

DCCN Lab
Experiment 3

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2018130015

18

Batch B

Objectives:

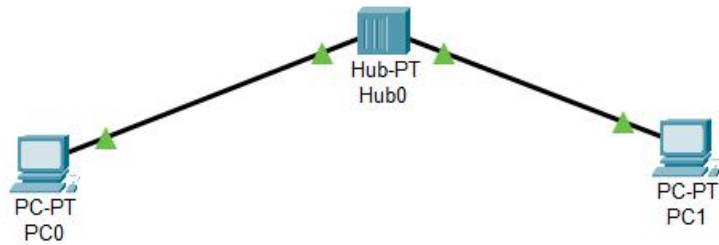
- Install Packet Tracer from <https://www.ciscopods.com/install-packet-tracer-ubuntu/>
 - Develop an understanding of the basic functions of Packet Tracer.
 - Create/model a simple Ethernet network using two hosts and a hub.
 - Observe traffic behavior on the network.
 - Observer data flow of ARP broadcasts and pings.
-

Step 1: Create a logical network diagram with two PCs and a hub

The bottom left-hand corner of the Packet Tracer screen displays eight icons that represent device categories or groups, such as Routers, Switches, or End Devices.

Moving the cursor over the device categories will show the name of the category in the box. To select a device, first select the device category. Once the device category is selected, the options within that category appear in the box next to the category listings. Select the device option that is required.

- a) Select **End Devices** from the options in the bottom left-hand corner. Drag and drop two generic PCs onto your design area.
- b) Select **Hubs** from the options in the bottom left-hand corner. Add a hub to the prototype network by dragging and dropping a generic hub onto the design area.
- c) Select **Connections** from the bottom left-hand corner. Choose a **Copper Straight-through** cable type. Click the first host, **PC0**, and assign the cable to the **FastEthernet** connector. Click the hub, **Hub0**, and select a connection port, **Port 0**, to connect to **PC0**.
- d) Repeat Step c for the second PC, **PC1**, to connect the PC to **Port 1** on the hub.



*There should be green dots at both ends of each cable connection. If not, check the cable type selected.

Step 2: Configure host names and IP addresses on the PCs

- a) Click PC0. A PC0 window will appear.
- b) From the PC0 window, select the **Config** tab. Change the PC **Display Name** to **PC-A**. (An error message window will appear warning that changing the device name may affect scoring of the activity. Ignore this error message.) Select the **FastEthernet** tab on the left and add the IP address of **192.168.1.1** and subnet mask of **255.255.255.0**. Close the PC-A configuration window by selecting the **x** in the upper righthand corner.

PC-A

Physical

Config

Desktop

Programming

Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

FastEthernet0

Bluetooth

Global Settings

Display NamePC-A

InterfacesFastEthernet0

Gateway/DNS IPv4

DHCP

Static

Default Gateway

DNS Server

Gateway/DNS IPv6

Automatic

Static

Default Gateway

DNS Server

Top

PC-A

Physical

Config

Desktop

Programming

Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

FastEthernet0

Bluetooth

FastEthernet0

Port Status

On

Bandwidth

100 Mbps

10 Mbps

Duplex

Half Duplex

Full Duplex

MAC Address0060.2F26.AA40

IP Configuration

DHCP

Static

IPv4 Address192.168.1.1

Subnet Mask255.255.255.0

IPv6 Configuration

Automatic

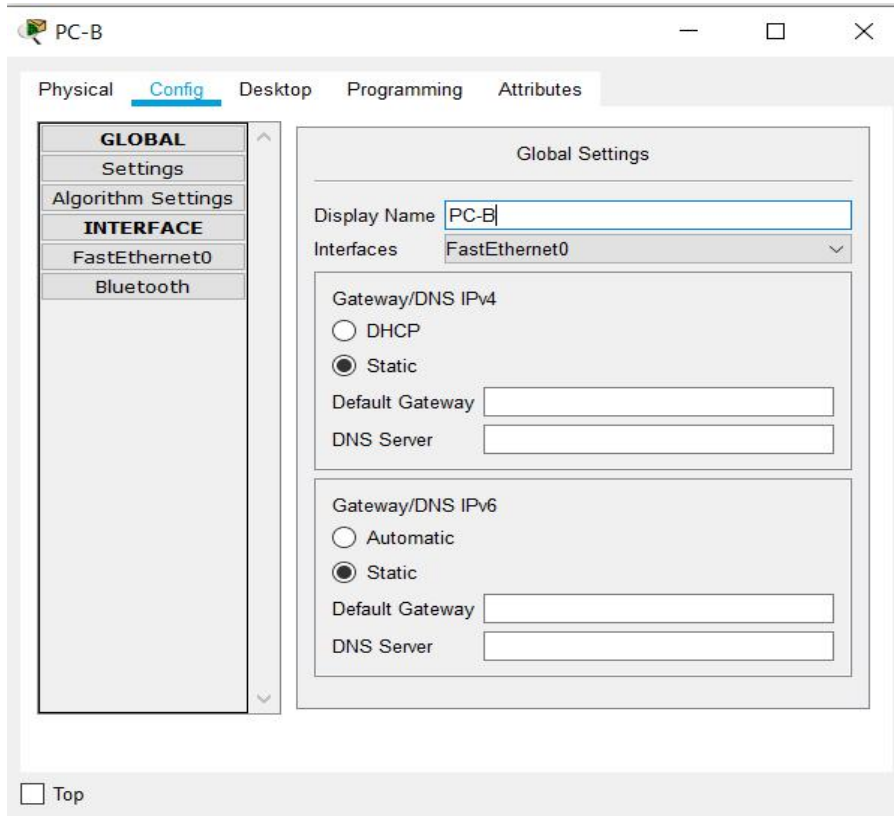
Static

IPv6 Address

Link Local AddressFE80::260:2FFF:FE26:AA40

Top

- c) Click PC1.
- d) Select the **Config** tab. Change the PC **Display Name** to **PC-B**. Select the **FastEthernet** tab on the left and add the IP address of **192.168.1.2** and subnet mask of **255.255.255.0**. Close the PC-B configuration window.



