

Lab 4 plus

*Lab 4 plus is a combination of Lab 4 and an extra activity on ARP.

Packet Tracer Simulation – Exploration of ARP and Switch Table Communications

Objectives

- To explore ARP and switching operations.

Introduction

The topology is given to you. All IP addresses have been assigned to all devices. Please follow each step in sequence.

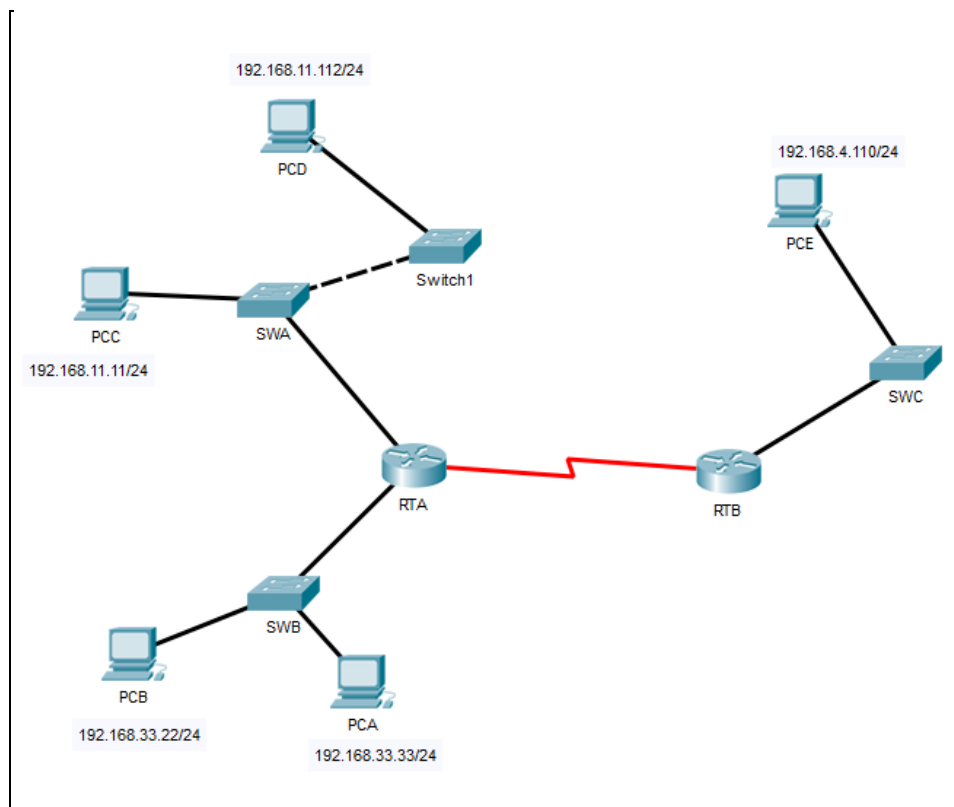


Figure 1

Part 1: Review the topology

Step 1: Perform the following tasks.

- a. At Router RTA, enter the CLI. At the command prompt type the following commands.
Snap the results after the last command and paste it here.

```
RTA>enable
RTA#show arp
```

```
RTA>enable
RTA#show arp
Protocol  Address          Age (min)  Hardware Addr  Type   Interface
Internet  192.168.11.1      -          0002.4A00.0E91  ARPA   FastEthernet1/0
Internet  192.168.33.1      -          000C.CF0C.593A  ARPA   FastEthernet0/0
RTA#
```

- b. At Router RTB, enter the CLI. At the command prompt type the commands as in Figure 2. Snap the results after the last command and paste it here.

```
RTB>enable
RTB#show arp
Protocol  Address          Age (min)  Hardware Addr  Type   Interface
Internet  192.168.4.1       -          0001.977A.B614  ARPA   FastEthernet0/0
RTB#
```

- c. At Switches SWA, SWAB and SWC, enter the CLI. At the command prompt type the following commands. Snap the results after the last command and paste it here.

```
SWA>enable
SWA#show arp

SWA#show mac-address-table
```

