COMPUTER NETWORKS
LAB ASSIGNMENT - 9

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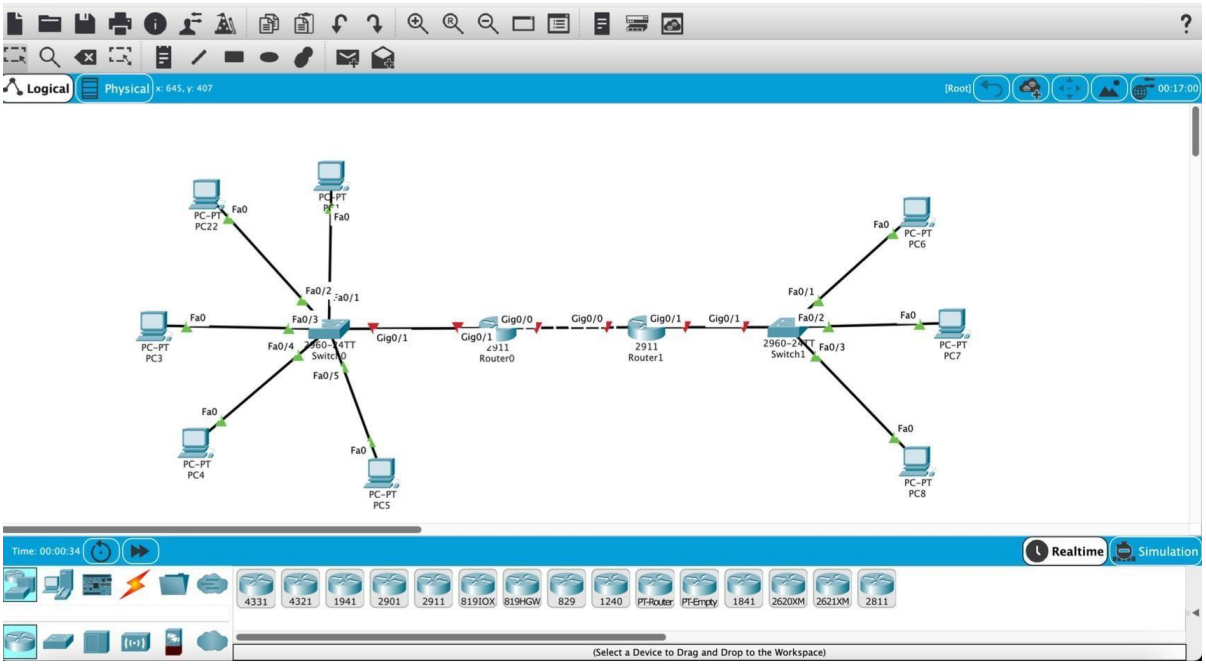
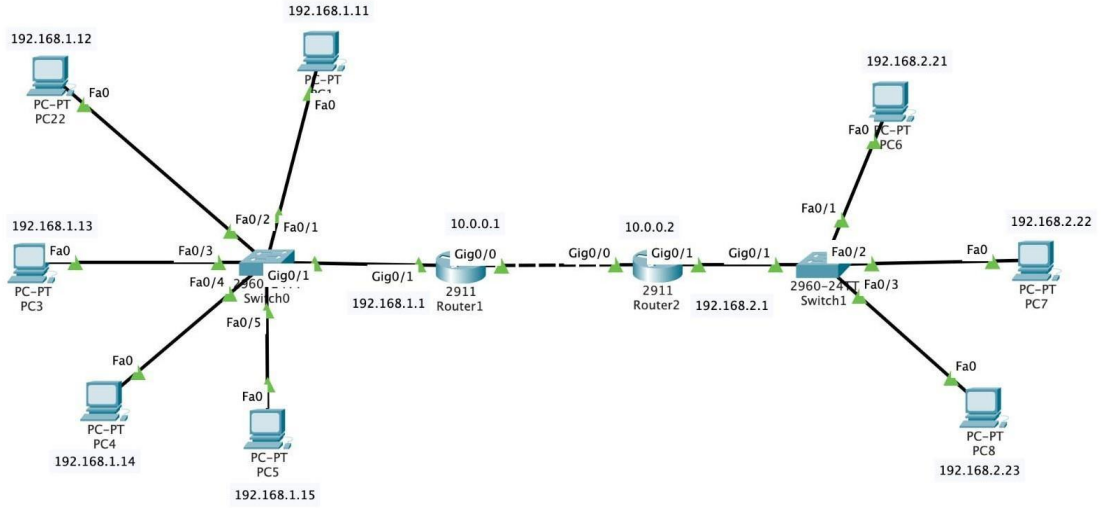
Q1. Configure the G0/0 and G0/1 interface of R1 and R2 as per network diagram and enable the interfaces.
Q2. Identify and explain which pings succeeded and which failed by pinging from PC1 to both R1's (G0/1 , G0/0) interfaces, both R2's (G0/0 , G0/1) interfaces then PC2.
Q3. Configure static routers on R1 and R2 that allow PC1 to reach PC2 and vice versa. Configure the routes to the subnets the PCs are part of not directly to the PCs. Test by using ping or tracer from each PC.

