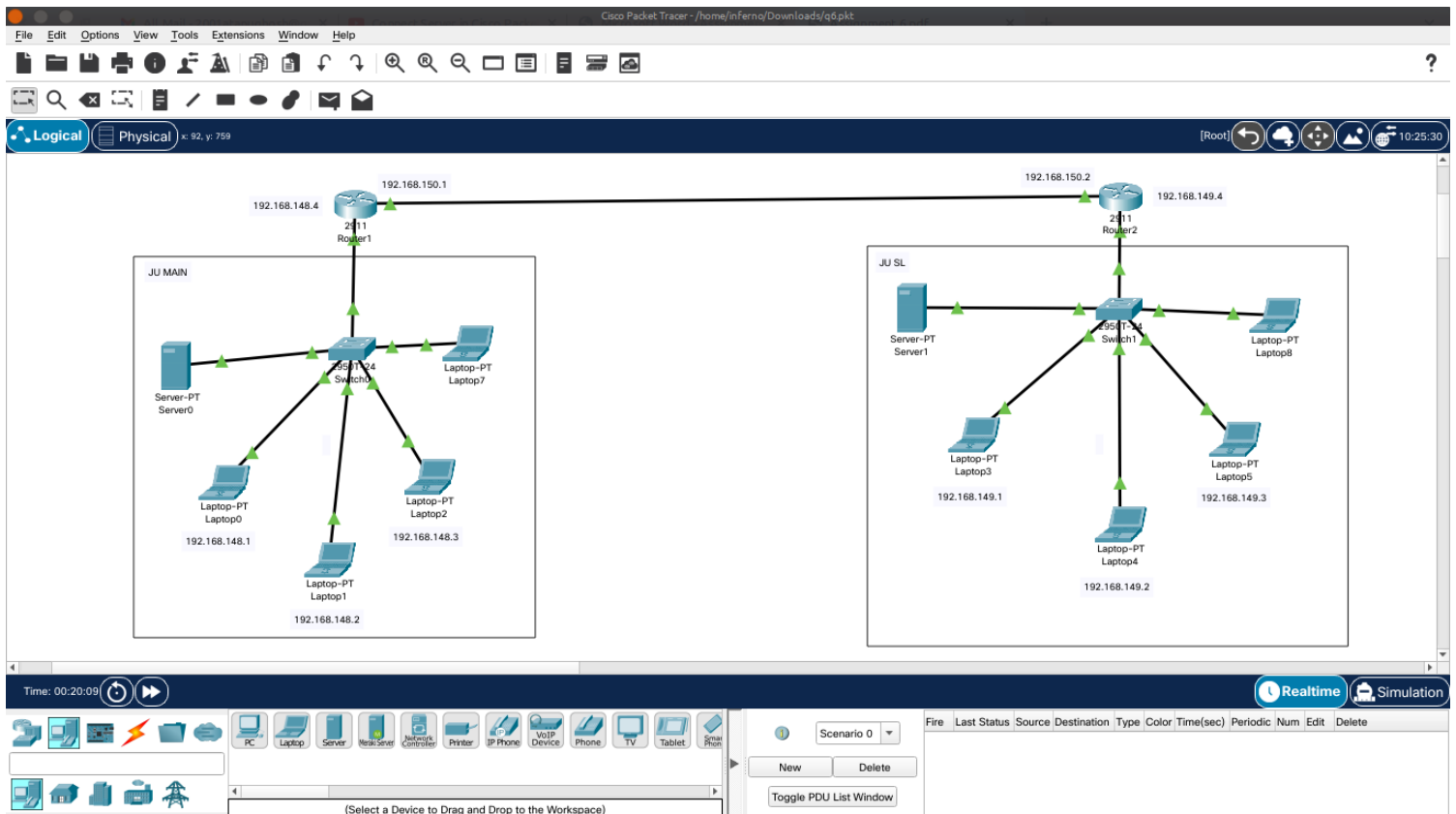
Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

☐ Top

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 address of the default gateway via this DHCP server.

In each LAN, a server was added and it was configured as a DHCP server. The default gateway was set to the IP of the router of that particular interface. The IP of the server is set as 192.168.148.5 in JU MAIN and 192.168.149.5 in JU SL. Now, when new hosts are added, IP address and gateway is provided via the DHCP server.