The image shows the 'PC-B' configuration window with the 'Config' tab selected. The left sidebar shows the 'INTERFACE' section with 'FastEthernet0' selected. The main area displays 'Global Settings' for 'FastEthernet0'. The 'Display Name' is set to 'PC-B'. Under 'Gateway/DNS IPv4', the 'Static' radio button is selected. Under 'Gateway/DNS IPv6', the 'Static' radio button is also selected. There are input fields for 'Default Gateway' and 'DNS Server' for both IPv4 and IPv6.

PC-B

Physical **Config** Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

FastEthernet0

Bluetooth

Global Settings

Display Name PC-B

Interfaces FastEthernet0

Gateway/DNS IPv4

☐ DHCP

☒ Static

Default Gateway

DNS Server

Gateway/DNS IPv6

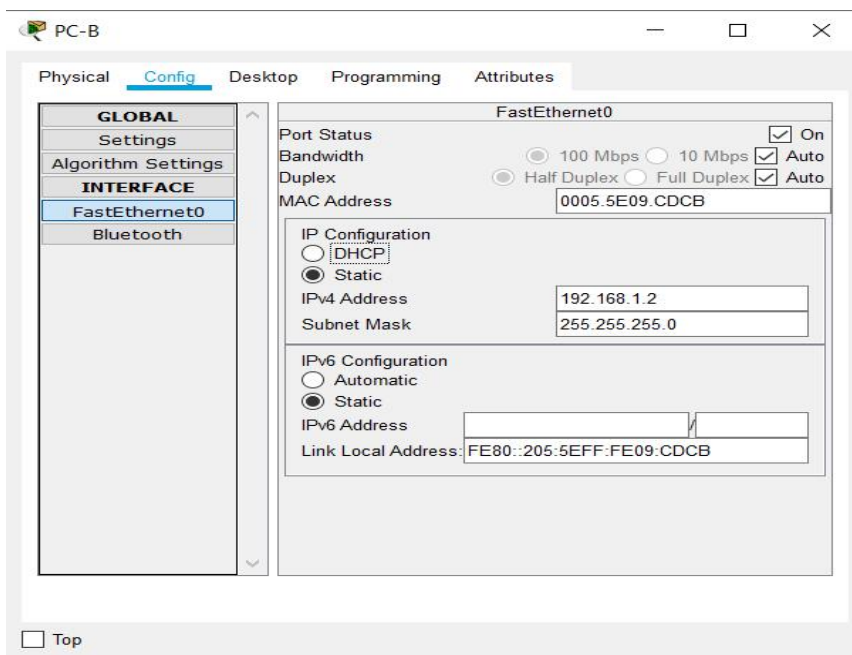
☐ Automatic

☒ Static

Default Gateway

DNS Server

☐ Top



The image shows the 'PC-B' configuration window with the 'Config' tab selected. The left sidebar shows the 'INTERFACE' section with 'FastEthernet0' selected. The main area displays 'FastEthernet0' settings. 'Port Status' is 'On'. 'Bandwidth' is '100 Mbps'. 'Duplex' is 'Half Duplex'. 'MAC Address' is '0005.5E09.CDCB'. Under 'IP Configuration', the 'Static' radio button is selected. The 'IPv4 Address' is '192.168.1.2' and the 'Subnet Mask' is '255.255.255.0'. Under 'IPv6 Configuration', the 'Static' radio button is selected. The 'IPv6 Address' is empty and the 'Link Local Address' is 'FE80::205:5EFF:FE09:CDCE'.

PC-B

Physical **Config** Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

FastEthernet0

Bluetooth

FastEthernet0

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☒ Half Duplex ☐ Full Duplex ☒ Auto