Q4. Identify the changes that happened at R2 by changing the IP address instead of G0/0 interface at R1.

CPT Network Connections :



CPT Network Connections after Configuring



Configuring Router - 1 :

Physical Config CLI Attributes

IOS Command Line Interface

```
Cisco CISCO2911/K9 (revision 1.0) with 491520K/32768K bytes of memory.
Processor board ID FTX152400KS
3 Gigabit Ethernet interfaces
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!



Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip add 10.0.0.1 255.255.255.0
Router(config-if)#no shutdown

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

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

Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip add 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

Router(config-if)#
```

Command+F6 to exit CLI focus

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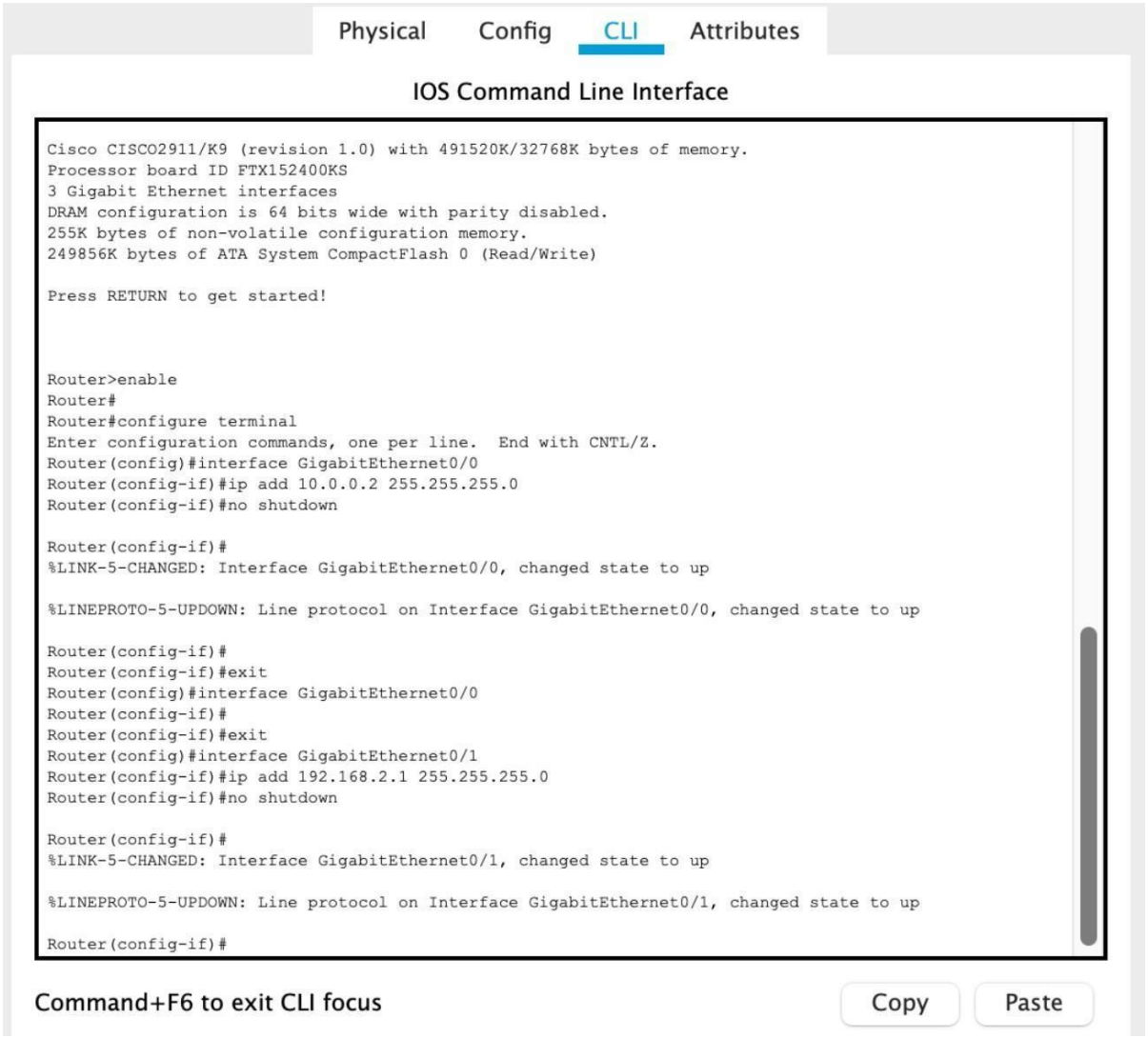
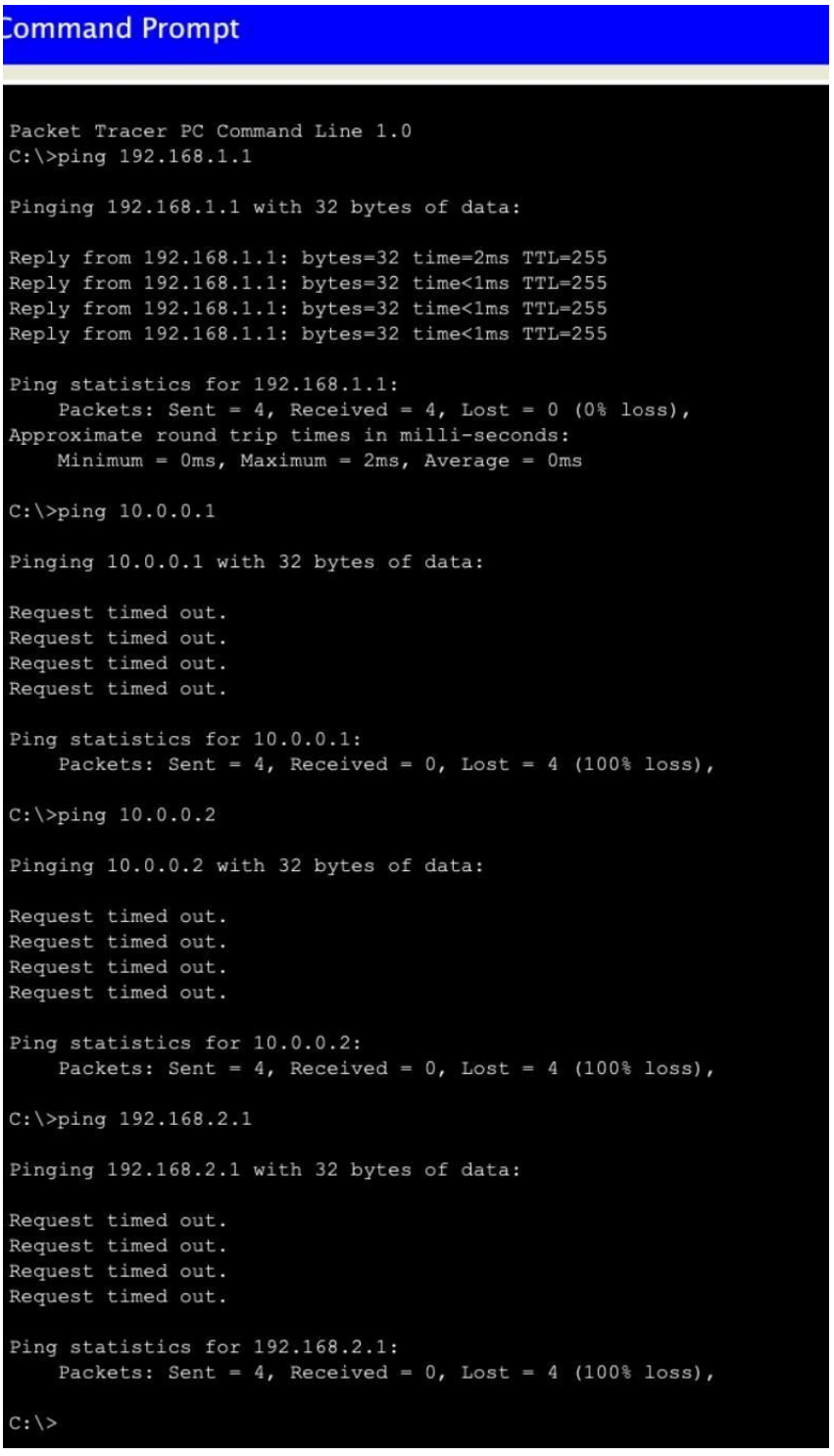
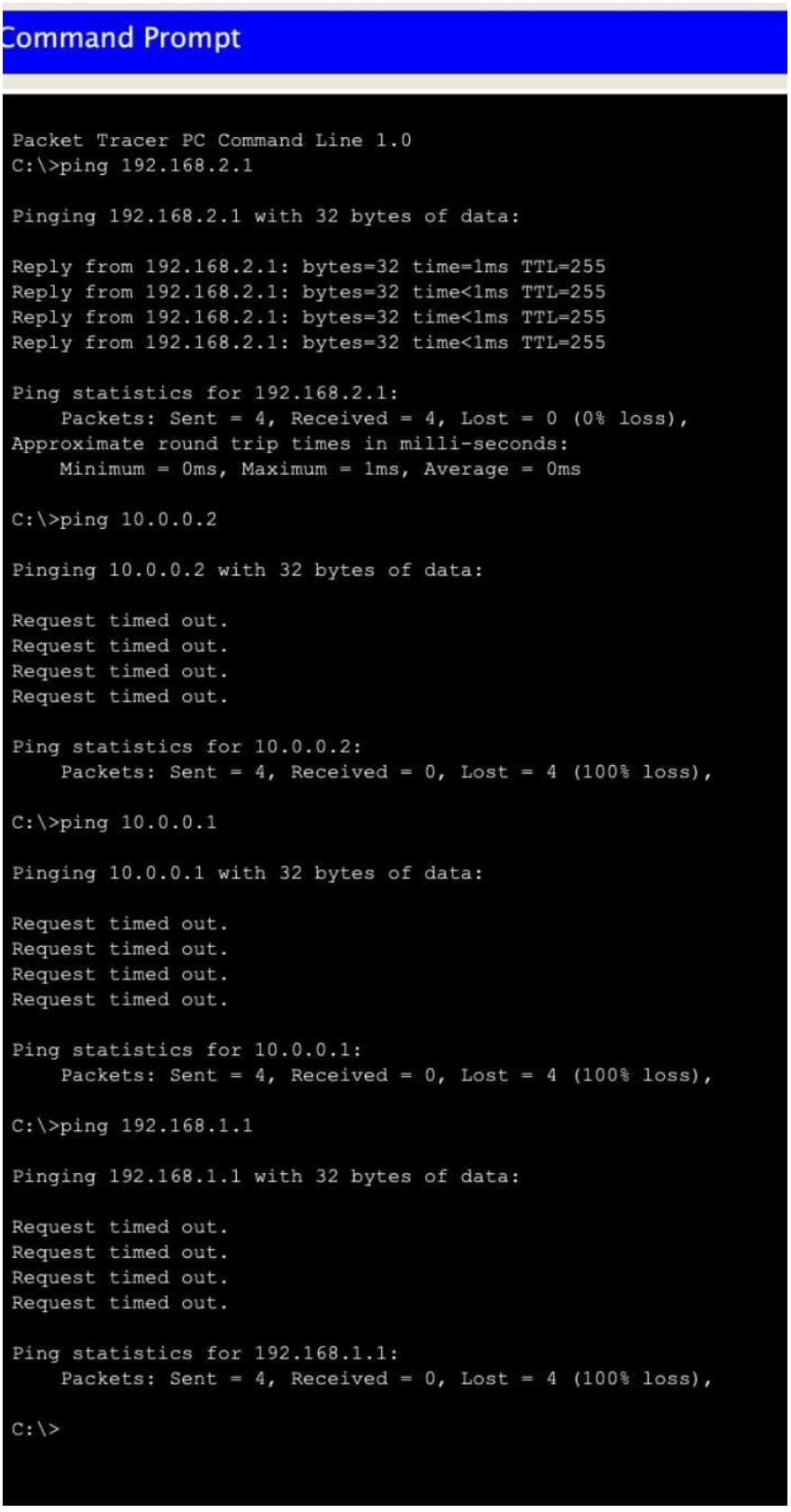
Configuring Router - 2 :



