LAB PROGRAM – 8

Q)To construct simple LAN and understand the concept and operation of Address Resolution Protocol (ARP)

Procedure :

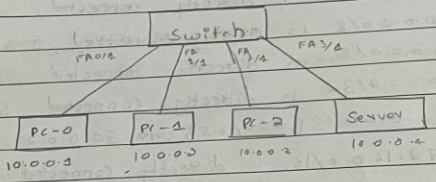
M T W T F S S

Date : 3/ 8/23

Experiment - 8

Aim: To Construct simple LAN and understand the concept and operation of Address Resolution protocol (ARP)

Topology:



Procedure:

Step 1: Create a network topology of 4 PC's and a server. Assign IP Address to all the 4 PC's.

Step 2: Connect the PC and switch using Copper - cross over wire.

Step 3: use the inspect tool on the right-hand tool bar to click on all the PC's to see the ARP table.

Step 4: use the Command arp -a in Command CLI of the PC's before pinging. Initially the ARP table is empty.

In the CLI of switch, the Command: show mac address - table can be given on every transaction to see how switch learns from the transaction & builds the Address table.

step 5: ping PC-0 & Server in command prompt and PC-1 & PC-2 while in Simulation mode and use the Capture button in Simulation panel to go step by step so that changes in ARP can be noted.

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COMPASS

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observe the switch as well the nodes update the ARP table as and when a new communication starts.

Result:

→ Before Pinging : PC0 Command prompt

PC> arp -a

No ARP entries found

→ After Pinging : PC0 Command prompt

PC> 10.0.0.4

pinging 10.0.0.4 with 32 bytes of data

Reply from 10.0.0.4: bytes=32 time=8ms TTL=128

Reply from 10.0.0.4: bytes=32 time=4ms TTL=128

Reply from 10.0.0.4: bytes=32 time=4ms TTL=128

Reply from 10.0.0.4: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.4:

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

Approximate round trip times in milli-seconds:

Minimum = 4ms, Maximum = 8ms, Average = 5ms

PC> arp -a

Internet Address	Physical Address	Type
10.0.0.4	0001.42e8.32c1	dyramic

→ Switch 0 CLI

Switch> show mac address-table

MAC Address Table

Vlan	Mac Address	Type	Port
1	0001.42e8.32c1	DYNAMIC	FA1/1
1	0001.96b5.9a0	DYNAMIC	FA0/1
1	0007.ecc9.8080	DYNAMIC	FA1/1
1	000d.bd98.b636	DYNAMIC	FA2/1

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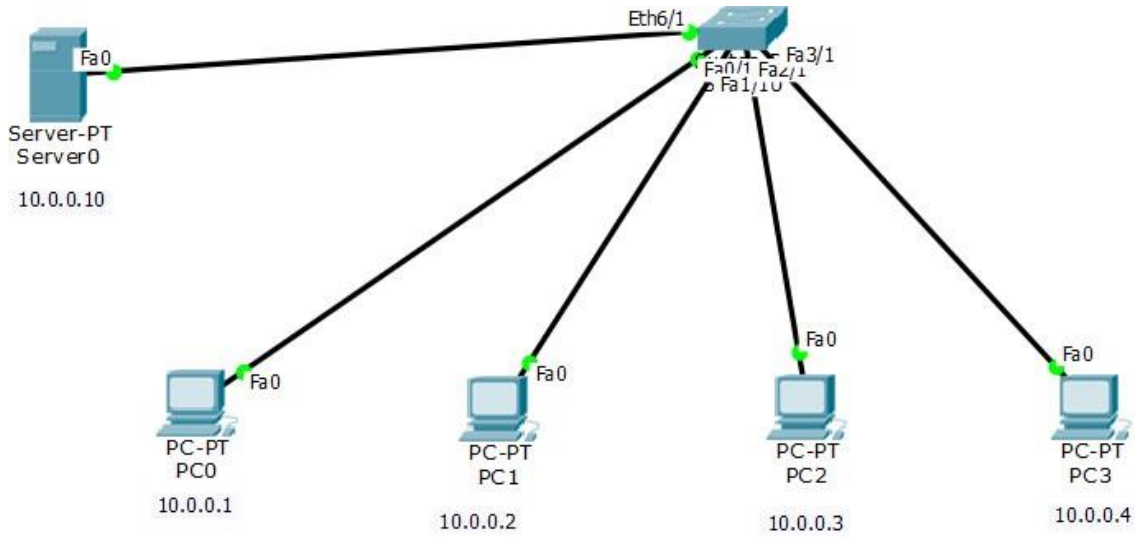
Observation:

ARP (Address Resolution protocol). It is a network layer protocol. It is responsible for finding the hardware address (MAC Address) of a host from a known IP Address.

At the network layer, when the source wants to communicate with the destination, it needs to know the mac Address of the destination. For this, it will check ARP table for the MAC Address of the destination. If the MAC Address of the destination is present, communication will take place.