SWA:

```
SWA>enable
SWA#show arp

SWA#show mac-address-table
      Mac Address Table
-----
Vlan    Mac Address      Type        Ports
----    -
      1    0002.4a00.0e91    DYNAMIC     Fa0/1
      1    000c.8546.7d85    DYNAMIC     Fa1/1
SWA#
```

SWB:

```
SWB>enable
SWB#show arp

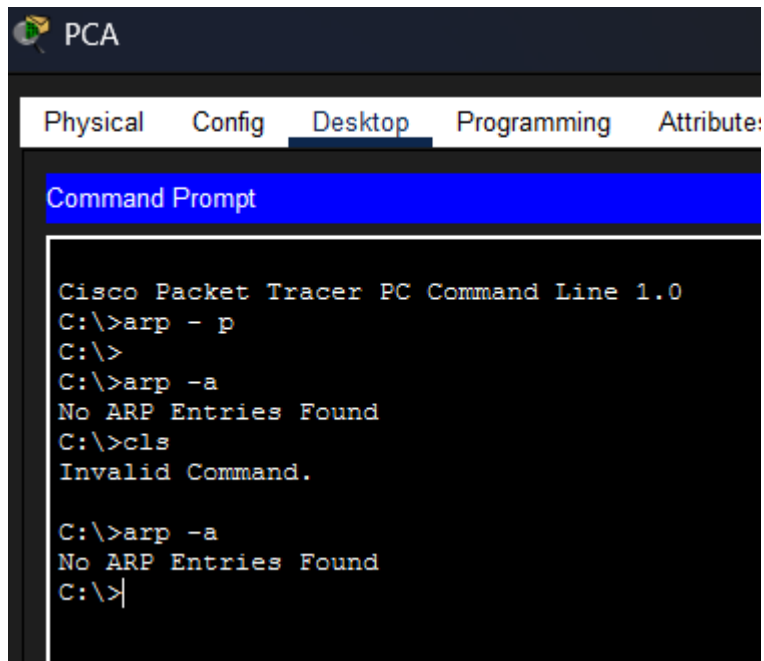
SWB#show mac-address-table
      Mac Address Table
-----
Vlan    Mac Address      Type        Ports
----    -
      1    000c.cf0c.593a    DYNAMIC     Fa0/1
SWB#
```

SWC:

```
SWC>enable
SWC#show arp

SWC#show mac-address-table
      Mac Address Table
-----
Vlan    Mac Address      Type        Ports
----    -
      1    0001.977a.b614    DYNAMIC     Fa0/1
SWC#
```

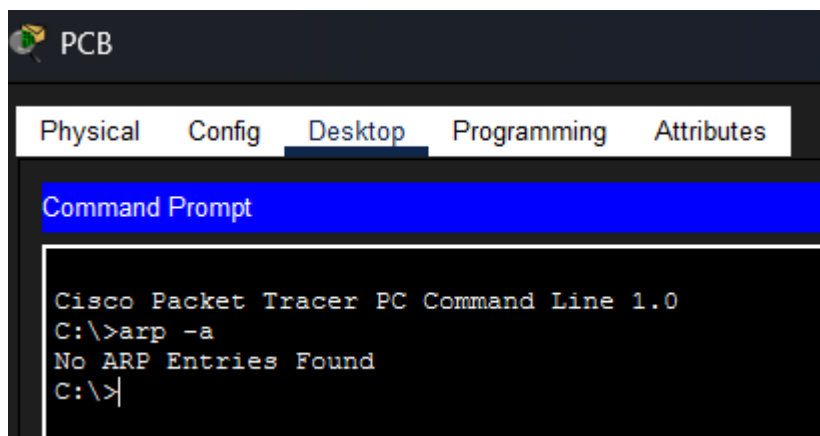
- d. At PCA, click on the PC icon, and then choose Desktop-Command Prompt. At the command prompt type `arp -a` and click enter. Snap the results after the last command and paste it here. Do this to all PCs in the topology.