Now, when a new host is added in JU MAIN:

Assigned IP: 192.168.148.6

Gateway: 192.168.148.4

The screenshot shows a configuration window titled 'Laptop7' with tabs for Physical, Config, Desktop, Programming, and Attributes. The 'Desktop' tab is active, displaying the 'IP Configuration' section for the 'FastEthernet0' interface. The 'DHCP' option is selected for IP Configuration, and 'Static' is selected for IPv6 Configuration. The IPv4 Address is set to 192.168.148.6, Subnet Mask to 255.255.255.0, Default Gateway to 192.168.148.4, and DNS Server to 0.0.0.0. The IPv6 Address is empty, Link Local Address is FE80::201:C7FF:FE5C:685A, and both Default Gateway and DNS Server are empty. The '802.1X' section has 'Use 802.1X Security' unchecked, Authentication set to MD5, and empty fields for Username and Password. A 'Top' button is at the bottom left.

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 192.168.148.6

Subnet Mask 255.255.255.0

Default Gateway 192.168.148.4

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::201:C7FF:FE5C:685A

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

Now, a new host is added in JU SL:

Assigned IP : 192.168.149.6

Gateway: 192.168.149.4

The screenshot shows a configuration window titled 'Laptop8' with tabs for Physical, Config, Desktop, Programming, and Attributes. The 'Desktop' tab is active, and the 'IP Configuration' section is highlighted in blue. Below this, the 'Interface' is set to 'FastEthernet0'. The 'IP Configuration' section has two radio buttons: 'DHCP' (selected) and 'Static'. The 'Static' configuration fields are filled with: IPv4 Address: 192.168.149.6, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.149.4, and DNS Server: 0.0.0.0. The 'IPv6 Configuration' section has two radio buttons: 'Automatic' and 'Static' (selected). The 'Static' configuration fields are: IPv6 Address (empty), Link Local Address: FE80::20D:BDFF:FE8B:EE22, Default Gateway (empty), and DNS Server (empty). The '802.1X' section has a checkbox 'Use 802.1X Security' (unchecked), an 'Authentication' dropdown set to 'MD5', and empty fields for 'Username' and 'Password'. A 'Top' button is at the bottom left.

