

ASSIGNMENT 1: BUILD A SWITCH AND ROUTER NETWORK WRITEUP

Introduction

In this lab we learned how to build a switch and router network. The assignment was divided into three major parts where the first part was on setting up a topology on packet tracer and initializing devices, the second part comprised of configuring basic settings on the devices and verifying their connectivity using ping commands and the final part was using different commands to display device information.

Part 1: Set Up Topology and Initialize Devices

In this part, setting up of the topology was done as well as initializing and reloading the router and switch. Attachment of the devices shown in the topology diagram, and cable.

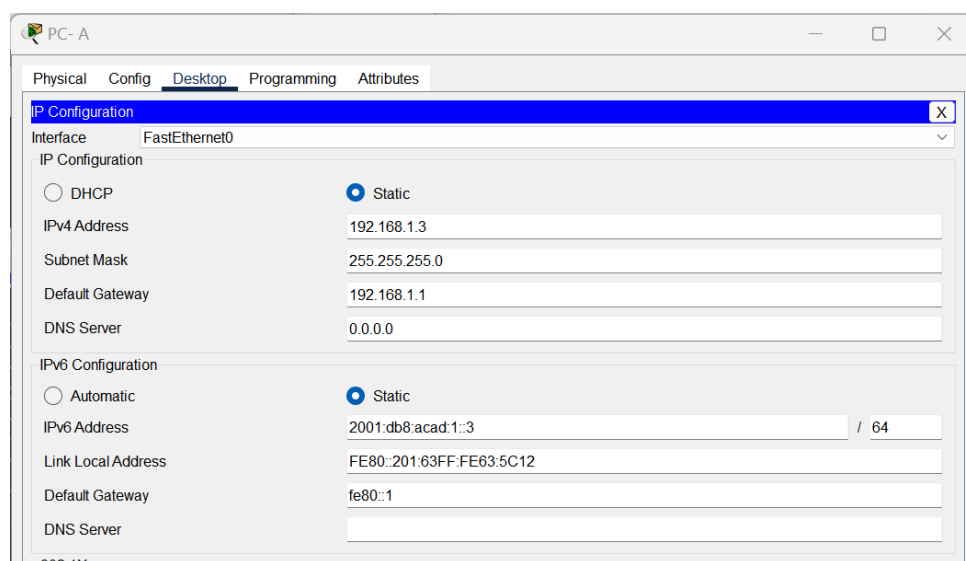


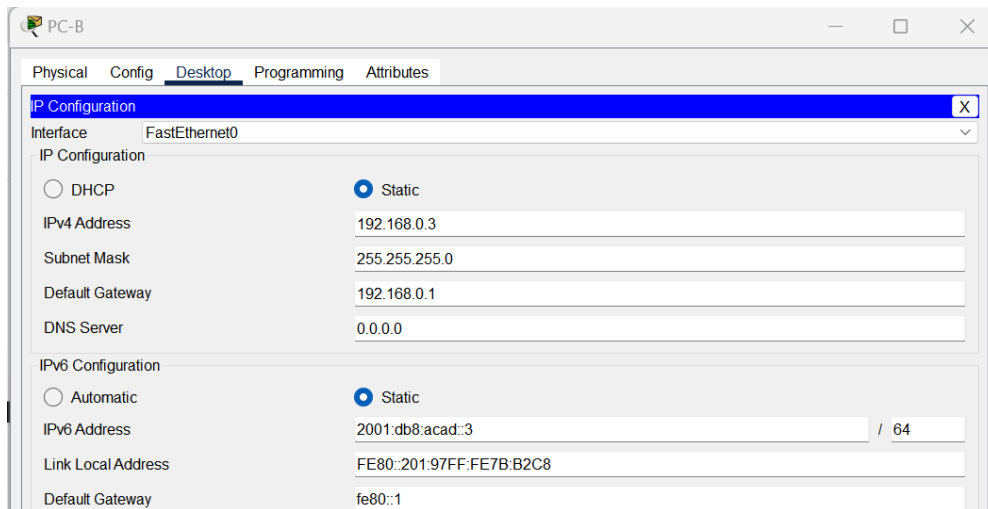
Part 2: Configure Devices and Verify Connectivity

In Part 2, configuration of the basic settings, such as the interface IP addresses, device access, and passwords were done.

