Exercise 6

The goal of the exercise is to get familiar with the operation of the ARP protocol, the use of mac addresses, as well as the MAC address table of the switch. RETURN to Moodle your answers to the questions presented, as well as the PC's ARP and switch MAC address table.

1. Find out your computer's MAC address

```
C:\Users\rashm>ipconfig -all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : DESKTOP-C1S83NB
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : elisakoti

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
   Physical Address. . . . . . . . . : AC-67-5D-56-80-E8
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
   Physical Address. . . . . . . . . : AE-67-5D-56-80-E7
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : elisakoti
   Description . . . . . . . . . . . : Intel(R) Wireless-AC 9461
   Physical Address. . . . . . . . . : AC-67-5D-56-80-E7
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::e35e:d4fb:d8db:5c42%3(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.100.10(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : Monday, February 3, 2025 2:36:32 PM
   Lease Expires . . . . . . . . . . : Wednesday, February 5, 2025 6:29:06 AM
   Default Gateway . . . . . . . . . : 192.168.100.1
   DHCP Server . . . . . . . . . . . : 192.168.100.1
   DHCPv6 IAID . . . . . . . . . . . : 61630301
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2E-73-BA-DE-AC-67-5D-56-80-E7
   DNS Servers . . . . . . . . . . . : 192.168.100.1
                                       192.168.100.1
   NetBIOS over Tcpip. . . . . . . . : Enabled

C:\Users\rashm>
```

- MAC address related to WI-FI : AC-67-5D-56-80-E7

2. Check out your computer's ARP table (arp-a)

```
C:\Users\rashm>arp -a

Interface: 192.168.100.10 --- 0x3
  Internet Address      Physical Address      Type
  192.168.100.1         fc-3f-7c-94-53-cf     dynamic
  192.168.100.255       ff-ff-ff-ff-ff-ff     static
  224.0.0.2             01-00-5e-00-00-02     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

3. Find out what the gateway address of your computer is

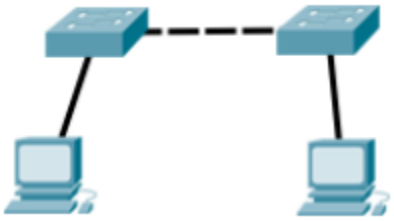
- Default Gateway . . . . . : 192.168.100.1

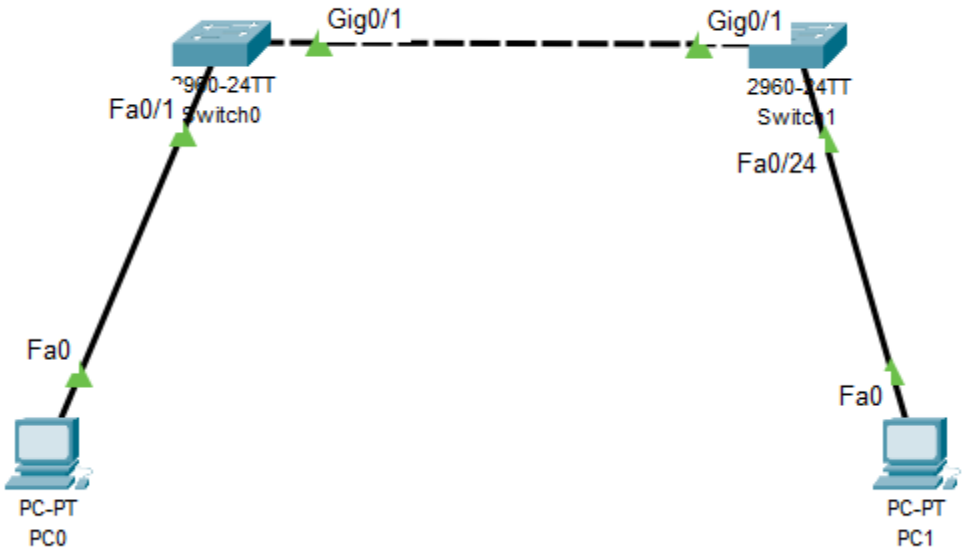
```
C:\Users\rashm>ipconfig -all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : DESKTOP-C1S83NB
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : elisakoti