The screenshot shows the 'PCA' window with the 'Desktop' tab selected. The 'Command Prompt' application is open, displaying the following text:

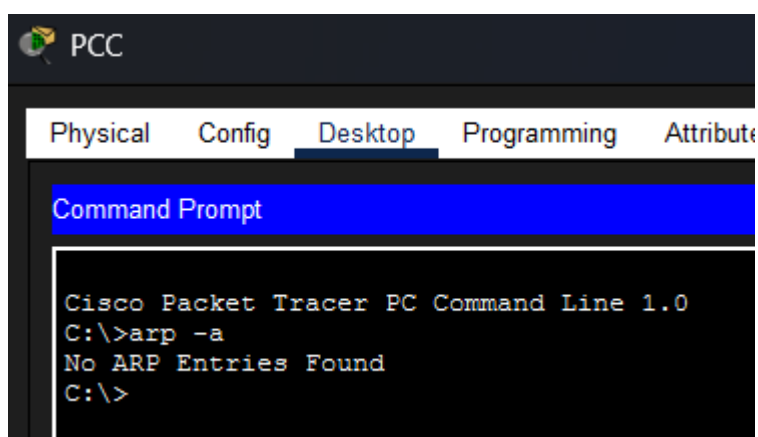
```
Cisco Packet Tracer PC Command Line 1.0
C:\>arp - p
C:\>
C:\>arp -a
No ARP Entries Found
C:\>cls
Invalid Command.

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



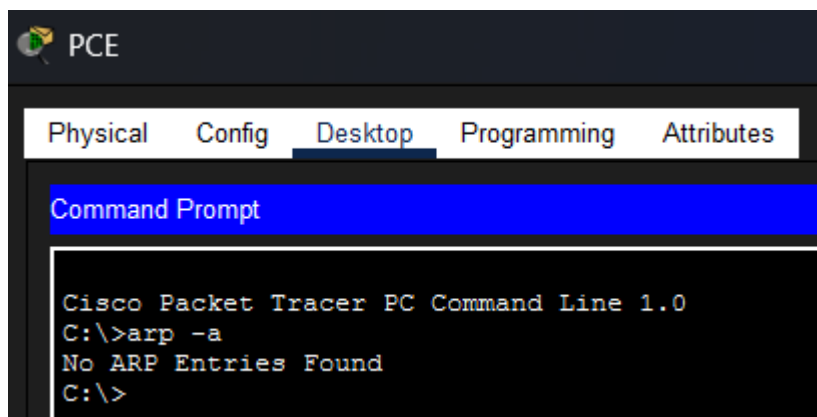
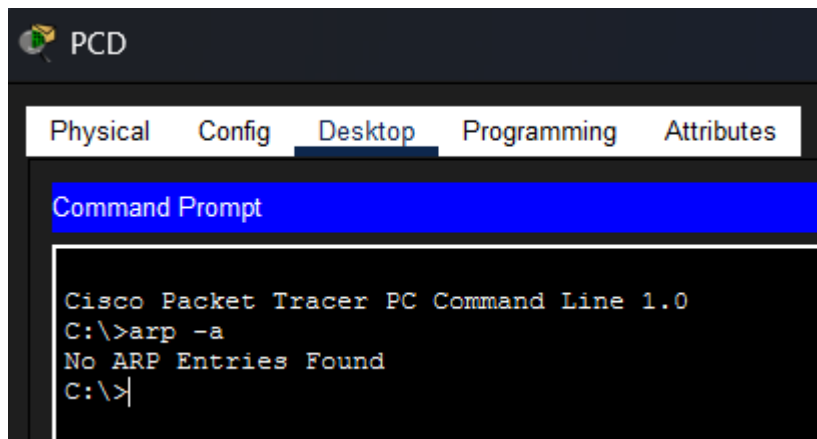
The screenshot shows the 'PCB' window with the 'Desktop' tab selected. The 'Command Prompt' application is open, displaying the following text:

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



The screenshot shows the 'PCC' window with the 'Desktop' tab selected. The 'Command Prompt' application is open, displaying the following text:

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



- e. What are your thoughts on the results?

There is no traffic generated yet. So the PC has not needed to resolve any MAC addresses.

Part 2: Generate Network Traffic

Step 1: Generate traffic between PCA and PCB.

In the command prompt Perform the following tasks task to reduce the amount of network traffic viewed in the simulation.

- Click **PCA** and click the Desktop tab > Command Prompt.
- Enter the **ping 192.168.33.22** command. This may take a few seconds.
- In the Command prompt of PCA, type **arp -a**. Paste the result of this command here.

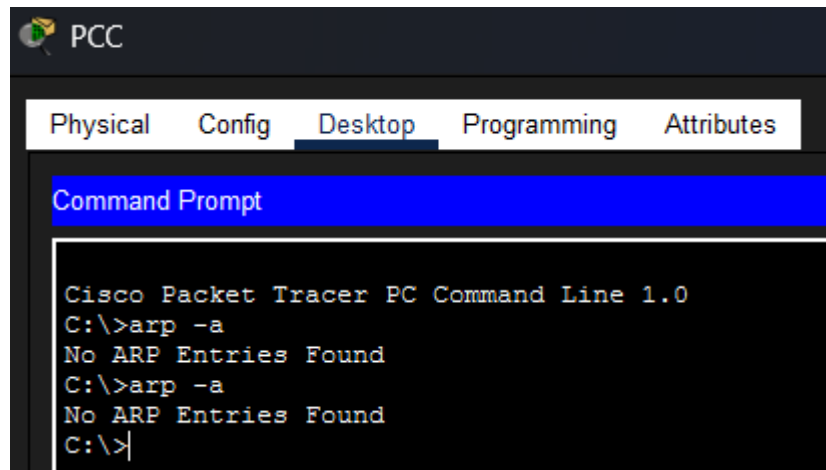
```
C:\>arp -a
Internet Address      Physical Address      Type
192.168.33.22         0060.47ea.a746        dynamic
C:\>
```

- In the Command prompt of PCB, type **arp -a**. Paste the result of this command here