AFTER CONFIGURING ROUTER, PINGING WITH PC - 1 TO THE INTERFACES :



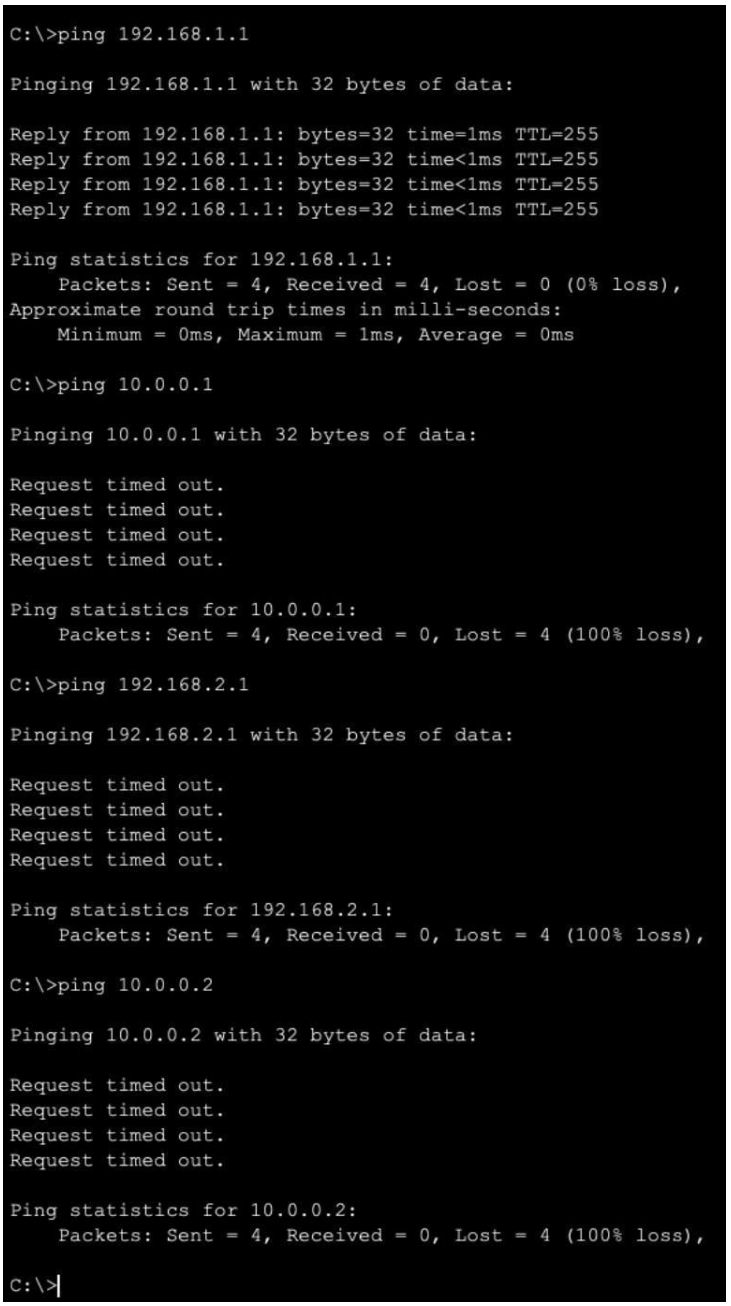
AFTER CONFIGURING ROUTER, PINGING WITH PC - 2 TO THE INTERFACES :



Here, after making setup and configuring routers, I am pinging all the interfaces of both the routers with the PC - 1 and PC - 2. So the result I got here is that the only interface that is connected between the router and the switch have got pingged and I got a reply that packets are successfully transmitted and the other 3 interfaces are not pingged and got a request timed out message.