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
   Physical Address. . . . . . . . . : AC-67-5D-56-80-E8
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
   Physical Address. . . . . . . . . : AE-67-5D-56-80-E7
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : elisakoti
   Description . . . . . . . . . . . : Intel(R) Wireless-AC 9461
   Physical Address. . . . . . . . . : AC-67-5D-56-80-E7
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::e35e:d4fb:d8db:5c42%3(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.100.10(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : Monday, February 3, 2025 2:36:32 PM
   Lease Expires . . . . . . . . . . : Wednesday, February 5, 2025 6:29:06 AM
   Default Gateway . . . . . . . . . : 192.168.100.1
   DHCP Server . . . . . . . . . . . : 192.168.100.1
   DHCPv6 IAID . . . . . . . . . . . : 61630301
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2E-73-BA-DE-AC-67-5D-56-80-E7
   DNS Servers . . . . . . . . . . . : 192.168.100.1
                                       192.168.100.1
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

4. Open the Packet Tracer program and build the network shown in the illustration.

- Connect computers to ports F0/1 and connect switches to each other from ports F0/24.

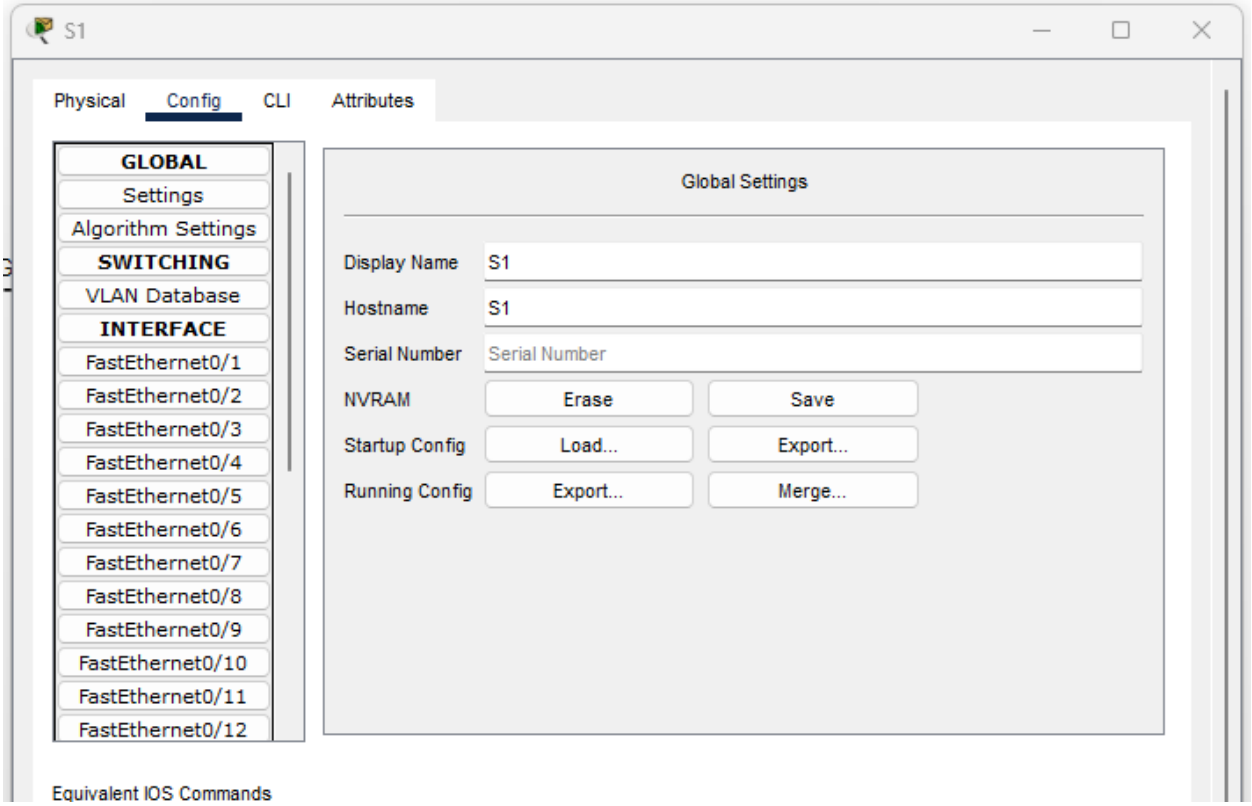
- You can use the 2960 series switches.