MAC Address 0005.5E09.CDCB

IP Configuration

☐ DHCP

☒ Static

IPv4 Address 192.168.1.2

Subnet Mask 255.255.255.0

IPv6 Configuration

☐ Automatic

☒ Static

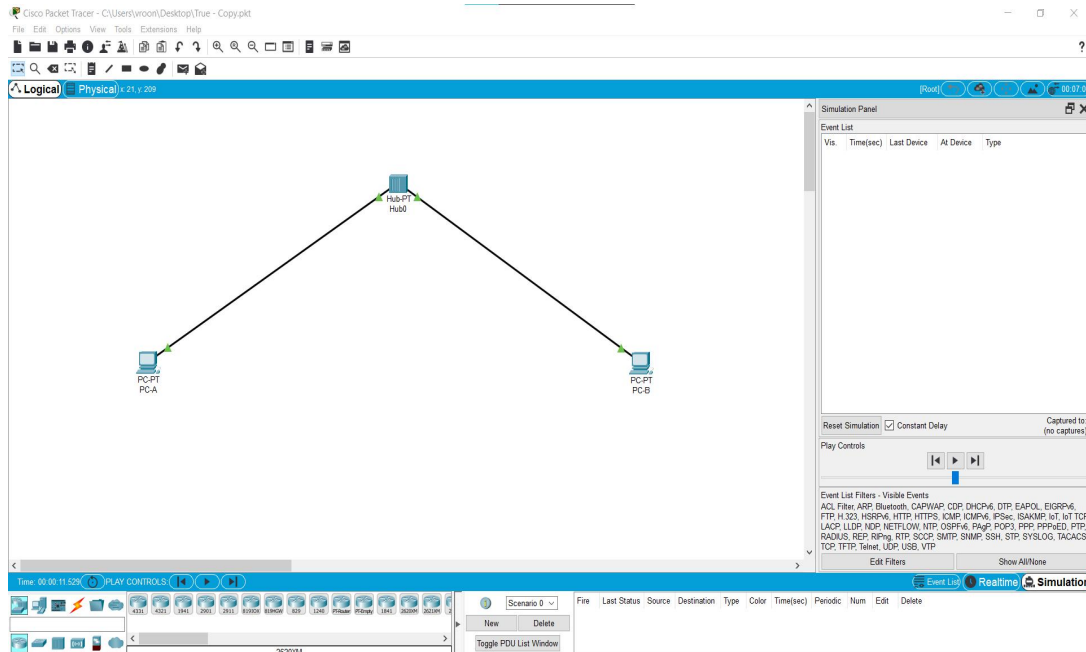
IPv6 Address

Link Local Address FE80::205:5EFF:FE09:CDCE

☐ Top

Step 3: Observe the flow of data from PC-A to PC-B by creating network traffic

- a) Switch to **Simulation** mode by selecting the tab that is partially hidden behind the **Realtime** tab in the bottom right-hand corner. The tab has the icon of a stopwatch on it.



- b) Click the **Edit Filters** button in the **Edit List Filters** area. Clicking the **Edit Filters** button will create a pop-up window. In the pop-up window, click the **Show All/None** box to deselect every filter. Select just the **ARP** and **ICMP** filters.



- c) Select a **Simple PDU** by clicking the closed envelope on the right vertical toolbar. Move your cursor to the display area of your screen. Click **PC-A** to establish the source. Move your cursor to **PC-B** and click to establish the destination.

Cisco Packet Tracer - C:\Users\vroon\Desktop\True - Copy.pkt

File Edit Options View Tools Extensions Help

Logical Physical x 304, y 86

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	0.000	--	PC-A	ICMP
	0.000	--	PC-A	ARP
	0.001	PC-A	Hub0	ARP

Reset Simulation ☒ Constant Delay Captured to: 0.001 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, Bluetooth, CAPWAP, CDP, DHCPv6, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPFv6, PaGP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress	PC-A	PC-B	ICMP		0.000	N	0	(edit)	(delete)
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(Select a Device to Drag and Drop to the Workspace)

Cisco Packet Tracer - C:\Users\vroon\Desktop\True - Copy.pkt

File Edit Options View Tools Extensions Help

Logical Physical x 355, y 15

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	0.000	--	PC-A	ICMP
	0.000	--	PC-A	ARP
	0.001	PC-A	Hub0	ARP
	0.002	Hub0	PC-B	ARP

Reset Simulation ☒ Constant Delay Captured to: 0.002 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, Bluetooth, CAPWAP, CDP, DHCPv6, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPFv6, PaGP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress	PC-A	PC-B	ICMP		0.000	N	0	(edit)	(delete)
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819HG-4G-iOX

Cisco Packet Tracer - C:\Users\vroon\Desktop\True - Copy.pkt

File Edit Options View Tools Extensions Help

Logical Physical x: 1245, y: 719

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	0.000	--	PC-A	ICMP
	0.000	--	PC-A	ARP
	0.001	PC-A	Hub0	ARP
	0.002	Hub0	PC-B	ARP
	0.003	PC-B	Hub0	ARP

Reset Simulation ☒ Constant Delay Captured to: 0.003 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, Bluetooth, CAPWAP, CDP, DHCPv6, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIPng, RTR, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:00:15.542 PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

Router-PT

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC-A PC-B ICMP 0.000 N 0 (edit) (delete)

Cisco Packet Tracer - C:\Users\vroon\Desktop\True - Copy.pkt

File Edit Options View Tools Extensions Help

Logical Physical x: 1397, y: 732

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	0.000	--	PC-A	ICMP
	0.000	--	PC-A	ARP
	0.001	PC-A	Hub0	ARP
	0.002	Hub0	PC-B	ARP
	0.003	PC-B	Hub0	ARP
	0.004	Hub0	PC-A	ARP
	0.004	--	PC-A	ICMP

Reset Simulation ☒ Constant Delay Captured to: 0.004 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, Bluetooth, CAPWAP, CDP, DHCPv6, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIPng, RTR, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:00:15.543 PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

Router-PT

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC-A PC-B ICMP 0.000 N 0 (edit) (delete)

Cisco Packet Tracer - C:\Users\vroon\Desktop\True - Copy.pkt

File Edit Options View Tools Extensions Help

Logical Physical x 997, y 710

Simulation Panel

Vis	Time(sec)	Last Device	At Device	Type
	0.000	--	PC-A	ICMP
	0.000	--	PC-A	ARP
	0.001	PC-A	Hub0	ARP
	0.002	Hub0	PC-B	ARP
	0.003	PC-B	Hub0	ARP
	0.004	Hub0	PC-A	ARP
	0.004	--	PC-A	ICMP
	0.005	PC-A	Hub0	ICMP

Reset Simulation ☒ Constant Delay Captured to: 0.005 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, Bluetooth, CAPWAP, CDP, DHCPv6, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIPv2, RIPv3, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Scenario 0

New Delete

Toggle PDU List Window

Router-PT

Time: 00:00:15.544 PLAY CONTROLS

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC-A PC-B ICMP 0.000 N 0 (edit) (delete)