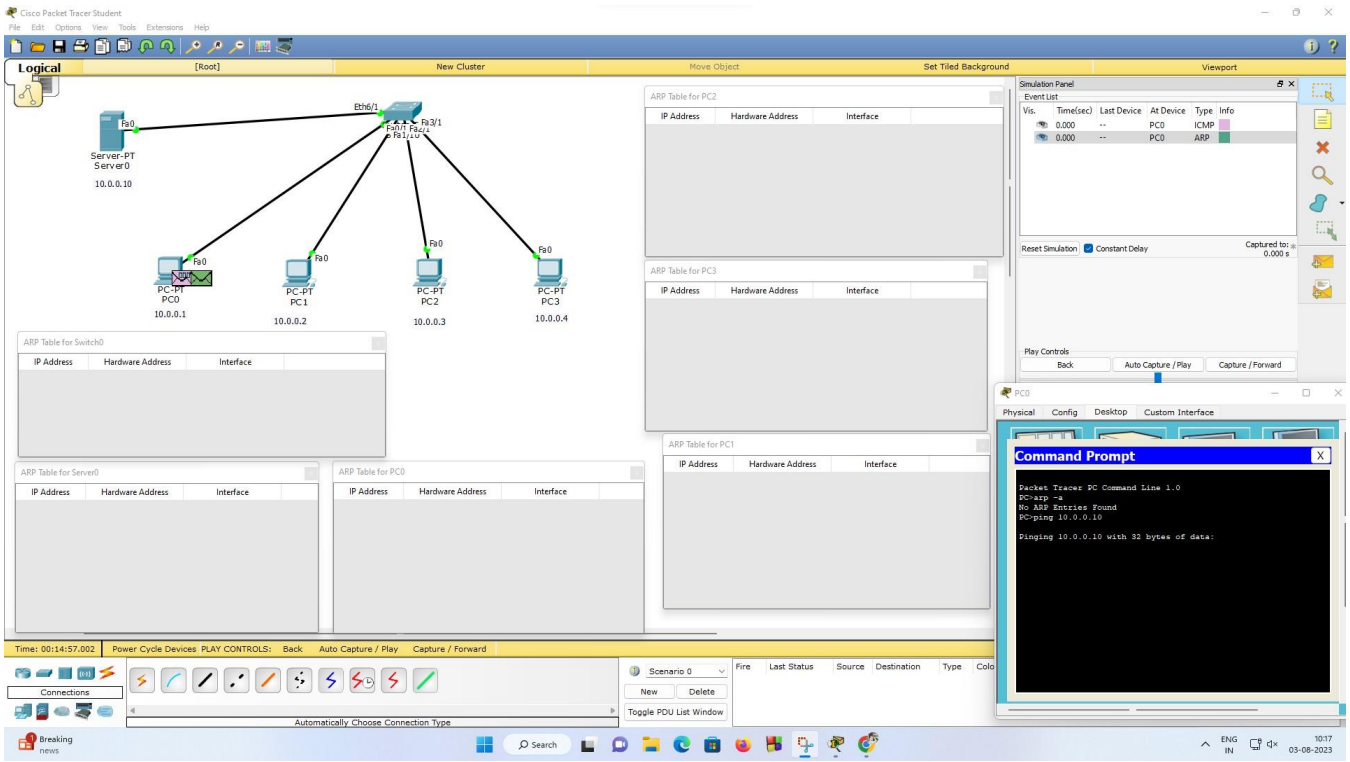
If the MAC Address is not a part of the ARP table the source sends a ARP request message (broadcast message.). All devices in the network will compare dest IP Address with it's own ip Address and if it matches, the device sends a ARP reply message (unicast). which contains the MAC Address. Now source and destination will communicate.

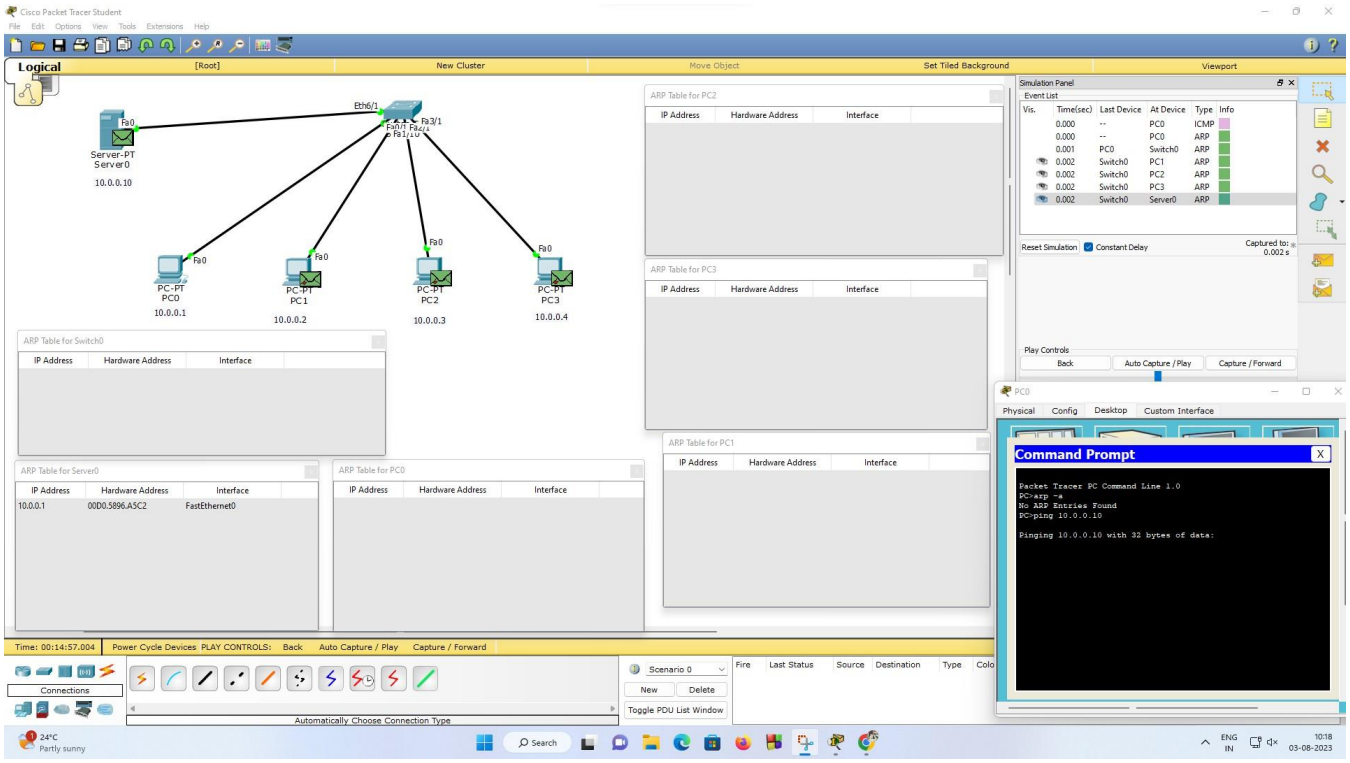
Topology:

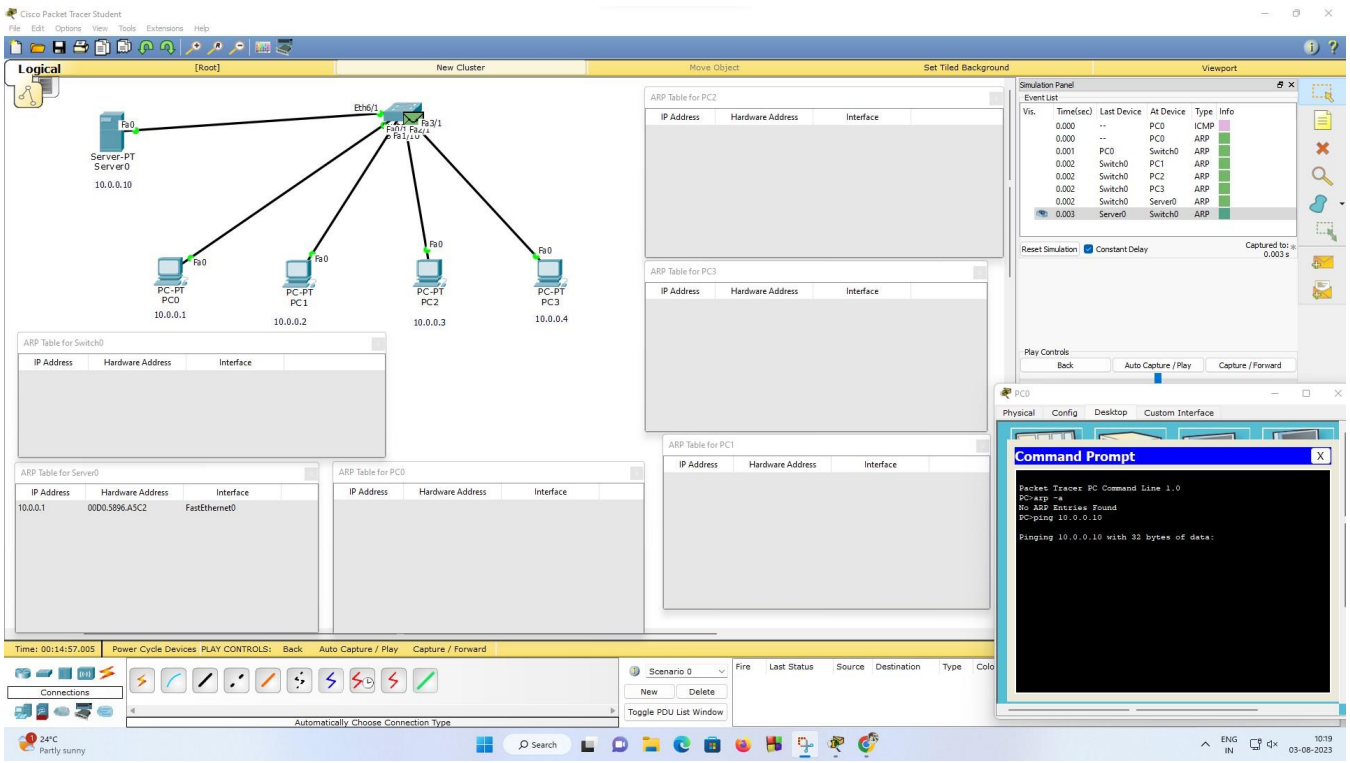


Ping Results(ARP Tables)

PC0 to Server0 :




Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Server-PT Server0
10.0.0.10
PC-PT PC0
10.0.0.1
PC-PT PC1
10.0.0.2
PC-PT PC2
10.0.0.3
PC-PT PC3
10.0.0.4
Simulation Panel
Event List
Command Prompt
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Time: 00:14:57.004
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
24°C
Partly sunny
Search
ENG
IN
10:18
03-08-2023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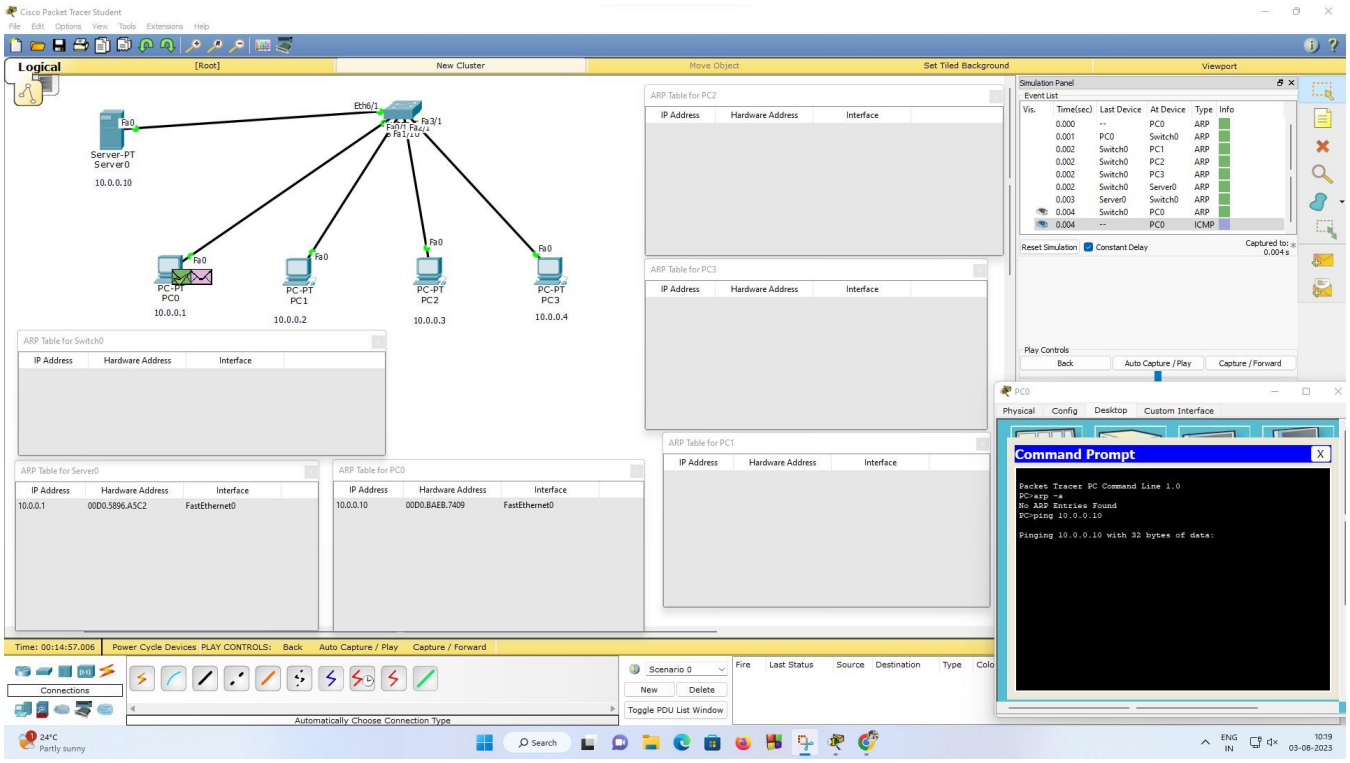
Scenario 0
New
Delete
Toggle PDU List Window
24°C
Partly sunny
Search
ENG
IN
10:19
03-08-2023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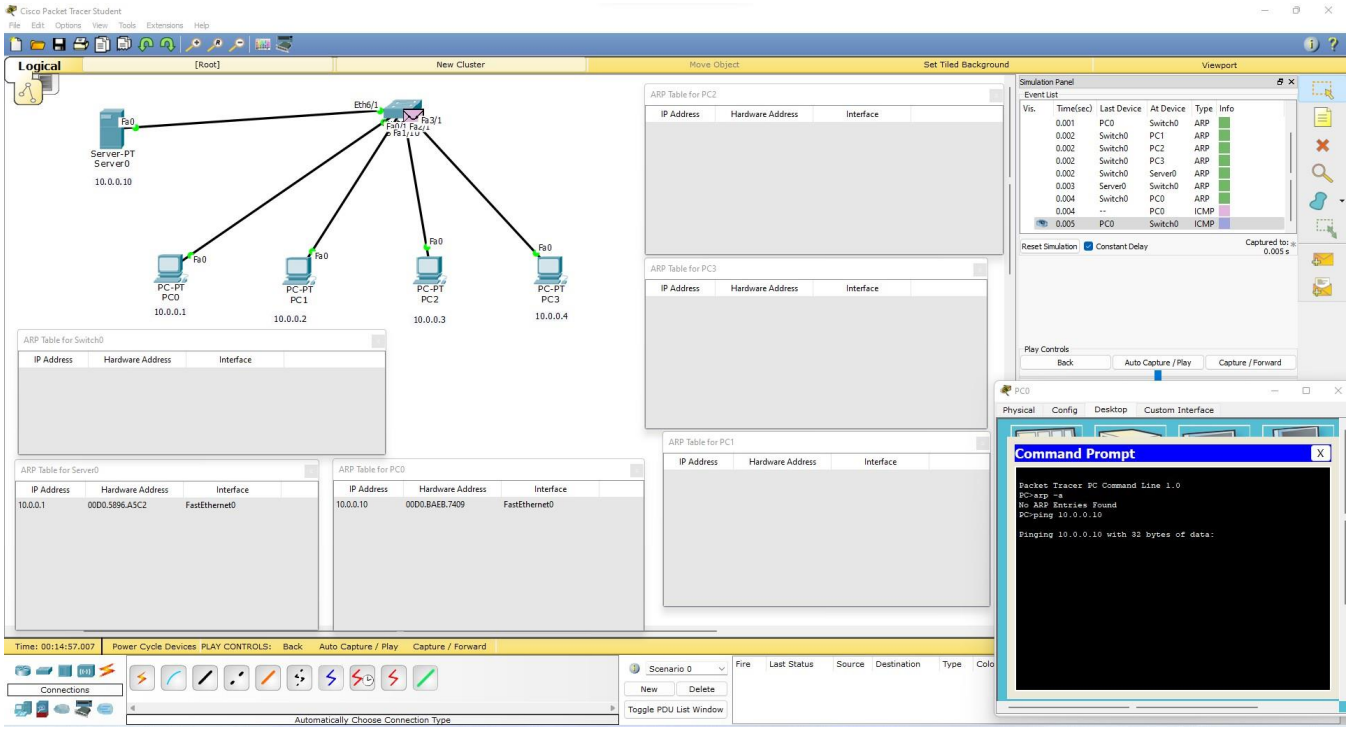