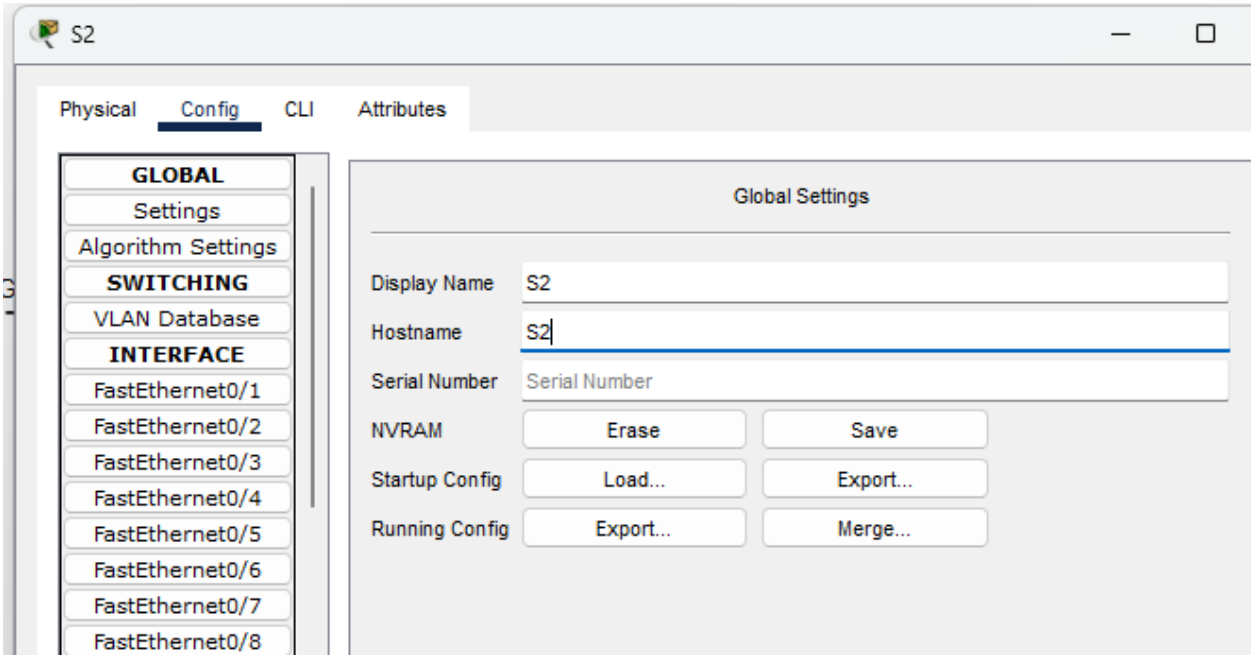




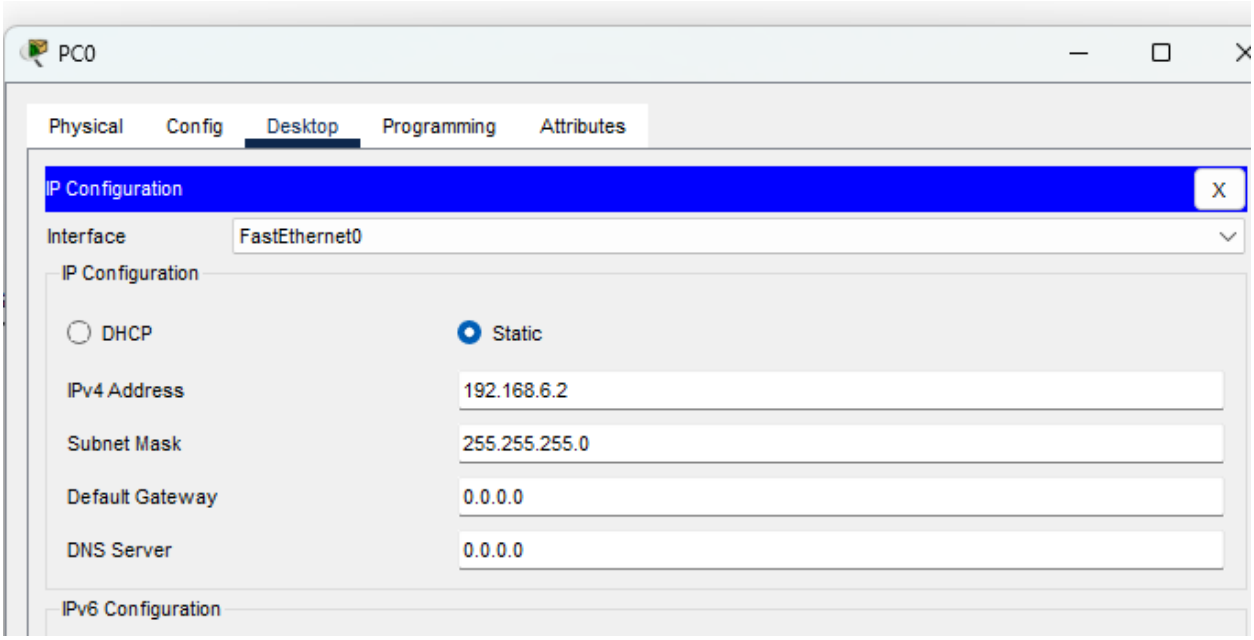
5. Name the switches S1 and S2