Cisco Packet Tracer - C:\Users\vroon\Desktop\True - Copy.pkt

File Edit Options View Tools Extensions Help

Logical Physical x 254, y 719

Simulation Panel

Vis	Time(sec)	Last Device	At Device	Type
	0.000	--	PC-A	ICMP
	0.000	--	PC-A	ARP
	0.001	PC-A	Hub0	ARP
	0.002	Hub0	PC-B	ARP
	0.003	PC-B	Hub0	ARP
	0.004	Hub0	PC-A	ARP
	0.004	--	PC-A	ICMP
	0.005	PC-A	Hub0	ICMP
	0.006	Hub0	PC-B	ICMP

Reset Simulation ☒ Constant Delay Captured to: 0.006 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, Bluetooth, CAPWAP, CDP, DHCPv6, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIPv2, RIPv3, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Scenario 0

New Delete

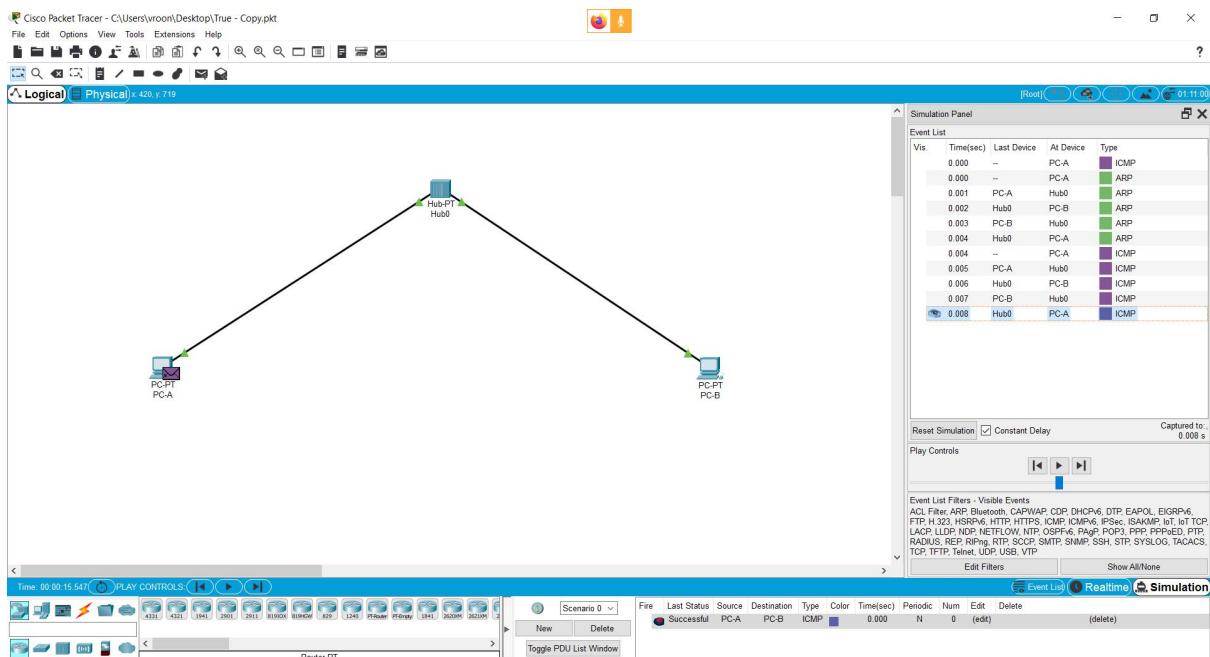
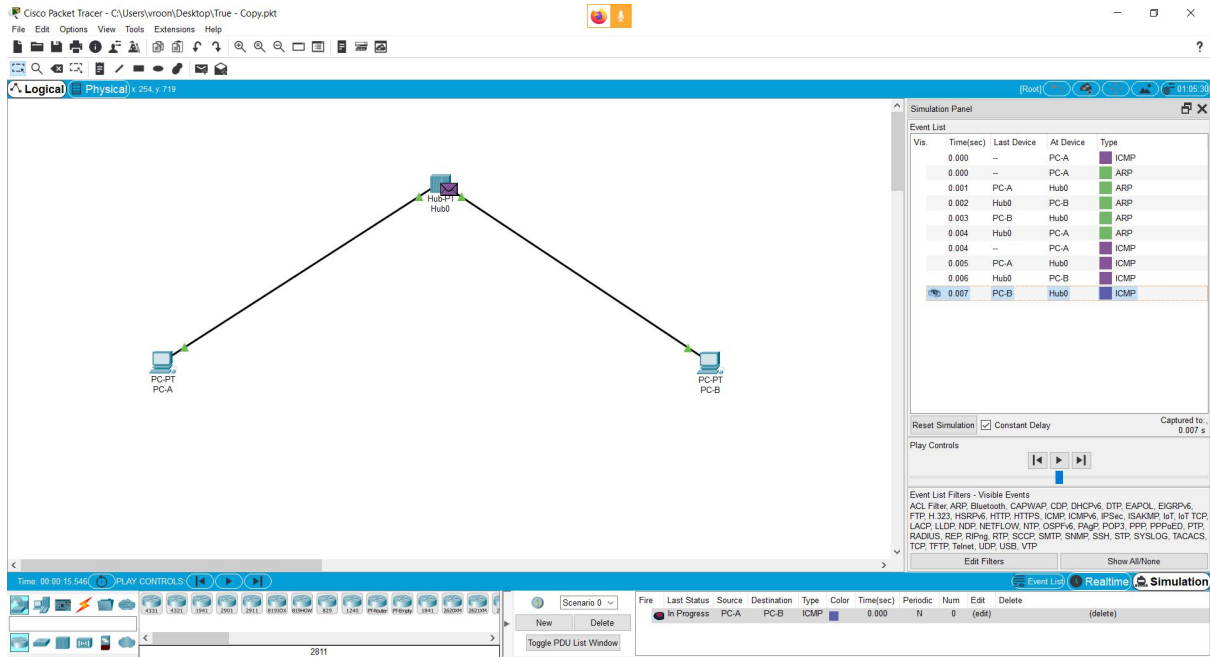
Toggle PDU List Window