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 192.168.149.6

Subnet Mask 255.255.255.0

Default Gateway 192.168.149.4

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::20D:BDFF:FE8B:EE22

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

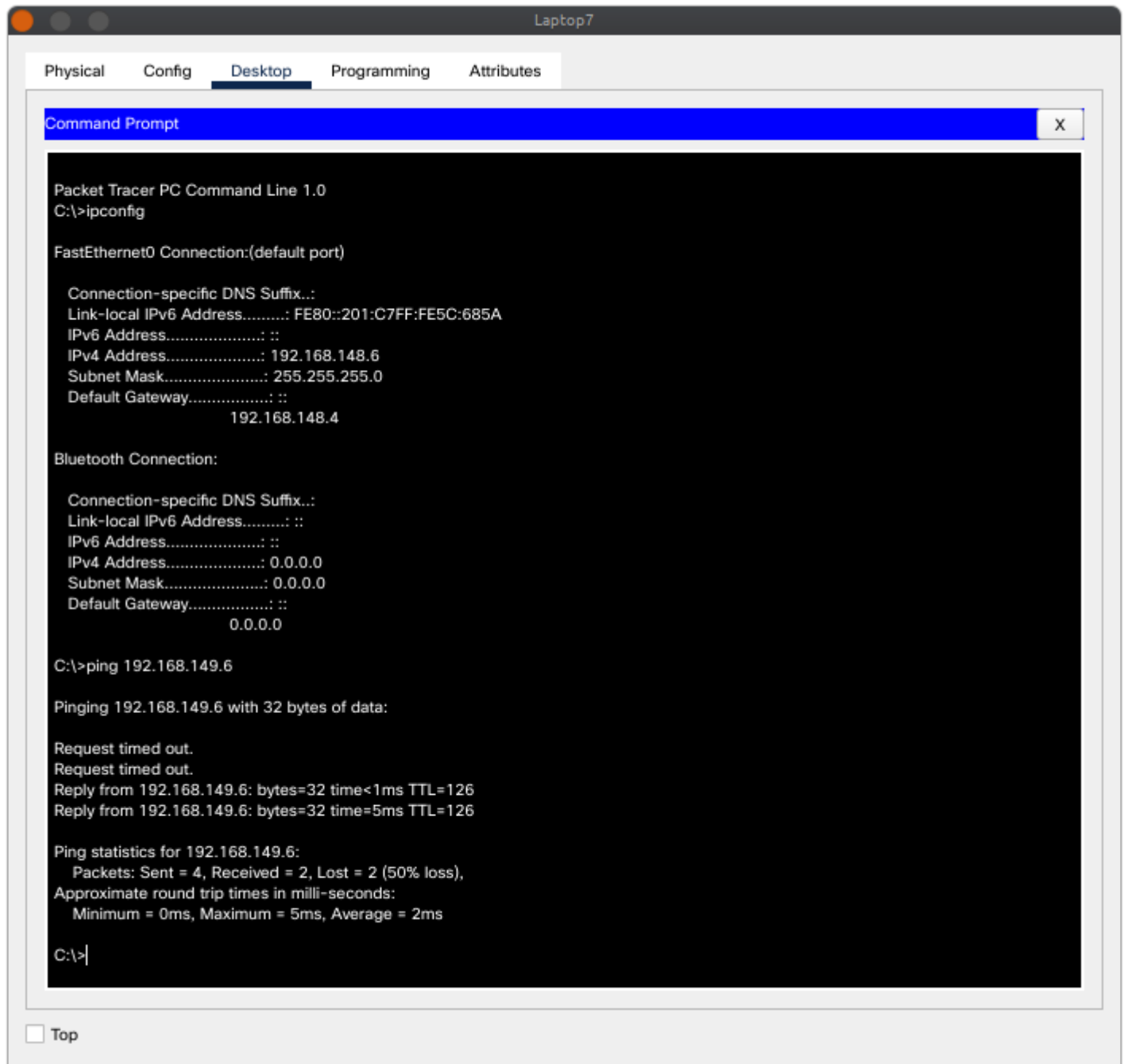
Authentication MD5

Username

Password

☐ Top

PING command was also successfully executed between the new hosts that were created via the DHCP server:



The screenshot shows a Packet Tracer interface for a device named 'Laptop7'. The 'Desktop' tab is selected, displaying a 'Command Prompt' window. The window title is 'Command Prompt' with a close button 'X'. The text inside the window is as follows:

```
Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address.....: FE80::201:C7FF:FE5C:685A
    IPv6 Address.....: ::
    IPv4 Address.....: 192.168.148.6
    Subnet Mask.....: 255.255.255.0
    Default Gateway.....: ::
                        192.168.148.4

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 192.168.149.6

Pinging 192.168.149.6 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 192.168.149.6: bytes=32 time<1ms TTL=126
Reply from 192.168.149.6: bytes=32 time=5ms TTL=126

Ping statistics for 192.168.149.6:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 5ms, Average = 2ms

C:\>|
```

At the bottom left of the window, there is a checkbox labeled 'Top'.

