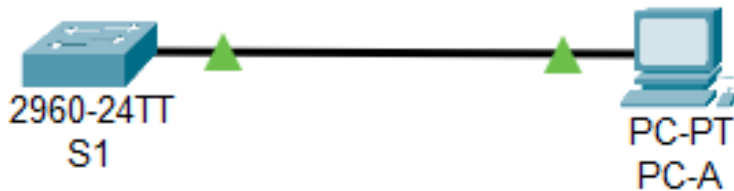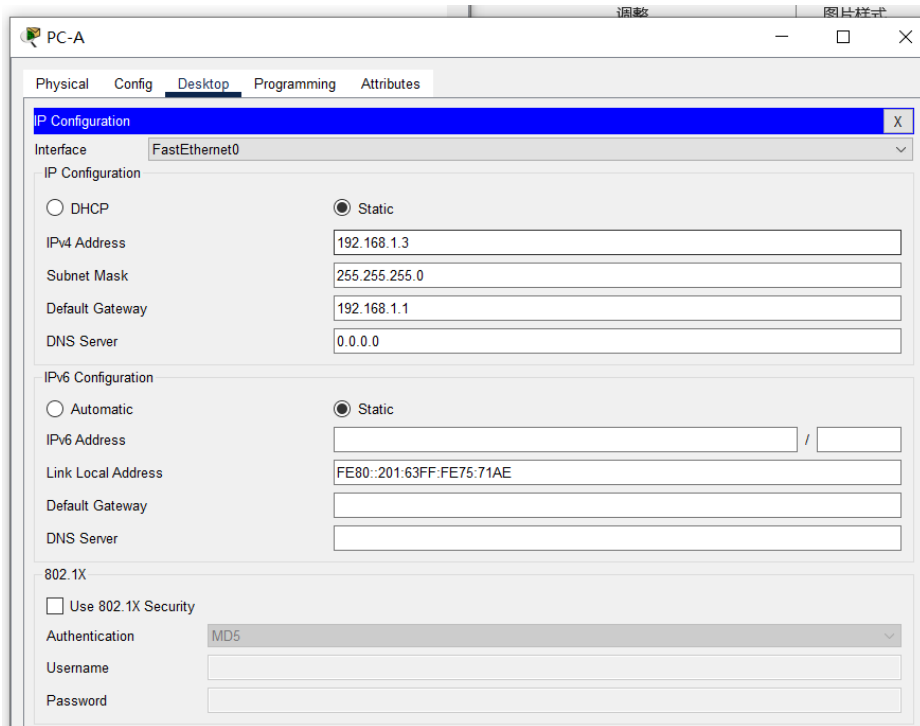# Réseaux/Networks

TP2

G1:

GUO Xiaofan

Zhao Chao

Lab-View Network Device MAC Addresses

Ex1/ Part 1/Step 1/a.&b.:

Ex1/ Part 1/Step 2/a.
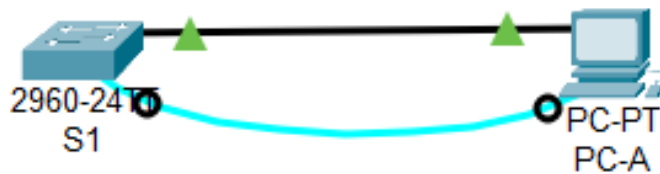

Ex1/ Part 1/Step 2/b.

Were the pings successful? Explain

No. The switch has not been configured now.

Ex1/ Part 1/Step 3/a.

Ex1/ Part 1/Step 3/b.&c.&d.

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#no ip domain-lookup
S1(config)#interface vlan 1
S1(config-if)#ip address 192.168.1.2 255.255.255.0
S1(config-if)#no shutdown

S1(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

S1(config-if)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console
```

Ex1/ Part 1/Step 4

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.1.2: bytes=32 time<1ms TTL=255
Reply from 192.168.1.2: bytes=32 time<1ms TTL=255
Reply from 192.168.1.2: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Were the pings successful?

Yes.

Ex1/ Part 2/Step 1/a.

What is the OUI portion of the MAC address for this device?

5C-26-0A

What is the serial number portion of the MAC address for this device?

24-2A-60

Using the example above, find the name of the vendor that manufactured this NIC.

Dell Inc.

Ex1/ Part 2/Step 1/b.

```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address................: 0001.6375.71AE
   Link-local IPv6 Address.........: FE80::201:63FF:FE75:71AE
   IPv6 Address....................: ::
   IPv4 Address....................: 192.168.1.3
   Subnet Mask.....................: 255.255.255.0
   Default Gateway.................: ::
                                     192.168.1.1
   DHCP Servers....................: 0.0.0.0
   DHCPv6 IAID.....................:
   DHCPv6 Client DUID..............: 00-01-00-01-2A-93-8B-67-00-01-63-75-71-AE
   DNS Servers.....................: ::
                                     0.0.0.0

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Physical Address................: 0090.0C8C.0E67
   Link-local IPv6 Address.........: ::
   IPv6 Address....................: ::
   IPv4 Address....................: 0.0.0.0
   Subnet Mask.....................: 0.0.0.0
   Default Gateway.................: ::
                                     0.0.0.0
   DHCP Servers....................: 0.0.0.0
   DHCPv6 IAID.....................:
   DHCPv6 Client DUID..............: 00-01-00-01-2A-93-8B-67-00-01-63-75-71-AE
   DNS Servers.....................: ::
                                     0.0.0.0
```
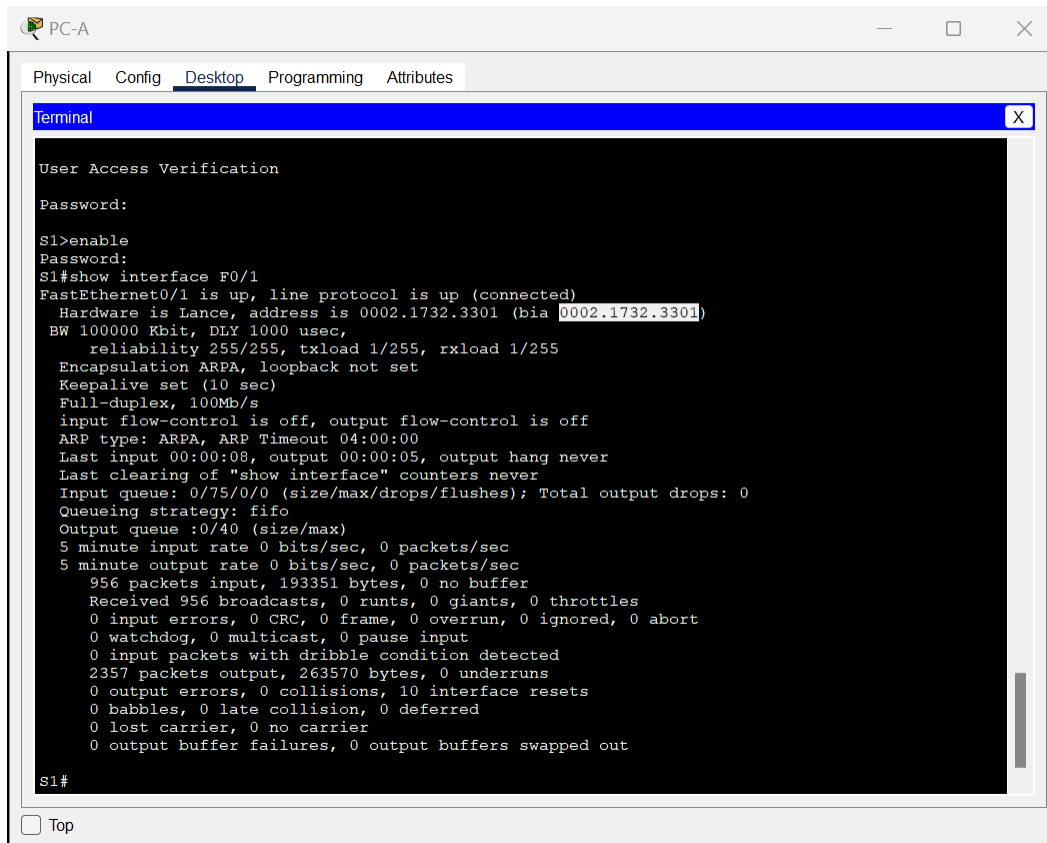
Identify the serial number portion of the MAC address for the NIC of PC-A.

75.71AE

Identify the name of the vendor that manufactured the NIC of PC-A.

0001.63

Cisco Systems, Inc

Ex1/ Part 2/Step 2/a.

```
S1>enable
S1#show interface vlan 1
Vlan1 is up, line protocol is up
  Hardware is CPU Interface, address is 000a.419d.7b04 (bia 000a.419d.7b04
  Internet address is 192.168.1.2/24
  MTU 1500 bytes, BW 100000 Kbit, DLY 1000000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 21:40:21, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     1682 packets input, 530955 bytes, 0 no buffer
     Received 0 broadcasts (0 IP multicast)
     0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     563859 packets output, 0 bytes, 0 underruns
     0 output errors, 23 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

What is the MAC address for VLAN 1 on S1?

000a.419d.7b04

What is the MAC serial number for VLAN 1?

9d.7b04

What is the OUI for VLAN 1?

00-0a-41

Based on this OUI, what is the name of the vendor?

Cisco Systems

What does bia stand for?

Burned in address.

Why does the output show the same MAC address twice?

The MAC address is alterable through a software command, yet the original address (bia)

remains unchanged and is displayed within parentheses.

Ex1/ Part 2/Step 2/b.

```
S1#show arp
Protocol  Address          Age (min)  Hardware Addr   Type    Interface
Internet  192.168.1.2          -      000A.419D.7B04  ARPA    Vlan1
Internet  192.168.1.3          16     0001.6375.71AE  ARPA    Vlan1
S1#
```

What Layer 2 addresses are displayed on S1?

  000A.419D.7B04

  0001.6375.71AE

What Layer 3 addresses are displayed on S1?

   192.168.1.2

   192.168.1.3

Ex1/ Part 2/Step 3/ **Did the switch display the MAC address of PC-A? If you answered**

yes, what port was it on?

```
C:\>
C:\>
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=5ms TTL=255
Reply from 192.168.1.2: bytes=32 time<1ms TTL=255
```

```
S1#show mac address-table
         Mac Address Table
-------------------------------------------

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

S1#show mac address-table
         Mac Address Table
-------------------------------------------

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

  1     0001.6375.71ae     DYNAMIC      Fa0/6
S1#
```

    Yes. Port should be F0/6. Answers will vary for the MAC address. In the example above,

    the MAC address would be 5c26.0a24.2a60.

Ex1/ Part 2/ Reflection Questions/1. **Can you have broadcasts at the Layer 2 level? If so, what would the MAC address be?**

Layer 2 allows for broadcasts.

ARP utilizes broadcasts to retrieve MAC address information.

The broadcast address is FF.FF.FF.FF.FF.FF.

Ex1/ Part 2/ Reflection Questions/2. **Why would you need to know the MAC address of a device.**

Several reasons might exist. In expansive networks, identifying a device by its MAC address might prove simpler than using its IP address, aiding in location and identification. The MAC OUI reveals the manufacturer, aiding in narrowing down the search. Additionally, Layer 2 supports security measures, necessitating knowledge of permissible MAC addresses.

Lab - View the Switch MAC Address Table

Ex2/ Part 1/Step 1:

Ex2/ Part 1/Step 2:

Ex2/ Part 1/Step 3:

Ex2/ Part 1/Step 4/a:

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

```
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S2
```

Ex2/ Part 1/Step 4/b.

```
S1(config)#int vlan1
S1(config-if)#ip address 192.168.1.11 255.255.255.0
S1(config-if)#no shutdown

S1(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

S1(config-if)#
```

```
S2(config)#int vlan 1
S2(config-if)#ip address 192.168.1.12 255.255.255.0
S2(config-if)#no shutdown

S2(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
```

Ex2/ Part 1/Step 4/c.

```
S1(config-if)#exit
S1(config)#line console 0
S1(config-line)#password cisco
S1(config-line)#login
S1(config-line)#line vty 0 15
S1(config-line)#password cisco
S1(config-line)#login
S1(config-line)#exit
S1(config)#
```

```
S2(config-if)#exit
S2(config)#line console 0
S2(config-line)#password cisco
S2(config-line)#login
S2(config-line)#exit
S2(config)#line vty 0 15
S2(config-line)#password cisco
S2(config-line)#login
S2(config-line)#exit
S2(config)#
```
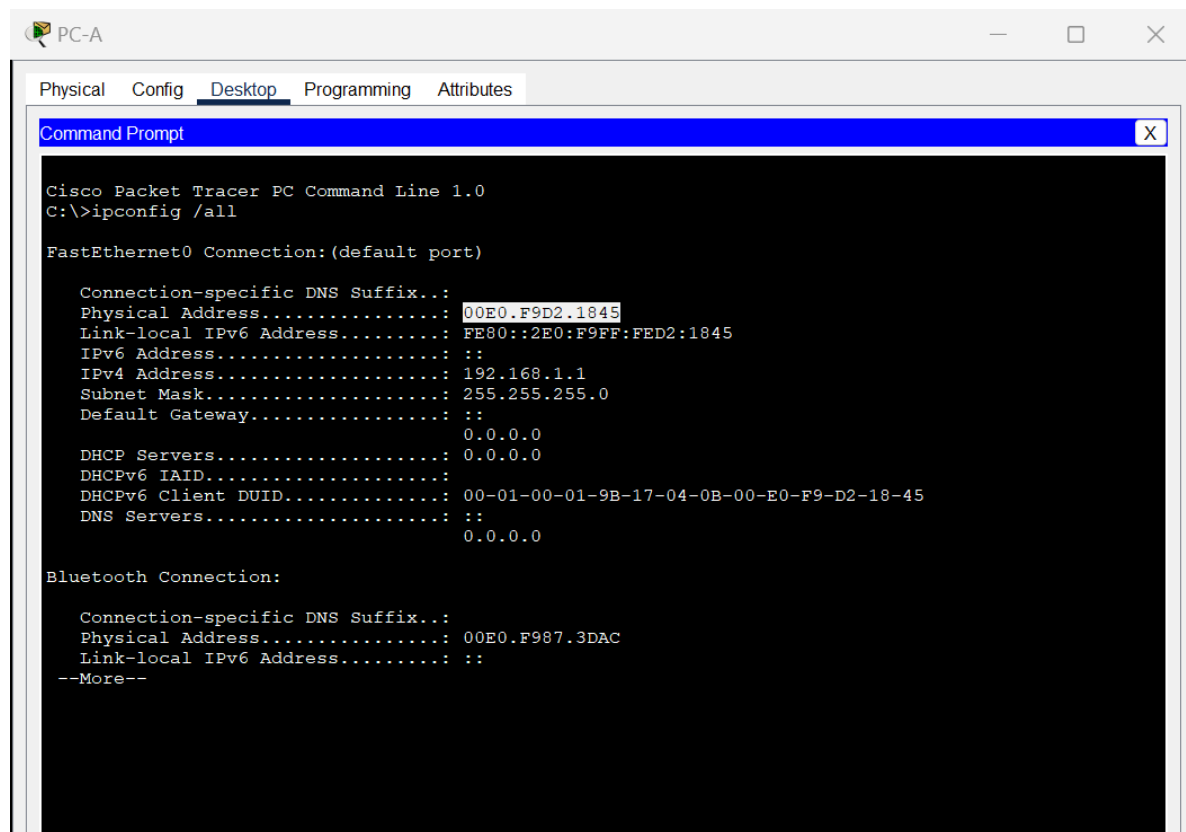
Ex2/ Part 1/Step 4/d.

```
S1(config)#enable secret class
S1(config)#
```

```
S2(config)#enable secret class
S2(config)#
```

Ex2/ Part 2/Step 1/a:

PC-A MAC Address: 00E0.F9D2.1845

PC-B MAC Address: 00D0.FF9D.444D

Ex2/ Part 2/Step 1/b:

S1 Fast Ethernet 0/1 MAC Address: 0002.1732.3301

S2 Fast Ethernet 0/1 MAC Address: 0001.9651.1e01

Ex2/ **Part 2**/Step 2/a:

Ex2/ **Part 2**/Step 2/b.

PC-A — Terminal

```
User Access Verification

Password:

S1>enable
Password:
S1#show interface F0/1
FastEthernet0/1 is up, line protocol is up (connected)
  Hardware is Lance, address is 0002.1732.3301 (bia 0002.1732.3301)
  BW 100000 Kbit, DLY 1000 usec,
```

PC-B — Terminal

```
S2#show interface F0/1
FastEthernet0/1 is up, line protocol is up (connected)
  Hardware is Lance, address is 0001.9651.1e01 (bia 0001.9651.1e01)
 BW 100000 Kbit, DLY 1000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s
  input flow-control is off, output flow-control is off
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:08, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     956 packets input, 193351 bytes, 0 no buffer
     Received 956 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 watchdog, 0 multicast, 0 pause input
     0 input packets with dribble condition detected
     2357 packets output, 263570 bytes, 0 underruns
     0 output errors, 0 collisions, 10 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out

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

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

   1     0002.1732.3301   DYNAMIC     Fa0/1
S2#
```
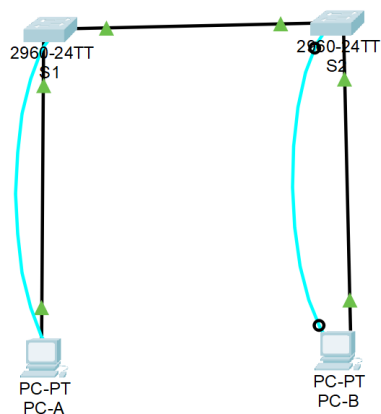
- **Are there any MAC addresses recorded in the MAC address table?**

  Yes.

- **What MAC addresses are recorded in the table? To which switch ports are they mapped and to which devices do they belong? Ignore MAC addresses that are mapped to the CPU.**

  The S1's MAC address recorded in via Fa0/1 switch port.

- **If you had not previously recorded MAC addresses of network devices in Step 1, how could you tell which devices the MAC addresses belong to, using only the output from the show mac address-table command? Does it work in all scenarios?**

  " show mac address-table command" shows the port that the MAC addresses were learned on and it would identify the MAC address belongs to which network device in the simple network system.

  But when multiple MAC addresses associated to the same port or the device uses a dynamic address, MAC addresses might not be directly correlated with specific devices.

Ex2/ Part 2/Step 3:

a.

```
S2#clear mac address-table dynamic
S2#
```

b.

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

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

   1    0002.1732.3301      DYNAMIC     Fa0/1
S2#show mac address-table
          Mac Address Table
-------------------------------------------

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

   1    0002.1732.3301      DYNAMIC     Fa0/1
S2#
```

- **Does the MAC address table have any addresses in it for VLAN 1? Are there other MAC addresses listed?**

  No. Just S1's MAC address re-recorded in via Fa0/1 switch port.

- **Wait 10 seconds, type the show mac address-table command, and press Enter. Are there new addresses in the MAC address table?**

  No, the same line showed.
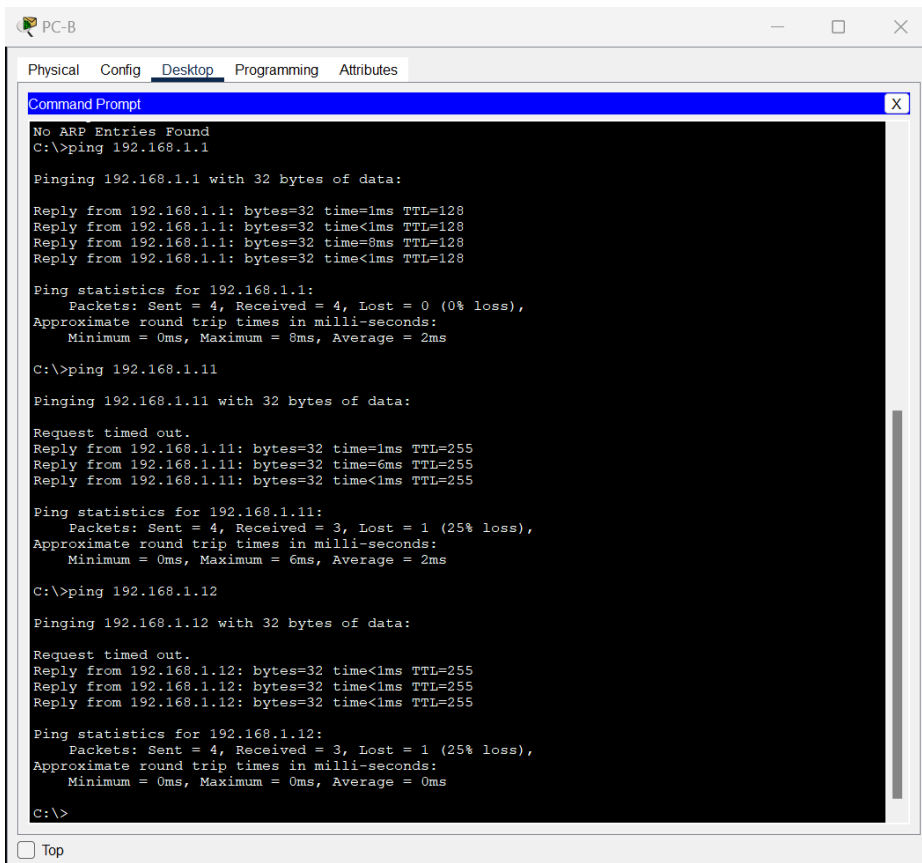
Ex2/ Part 2/Step 4/a.

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

- **Not including multicast or broadcast addresses, how many devices IP-to-MAC address pairs have been learned by ARP?**

  ARP cache have no entries in it.

Ex2/ Part 2/Step 4/b.

```
                                                          PC-B                        —  □  X

Physical   Config   Desktop   Programming   Attributes

Command Prompt                                                                    X
No ARP Entries Found
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=1ms TTL=128
Reply from 192.168.1.1: bytes=32 time<1ms TTL=128
Reply from 192.168.1.1: bytes=32 time=8ms TTL=128
Reply from 192.168.1.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 8ms, Average = 2ms

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Request timed out.
Reply from 192.168.1.11: bytes=32 time=1ms TTL=255
Reply from 192.168.1.11: bytes=32 time=6ms TTL=255
Reply from 192.168.1.11: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 6ms, Average = 2ms

C:\>ping 192.168.1.12

Pinging 192.168.1.12 with 32 bytes of data:

Request timed out.
Reply from 192.168.1.12: bytes=32 time<1ms TTL=255
Reply from 192.168.1.12: bytes=32 time<1ms TTL=255
Reply from 192.168.1.12: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.12:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

Top
```

- **Did all devices have successful replies? If not, check your cabling and IP configurations.**

Yes, all devices have successful replies.

Ex2/ Part 2/Step 4/c.

- **Has the switch added additional MAC addresses to the MAC address table? If so, which addresses and devices?**

Yes, including S1(1st line), PC-A(4th line) , PC-B(2nd line),

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

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

  1     0002.1732.3301     DYNAMIC     Fa0/1
  1     00d0.ff9d.444d     DYNAMIC     Fa0/18
  1     00e0.f979.52e1     DYNAMIC     Fa0/1
  1     00e0.f9d2.1845     DYNAMIC     Fa0/1
S2#
```

- **Does the PC-B ARP cache have additional entries for all network devices that were sent pings?**

Yes, PC-A(1st line), S1(2nd line), S2(3rd line).

```
C:\>arp -a
  Internet Address       Physical Address       Type
  192.168.1.1            00e0.f9d2.1845         dynamic
  192.168.1.11           00e0.f979.52e1         dynamic
  192.168.1.12           0005.5eb3.6114         dynamic

C:\>
```

Ex2/ Part 2/Reflection Question:

what might be some of the challenges on larger networks?

1. **ARP Cache Size Limitations:** on the large network system, the number of entries may surpass the capacity of the caches.

2. **MAC Address Table Scalability:** the number of MAC addresses can handle may limited.

3. **Dynamic Nature of Devices:** Devices on the large network are often dynamic, the displayed data deviates from the real situation.

Packet Tracer-

Build a Switch and Router Network - Physical Mode

Ex3/ Part 1/a.&b.&c.&d.
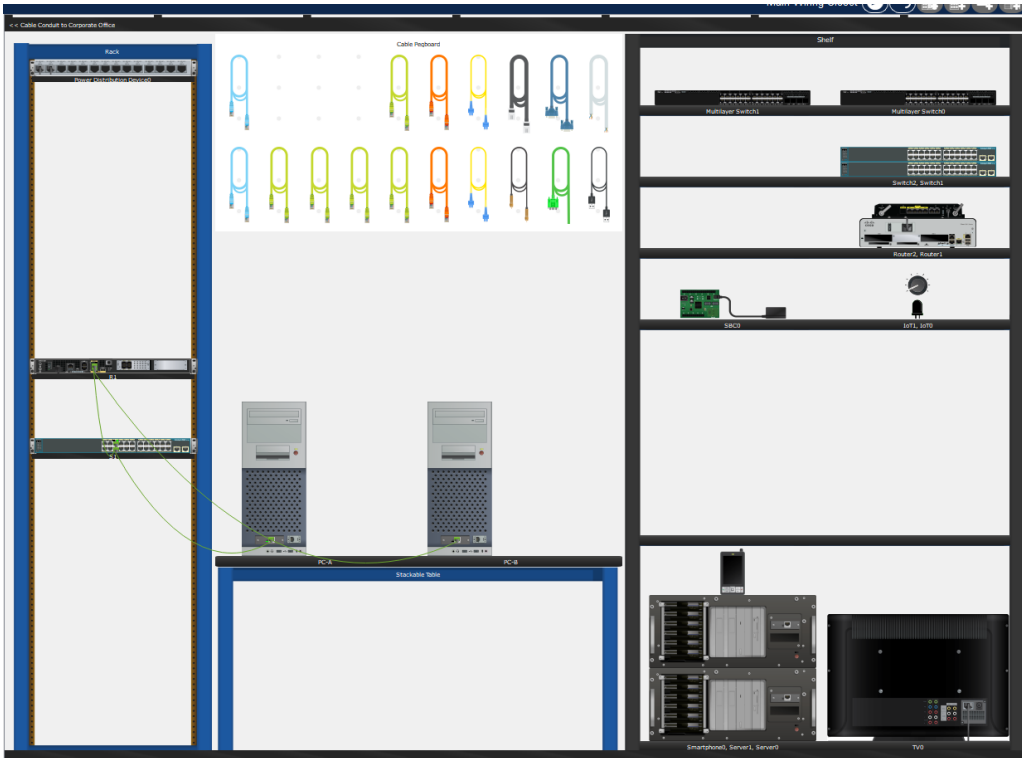
Ex3/ Part 2/Step1/a.
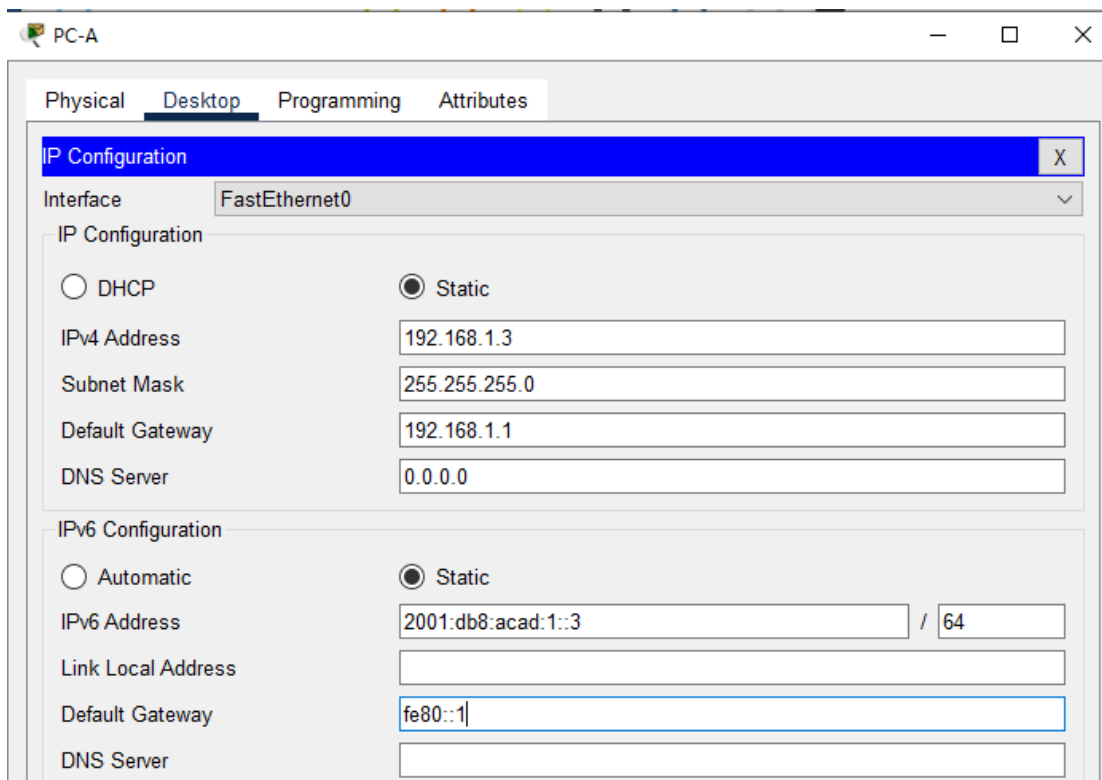
Ex3/ Part 2/Step1/b.

Ex3/ Part 2/Step1/c. **Why were the pings not successful?**

Layer 3 traffic isn't being routed between subnets because the router interfaces (default gateways) haven't been configured yet.

Ex3/ Part 2/Step2/d.&e.& f.& g.& h.

Ex3/ Part 2/Step2/i.&j.&k.&l.

```
R1(config-if)#int g0/0/0
R1(config-if)#description Connection toPC-B
R1(config-if)#int
R1(config-if)#int g0/0/1
R1(config-if)#description Connection to S1
R1(config-if)#exit
R1(config)#ipv6 unicast-routing
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#clock set ?
  hh:mm:ss  Current Time
R1#clock set 10:10:15 ?
  <1-31>  Day of the month
  MONTH   Month of the year
R1#clock set 10:10:15 16 November 2023
```

Ex3/ Part 2/Step2/m.&n. **Were the pings successful? Explain.**

```
C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.0.3: bytes=32 time<1ms TTL=127
Reply from 192.168.0.3: bytes=32 time<1ms TTL=127
Reply from 192.168.0.3: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Yes. The router effectively routes traffic between the two subnets. The default configurations of the 2960 switch automatically activate the interfaces linked to devices.

Ex3/ Part 2/Step3/a.&b.&c.& d.& e.&f.

Ex3/ Part 2/Step4/a.

Ex3/ Part 2/Step4/b.

Ex3/ Part 3/Step1/a.

```
R1#show 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

      192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.0.0/24 is directly connected, GigabitEthernet0/0/0
L        192.168.0.1/32 is directly connected, GigabitEthernet0/0/0
      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.1.0/24 is directly connected, GigabitEthernet0/0/1
L        192.168.1.1/32 is directly connected, GigabitEthernet0/0/1
```

What code is used in the routing table to indicate a directly connected network?

C (a directly connected subnet)

L (a local interface)

How many route entries are coded with a C code in the routing table?

TWO.

What interface types are associated to the C coded routes?

G0/0/0 & G0/0/1.

Ex3/ Part 3/Step1/b.

```
R1#show ipv6 route
IPv6 Routing Table - 5 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
C   2001:DB8:ACAD::/64 [0/0]
     via GigabitEthernet0/0/0, directly connected
L   2001:DB8:ACAD::1/128 [0/0]
     via GigabitEthernet0/0/0, receive
C   2001:DB8:ACAD:1::/64 [0/0]
     via GigabitEthernet0/0/1, directly connected
L   2001:DB8:ACAD:1::1/128 [0/0]
     via GigabitEthernet0/0/1, receive
L   FF00::/8 [0/0]
     via Null0, receive
```

Ex3/ Part 3/Step2/a.

```
R1#show interface g0/0/1
GigabitEthernet0/0/1 is up, line protocol is up (connected)
  Hardware is Lance, address is 0060.4731.8102 (bia 0060.4731.8102)
  Description: Connection to S1
  Internet address is 192.168.1.1/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Full-duplex, 100Mb/s, media type is RJ45
  ARP type: ARPA, ARP Timeout 04:00:00,
  Last input 00:00:08, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 130 bits/sec, 0 packets/sec
     21 packets input, 2608 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 input packets with dribble condition detected
     204 packets output, 16816 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
```

What is the operational status of the G0/0/1 interface?

GigabitEthernet0/0/1 is up, line protocol is up

What is the Media Access Control (MAC) address of the G0/1 interface?

0060.4731.8102

How is the internet address displayed in this command?

192.168.1.1/24

Ex3/ Part 3/Step2/b.

```
R1#
R1#show ipv6 interface g0/0/1
GigabitEthernet0/0/1 is up, line protocol is up
  IPv6 is enabled, link-local address is FE80::1
  No Virtual link-local address(es):
  Global unicast address(es):
    2001:DB8:ACAD:1::1, subnet is 2001:DB8:ACAD:1::/64
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FF00:1
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ICMP unreachables are sent
  ND DAD is enabled, number of DAD attempts: 1
  ND reachable time is 30000 milliseconds
  ND advertised reachable time is 0 (unspecified)
  ND advertised retransmit interval is 0 (unspecified)
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  ND advertised default router preference is Medium
  Hosts use stateless autoconfig for addresses.
```

Ex3/ Part 3/Step3/a.

```
R1#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0/0   192.168.0.1     YES manual up                    up
GigabitEthernet0/0/1   192.168.1.1     YES manual up                    up
GigabitEthernet0/1/0   unassigned      YES unset  up                    down
GigabitEthernet0/1/1   unassigned      YES unset  up                    down
GigabitEthernet0/1/2   unassigned      YES unset  up                    down
GigabitEthernet0/1/3   unassigned      YES unset  up                    down
Vlan1                  unassigned      YES unset  administratively down down
R1#
```

Ex3/ Part 3/Step3/b.

```
R1#
R1#show ipv6 interface g0/0/1
GigabitEthernet0/0/1 is up, line protocol is up
  IPv6 is enabled, link-local address is FE80::1
  No Virtual link-local address(es):
  Global unicast address(es):
    2001:DB8:ACAD:1::1, subnet is 2001:DB8:ACAD:1::/64
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FF00:1
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ICMP unreachables are sent
  ND DAD is enabled, number of DAD attempts: 1
  ND reachable time is 30000 milliseconds
  ND advertised reachable time is 0 (unspecified)
  ND advertised retransmit interval is 0 (unspecified)
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  ND advertised default router preference is Medium
  Hosts use stateless autoconfig for addresses.
R1#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0/0   192.168.0.1     YES manual up                    up
GigabitEthernet0/0/1   192.168.1.1     YES manual up                    up
GigabitEthernet0/1/0   unassigned      YES unset  up                    down
GigabitEthernet0/1/1   unassigned      YES unset  up                    down
GigabitEthernet0/1/2   unassigned      YES unset  up                    down
GigabitEthernet0/1/3   unassigned      YES unset  up                    down
Vlan1                  unassigned      YES unset  administratively down down
R1#
R1#show ipv6 interface brief
GigabitEthernet0/0/0       [up/up]
    FE80::1
    2001:DB8:ACAD::1
GigabitEthernet0/0/1       [up/up]
    FE80::1
    2001:DB8:ACAD:1::1
GigabitEthernet0/1/0       [up/down]
GigabitEthernet0/1/1       [up/down]
GigabitEthernet0/1/2       [up/down]
GigabitEthernet0/1/3       [up/down]
Vlan1                      [administratively down/down]
    unassigned
R1#
```

Ex3/ Part 3/Step3/c.

```
S1>enable
S1#show ip interface brief
Interface            IP-Address     OK? Method Status        Protocol
FastEthernet0/1      unassigned     YES manual down          down
FastEthernet0/2      unassigned     YES manual down          down
FastEthernet0/3      unassigned     YES manual down          down
FastEthernet0/4      unassigned     YES manual down          down
FastEthernet0/5      unassigned     YES manual up            up
FastEthernet0/6      unassigned     YES manual up            up
FastEthernet0/7      unassigned     YES manual down          down
FastEthernet0/8      unassigned     YES manual down          down
FastEthernet0/9      unassigned     YES manual down          down
FastEthernet0/10     unassigned     YES manual down          down
FastEthernet0/11     unassigned     YES manual down          down
FastEthernet0/12     unassigned     YES manual down          down
FastEthernet0/13     unassigned     YES manual down          down
FastEthernet0/14     unassigned     YES manual down          down
FastEthernet0/15     unassigned     YES manual down          down
FastEthernet0/16     unassigned     YES manual down          down
FastEthernet0/17     unassigned     YES manual down          down
FastEthernet0/18     unassigned     YES manual down          down
FastEthernet0/19     unassigned     YES manual down          down
FastEthernet0/20     unassigned     YES manual down          down
FastEthernet0/21     unassigned     YES manual down          down
FastEthernet0/22     unassigned     YES manual down          down
FastEthernet0/23     unassigned     YES manual down          down
FastEthernet0/24     unassigned     YES manual down          down
GigabitEthernet0/1   unassigned     YES manual down          down
GigabitEthernet0/2   unassigned     YES manual down          down
Vlan1                192.168.1.2    YES manual up            up
S1#
```

Ex3/ Part 3/ Reflection Questions/1. **If the G0/0/1 interface showed that it was administratively down, what interface configuration command would you use to bring the interface up?**

R1(config-if)# no shutdown

Ex3/ Part 3/ Reflection Questions/2. **What would happen if you had incorrectly configured interface G0/0/1 on the router with an IP address of 192.168.1.2?**

PC-A cannot ping PC-B as they belong to different networks. To route packets to PC-B, PC-A requires the default gateway router. However, PC-A is configured to use 192.168.1.1 as the default gateway router, which isn't assigned to any device on the LAN. Consequently, packets destined for the default gateway cannot reach their intended destination for routing.

Cisco Packet Tracer - C:\Users\16273\GitHub\ISEP-Documents\2309-2401\Réseaux et Networks\TP2-EN\TP2-ex3.pka - Guest - 2023-11-14 20:13:29
File Edit Options View Tools Extensions Window Help

Activity Results

Congratulations Guest! You completed the activity.

Packet Tracer - Examine the ARP Table

Ex4/ Part 1/Step 1/b:

```
C:\>arp -d
```

Ex4/ Part 1/Step 1/c:

```
C:\>ping 172.16.31.3

Pinging 172.16.31.3 with 32 bytes of data:

Reply from 172.16.31.3: bytes=32 time<1ms TTL=128
Reply from 172.16.31.3: bytes=32 time<1ms TTL=128
Reply from 172.16.31.3: bytes=32 time<1ms TTL=128
Reply from 172.16.31.3: bytes=32 time<1ms TTL=128

Ping statistics for 172.16.31.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Ex4/ Part 1/Step 1/d: Click Capture/Forward once. The ARP PDU moves Switch1 while the ICMP PDU disappears, waiting for the ARP reply. Open the PDU and record the destination MAC address.

Is this address listed in the table above?
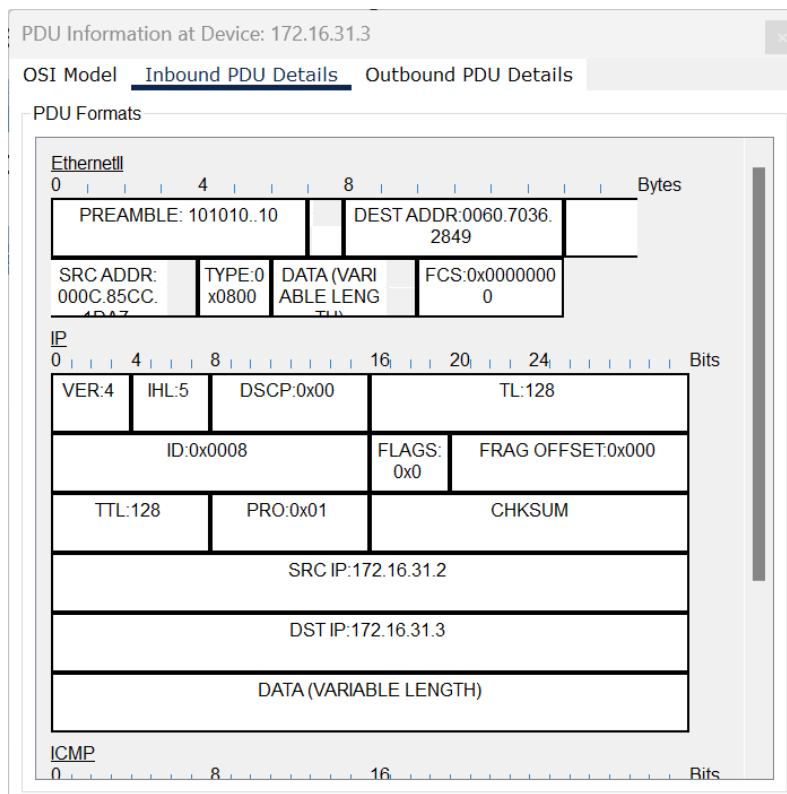
No.

Ex4/ Part 1/Step 1/e. **Click Capture/Forward to move the PDU to the next device.**
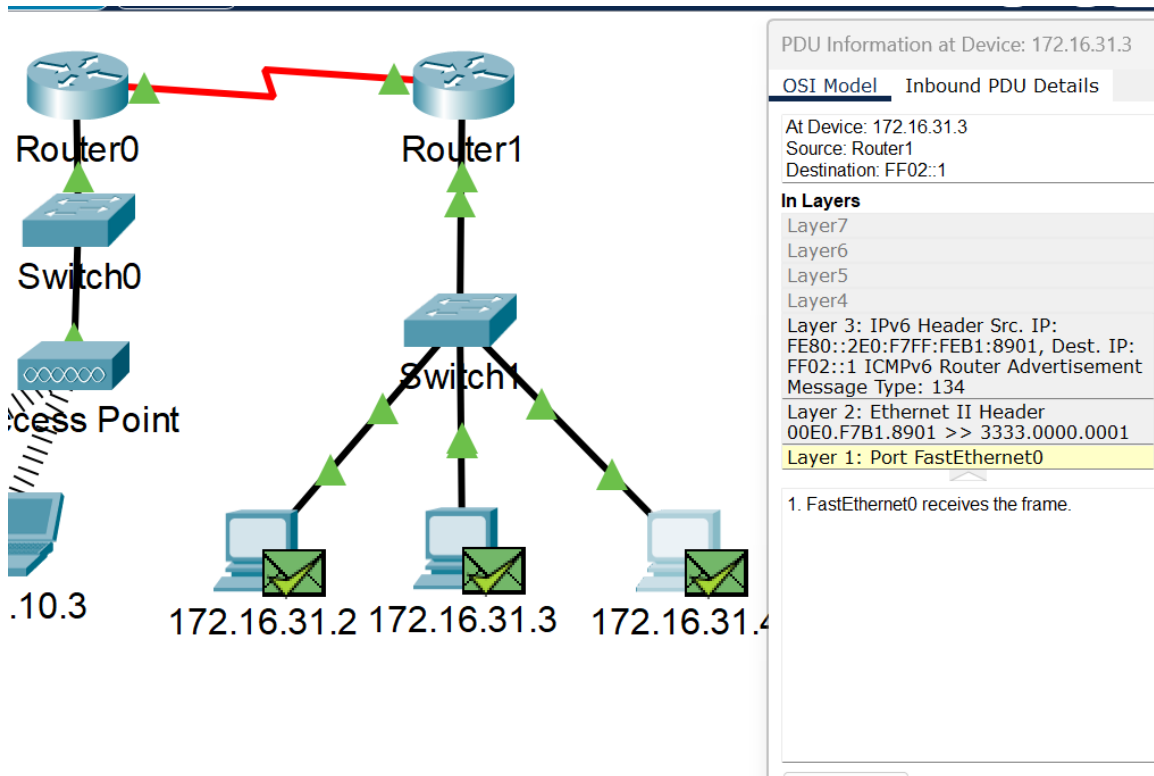
How many copies of the PDU did Switch1 make?

3.

Ex4/ Part 1/Step 1/f. **What is the IP address of the device that accepted the PDU?**

172.16.31.3

Ex4/ Part 1/Step 1/g. Open the PDU and examine Layer 2. **What happened to the source and destination MAC addresses?**

PDU Information at Device: 172.16.31.3

OSI Model   Inbound PDU Details   Outbound PDU Details

At Device: 172.16.31.3
Source: 172.16.31.2
Destination: Broadcast

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer3	Layer3
Layer 2: Ethernet II Header 000C. 85CC.1DA7 >> FFFF.FFFF.FFFF ARP Packet Src. IP: 172.16.31.2, Dest. IP: 172.16.31.3	Layer 2: Ethernet II Header 0060.7036.2849 >> 000C.85CC.1DA7 ARP Packet Src. IP: 172.16.31.3, Dest. IP: 172.16.31.2
Layer 1: Port FastEthernet0	Layer 1: Port(s): FastEthernet0

1. FastEthernet0 receives the frame.

FFFF.FFFF.FFFF turned into MAC address of 172.16.31.3, Source became destination.

Ex4/ Part 1/Step 1/ h. Click Capture/Forward until the PDU returns to 172.16.31.2. **How many copies of the PDU did the switch make during the ARP reply?**

PDU Information at Device: 172.16.31.2

OSI Model   Outbound PDU Details

PDU Formats

EthernetII

| PREAMBLE: 101010..10 | S— | DEST ADDR:FFFF.FFFF.FFFF | |
| SRC ADDR:000C.85CC. 1DA7 | TYPE:0x08 06 | DATA (VARIABLE LENGTH) | FCS:0x00000000 |

Arp

HARDWARE TYPE:0x0001	PROTOCOL TYPE:0x0800
HLEN:0x06	PLEN:0x04	OPCODE:0x0001
SOURCE MAC :000C.85CC.1DA7	
	SOURCE IP :172.16.31.2
TARGET MAC:0000.0000.0000	
TARGET IP:172.16.31.3	

One.

Ex4/ Part 1/Step 2/a. Note that the ICMP packet reappears. Open the PDU and examine the MAC addresses. **Do the MAC addresses of the source and destination align with their IP addresses?**

```
PDU Information at Device: 172.16.31.2                          ×

OSI Model   Outbound PDU Details

At Device: 172.16.31.2
Source: 172.16.31.2
Destination: Broadcast

In Layers                          Out Layers
Layer7                             Layer7
Layer6                             Layer6
Layer5                             Layer5
Layer4                             Layer4
Layer3                             Layer3
                                   Layer 2: Ethernet II Header 000C.
Layer2                             85CC.1DA7 >> FFFF.FFFF.FFFF ARP
                                   Packet Src. IP: 172.16.31.2, Dest. IP:
                                   172.16.31.3
Layer1                             Layer 1: Port(s): FastEthernet0

1. The ARP process constructs a request for the target IP address.
2. The device encapsulates the PDU into an Ethernet frame.
```

Yes.

Ex4/ Part 1/Step 2/ b. Switch back to Realtime and the ping completes.

```
C:\>
ping 172.16.31.3

Pinging 172.16.31.3 with 32 bytes of data:

Reply from 172.16.31.3: bytes=32 time=26ms TTL=128
Reply from 172.16.31.3: bytes=32 time<1ms TTL=128
Reply from 172.16.31.3: bytes=32 time<1ms TTL=128
Reply from 172.16.31.3: bytes=32 time<1ms TTL=128

Ping statistics for 172.16.31.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 26ms, Average = 6ms

C:\>

☐ Top
                                                    🕐Realtime
```

Ex4/ Part 1/Step 2/ c. Click 172.16.31.2 and enter the arp –a command. **To what IP address does the MAC address entry correspond?**

```
C:\>arp -a
  Internet Address       Physical Address       Type
  172.16.31.3            0060.7036.2849         dynamic
```

172.16.31.3

Ex4/ Part 1/Step 2/ d. In general, **when does an end device issue an ARP request?**

When the receiver's MAC address is unknown.

Ex4/ Part 2/Step 1/ a. From 172.16.31.2, enter the ping 172.16.31.4 command.
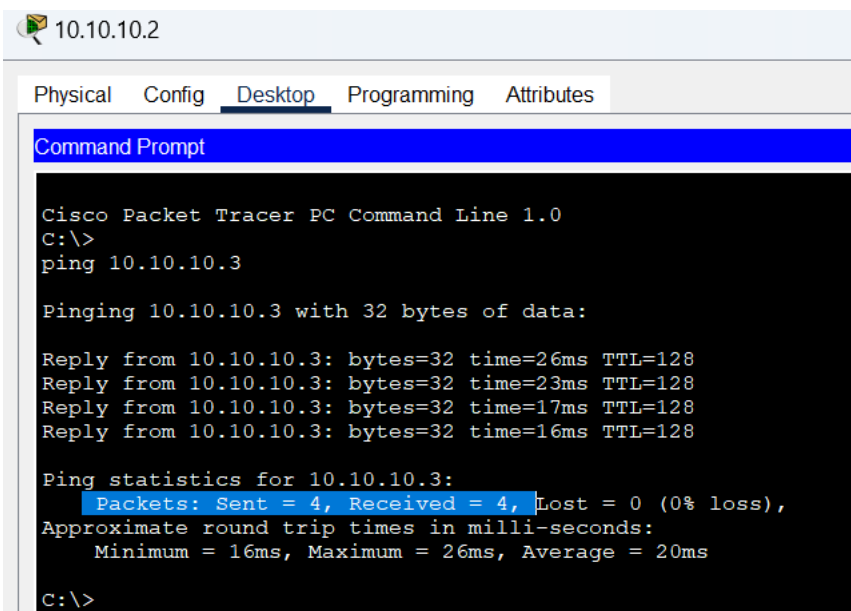
```
C:\>ping 172.16.31.4

Pinging 172.16.31.4 with 32 bytes of data:

Reply from 172.16.31.4: bytes=32 time<1ms TTL=128
Reply from 172.16.31.4: bytes=32 time<1ms TTL=128
Reply from 172.16.31.4: bytes=32 time<1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=2ms TTL=128

Ping statistics for 172.16.31.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>
```

Ex4/ Part 2/Step 1/c. Enter the ping 10.10.10.3 command. **How many replies were sent and received?**

```
10.10.10.2

Physical   Config   Desktop   Programming   Attributes

Command Prompt

Cisco Packet Tracer PC Command Line 1.0
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=26ms TTL=128
Reply from 10.10.10.3: bytes=32 time=23ms TTL=128
Reply from 10.10.10.3: bytes=32 time=17ms TTL=128
Reply from 10.10.10.3: bytes=32 time=16ms 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 = 16ms, Maximum = 26ms, Average = 20ms

C:\>
```

4 sent, 4 received.

Ex4/ Part 2/Step 2/a. Click Switch1 and then the CLI tab. Enter the show mac-address-table command. **Do the entries correspond to those in the table above?**

```
Switch>enable
Switch#show mac-address-table
          Mac Address Table
-------------------------------------------

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

   1    00e0.f7b1.8901    DYNAMIC     Gig0/1
Switch#
```

Yes.

Ex4/ Part 2/Step 2/b. Click Switch0, then the CLI tab. Enter the show mac-address-table command. **Do the entries correspond to those in the table above?**

```
Switch0>enable
Switch0#show mac-address-table
          Mac Address Table
-------------------------------------------

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

  1     0001.6458.2501   DYNAMIC     Gig0/1
Switch0#
```
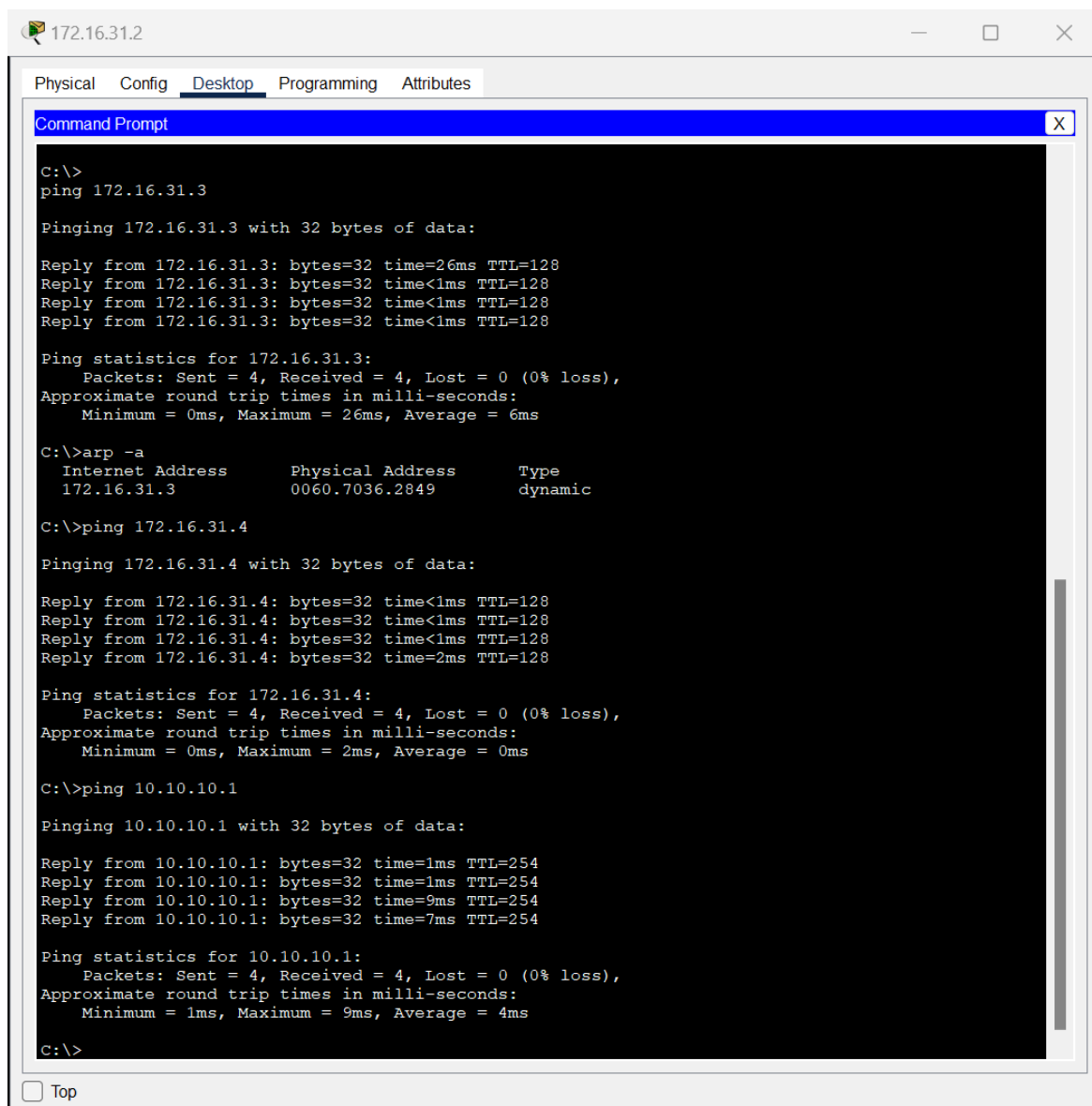
Yes.

Ex4/ Part 2/Step 2/c. **Why are two MAC addresses associated with one port?**

Both devices connect to one port through the Access Point.

Ex4/ Part 3/Step 1/a. Click 172.16.31.2 and open the Command Prompt.

Ex4/ Part 3/Step 1/b. Enter the ping 10.10.10.1 command.

Ex4/ Part 3/Step 1/c. Type arp –a. **What is the IP address of the new ARP table entry?**

```
C:\>arp -a
  Internet Address       Physical Address       Type
  172.16.31.1            00e0.f7b1.8901         dynamic
  172.16.31.3            0060.7036.2849         dynamic
  172.16.31.4            0002.1640.8d75         dynamic
```
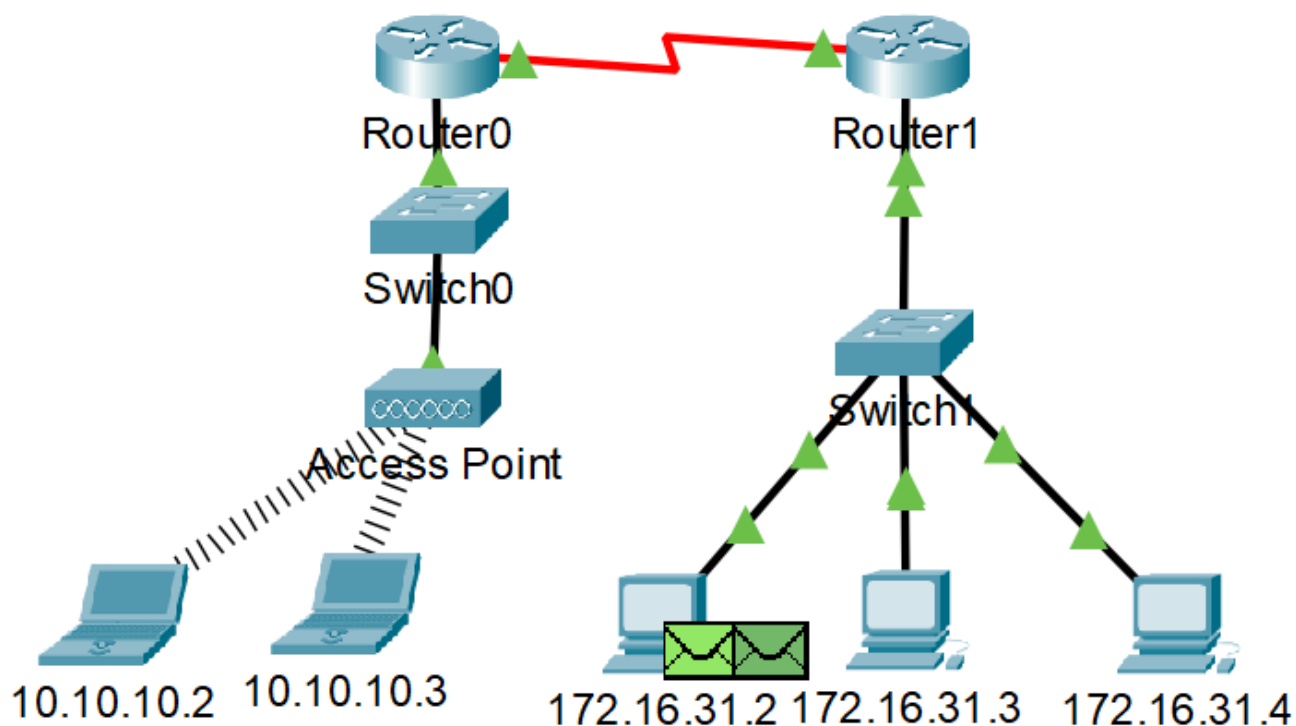
   172.16.31.1

Ex4/ Part 3/Step 1/ d. Enter arp -d to clear the ARP table and switch to Simulation mode.

```
C:\>arp -d
C:\>
```

Ex4/ Part 3/Step 1/ e. Repeat the ping to 10.10.10.1. **How many PDUs appear?**

```
C:\>ping 10.10.10.1

Pinging 10.10.10.1 with 32 bytes of data:
```


   Two.

Ex4/ Part 3/Step 1/ f. Click Capture/Forward. Click the PDU that is now at Switch1. **What is the target destination IP destination address of the ARP request?**

PDU Information at Device: Switch1 ✕

OSI Model | Inbound PDU Details | Outbound PDU Details

At Device: Switch1
Source: 172.16.31.2
Destination: Broadcast

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer3	Layer3
Layer 2: Ethernet II Header 000C.85CC.1DA7 >> FFFF.FFFF.FFFF ARP Packet Src. IP: 172.16.31.2, Dest. IP: 172.16.31.1	Layer 2: Ethernet II Header 000C.85CC.1DA7 >> FFFF.FFFF.FFFF ARP Packet Src. IP: 172.16.31.2, Dest. IP: 172.16.31.1
Layer 1: Port FastEthernet0/1	Layer 1: Port(s): FastEthernet0/2 FastEthernet0/3 GigabitEthernet0/1

1. FastEthernet0/1 receives the frame.

172.16.31.1

Ex4/ Part 3/Step 1/ g. The destination IP address is not 10.10.10.1. **Why?**

The host's IPv4 configuration stores the gateway address, typically the router interface within the same network. If the destination isn't on the local network, the source initiates the ARP process to find the MAC address corresponding to the router interface acting as the gateway.

Ex4/ Part 3/Step 2/a. Switch to Realtime mode. Click Router1 and then the CLI tab.

Ex4/ Part 3/Step 2/b. Enter privileged EXEC mode and then the show mac-address-table command. **How many MAC addresses are in the table? Why?**

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

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

Router#
```

Zero, because the command "show mac address-table" serves a distinct purpose compared to the switch command.

Ex4/ Part 3/Step 2/c. Enter the show arp command. **Is there an entry for 172.16.31.2? What happens to the first ping in a situation where the router responds to the ARP request?**

```
Router#show arp
Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  172.16.31.1            -     00E0.F7B1.8901  ARPA   GigabitEthernet0/0
Internet  172.16.31.2            8     000C.85CC.1DA7  ARPA   GigabitEthernet0/0
Router#
```

Yes. The times out.

Cisco Packet Tracer - C:\Users\16273\GitHub\ISEP-Documents\2309-2401\Réseaux et Networks\TP2-EN\TP2-ex4.pka - Guest - 2016-08-24 15:25:38

File   Edit   Options   View   Tools   Extensions   Window   Help

Activity Results

Congratulations Guest! You completed the activity.

Overall Feedback   Assessment Items   Connectivity Tests