```
C:\>arp -a
Internet Address      Physical Address      Type
192.168.33.33         0002.1755.9a06        dynamic
C:\>
```

- e. In the Command prompt of PCC, PCD and PCE, type **arp -a**. Paste the result of this command here.

a. PCC:

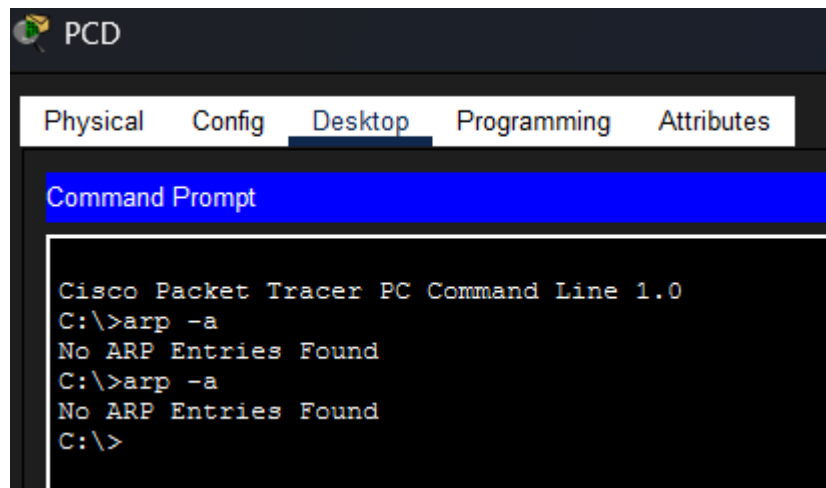


The screenshot shows the PCC (Packet Configuration Console) interface with the 'Desktop' tab selected. The 'Command Prompt' window is open, displaying the following text:

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

i.

b. PCD:

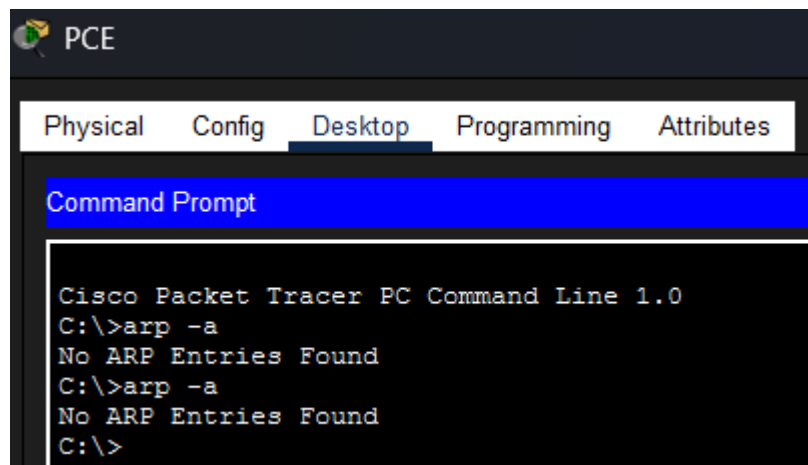


The screenshot shows the PCD (Packet Configuration Console) interface with the 'Desktop' tab selected. The 'Command Prompt' window is open, displaying the following text:

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

i.

c. PCE:



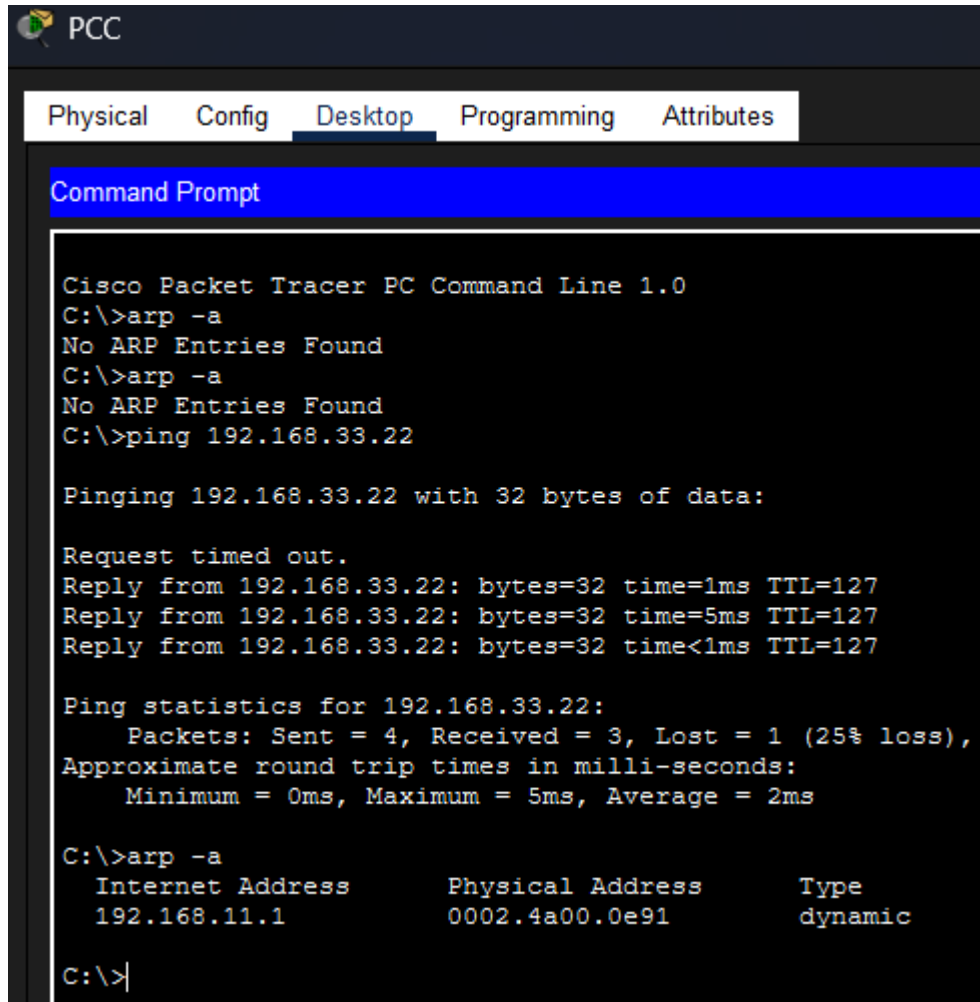
The screenshot shows the PCE (Packet Configuration Console) interface with the 'Desktop' tab selected. The 'Command Prompt' window is open, displaying the following text:

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

i.

Step 2: Generate traffic between PCC to all other PC except PCA.

- a. Click **PCC** and click the Desktop tab > Command Prompt.
- b. Enter the **ping 192.168.33.22** command (ping to PCB). Then type **arp -a**. Paste the result after these commands here.



The screenshot shows the Cisco Packet Tracer interface with the 'PCC' device selected. The 'Desktop' tab is active, and the 'Command Prompt' window is open. The command prompt displays the following text:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>arp -a
No ARP Entries Found
C:\>arp -a
No ARP Entries Found
C:\>ping 192.168.33.22

Pinging 192.168.33.22 with 32 bytes of data:

Request timed out.
Reply from 192.168.33.22: bytes=32 time=1ms TTL=127
Reply from 192.168.33.22: bytes=32 time=5ms TTL=127
Reply from 192.168.33.22: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.33.22:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 5ms, Average = 2ms

C:\>arp -a
    Internet Address      Physical Address        Type
    192.168.11.1          0002.4a00.0e91         dynamic

C:\>|
```