BEFORE CONFIGURING STATIC ROUTER - 1 :

PINGING ALL THE INTERFACES WITH PC - 1 :



BEFORE CONFIGURING STATIC ROUTER - 2 :

PINGING ALL THE INTERFACES WITH PC - 2 :

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time=1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

BEFORE CONFIGURING AS BOTH STATIC ROUTER - 1 AND ROUTER - 2

ROUTING TABLE OF ROUTER 1 AND 2 IS :

Routing Table for Router2

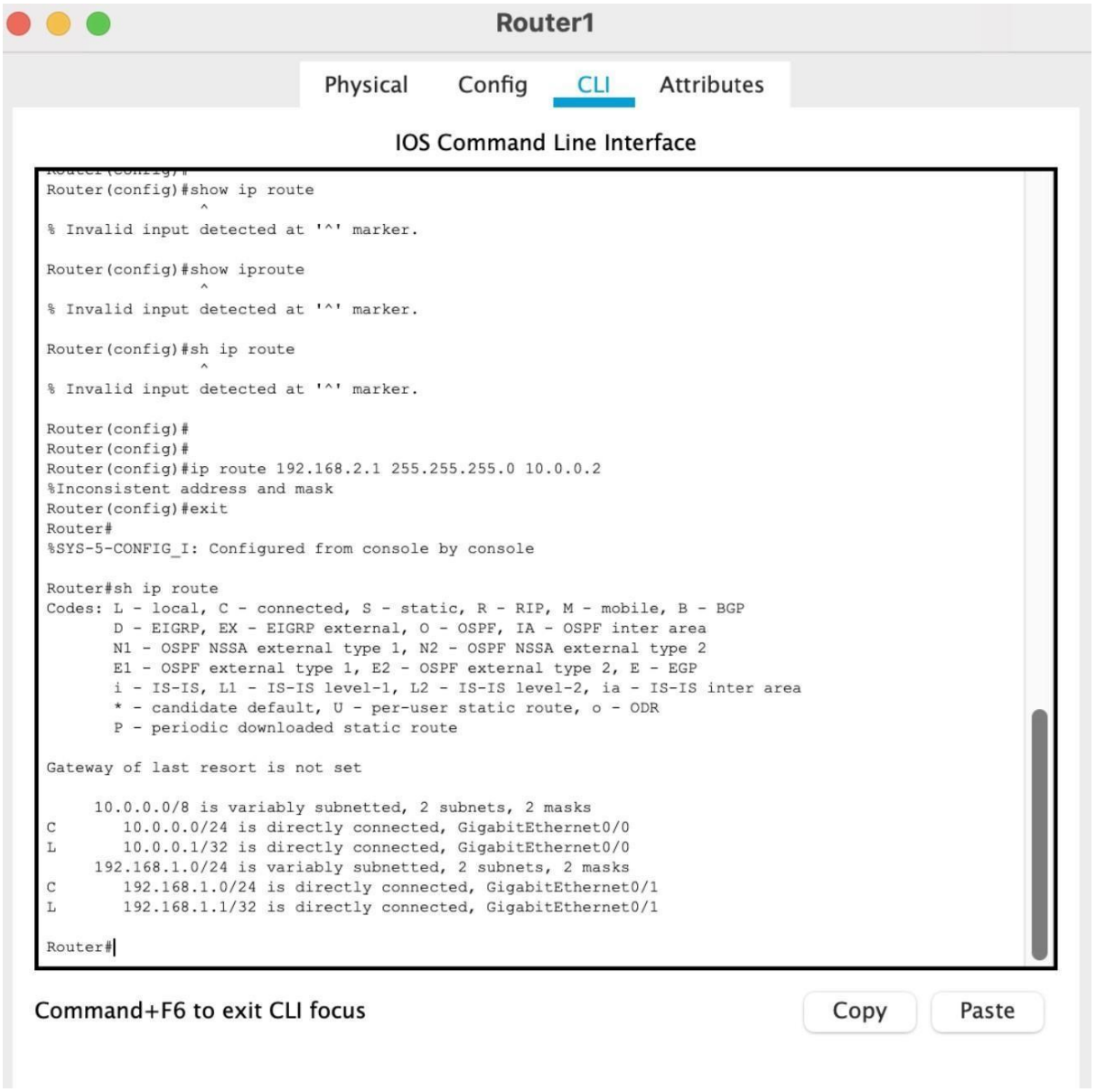
Type	Network	Port	Next Hop IP	Metric
C	10.0.0.0/24	GigabitEthernet0/0	---	0/0
L	10.0.0.2/32	GigabitEthernet0/0	---	0/0
C	192.168.2.0/24	GigabitEthernet0/1	---	0/0
L	192.168.2.1/32	GigabitEthernet0/1	---	0/0