2811

Time: 00:00:15.545 PLAY CONTROLS

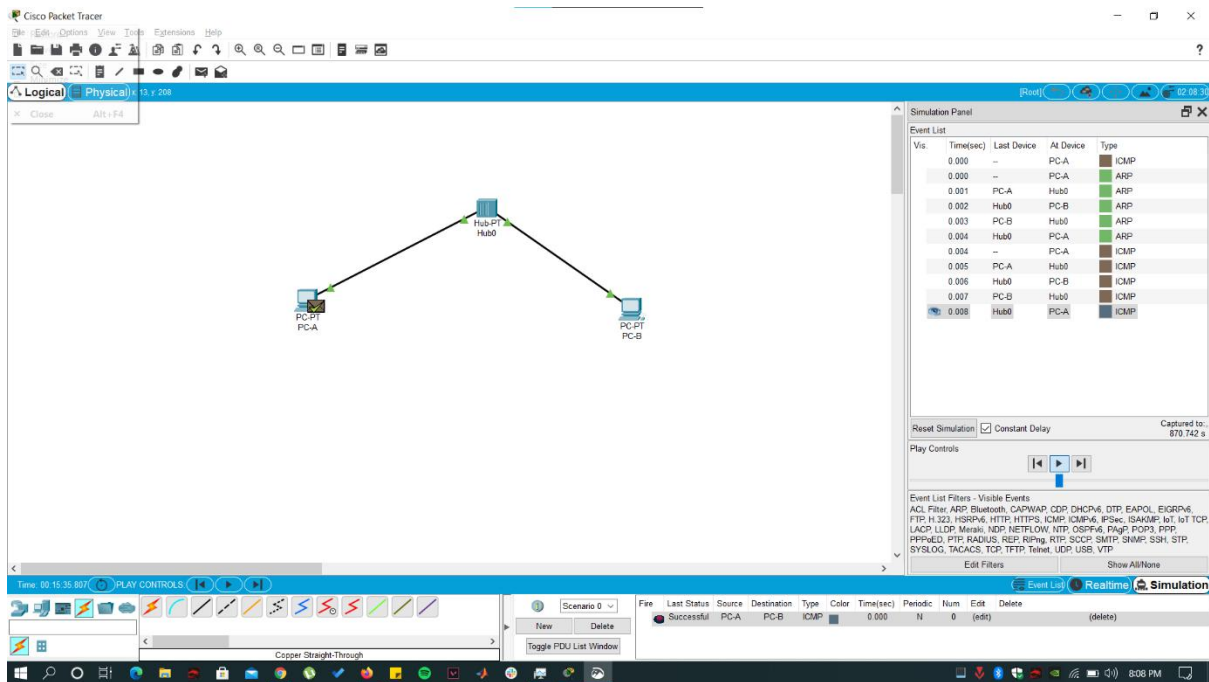
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC-A PC-B ICMP 0.000 N 0 (edit) (delete)

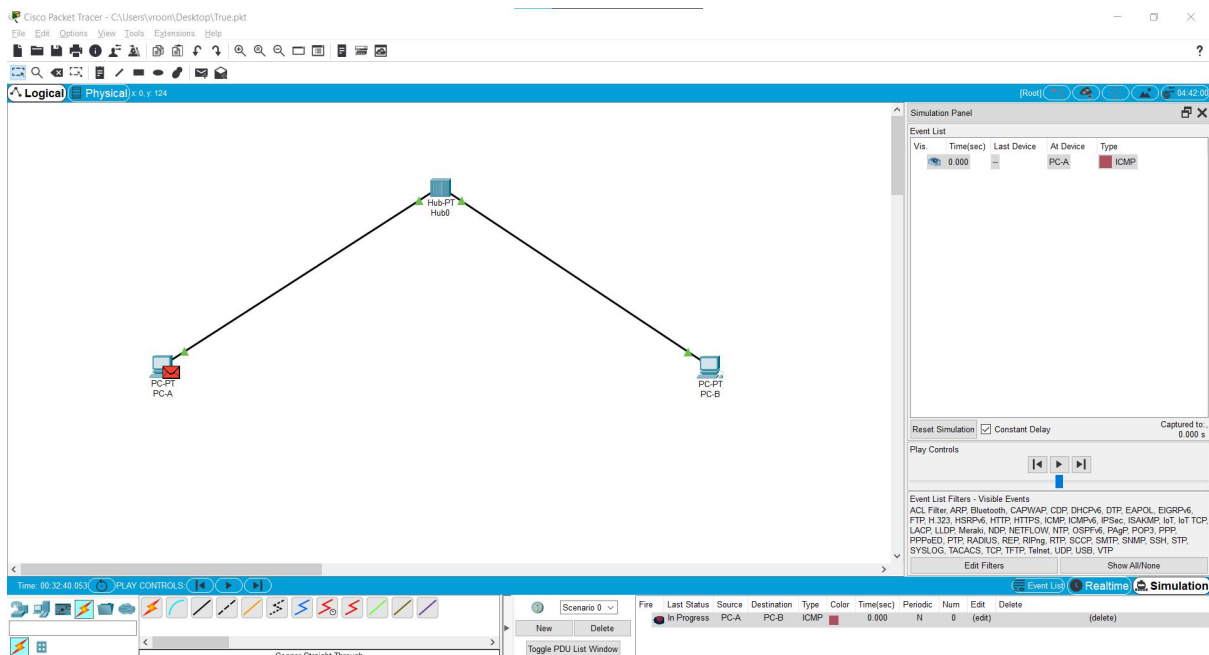


****Notice that two envelopes are now positioned beside PC-A. One envelope is ICMP, while the other is ARP. The Event List in the Simulation Panel will identify exactly which envelope represents ICMP and which represents ARP.**