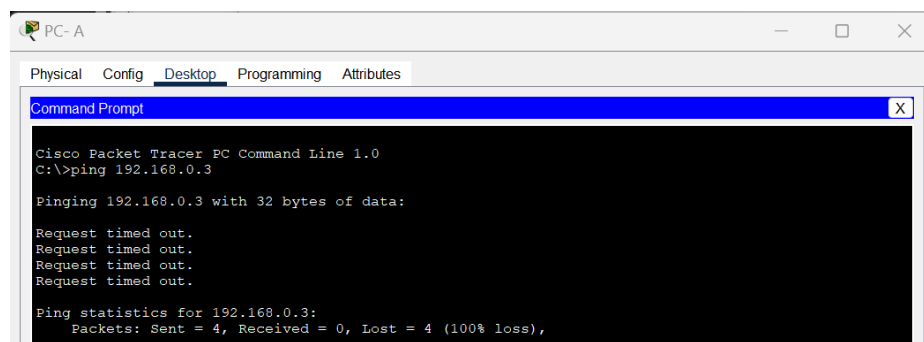
Step 1: Assign static IP information to the PC interfaces.

In this step configuration of the IP address, subnet mask, and default gateway settings are done on PC-A and PC-B as shown below:





To confirm Ping PC-B from a command prompt window on PC-A.



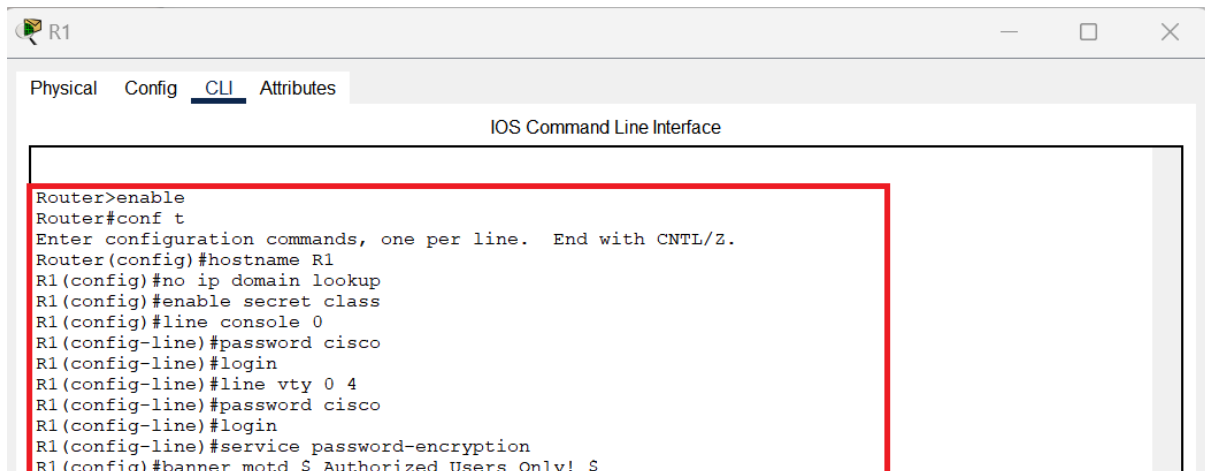
Question:

Why were the pings not successful?

The pings were not successful because the router interfaces (default gateways) have not been configured yet so Layer 3 traffic is not being routed between subnets.