PC-PT PC3
10.0.0.4
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Time: 00:14:57.006
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
24°C
Partly sunny
Search
ENG
IN
10:19
03-08-2023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Auto Capture / Play
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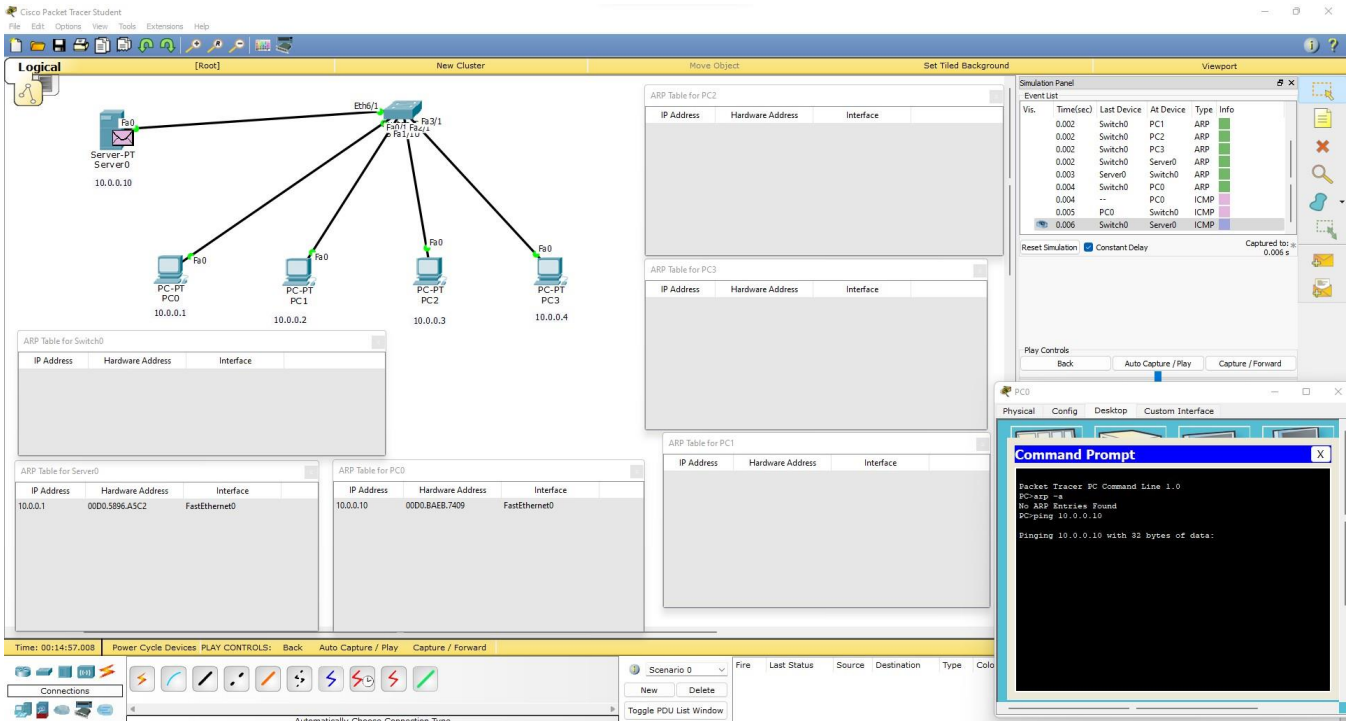
Command Prompt
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Time: 00:14:57.007
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type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Viewport
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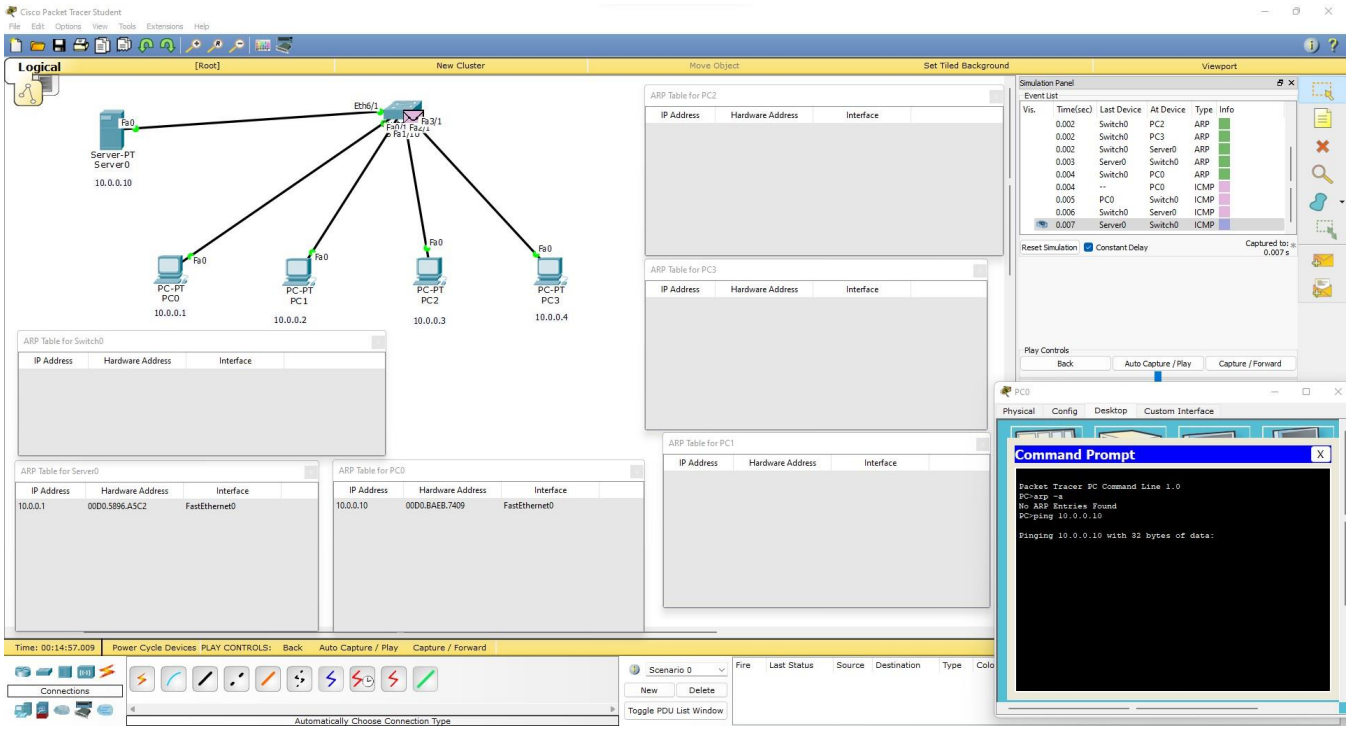