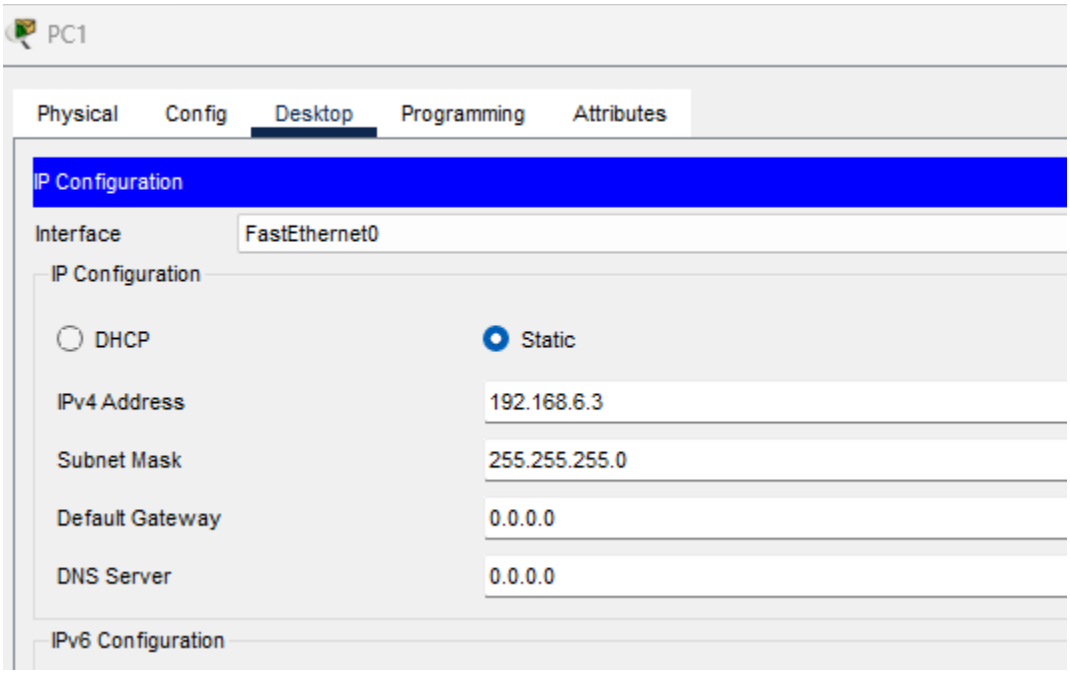
```
Switch>enable
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#
```