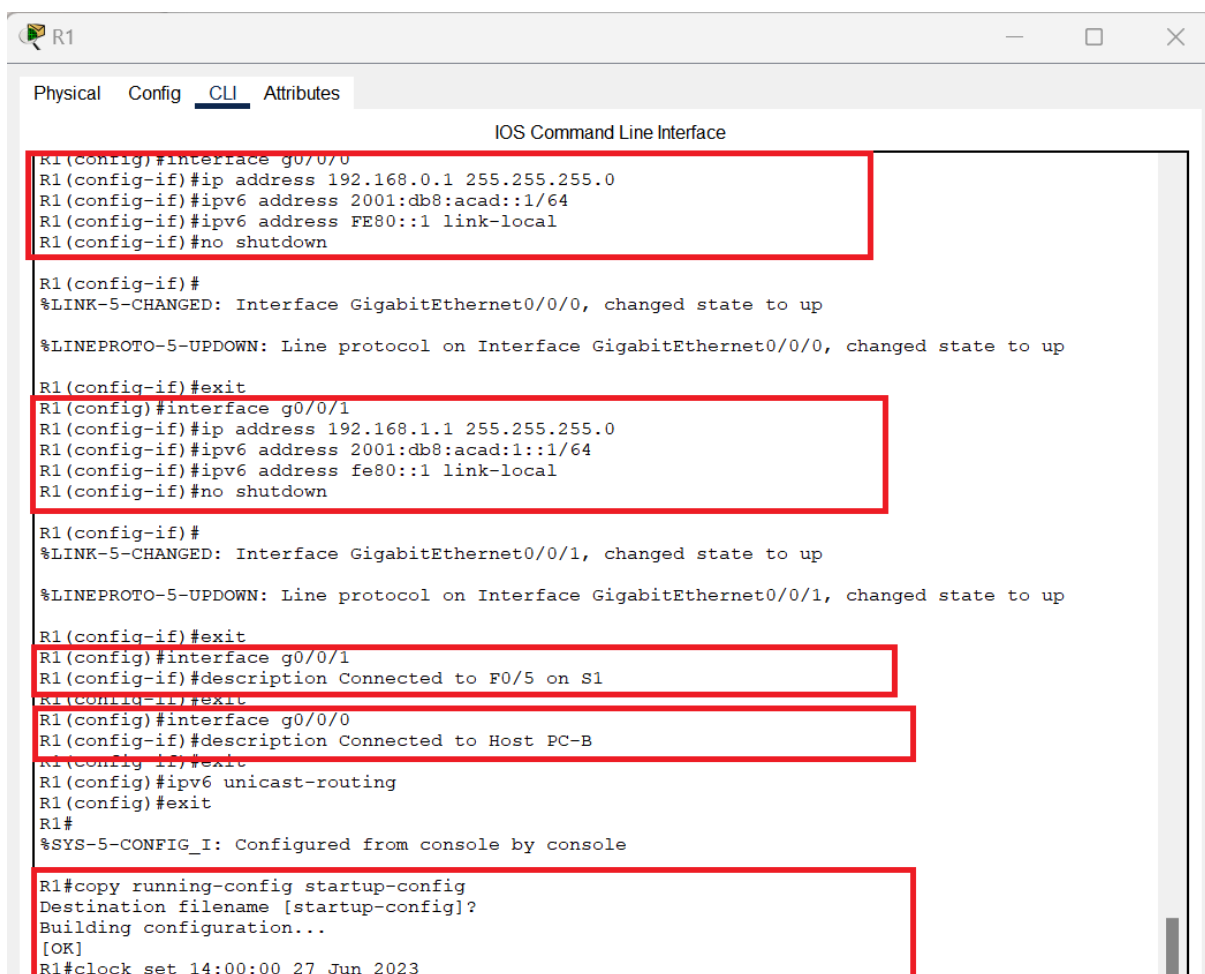
Step 2: Configure the router.

In this step configuration of the hostname, DNS lookup, and activation of both interfaces on the router was done. The following displays the configuration:



```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#no ip domain lookup
R1(config)#enable secret class
R1(config)#line console 0
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#line vty 0 4
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#service password-encryption
R1(config)#banner motd $ Authorized Users Only! $
```

Configure and activate both interfaces on the router, Configure an interface description for each interface indicating which device is connected to it and set the clock on the router.



```
R1(config)#interface g0/0/0
R1(config-if)#ip address 192.168.0.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad::1/64
R1(config-if)#ipv6 address FE80::1 link-local
R1(config-if)#no shutdown

R1(config-if)#
%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

R1(config-if)#exit
R1(config)#interface g0/0/1
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad:1::1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

R1(config-if)#exit
R1(config)#interface g0/0/1
R1(config-if)#description Connected to F0/5 on S1
R1(config-if)#exit
R1(config)#interface g0/0/0
R1(config-if)#description Connected to Host PC-B
R1(config-if)#exit
R1(config)#ipv6 unicast-routing
R1(config)#exit
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 14:00:00 27 Jun 2023
```