a.

- c. Enter the **ping 192.168.11.112** command (ping to PCD). Then type **arp -a**. Paste the result after these commands here.

```
C:\>ping 192.168.11.112

Pinging 192.168.11.112 with 32 bytes of data:

Reply from 192.168.11.112: bytes=32 time<1ms TTL=128
Reply from 192.168.11.112: bytes=32 time<1ms TTL=128
Reply from 192.168.11.112: bytes=32 time<1ms TTL=128
Reply from 192.168.11.112: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.11.112:
    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
    -----
    192.168.11.1          0002.4a00.0e91          dynamic
    192.168.11.112        0001.6462.0278          dynamic

C:\>
```

a.

- d. Enter the **ping 192.168.4.110** command (ping to PCE). Then type **arp -a**. Paste the result after these commands here.

```
C:\>ping 192.168.4.110

Pinging 192.168.4.110 with 32 bytes of data:

Request timed out.
Reply from 192.168.4.110: bytes=32 time=4ms TTL=126
Reply from 192.168.4.110: bytes=32 time=7ms TTL=126
Reply from 192.168.4.110: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.4.110:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 7ms, Average = 4ms

C:\>arp -a

    Internet Address      Physical Address         Type
    -----
    192.168.11.1          0002.4a00.0e91          dynamic
    192.168.11.112        0001.6462.0278          dynamic

C:\>
```

a.

- e. Discuss the results you got from all the commands on PCC.
- a. The results confirm successful connectivity, as all pings worked after a brief initial timeout caused by the normal ARP resolution process. The commands demonstrate correct routing behavior: PCC resolved the specific MAC address for the local device (192.168.11.112) but correctly used the Default Gateway's MAC address (192.168.11.1) to reach the remote networks (192.168.33.22 and 192.168.4.110).
- f. At Router RTA, enter the CLI. At the command prompt type the following commands. Snap the results after the last command and paste it here.

```
RTA>enable
RTA#show arp
```

```
RTA>enable
RTA#show arp
Protocol  Address          Age (min)  Hardware Addr  Type   Interface
Internet  192.168.11.1      -          0002.4A00.0E91  ARPA   FastEthernet1/0
Internet  192.168.11.11    117        00D0.D39A.C0D9  ARPA   FastEthernet1/0
Internet  192.168.33.1     -          000C.CF0C.593A  ARPA   FastEthernet0/0
Internet  192.168.33.22    117        0060.47EA.A746  ARPA   FastEthernet0/0
RTA#
```

- g. At Router RTB, enter the CLI. At the command prompt type the following commands. Snap the results after the last command and paste it here.

```
RTB>enable
RTB#show arp
```

```
RTB>enable
RTB#show arp
Protocol  Address          Age (min)  Hardware Addr  Type   Interface
Internet  192.168.4.1      -          0001.977A.B614  ARPA   FastEthernet0/0
Internet  192.168.4.110    117        0060.702D.7C08  ARPA   FastEthernet0/0
RTB#
```

Step 3: Switch MAC address table.