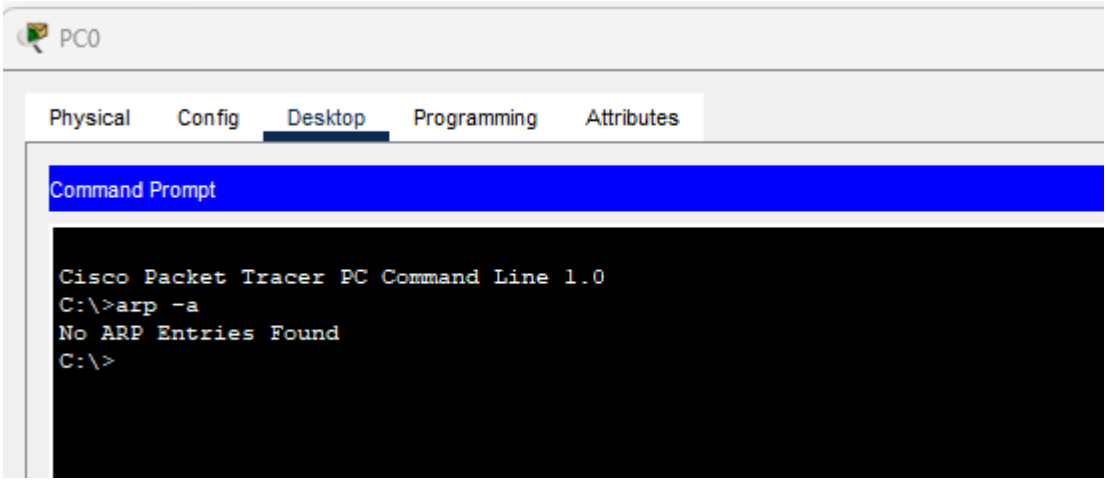


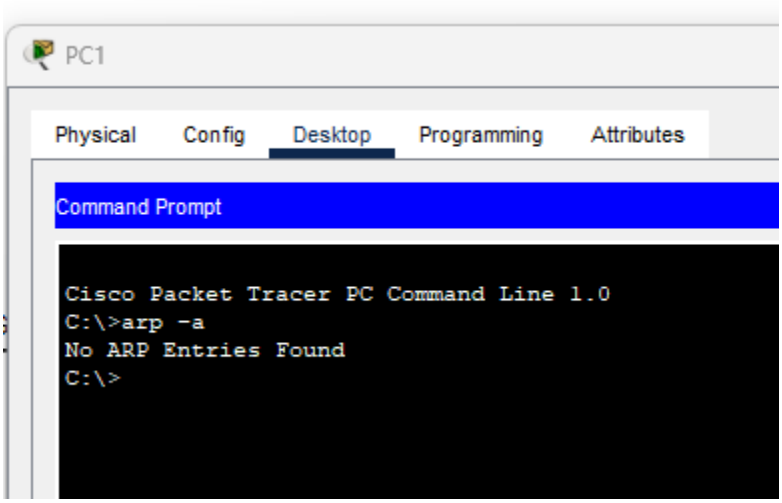
6. Assign IP addresses to computers. Use the 192.168.6.0 /24 network