Ping PC-B from a command prompt window on PC-A.

```
C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:

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
Reply from 192.168.0.3: bytes=32 time<1ms TTL=127

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

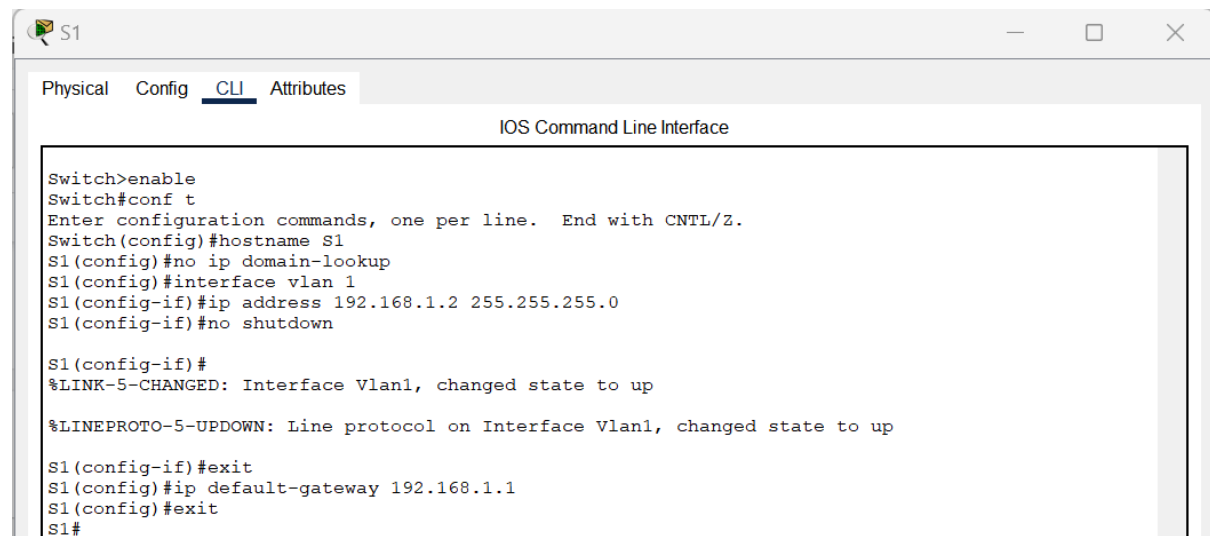
Question:

Were the pings successful? Explain.

Yes the ping was successful because the router was configured and is routing the ping traffic across the two subnets.

Step 3: Configure the switch.

In this step, configuration of the hostname, the VLAN 1 interface and its default gateway were done as shown below:



```
Switch>enable
Switch#conf t
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)#exit
S1(config)#ip default-gateway 192.168.1.1
S1(config)#exit
S1#
```

Step 4: Verify connectivity end-to-end connectivity.

To verify the connectivity from S1, ping PC-B in which was successful hence the configuration was correct.

```
S1#ping 192.168.0.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.0.3, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms

S1#
```

Part 3: Display Device Information

In Part 3, we will use **show** commands to retrieve interface and routing information from the router and switch.

Step 1: Display the routing table on the router.

Using the show ip/ ipv6 route command on router to display the routing table.