PC-PT PC0
10.0.0.1
PC-PT PC1
10.0.0.2
PC-PT PC2
10.0.0.3
PC-PT PC3
10.0.0.4
Command Prompt
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Time: 00:14:57.008
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward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Move Object
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Viewport
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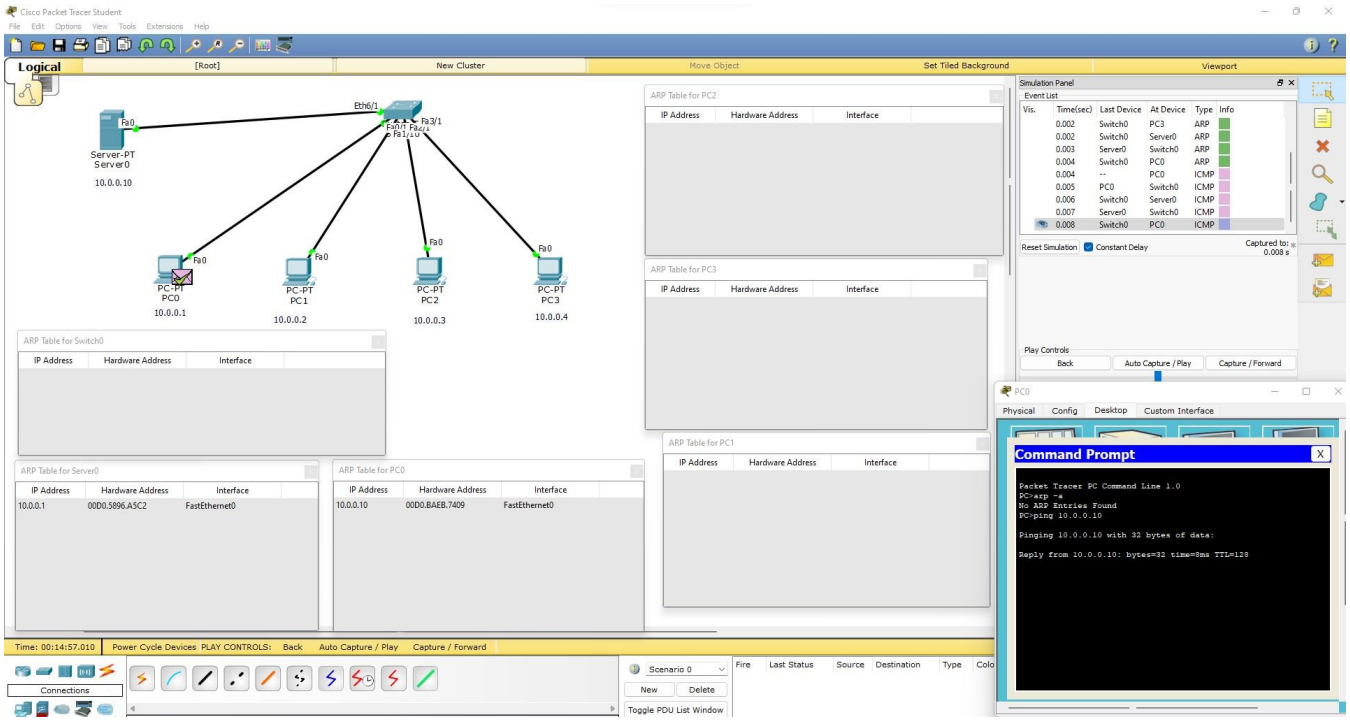
10.0.0.10
PC-PT PC0
10.0.0.1
PC-PT PC1
10.0.0.2
PC-PT PC2
10.0.0.3
PC-PT PC3
10.0.0.4
Command Prompt
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Time: 00:14:57.009