- a. At Switch SWA, enter the CLI. At the command prompt type the following commands.
Snap the results after the last command and paste it here.

```
SWA>enable
SWA#show arp

SWA#show mac-address-table
```

```
SWA>enable
SWA#show arp

SWA#show mac-address-table
      Mac Address Table
-----
Vlan    Mac Address      Type    Ports
----    -
      1    0002.4a00.0e91    DYNAMIC Fa0/1
      1    000c.8546.7d85    DYNAMIC Fa1/1
SWA#
```

- b. At Switch SWB, enter the CLI. At the command prompt type the following commands.
Snap the results after the last command and paste it here.

```
SWB>enable
SWB#show arp

SWB#show mac-address-table
```

```
SWB>enable
SWB#show arp

SWB#show mac-address-table
      Mac Address Table
-----
Vlan    Mac Address      Type    Ports
----    -
      1    000c.cf0c.593a    DYNAMIC Fa0/1
SWB#
```

- c. At Switches SWC and Switch1, enter the CLI. At the command prompt type the following commands. Snap the results after the last command and paste it here.

```
SWC>enable
SWC#show arp

SWC#show mac-address-table
```

```
SWC>enable
SWC#show arp
```

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

Vlan	Mac Address	Type	Ports
1	0001.977a.b614	DYNAMIC	Fa0/1

```
SWC#
```

- d. Do switches use arp table? (Y/N)

a. Y

- e. Explain your answer in (d) **Hint: the answer may surprise you. Google for the explanation.*

It is not part of NetComm syllabi, it is just for knowledge..

b-a. If you assign an IP address to a switch (to Ping, Telnet, or SSH into it), the switch needs to reply to you. To send that reply, it must map your IP address to your MAC address, just like a PC does. Therefore, it maintains its own ARP Table strictly for its own management traffic, even though it doesn't need one to switch data between other devices.

- d-f. What information does the command `show mac-address-table` gives?

It lists the mapping between MAC addresses and switch ports, telling you exactly which physical port a specific device is plugged into and which VLAN it is on.

Part 3: Attach wireless lab results.

In this part, you will use Lab 4 .pka file.

Step1: Change the filename of Lab 4.

- Change the Lab 4 filename to include your name. *Example: Lab4AliAhmad.pkt
- Go through the instructions. As you complete the tasks, you will see the bottom right hand corner of the pkt file increase in completion percentage, until you get 100/100.

The screenshot displays the Cisco Packet Tracer interface. On the left, a network topology is shown with a central switch (S1) connected to three PCs (PC1, PC2, PC3) and a wireless router (WRS2). PC1 is connected to S1 via F0/11, PC2 via F0/18, and PC3 via F0/7. WRS2 is connected to S1 via F0/7. The topology includes VLANs 10, 20, and 88. A subinterfaces table is visible:

Subinterfaces
G0/0.10 172.17.10.1/24
G0/0.20 172.17.20.1/24
G0/0.88 172.17.88.1/24

On the right, the 'PT Activity: 00:12:52' window is open, titled 'Packet Tracer – Configuring Wireless LAN Access'. It contains an 'Addressing Table':

Device	Interface	IP Address	Subnet Mask	Default Gate
R1	G0/0.10	172.17.10.1	255.255.255.0	N/A
	G0/0.20	172.17.20.1	255.255.255.0	N/A
	G0/0.88	172.17.88.1	255.255.255.0	N/A
PC1	NIC	172.17.10.21	255.255.255.0	172.17.10.1

At the bottom of the PT Activity window, the 'Completion: 100/100' status is shown, indicating that all tasks have been completed.