```
R1#
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

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
```

Questions:

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

The C designates a directly connected subnet. An L designates a local interface.

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

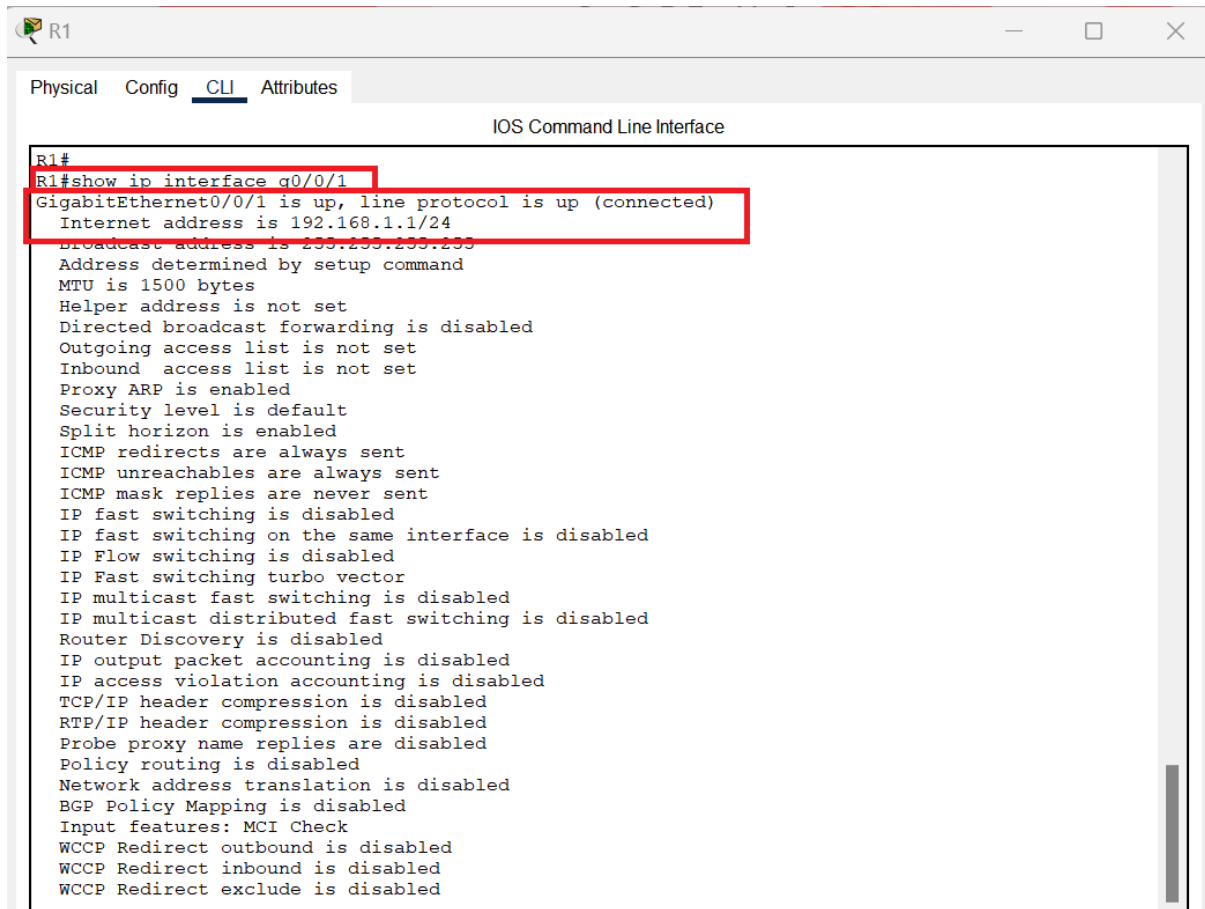
Two.

What interface types are associated to the C coded routes?

G0/0/0 and G0/0/1 as shown in the above diagram.

Step 2: Display interface information on the router R1.

Using the **show ip interface g0/0/1** to display the interface information as shown below:



```
R1#
R1#show ip interface g0/0/1
GigabitEthernet0/0/1 is up, line protocol is up (connected)
Internet address is 192.168.1.1/24
Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1500 bytes
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP Flow switching is disabled
IP Fast switching turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
RTP/IP header compression is disabled
Probe proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
BGP Policy Mapping is disabled
Input features: MCI Check
WCCP Redirect outbound is disabled
WCCP Redirect inbound is disabled
WCCP Redirect exclude is disabled
```

Questions:

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

GigabitEthernet0/0/1 is up, line protocol is up(connected) as show in the diagram above.

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

Using the show interface g0/0/1 the mac address would be

How is the Internet address displayed in this command?

Internet address is 192.168.1.1/24 as shown in the diagram above.

Reflection Questions

1. If the G0/0/1 interface showed that it was administratively down, what interface configuration command would you use to turn the interface up?

R1(config)#no shutdown

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 would not be able to ping PC-B. This is because PC-B is on a different network than PC-A which requires the default-gateway router to route these packets. PC-A is configured to use the IP address of 192.168.1.1 for the default-gateway router, but this address is not assigned to any device on the LAN. Any packets that need to be sent to the default-gateway for routing will never reach their destination.

Conclusion

In conclusion, this lab has provided us with invaluable practical experience in constructing and managing switch and router networks. By successfully completing each part of the assignment, we have developed a strong foundation in network building, configuration, and troubleshooting.