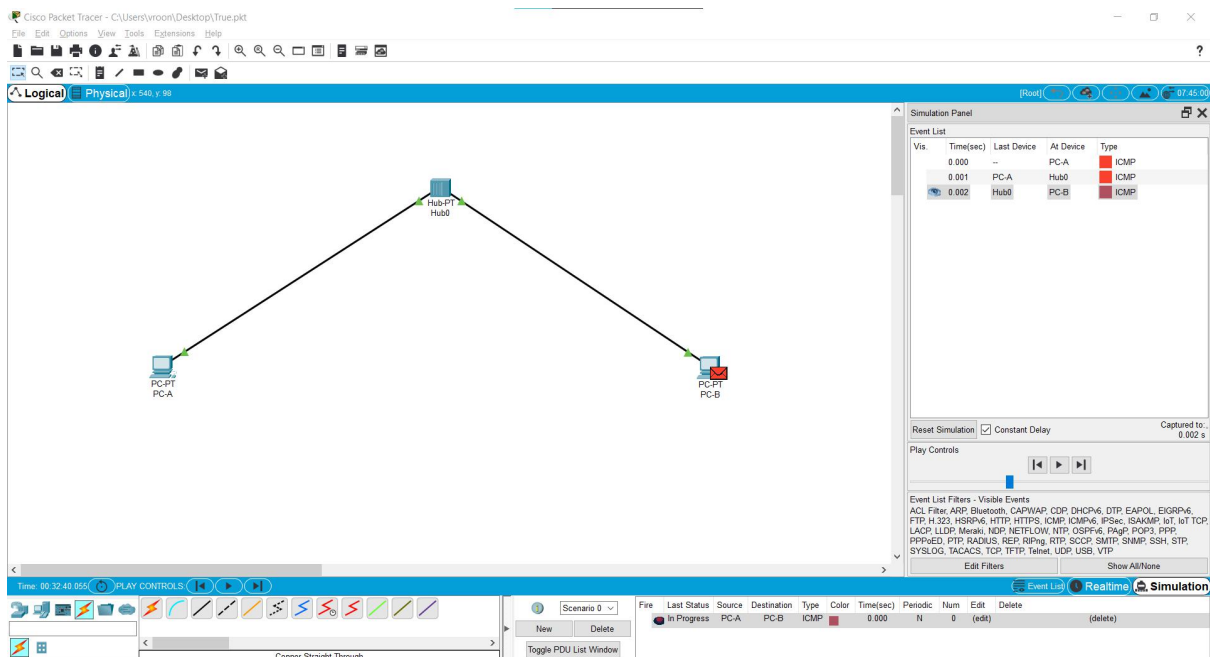
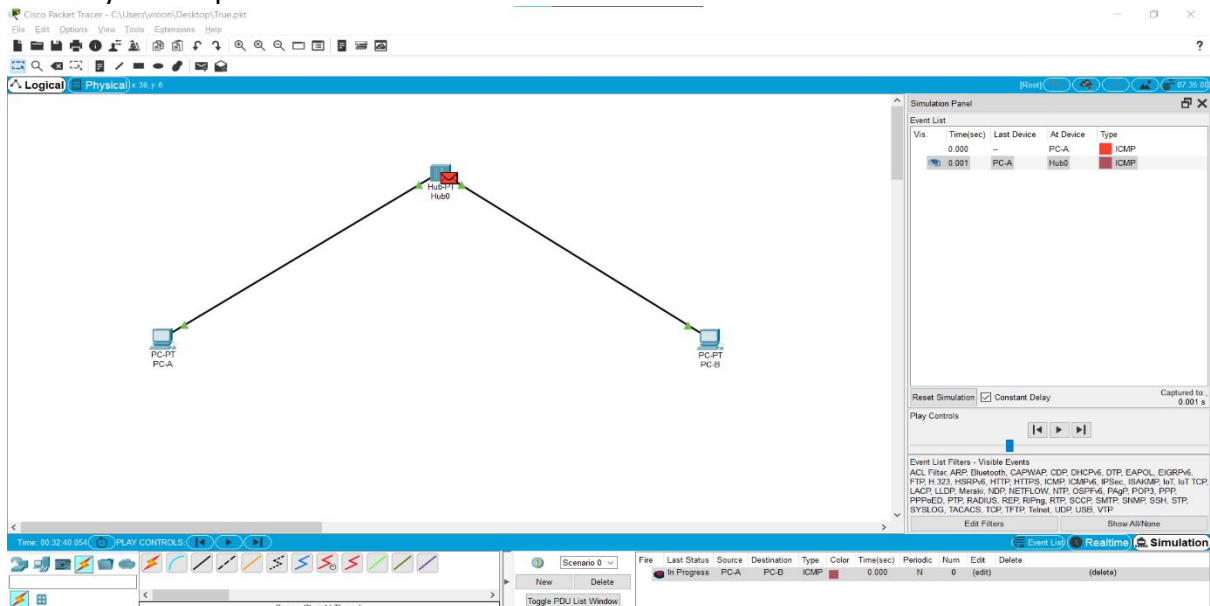
- d) Select **Auto Capture / Play** from the **Play Controls** area of the Simulation Panel. Below the **Auto Capture / Play** button is a horizontal bar, with a vertical button that controls the speed of the simulation. Dragging the button to the right will speed up the simulation, while dragging is to the left will slow down the simulation.