Physical Config **Desktop** Programming Attributes

Command Prompt X

```
Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address.....: FE80::20D:BDFF:FE8B:EE22
    IPv6 Address.....: ::
    IPv4 Address.....: 192.168.149.6
    Subnet Mask.....: 255.255.255.0
    Default Gateway.....: ::
                        192.168.149.4

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 192.168.148.6

Pinging 192.168.148.6 with 32 bytes of data:

Reply from 192.168.148.6: bytes=32 time<1ms TTL=126
Reply from 192.168.148.6: bytes=32 time<1ms TTL=126
Reply from 192.168.148.6: bytes=32 time<1ms TTL=126
Reply from 192.168.148.6: bytes=32 time<1ms TTL=126

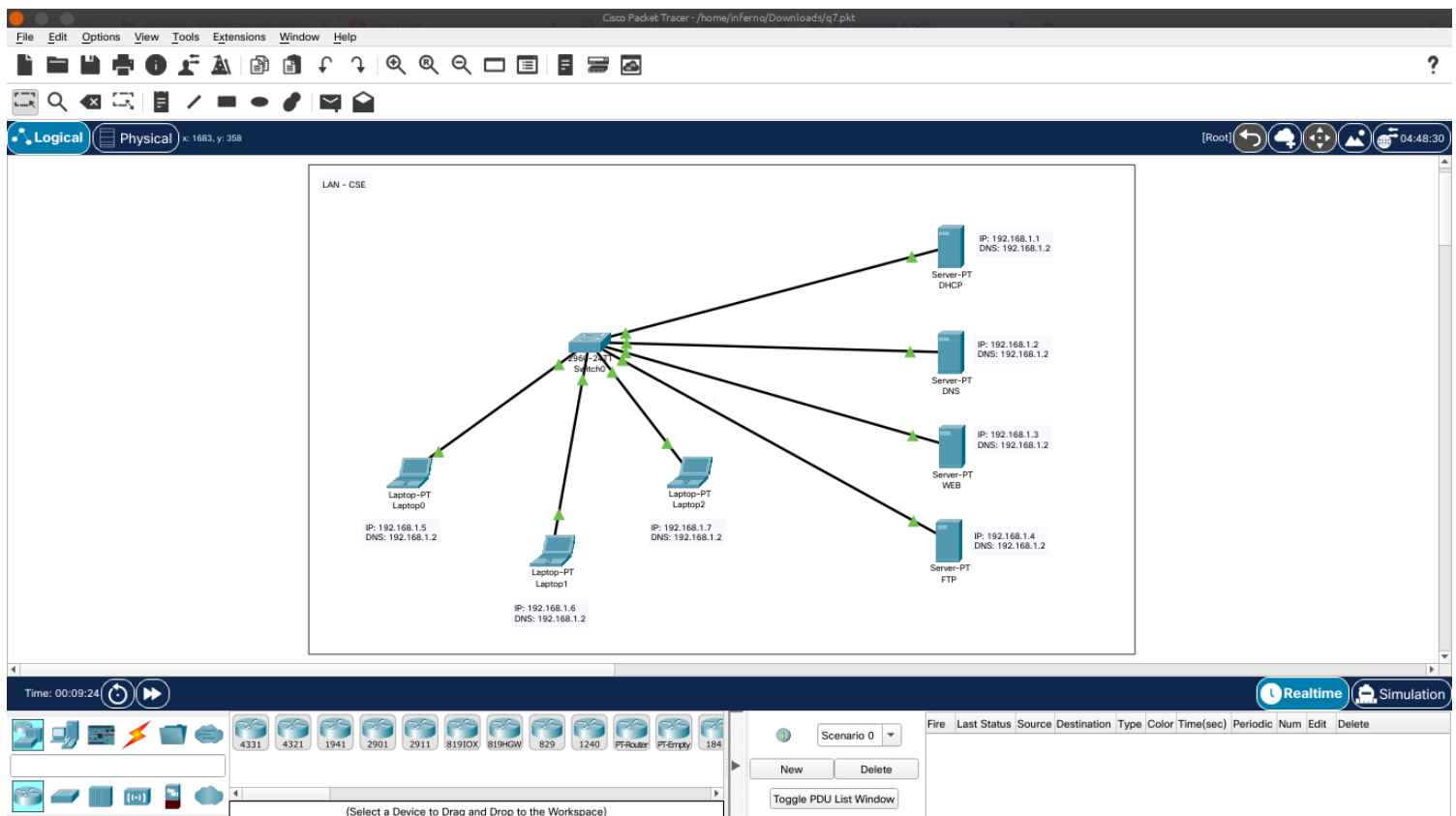
Ping statistics for 192.168.148.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>|
```

☐ Top

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.

A LAN was created using a switch and three hosts. Four servers were also added to the switch as per the given question. One of them is the DHCP server which was configured so that the hosts added to the switch could generate their own IP address using the DHCP server. A WEB and an FTP server were also added. A DNS server was added and configured. Now, the following were obtained.