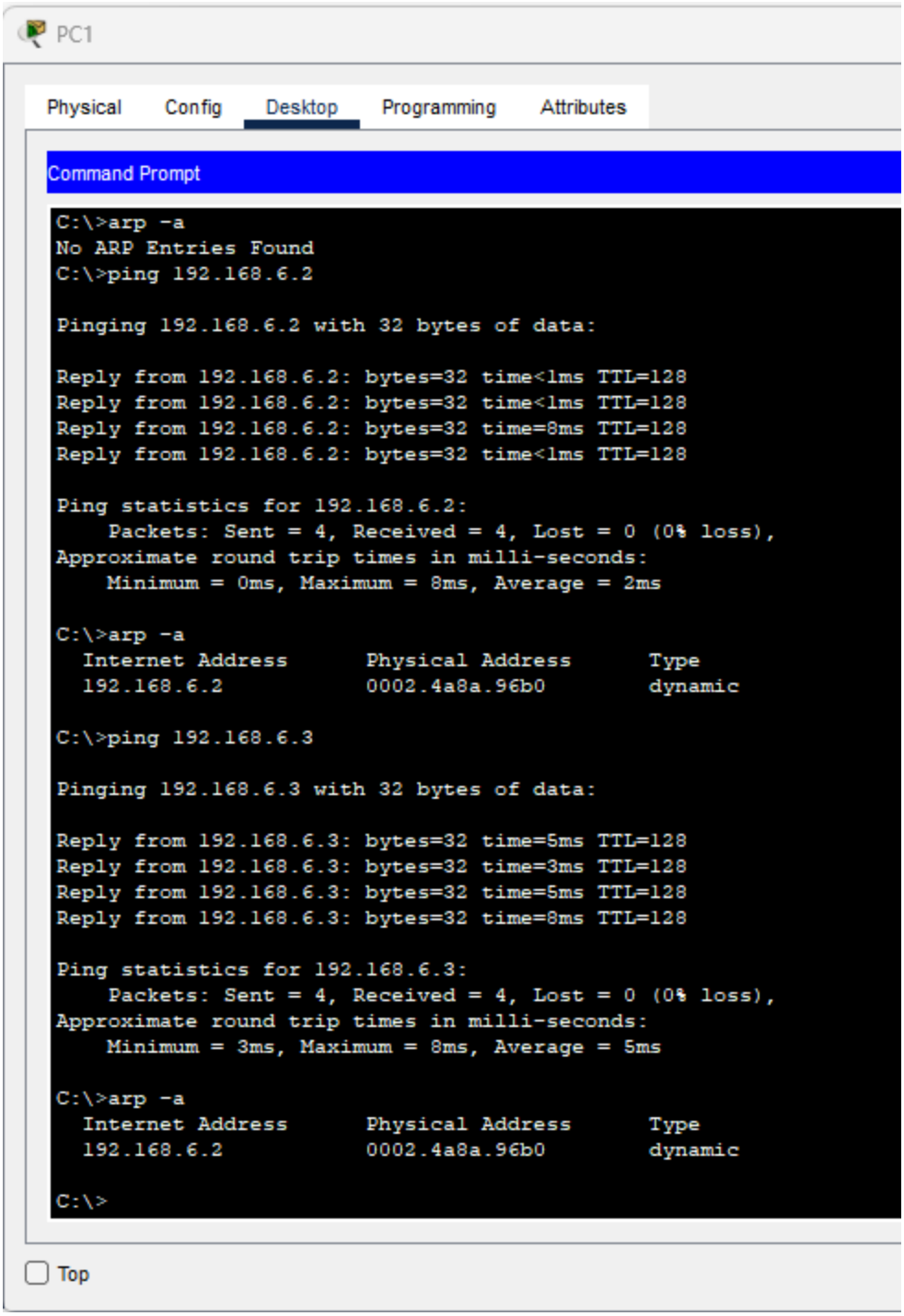
7. Check out the ARP table on both computers. What addresses appear on the table?