- e) The animation will run until the message window *No More Events* appears. All requested events have been completed. Select OK to close the message box.
- f) Choose the **Reset Simulation** button in the Simulation Panel. Notice that the ARP envelope is no longer present. This has reset the simulation but has not cleared any configuration changes or dynamic table entries, such as ARP table entries. The ARP request is not necessary to complete the **ping** command because PC-A already has the MAC address in the ARP table.



- g) Choose the **Capture / Forward** button. The ICMP envelope will move from the source to the hub and stop. The **Capture / Forward** button allows you to run the simulation one step at a time. Continue selecting the **Capture / Forward** button until you complete the event.



Cisco Packet Tracer - C:\Users\yroom\Desktop\True.pkt

File Edit Options View Tools Extensions Help

Logical Physical x: 576, y: 55

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	0.000	--	PC-A	ICMP
	0.001	PC-A	Hub0	ICMP
	0.002	Hub0	PC-B	ICMP
	0.003	PC-B	Hub0	ICMP

Reset Simulation ☒ Constant Delay Captured to: 0.003 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, Bluetooth, CAPWAP, CDP, DHCPv6, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPFv6, PaP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:32:40.856 PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC-A PC-B ICMP 0.000 N 0 (edit) (delete)

Copper Straight-Through

Cisco Packet Tracer - C:\Users\yroom\Desktop\True.pkt

File Edit Options View Tools Extensions Help

Logical Physical x: 256, y: 6

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	0.000	--	PC-A	ICMP
	0.001	PC-A	Hub0	ICMP
	0.002	Hub0	PC-B	ICMP
	0.003	PC-B	Hub0	ICMP
	0.004	Hub0	PC-A	ICMP

Reset Simulation ☒ Constant Delay Captured to: 0.004 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, Bluetooth, CAPWAP, CDP, DHCPv6, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPFv6, PaP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:32:48.051 PLAY CONTROLS

Scenario 0

New Delete

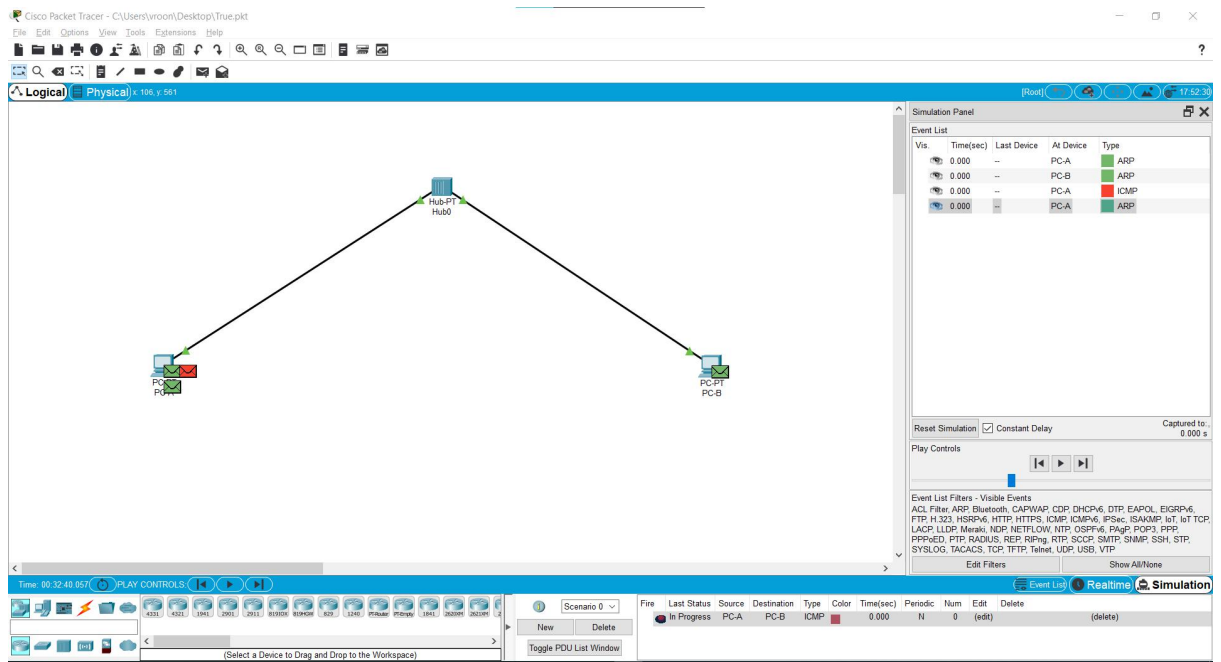
Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

Successful PC-A PC-B ICMP 0.000 N 0 (edit) (delete)

Copper Straight-Through

h) Choose the **Power Cycle Devices** button on the bottom left, above the device icons.



- i) An error message will appear asking you to confirm reset. Choose **Yes**. Now both the ICMP and ARP envelopes are present again. The **Reset Network** button will clear any configuration changes not saved and will clear all dynamic table entries, such as the ARP and MAC table entries.

Step 4: View ARP Tables on each PC

- a) Choose the **Auto Capture / Play** button to repopulate the ARP table on the PCs. Click **OK** when the *No More Events* message appears.
- b) Select the magnifying glass on the right vertical tool bar.
- c) Click **PC-A**. The ARP table for PC-A will appear. Notice that PC-A does have an ARP entry for PC-C. View the ARP tables for PC-B and PC-C as well. Close all ARP table windows.