Dynamic IP address generation for a new host:

Laptop3

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 192.168.1.8

Subnet Mask 255.255.255.0

Default Gateway 0.0.0.0

DNS Server 192.168.1.2

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::240:BFF:FE23:66C6

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

The DNS record table is made as follows:

PhysicalConfig**Services**DesktopProgrammingAttributes

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

DNS

DNS Service

☒ On

☐ Off

Resource Records

Name

Type

A Record

Address

Add

Save

Remove

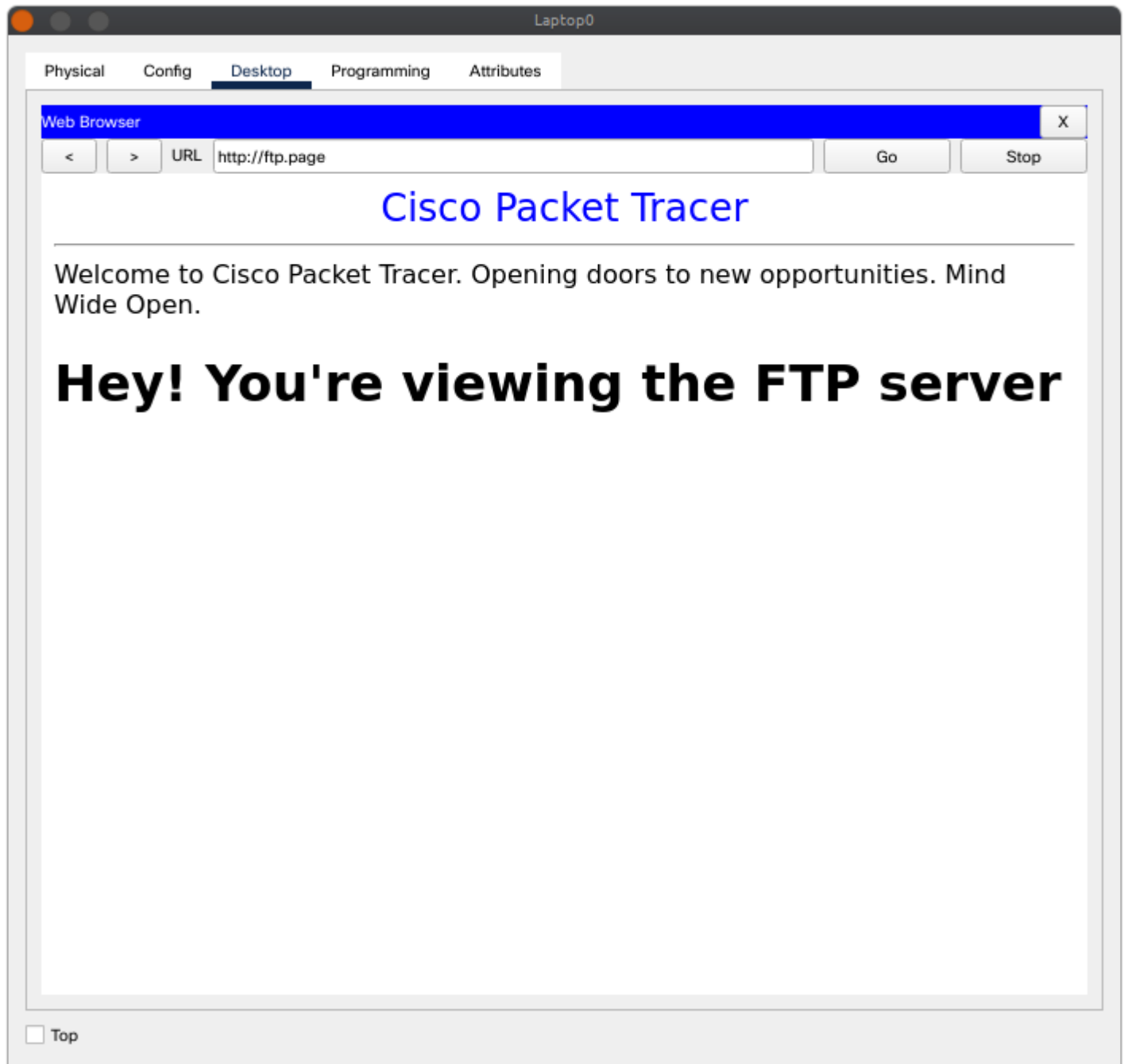
No.	Name	Type	Detail
0	cse.myuniv.edu	A Record	192.168.1.2
1	dhcp.page	A Record	192.168.1.1
2	dns.page	A Record	192.168.1.2
3	ftp.page	A Record	192.168.1.4
4	web.page	A Record	192.168.1.3