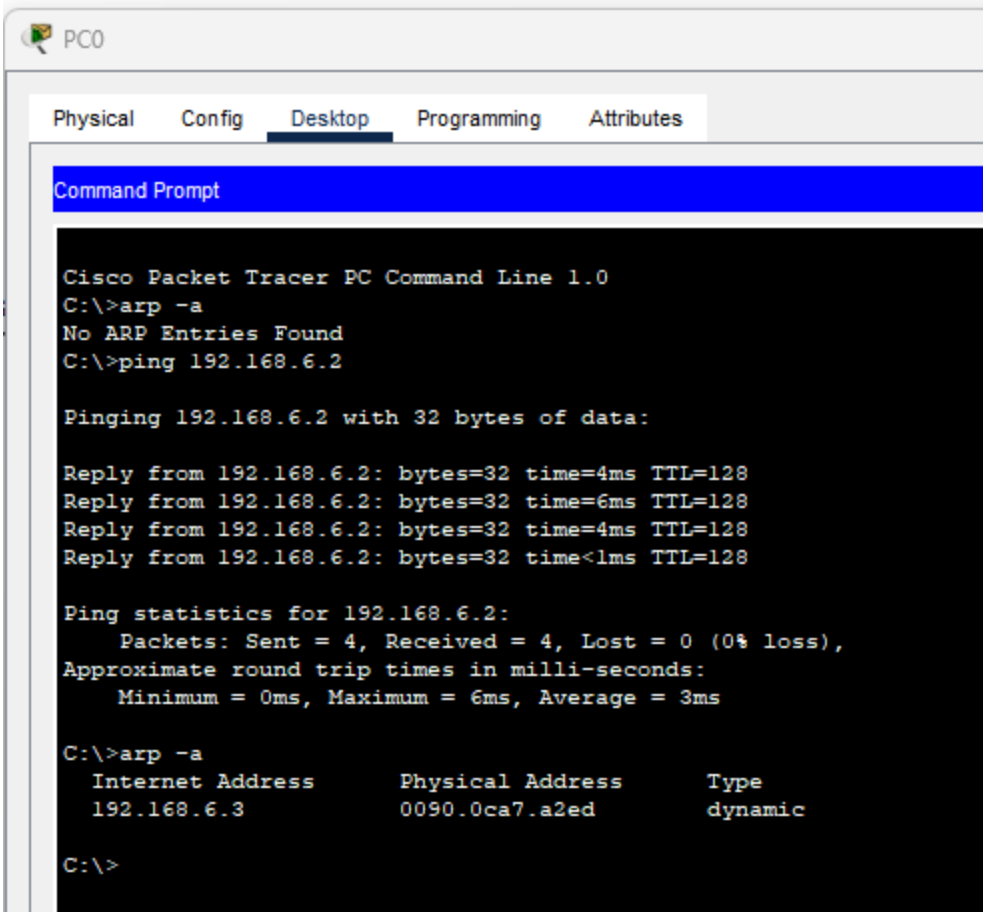




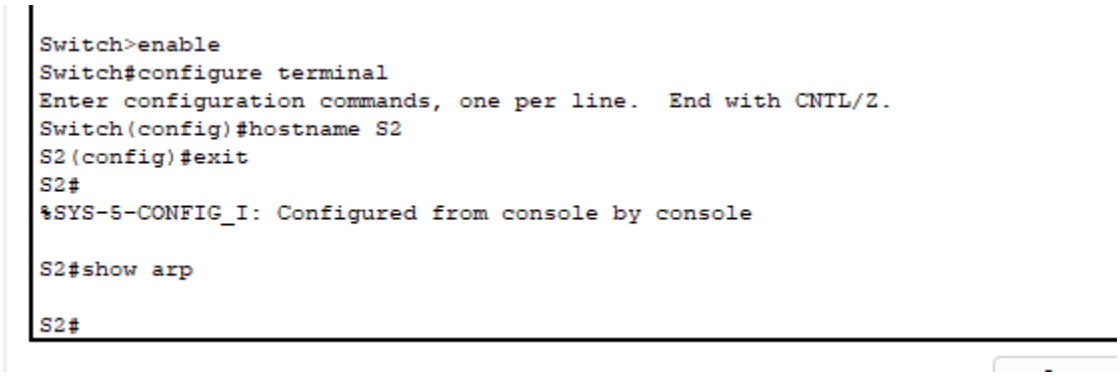
8. Ping to test the connection between computers and check the ARP table again. Has anything changed?

Then the ARP table shows the data.


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
C:\>arp -a
No ARP Entries Found
C:\>ping 192.168.6.2
Pinging 192.168.6.2 with 32 bytes of data:
Reply from 192.168.6.2: bytes=32 time<1ms TTL=128
Reply from 192.168.6.2: bytes=32 time<1ms TTL=128
Reply from 192.168.6.2: bytes=32 time=8ms TTL=128
Reply from 192.168.6.2: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.6.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 8ms, Average = 2ms
C:\>arp -a
Internet Address Physical Address Type
192.168.6.2 0002.4a8a.96b0 dynamic
C:\>ping 192.168.6.3
Pinging 192.168.6.3 with 32 bytes of data:
Reply from 192.168.6.3: bytes=32 time=5ms TTL=128
Reply from 192.168.6.3: bytes=32 time=3ms TTL=128
Reply from 192.168.6.3: bytes=32 time=5ms TTL=128
Reply from 192.168.6.3: bytes=32 time=8ms TTL=128
Ping statistics for 192.168.6.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 3ms, Maximum = 8ms, Average = 5ms
C:\>arp -a
Internet Address Physical Address Type
192.168.6.2 0002.4a8a.96b0 dynamic
C:\>
Top



9. Find out what the switch arp table looks like (Switch#show arp)



The ARP table is empty in the Switch

- • What you should to do that it's possible to see arp-table on the switch?
-
    - Set an IP address to the switch and enable it.
- • Why arp table of the switch is empty?

-
    - Because the Switch do not have a IP address
-
    - The switch may be operating as a Layer 2 device without its own IP interface.
-
    - No IP traffic (and thus no ARP requests/replies) has been generated by the switch.

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S2
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#show arp

S2#
```

10. Check the contents of the switch's mac address table

- • If mac address table is empty, you should ping between computers again

```
S2#show mac-address-table
          Mac Address Table
-------------------------------------------

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

   1    00d0.bc39.6019    DYNAMIC     Gig0/1
S2#
```

```
Request timed out.
Reply from 192.168.6.253: bytes=32 time<1ms TTL=255
Reply from 192.168.6.253: bytes=32 time<1ms TTL=255
Reply from 192.168.6.253: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.6.253:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.6.253

Pinging 192.168.6.253 with 32 bytes of data:

Reply from 192.168.6.253: bytes=32 time<1ms TTL=255
Reply from 192.168.6.253: bytes=32 time<1ms TTL=255
Reply from 192.168.6.253: bytes=32 time<1ms TTL=255
Reply from 192.168.6.253: bytes=32 time=11ms TTL=255

Ping statistics for 192.168.6.253:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 2ms

C:\>ping 192.168.6.3

Pinging 192.168.6.3 with 32 bytes of data:

Reply from 192.168.6.3: bytes=32 time=9ms TTL=128
Reply from 192.168.6.3: bytes=32 time<1ms TTL=128
Reply from 192.168.6.3: bytes=32 time<1ms TTL=128
Reply from 192.168.6.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.6.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 9ms, Average = 2ms

C:\>
```

```
S2#show mac-address-table
          Mac Address Table
-------------------------------------------

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

   1    0002.4a8a.96b0    DYNAMIC     Gig0/1
   1    0090.0ca7.a2ed    DYNAMIC     Fa0/24
   1    00d0.bc39.6019    DYNAMIC     Gig0/1
S2#
```

11. What's the difference between arp and mac address tables?

- ARP Table: Works at the network layer (Layer 3) to map IP addresses to MAC addresses.
- MAC Address Table: Works at the data link layer (Layer 2) to map MAC addresses to switch
- ARP Table: Used by devices to determine where to send IP packets on a local network.
- MAC Address Table: Used by switches to efficiently forward Ethernet frames to the correct destination.

RETURN to the Moodle: Answers to the questions asked and PC's arp table and switch mac address table. All in same file

Repository Link

Link: https://github.com/Rashmika-Dineth/Information-Networks/tree/main/Task%206