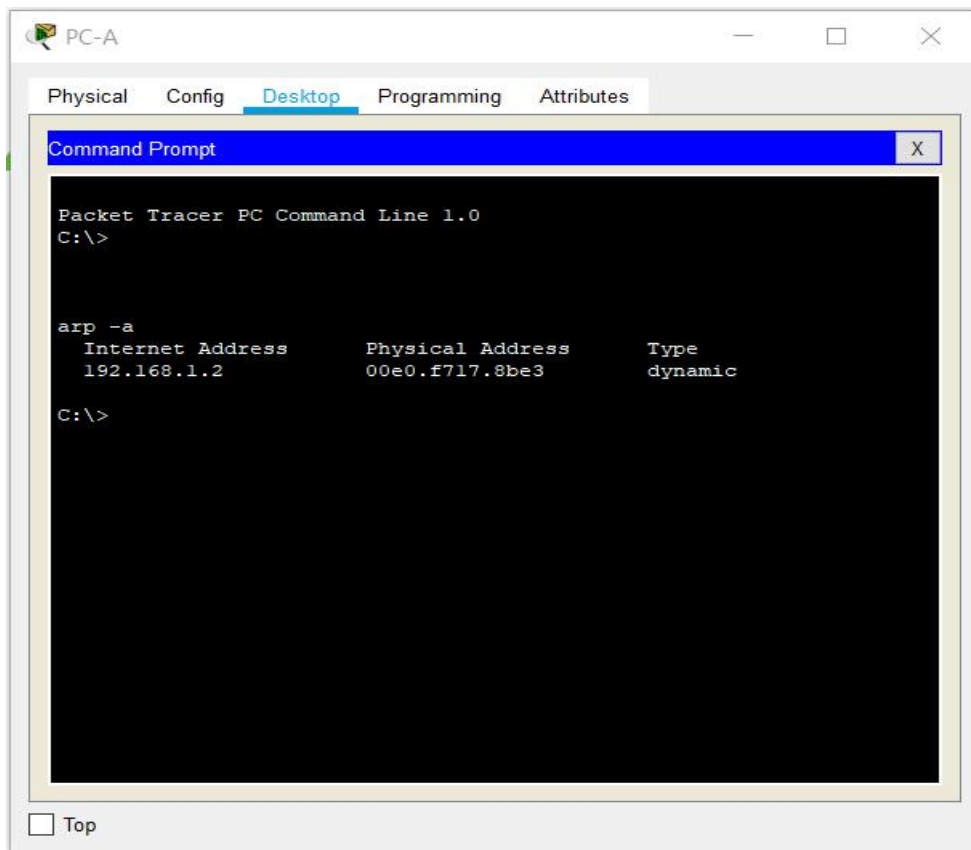
ARP Table for PC-A

IP Address	Hardware Address	Interface
192.168.1.2	00E0.F717.8BE3	FastEthernet0

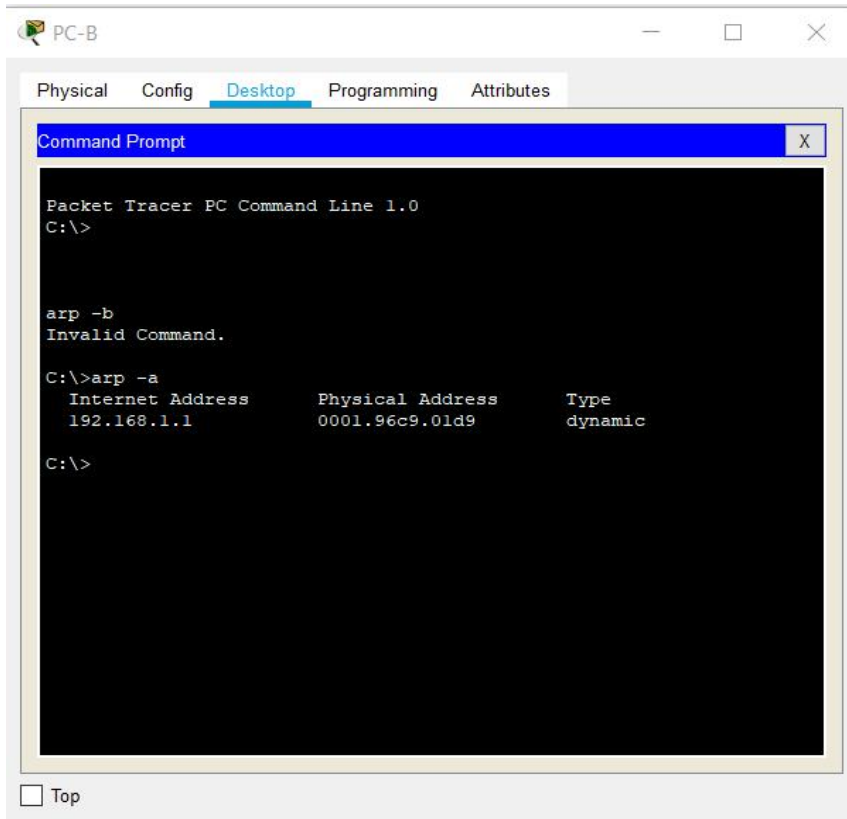
ARP Table for PC-B

IP Address	Hardware Address	Interface
192.168.1.1	0001.96C9.01D9	FastEthernet0

- d) Click the **Select Tool** on the right vertical tool bar. (This is the first icon present in the toolbar.)
- e) Click **PC-A** and select the **Desktop** tab.
- f) Select the **Command Prompt** and type the command **arp -a** and press *enter* to view the ARP table from the desktop view. Close the PC-A configuration window.



g) Examine the ARP table for **PC-B**.



- h) Close the PC-B configuration window.
- i) Click the **Check Results** button at the bottom of the instruction window to verify that the topology is correct.

CONCLUSION

- ❖ Learnt and used the basic functionalities of the Cisco Packet Tracer.
 - ❖ Created a simple Ethernet network with two PCs and a hub and observed the traffic behavior and data flow on the network.
-