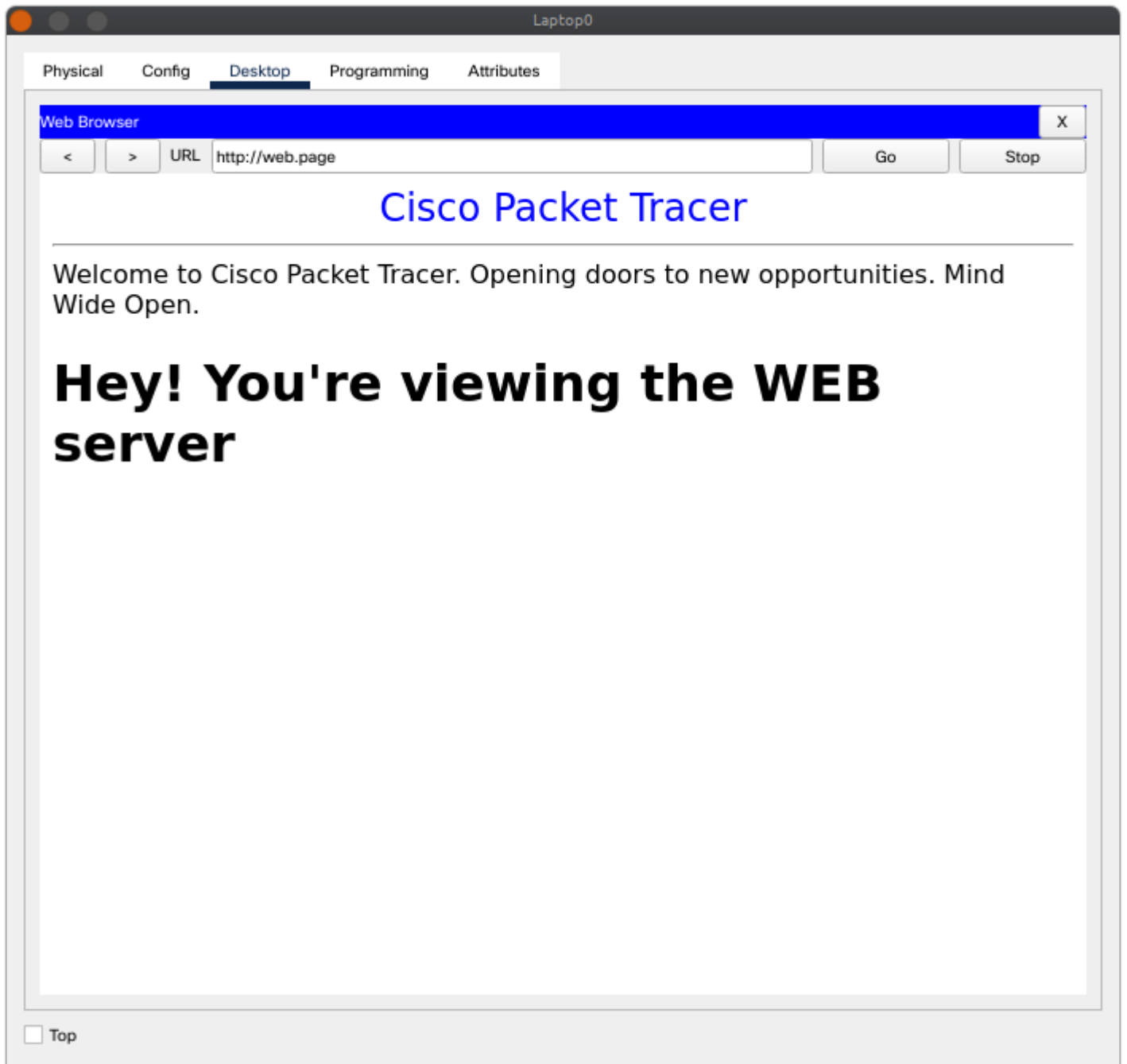
DNS Cache

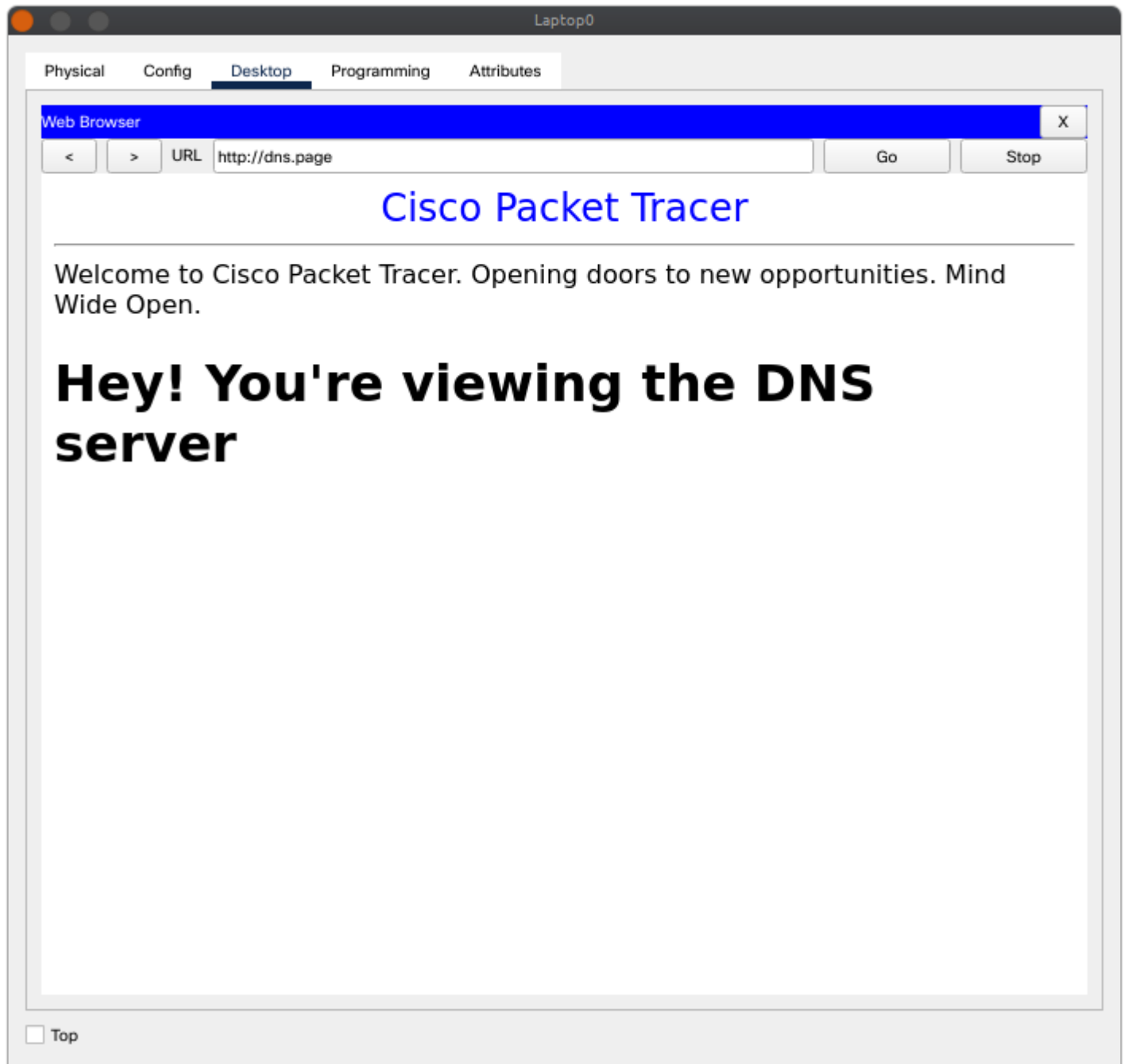
☐ Top

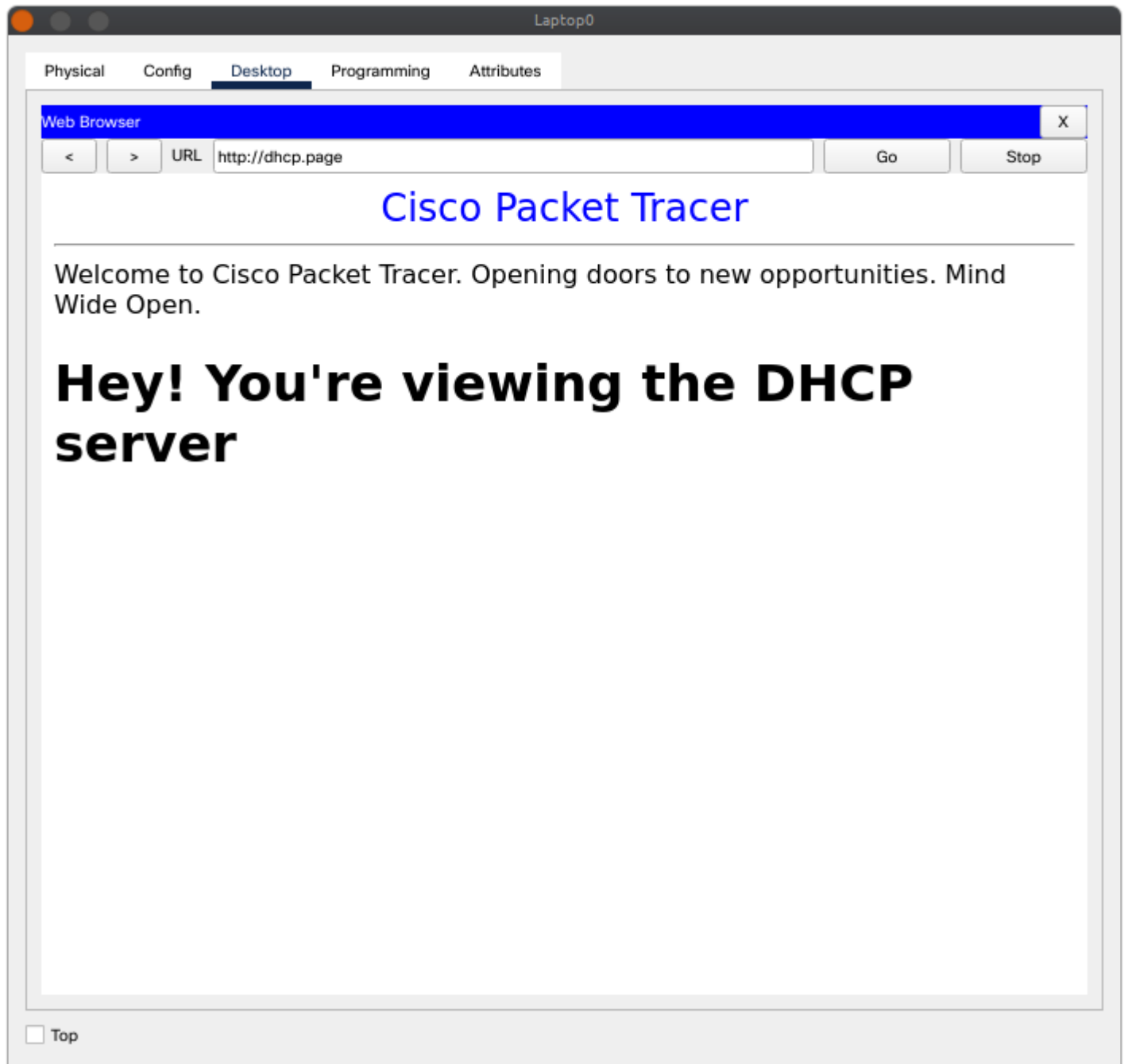
On using the web browser in a host computer connected to the LAN:











COMMENTS

This was a very interesting and unique assignment. It led me to learn to use a new utility tool Cisco Packet Tracer. I had to explore a lot to perform the experiments and it was really a very exciting experience. Overall, I found this assignment very informative.