- Once you have completed fully, capture the screen (which includes the filename, the topology and the activity wizard showing completion) and paste it here.

This screenshot shows the Cisco Packet Tracer interface with the same network topology as the previous image. The 'PT Activity: 01:16:16' window is open, displaying detailed instructions for configuring the wireless LAN access. The instructions are organized into sections:

- Objectives:** Part 1: Configure a Wireless Router; Part 2: Configure a Wireless Client; Part 3: Verify Connectivity.
- Scenario:** In this activity, you will configure a wireless router, allowing for remote access from PCs as well as wireless connectivity with WPA2 security. You will manually configure PC wireless connectivity by entering the wireless router SSID and password.
- Part 1: Configure a Wireless Router**
 - Step 1: Connect the Internet interface of WRS2 to S1.** Connect the WRS2 Internet interface to the S1 F0/7 interface.
 - Step 2: Configure the Internet connection type.**
 - Click WRS2 > GUI tab.
 - Set the Internet Connection type to: Static IP.
 - Configure the IP addressing according to the Addressing Table.
 - Step 3: Configure the network setup.**
 - Scroll down to Network Setup. For the Router IP option, set the IP address to 172.17.40.1 and the subnet mask to 255.255.255.0.
 - Enable the DHCP server.
 - Scroll to the bottom of the page and click Save Settings.
 - Step 4: Configure wireless access and security.**
 - At the top of the window, click Wireless. Set the Network Mode to Wireless-N Only and change the SSID to WRS_LAN.
 - Disable SSID Broadcast and click Save Settings.
 - Click the Wireless Security option.
 - Change the Security Mode from Disabled to WPA2 Personal.
 - Configure cisco123 as the passphrase.
 - Scroll to the bottom of the page and click Save Settings.
- Part 2: Configure a Wireless Client**
 - Step 1: Configure PC3 for wireless connectivity.** Because SSID broadcast is disabled, you must manually configure PC3 with the correct SSID and passphrase to establish a connection with the router.
 - Click PC3 > Desktop > PC Wireless.
 - Click the Profiles tab.
 - Click New.
 - Name the new profile Wireless Access.
 - On the next screen, click Advanced Setup. Then manually enter the SSID of WRS_LAN on Wireless Network Name. Click Next.
 - Choose Obtain network settings automatically (DHCP) as the network settings, and then click Next.
 - On Wireless Security, choose WPA2-Personal as the method of encryption and click Next.
 - Enter the passphrase cisco123 and click Next.
 - Click Save and then click Connect to Network.

The bottom of the PT Activity window shows the 'Completion: 100/100' status, indicating that all tasks have been completed.

Cisco Packet Tracer - C:\Users\User\OneDrive\Desktop\Netcomp\Works\Lab\Lab4\Lab4AbdurrafiqZakaria.pka -...

File Edit Options View Tools Extensions Window Help

Activity Results Time Elapsed: 01:17:28

Congratulations Guest! You completed the activity.

Overall Feedback Assessment Items Connectivity Tests

Expand/Collapse All Show Incorrect Items

Assessment Items	Status	Points
- Network		
- PC3		
- Wireless		
- Security Mode		
✓ Authn Type	Correct	1
✓ Pass Phrase	Correct	4
✓ SSID	Correct	5
- WRS2		
- (deprecated) DHCP Server		
✓ (deprecated) DHCP Enable	Correct	10
- (deprecated) Pools		0
- (deprecated) Pool linksysPool		0
✓ (deprecated) Default Gateway	Correct	10
✓ Default Gateway	Correct	10
- Ports		
- Internet		
✓ IP Address	Correct	10
- Link to S1		
✓ Connects to FastEthernet0/7	Correct	5
✓ Type	Correct	5
- Wireless		0
- Wireless		
- Security Mode		
✓ Authn Type	Correct	10
✓ Pass Phrase	Correct	10
✓ SSID	Correct	10
✓ SSID BroadCast	Correct	10