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Automatically Choose Connection Type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New Cluster
Move Object
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Viewport
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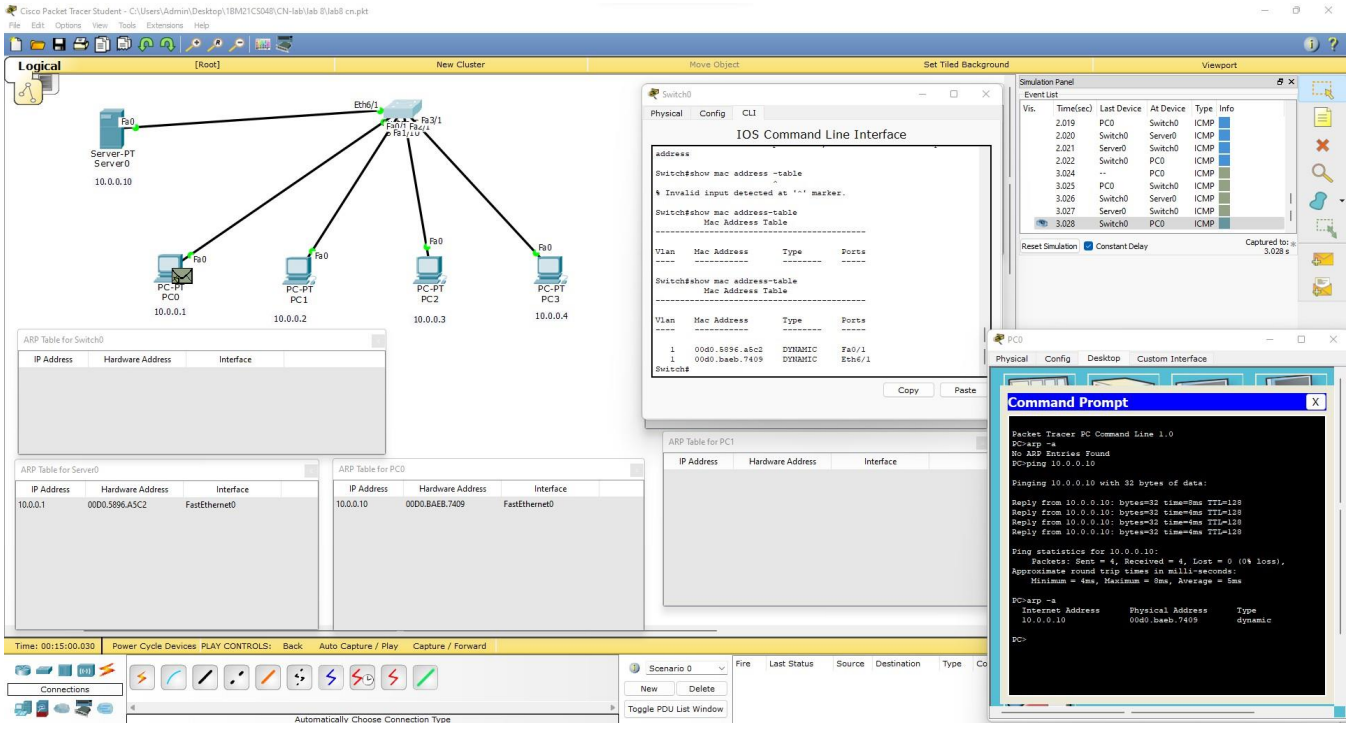
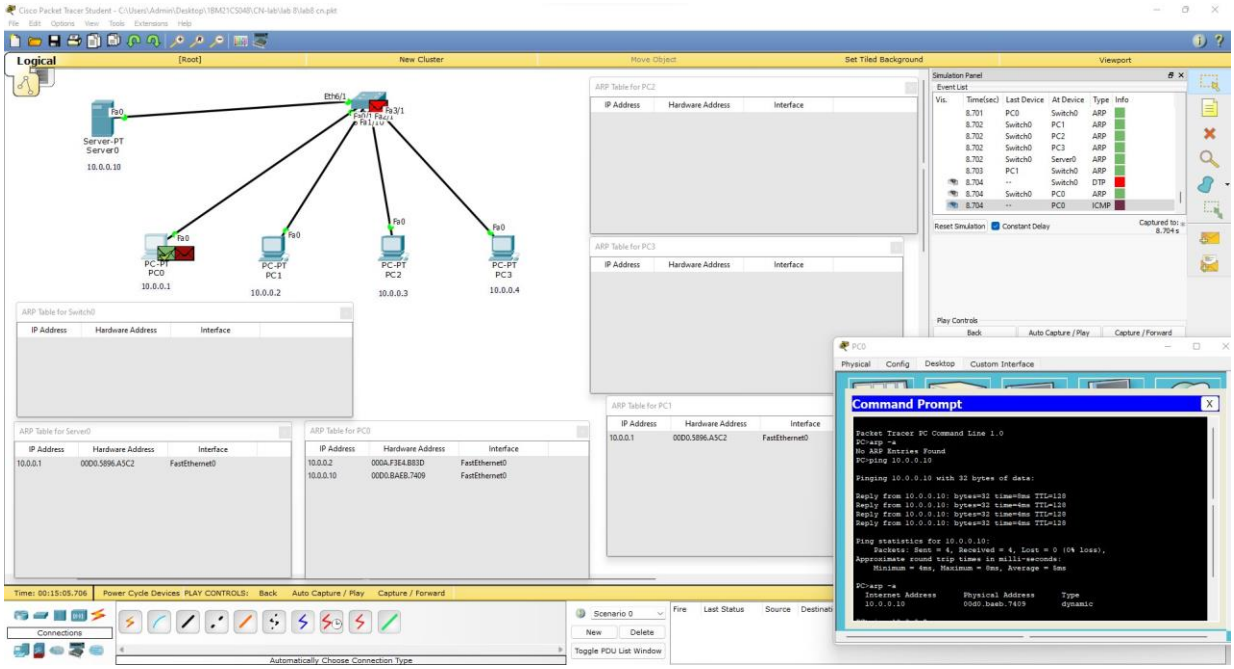
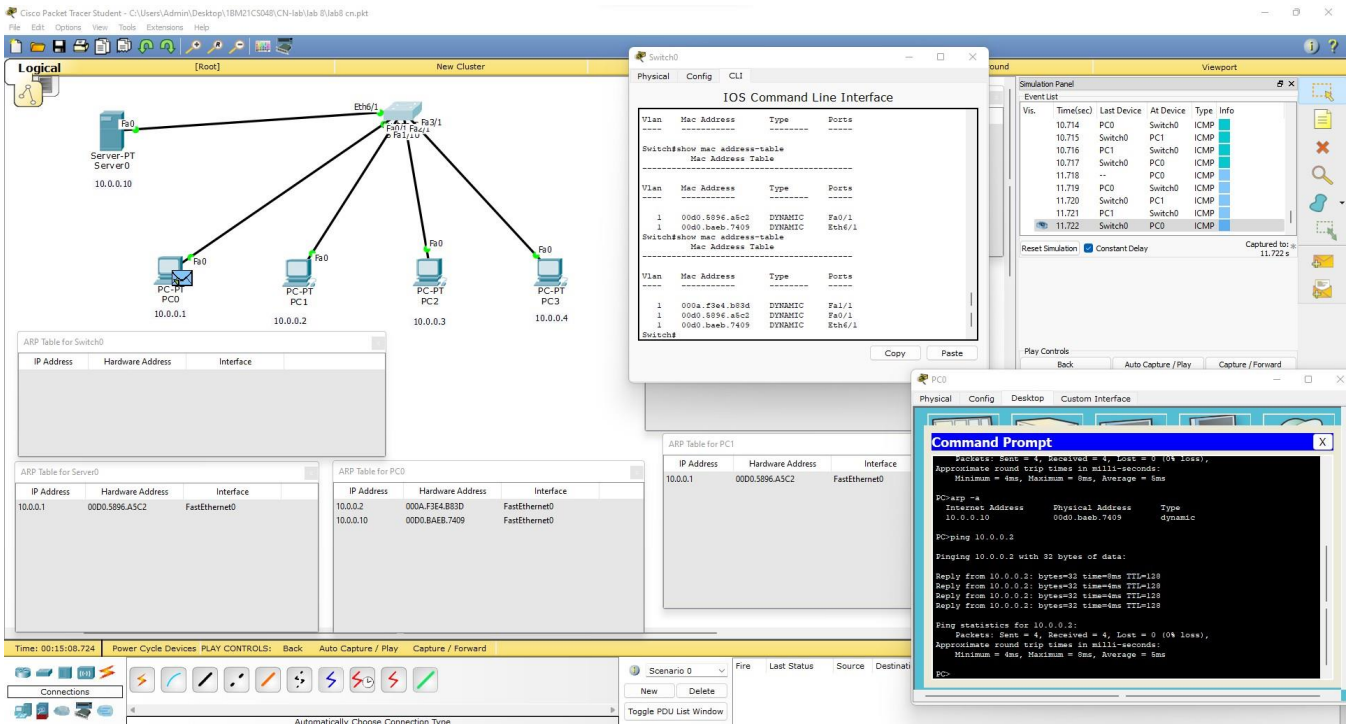
10.0.0.10
PC-PT PC0
10.0.0.1
PC-PT PC1
10.0.0.2
PC-PT PC2
10.0.0.3
PC-PT PC3
10.0.0.4
Command Prompt
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Reply from 10.0.0.10: bytes=32 time=8ms TTL=128


Cisco Packet Tracer Student - C:\Users\Admin\Desktop\18M21CS048\CN-lab\lab 8\lab8 cn.pkt
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Server-PT Server0
10.0.0.10
PC-PT PC0
10.0.0.1
PC-PT PC1
10.0.0.2
PC-PT PC2
10.0.0.3
PC-PT PC3
10.0.0.4
IOS Command Line Interface
Switch#show mac address-table
% Invalid input detected at '^' marker.
Command Prompt
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Reply from 10.0.0.10: bytes=32 time=8ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Ping statistics for 10.0.0.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 8ms, Average = 5ms
PC>arp -a
Internet Address Physical Address Type
10.0.0.10 00d0.baeb.7409 dynamic
PC>

Ping from PC0 to PC1:





Final ARP Tables after pinging: