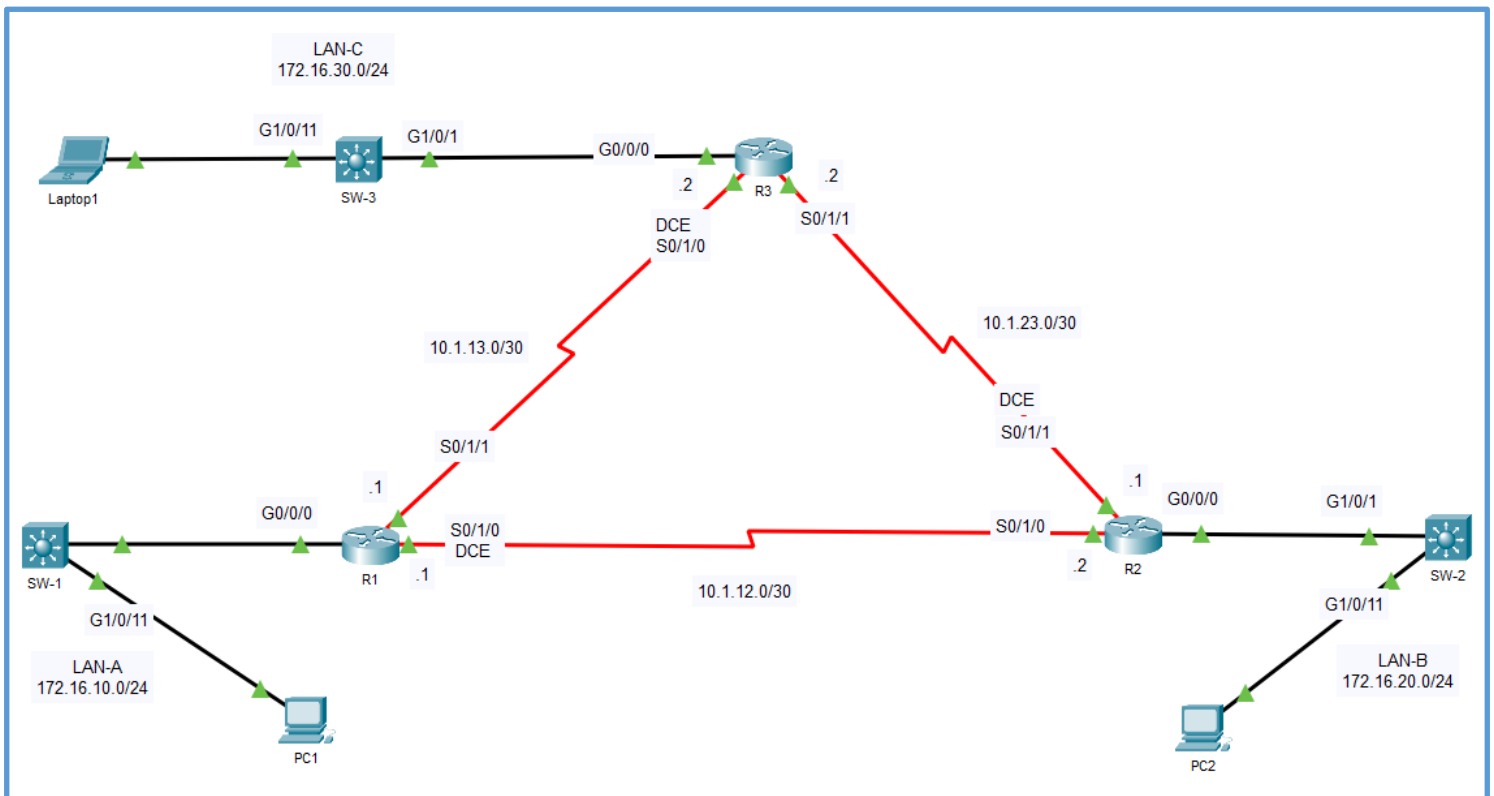## Lab Activity 1 – ACL Configuration:

There are three switches and three routers connected. Please develop the following topology on the physical pod/rack in the lab room.

Required Resources:

- Three Layer-3/Multilayer Switches (Cisco Catalyst 1000 Series with Cisco IOS Release 15.1+ image)
- Three Routers (Cisco 4221 with Cisco IOS Release 17.6+ image)
- Two PCs and one laptop (Windows with Terminal Emulation Program)
- Cables:
    - Console cables to configure the Cisco IOS devices via the console port.
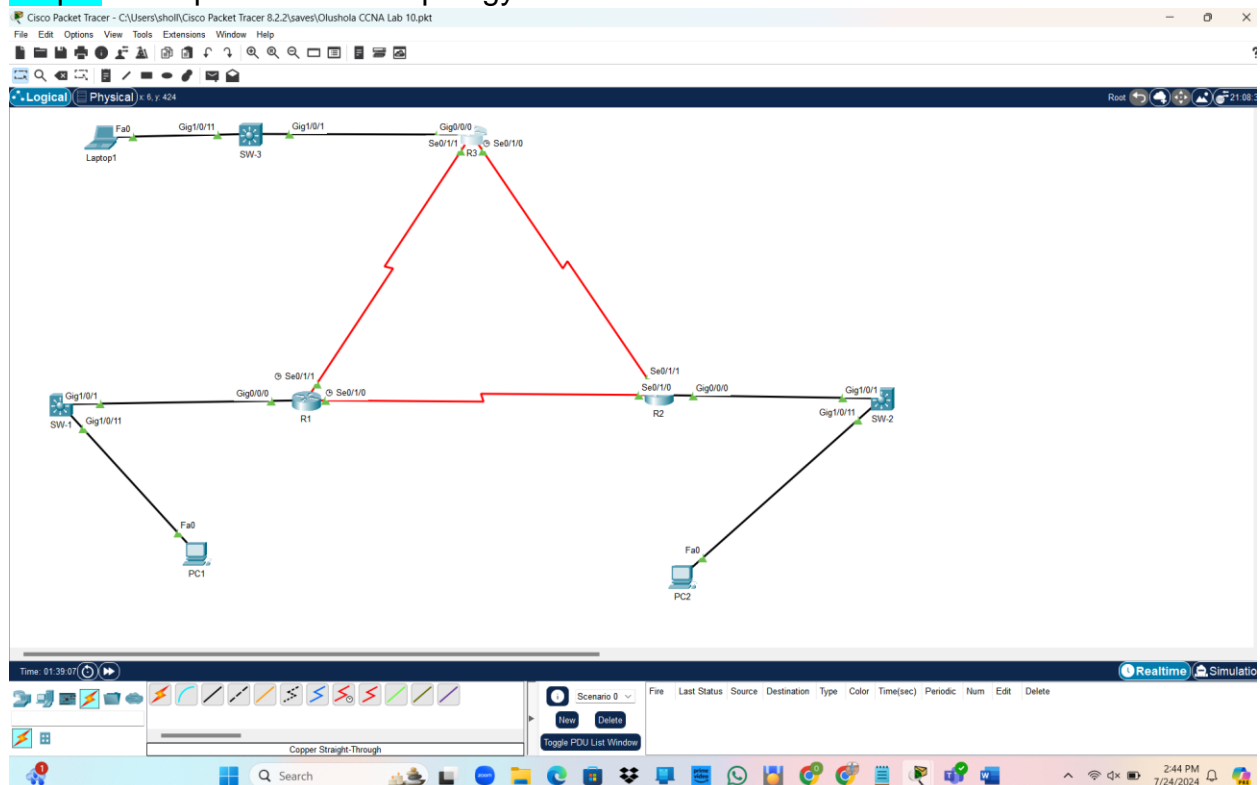   - Ethernet and serial cables as shown in the topology.

Addressing Table:

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0/0	172.16.10.1	255.255.255.0	N/A
	S0/1/0	10.1.12.1	255.255.255.252	
	S0/1/1	10.1.13.1	255.255.255.252	
R2	G0/0/0	172.16.20.1	255.255.255.0	N/A
	S0/1/0	10.1.12.2	255.255.255.252	
	S0/1/1	10.1.23.1	255.255.255.252	
R3	G0/0/0	172.16.30.1	255.255.255.0	N/A
	S0/1/0	10.1.13.2	255.255.255.252	
	S0/1/1	10.1.23.2	255.255.255.252	
SW-1	VLAN 77	172.16.10.2	255.255.255.0	172.16.10.1
SW-2	VLAN 77	172.16.20.2	255.255.255.0	172.16.20.1
SW-3	VLAN 77	172.16.30.2	255.255.255.0	172.16.30.1
PC1	NIC	172.16.10.10	255.255.255.0	172.16.10.1
PC2	NIC	172.16.20.20	255.255.255.0	172.16.20.1
Laptop1	NIC	172.16.30.30	255.255.255.0	172.16.30.1

Part –1:

Instructions:

Step 1: Set up the network topology.

Step 2: Configure and verify basic switch settings on all switches.

3

SW-1

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/11, chan

Switch>enable
Switch#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SW1
SW1(config)#no ip domain-lookup
SW1(config)#banner motd "Warning! Authorized Access only!"
SW1(config)#
SW1(config)#line console 0
SW1(config)#enable secret cisco
SW1(config-line)#password trios
SW1(config-line)#login
SW1(config-line)#logging synchronous
SW1(config-line)#exit
SW1(config)#line vty 0 15
SW1(config-line)#password trios
SW1(config-line)#login local
SW1(config-line)#exit
SW1(config)#service password-encryption
SW1(config)#interface vlan 77
SW1(config-if)#ip address 172.16.10.2 255.255.255.0
SW1(config-if)#no shutdown
SW1(config-if)#exit
SW1(config)#ip default-gateway 172.16.10.1
SW1(config)#exit
SW1#copy running-config  startup-config
%SYS-5-CONFIG_I: Configured from console by console

SW1#copy running-config  startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW1#
%LINK-5-CHANGED: Interface GigabitEthernet1/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/1, chang

SW1#
```

SW-2

```
% Please answer 'yes' or 'no'.
Would you like to enter the initial configuration dialog?

Press RETURN to get started!


Switch>enable
Switch#config terminal
Enter configuration commands, one per line.  End with CNT
Switch(config)#hostname SW2
SW2(config)#no ip domain-lookup
SW2(config)#banner motd "Warning! Authorized Access only!
SW2(config)#
SW2(config)#enable secret cisco
SW2(config)#line console 0
SW2(config-line)#password trios
SW2(config-line)#login
SW2(config-line)#logging synchronous
SW2(config-line)#exit
SW2(config)#line vty 0 15
SW2(config-line)#password trios
SW2(config-line)#login local
SW2(config-line)#exit
SW2(config)#service password-encryption
SW2(config)#interface vlan 77
SW2(config-if)#ip address 172.16.20.2 255.255.255.0
SW2(config-if)#no shutdown
SW2(config-if)#exit
SW2(config)#ip default-gateway 172.16.20.1
SW2(config)#exit
SW2#copy running-config  startup-config
%SYS-5-CONFIG_I: Configured from console by console

SW2#copy running-config  startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW2#
```

SW-3

```
Press RETURN to get started!

%LINK-5-CHANGED: Interface GigabitEthernet1/0/11, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/11, changed state to up

Switch>
Switch>enable
Switch#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SW3
SW3(config)#no ip domain-lookup
SW3(config)#banner motd "Warning! Authorized Access only!"
SW3(config)#
SW3(config)#enable secret cisco
SW3(config)#line console 0
SW3(config-line)#password trios
SW3(config-line)#login
SW3(config-line)#logging synchronous
SW3(config-line)#exit
SW3(config)#line vty 0 15
SW3(config-line)#password trios
SW3(config-line)#login local
SW3(config-line)#exit
SW3(config)#service password-encryption
SW3(config)#interface vlan 77
SW3(config-if)#ip address 172.16.30.2 255.255.255.0
SW3(config-if)#no shutdown
SW3(config-if)#exit
SW3(config)#ip default-gateway 172.16.30.1
SW3(config)#exit
SW3#copy running-config  startup-config
%SYS-5-CONFIG_I: Configured from console by console

SW3#copy running-config  startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

LAN-C
172.16.30.0/24

10.1.23.0/30

SW-1

```
%LINK-5-CHANGED: Interface Vlan77, changed state to up

SW1(config-vlan)#name Management
SW1(config-vlan)#exit
SW1(config)#
SW1(config)#int range g0/0/1-24
interface range not validated - command rejected
SW1(config)#int range g0/0/1, g0/0/11
interface range not validated - command rejected
SW1(config)#
SW1(config)#
SW1(config)#int range g1/0/1, g1/0/11
SW1(config-if-range)#switchport mode access
SW1(config-if-range)#switchport access vlan 77
SW1(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan77, changed state to up

SW1(config-if-range)#exit
SW1(config)#exit
SW1#
%SYS-5-CONFIG_I: Configured from console by console

SW1#wr mem
Building configuration...
Compressed configuration from 7383 bytes to 3601 bytes[OK]
[OK]
SW1#
```

SW-2

```
SW1(config)#
SW1(config)#
SW2(config)#int range g1/0/1, g1/0/11
SW2(config-if-range)#switchport mode access
SW2(config-if-range)#switchport access vlan 77
SW2(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan77, changed state to up

SW2(config-if-range)#exit
SW1(config)#exit
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2#
SW2#wr mem
Building configuration...
Compressed configuration from 7383 bytes to 3601 bytes[OK]
[OK]
SW2#
```

SW-3

```
SW3(config-vlan)#
SW3(config-vlan)#
SW3(config-vlan)#
SW3(config-vlan)#exit
SW3(config)#
SW3(config)#inter range
% Incomplete command.
SW3(config)#inter range g1/0/1, g1/0/11
SW3(config-if-range)#switchport mode access
SW3(config-if-range)#switchport access vlan 77
SW3(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan77, changed state to up

SW3(config-if-range)#exit
SW3(config)#exit
SW3#
%SYS-5-CONFIG_I: Configured from console by console

SW3#
SW3#
SW3#wr mem
```

Step 3: Configure and verify connectivity in basic router settings on all routers.

R1 CLI:
```
Router>Enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R1
R1(config)#no ip domain-lookup
R1(config)#banner motd "Warning! Authorized Access Only!"
R1(config)#enable secret cisco
R1(config)#line console 0
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#logging synchronous
R1(config-line)#exit
R1(config)#line vty 0 4
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#interface g0/0/0
R1(config-if)#ip address 172.16.10.1 255.255.255.0
R1(config-if)#no shutdown

R1(config-if)#exit
R1(config)#interface s0/1/0
R1(config-if)#ip address 10.1.12.1 255.255.255.252
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
R1(config-if)#exit
R1(config)#interface s0/1/1
R1(config-if)#ip address 10.1.13.1 255.255.255.252
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
R1(config-if)#exit
R1(config)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed sta

R1(config)#rip
          ^
% Invalid input detected at '^' marker.

R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#no auto-summary
R1(config-router)#network 172.16.10.0
R1(config-router)#network 10.1.12.0
R1(config-router)#network 10.1.13.0
R1(config-router)#passive-interface g0/0/0
R1(config-router)#end
R1#copy running-config startup-config
Destination filename [startup-config]?
%SYS-5-CONFIG_I: Configured from console by console

Destination filename [startup-config]?
Building configuration...
[OK]
```

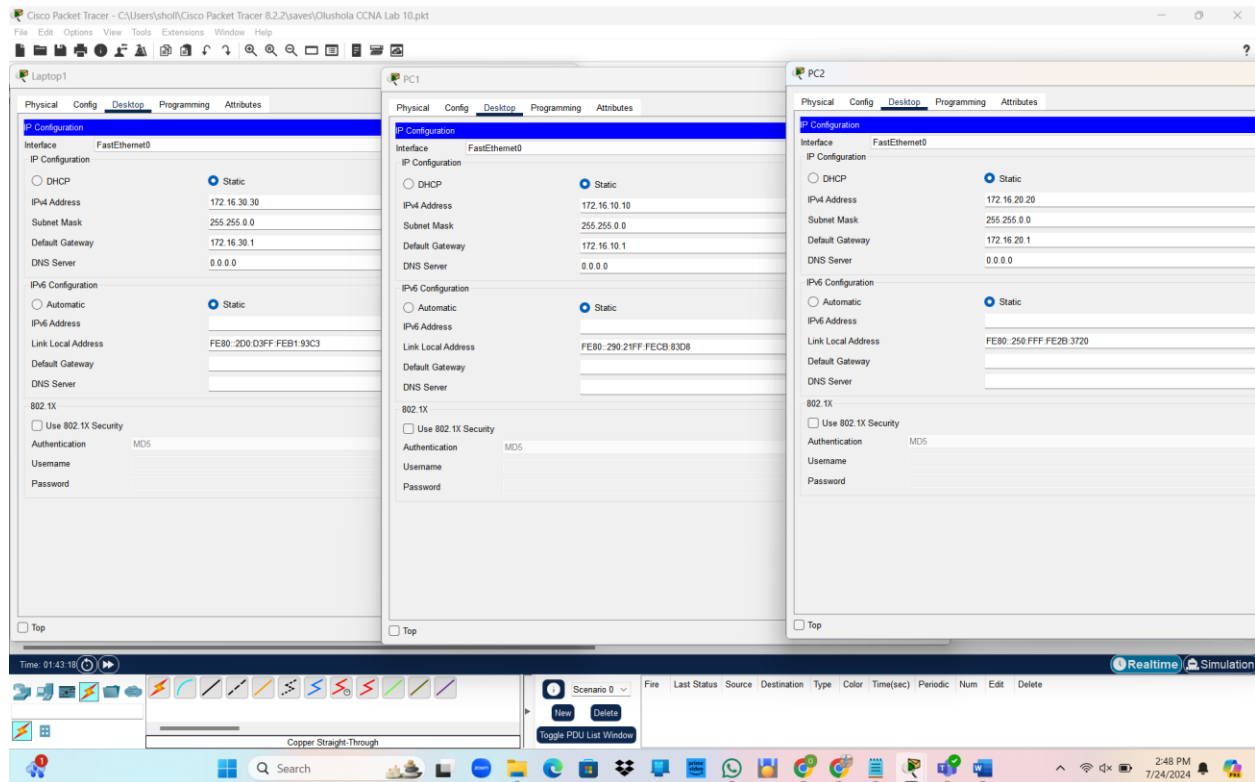**R2 CLI:**
```
Router(config)#hostname R2
R2(config)#ip domain-lookup
R2(config)#banner motd "Warning! Authorized Access On
R2(config)#enable secret cisco
R2(config)#line console 0
R2(config-line)#password cisco
R2(config-line)#login
R2(config-line)#logging synchronous
R2(config-line)#exit
R2(config)#line vty 0 4
R2(config-line)#password cisco
R2(config-line)#login
R2(config-line)#exit
R2(config)#service password-encryption
R2(config)#interface g0/0/0
R2(config-if)#ip address 172.16.20.1 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#exit
R2(config)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, cha

%LINEPROTO-5-UPDOWN: Line protocol on Interface Giga

R2(config)#interface s0/1/0
R2(config-if)#ip address 10.1.12.2 255.255.255.252
R2(config-if)#no shutdown

R2(config-if)#exit
R2(config)#interface s0/1/1
R2(config-if)#ip address 10.1.23.1 255.255.255.252
R2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state
R2(config-if)#exit
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#no auto-summary
R2(config-router)#network 172.16.20.0
R2(config-router)#network 10.1.12.0
R2(config-router)#network 10.1.23.0
R2(config-router)#passive interface g0/0/0
                                      ^
% Invalid input detected at '^' marker.

R2(config-router)#end
R2#copy running-config startup-config
Destination filename [startup-config]?
%LINK-5-CHANGED: Interface Serial0/1/0, changed stat

%SYS-5-CONFIG_I: Configured from console by console

Destination filename [startup-config]?
Building configuration...
[OK]
R2#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Seri
```
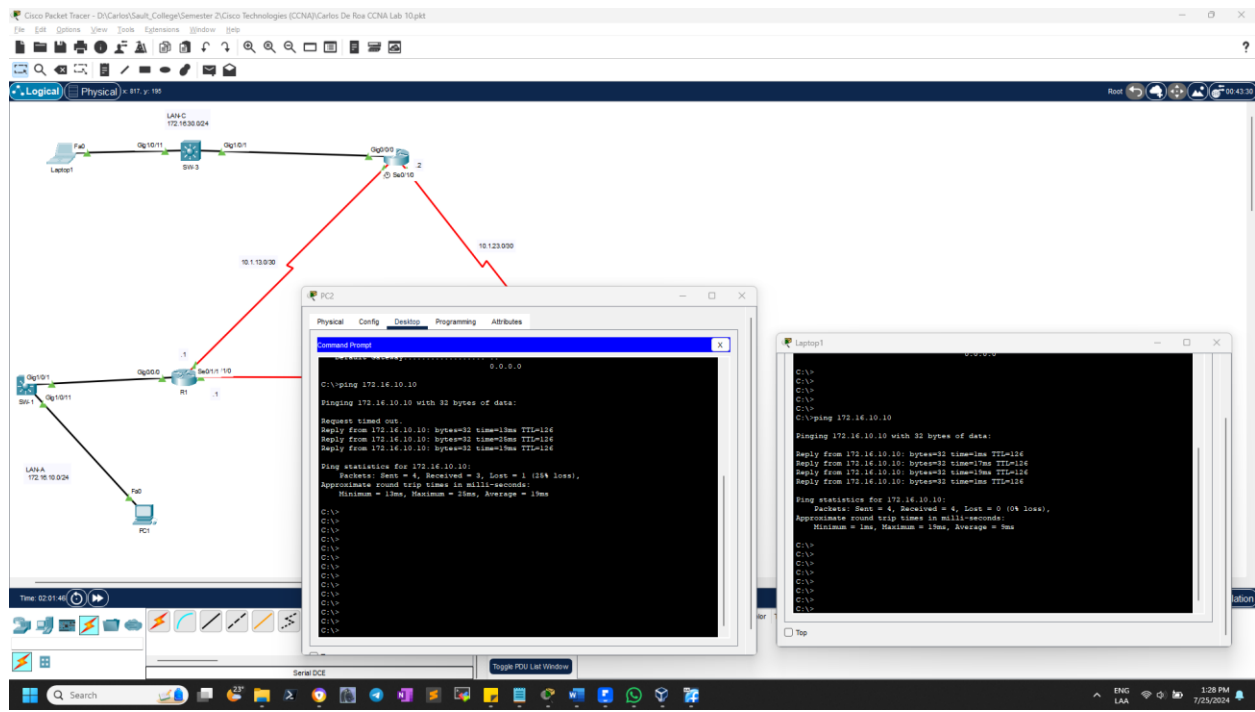
R3 CLI:
```
R3(config-line)#password cisco
R3(config-line)#login
R3(config-line)#logging synchronous
R3(config-line)#exit
R3(config)#line vty 0 4
R3(config-line)#password cisco
R3(config-line)#login
R3(config-line)#exit
R3(config)#service password-encryption
R3(config)#interface g0/0/0
R3(config-if)#ip address 172.16.30.1 255.255.255.0
R3(config-if)#no shutdown

R3(config-if)#exit
R3(config-if)#interface s0/1/0
R3(config-if)#ip address 10.1.13.2 255.255.255.252
R3(config-if)#no shutdown

R3(config-if)#exit
R3(config-if)#interface s0/1/1
R3(config-if)#ip address 10.1.23.2 255.255.255.252
R3(config-if)#no shutdown

R3(config-if)#exit
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up

R3(config-if)#exit
R3(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up

R3(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up

R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#no auto-summary
R3(config-router)#network 172.16.30.0
R3(config-router)#network 10.1.13.0
R3(config-router)#network 10.1.23.0
R3(config-router)#passive-interface g0/0/0
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#wite memory
      ^
% Invalid input detected at '^' marker.

R3#write memory
Building configuration...
[OK]
R3#
```


Cisco Packet Tracer - C:\Users\sholl\Cisco Packet Tracer 8.2.2\saves\Olushola CCNA Lab 10.pkt

R1 CLI:
```
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up

%SYS-5-CONFIG_I: Configured from console by console

Destination filename [startup-config]?
Building configuration...
[OK]
R1#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed
R1#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed

R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ip route 172.16.20.0 255.255.255.0 10.1.12.2
R1(config)#ip route 172.16.30.0 255.255.255.0 10.1.13.2
R1(config)#ip route 10.1.23.0 255.255.255.252 10.1.13.2
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr mem
                ^
% Invalid input detected at '^' marker.

R1#wr mem
Building configuration...
[OK]
R1#




R1 con0 is now available
```

R2 CLI:
```
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state

%LINK-3-UPDOWN: Interface Serial0/1/0, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state

Warning! Authorized Access Only!

User Access Verification

Password:
Password:
Password:

R2>en
Password:
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip route 172.16.10.0 255.255.255.0 10.1.12.1
R2(config)#ip route 172.16.30.0 255.255.255.0 10.1.23.2
R2(config)#ip route 10.1.13.0 255.255.255.252 10.1.12.1
R2(config)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#wr mem
Building configuration...
[OK]
R2#
```

R3 CLI:
```
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up

%LINK-3-UPDOWN: Interface Serial0/1/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to down

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up

Warning! Authorized Access Only!

User Access Verification

Password:
Password:

R3>en
Password:
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ip route 0.0.0.0 0.0.0.0. 10.1.13.1
                                    ^
% Invalid input detected at '^' marker.

R3(config)#ip route 0.0.0.0 0.0.0.0 10.1.13.1
R3(config)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#wr mem
Building configuration...
[OK]
R3#
```

Step 4: Configure the PCs and laptop.

Step 5: Verify connectivity.
- Ping to PC2 from PC1.
- Ping to Laptop1 from PC1.

- Ping to SVI of S1 from PC2.
- Ping to SVI of S2 from PC2.
- Ping to SVI of S3 from PC2.

- Ping to G0/0/0 interface of R1 from Laptop1.
- Ping to S0/1/0 interface of R1 from Laptop1.
- Ping to S0/1/1 interface of R1 from Laptop1.

- Ping to G0/0/0 interface of R2 from PC1.
- Ping to S0/1/0 interface of R2 from PC1.
- Ping to s0/1/1 interface of R2 from PC1.
- Ping to G0/0/0 interface of R3 from PC2.

Part 2:
Implement Access Control List:
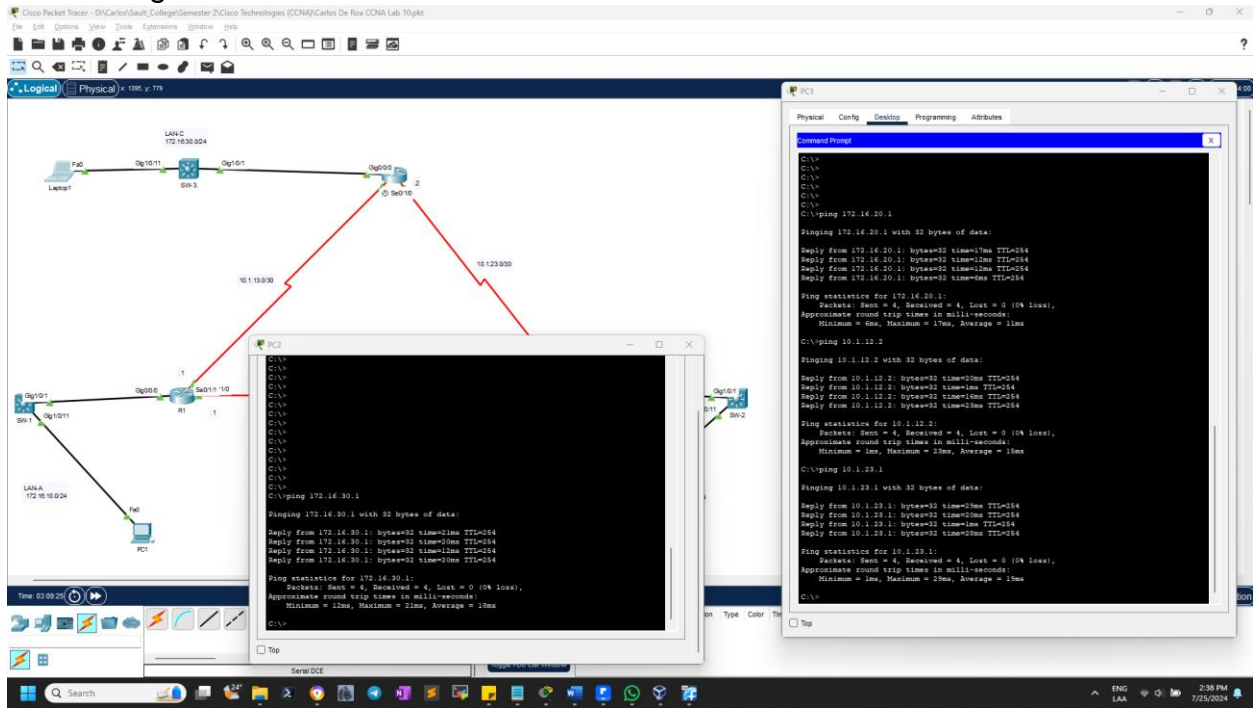
R2 ACL configuration

R3

Step 4: Verify ACL configuration as per planning.

- Use the following commands to verify ACL configuration and placement on R3.
  For example:
  - *show access-list*
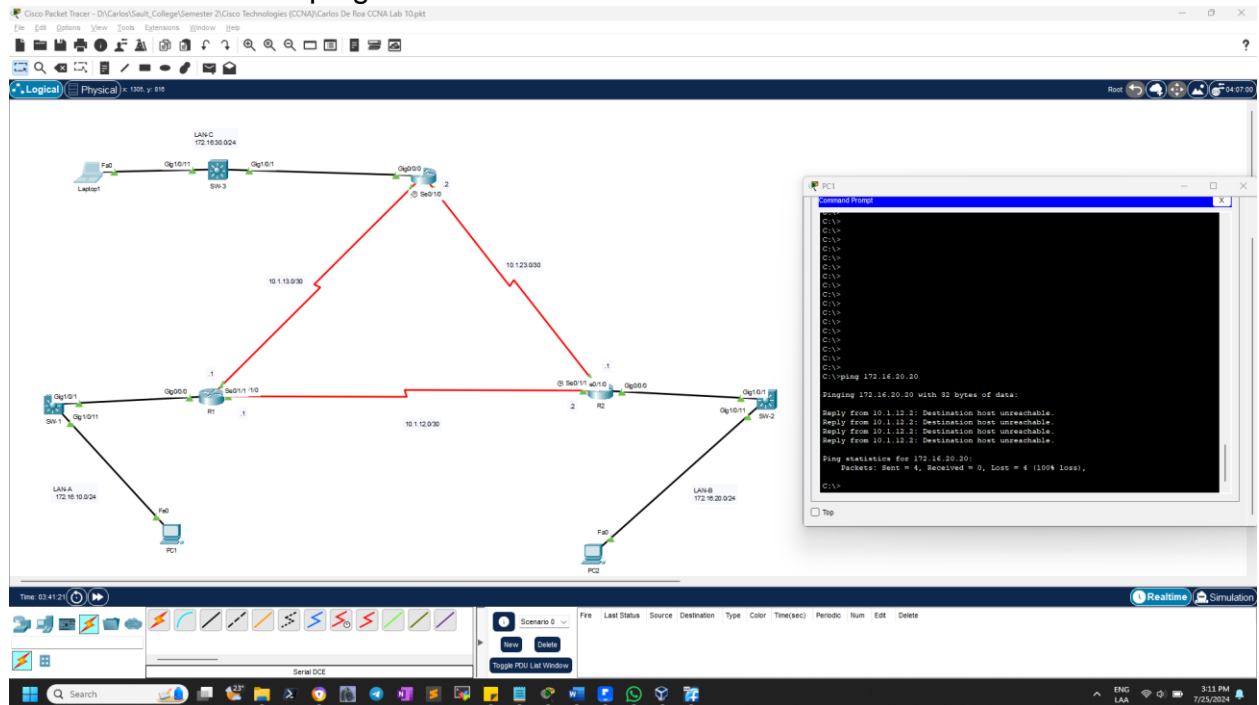 - *show ip interface g0/0/0*
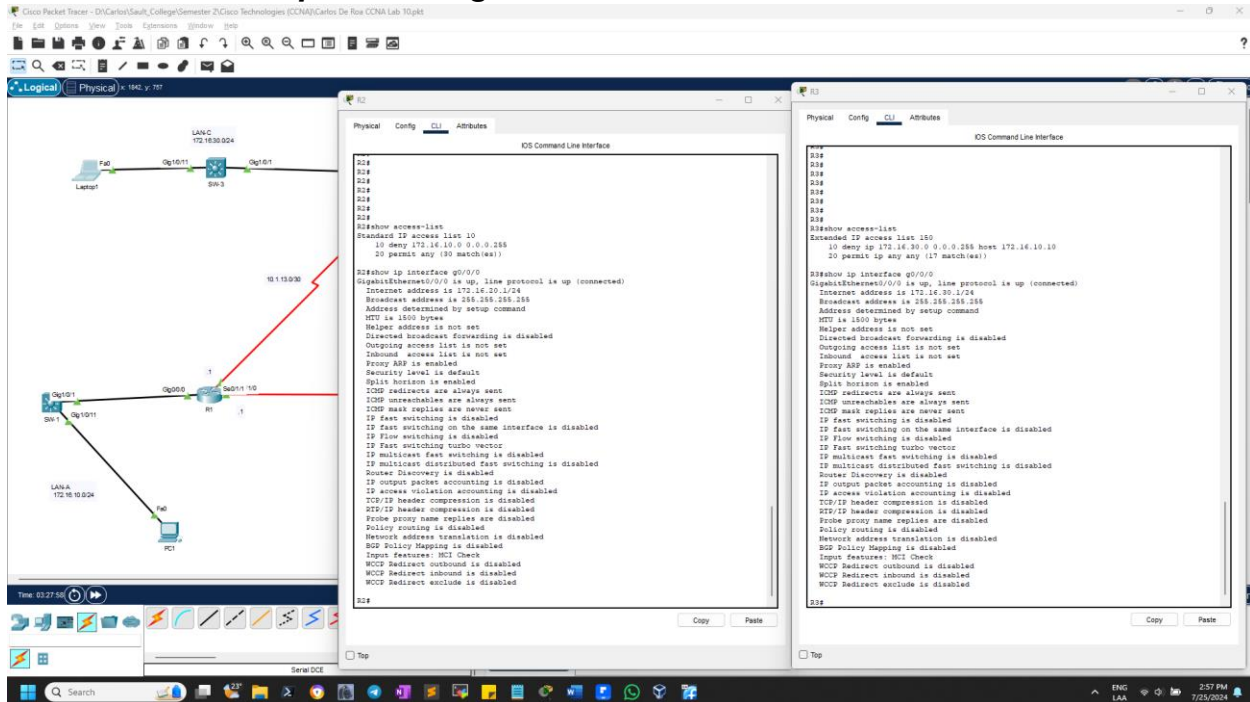
  - *show running-config*
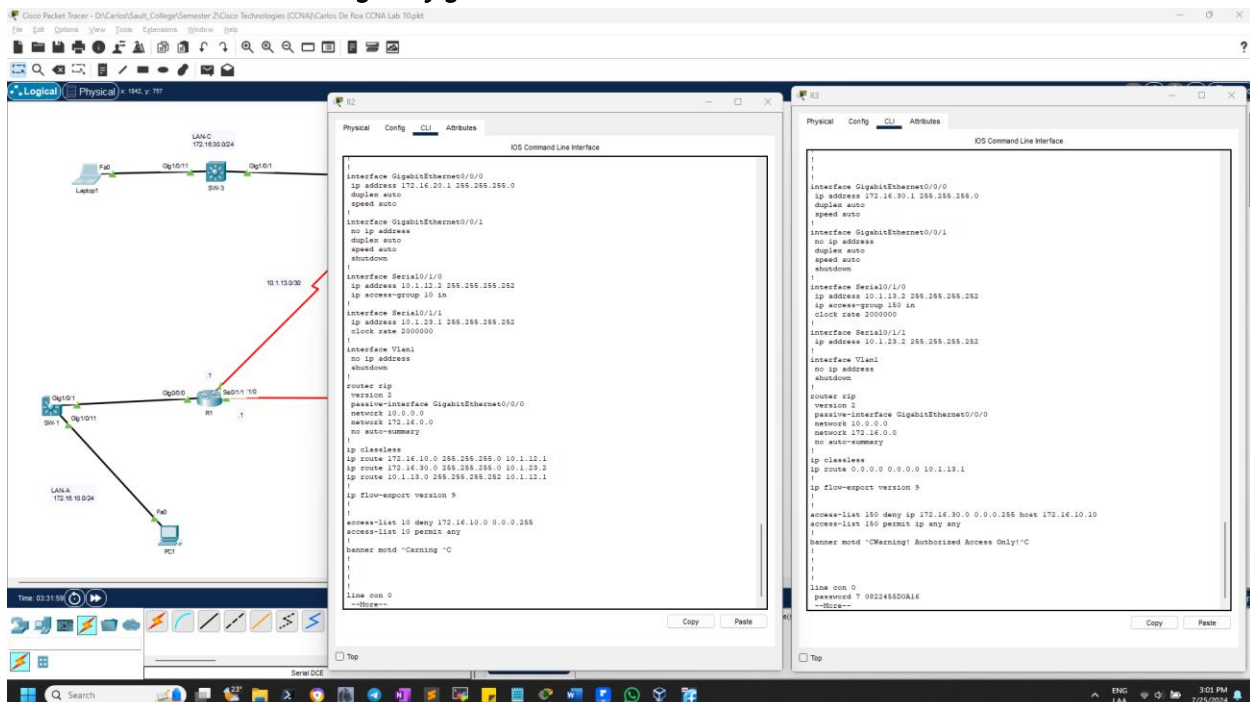
- Use similar commands to verify ACL configuration and placement on R2 as well.
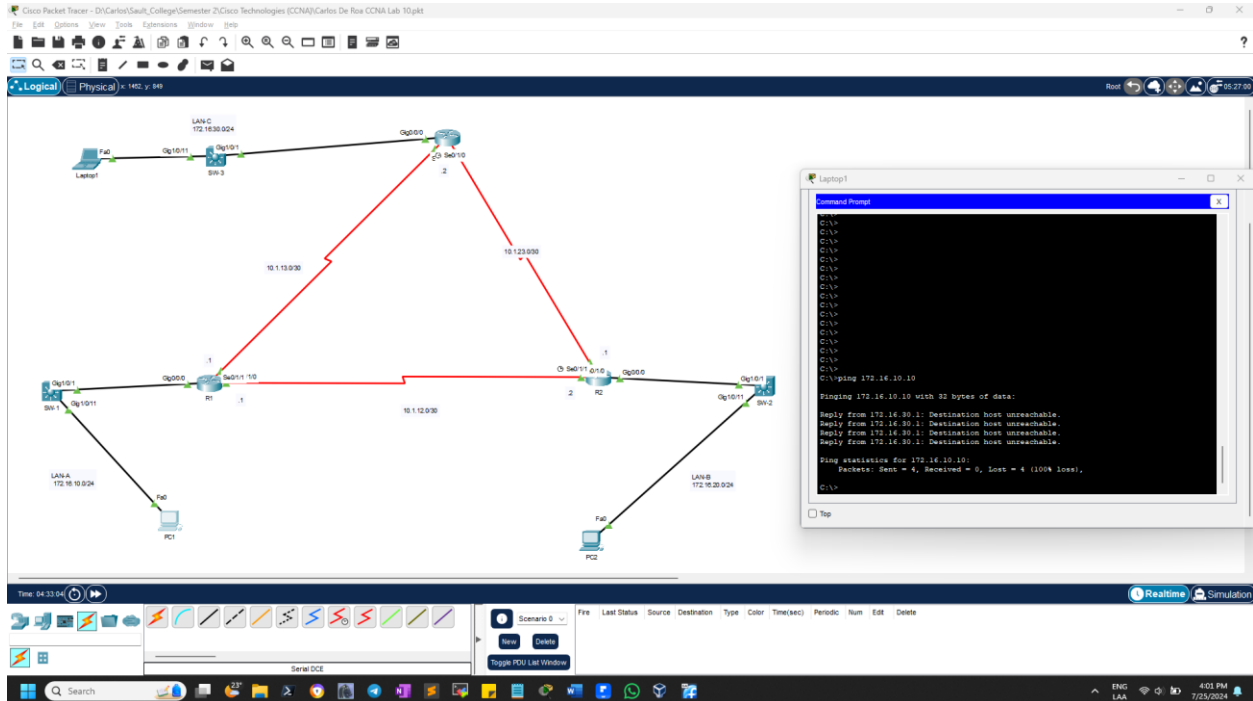- A successful ping from Laptop1 to PC2 in LAN-B network.
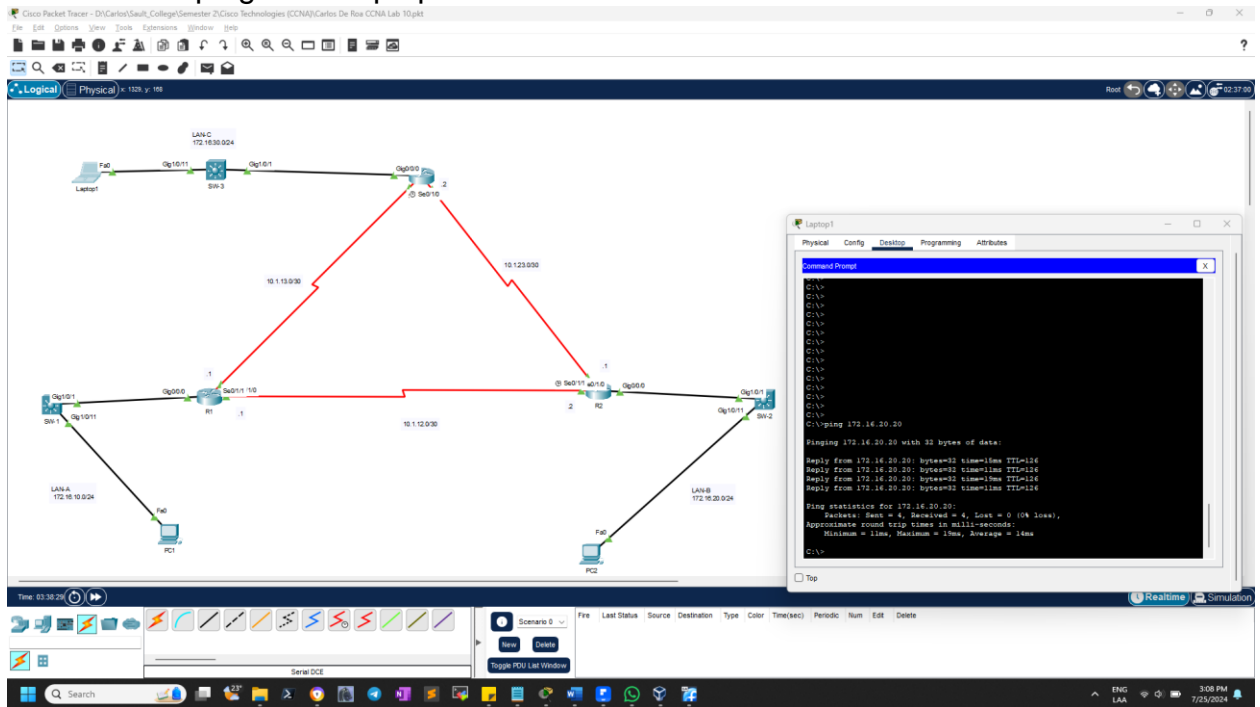
- A successful ping from PC1 to Laptop1 in LAN-C network. (Unsuccessfull)
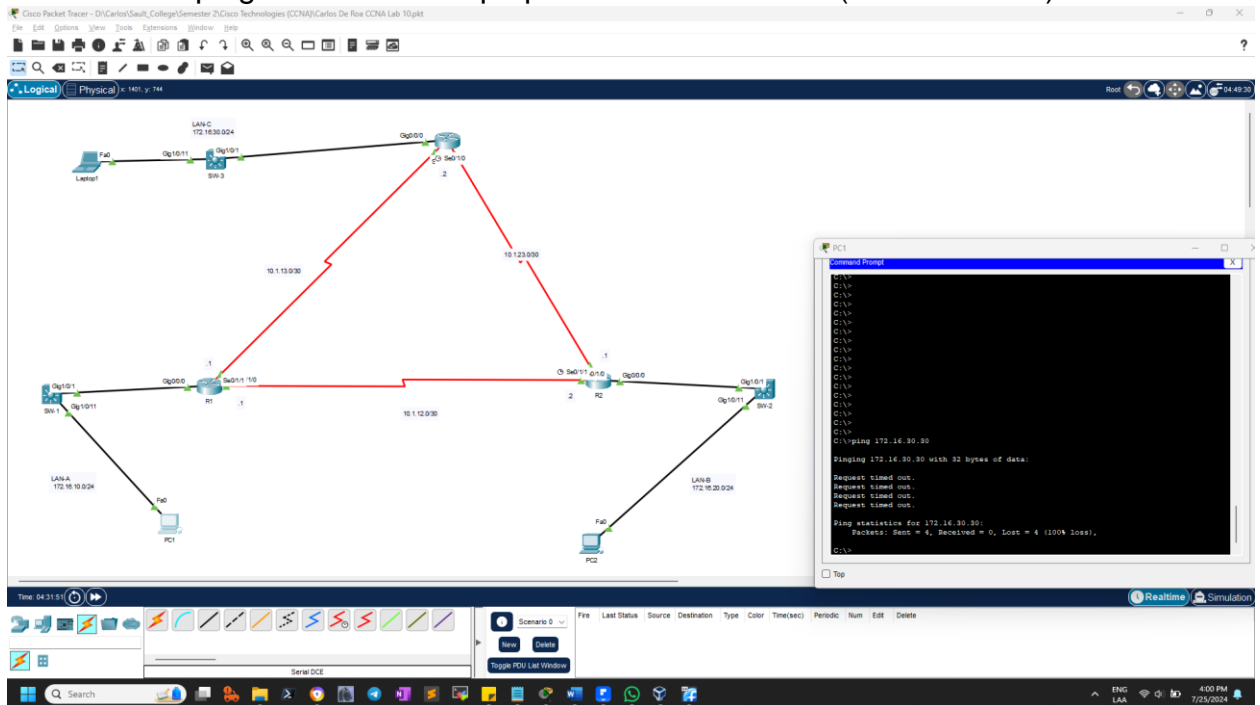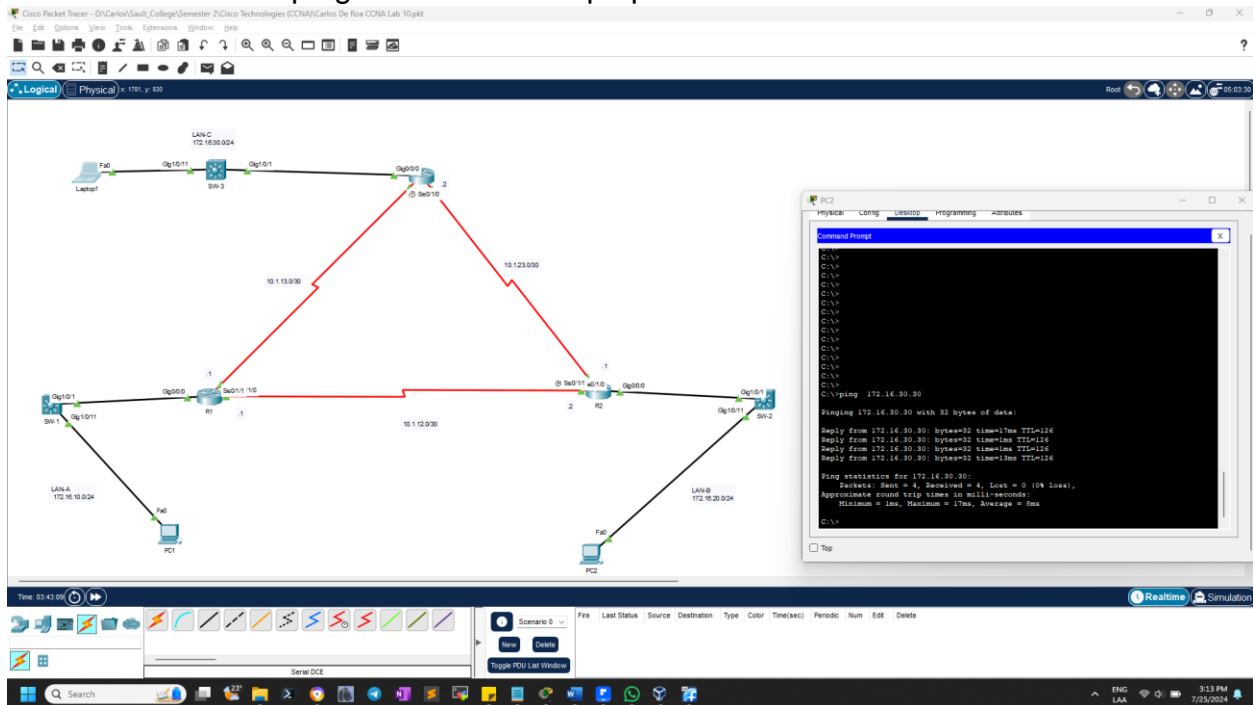
- An un-successful ping from PC1 to PC2 in LAN-B network.

- An un-successful ping from Laptop1 to PC1 in LAN-A network.

- A successful ping from PC-2 to Laptop1 in LAN-C network.

Question:
   (a) If PC-2 tries to ping to PC-1, will it be successful or not? Provide the appropriate reason to support your answer.

The reason is PC1 is configured (into Standard Access Control List) not to access Vlan B, 172.16.20.0; then PC1 can not sent an answer back to VLAN-A 172.16.10.0

   (b) If PC-1 tries to ping to Laptop1, will it be successful, or not? Provide the appropriate reason to support your answer.

Extended Access Control List was configured in R3 in order to deny access to Laptop-1 for any host coming to LAN-A 172.16.10.0, but permit access for others LANs is possible,