Routing Table for Router1

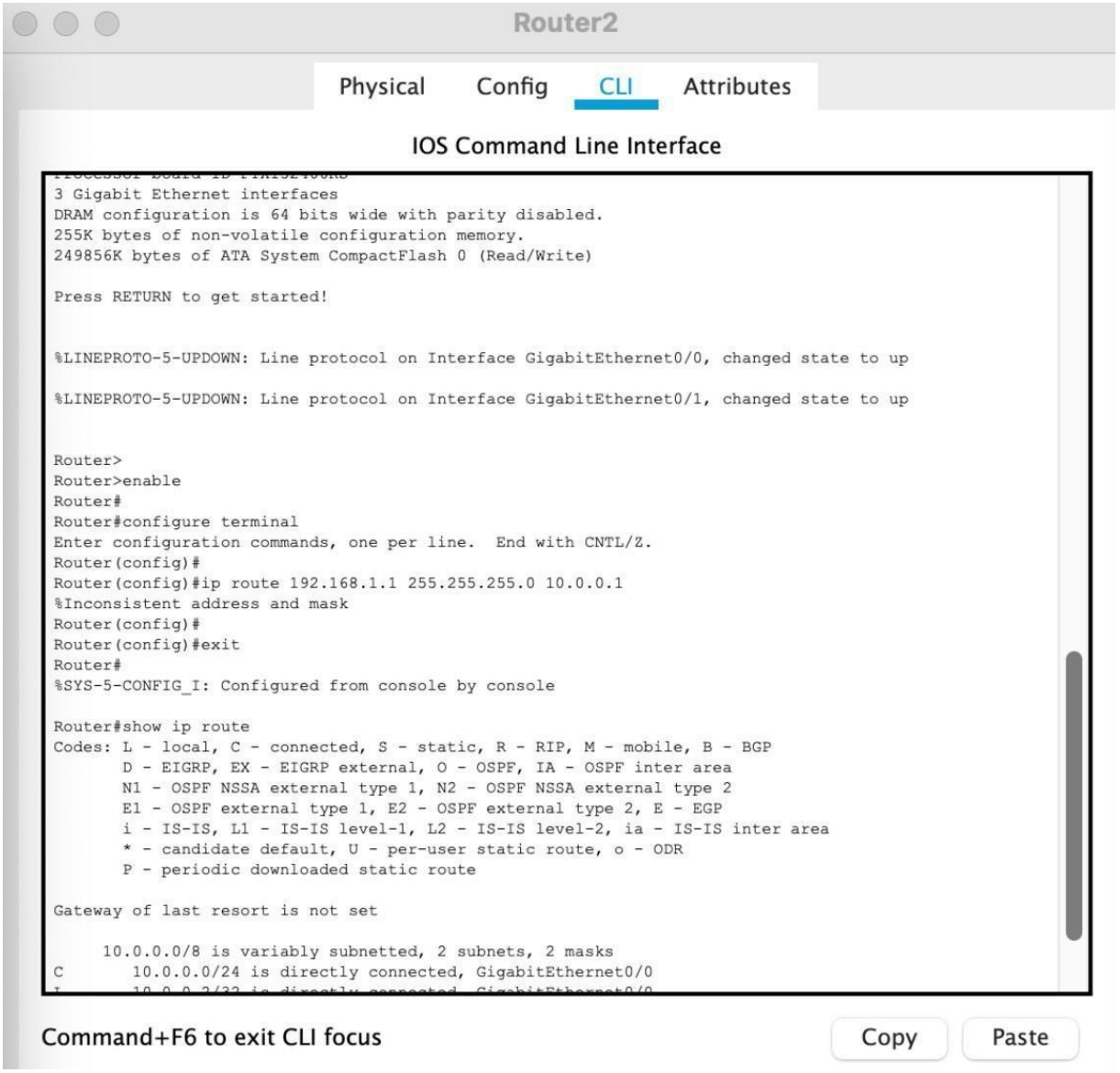
Type	Network	Port	Next Hop IP	Metric
C	10.0.0.0/24	GigabitEthernet0/0	---	0/0
L	10.0.0.1/32	GigabitEthernet0/0	---	0/0
C	192.168.1.0/24	GigabitEthernet0/1	---	0/0
L	192.168.1.1/32	GigabitEthernet0/1	---	0/0

SHOWING (show ip route command) FOR BOTH ROUTER:

ROUTER - 1 :



ROUTER - 2 :


Router2
Physical
Config
CLI
Attributes
IOS Command Line Interface
3 Gigabit Ethernet interfaces
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)
Press RETURN to get started!
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
Router>
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.1.1 255.255.255.0 10.0.0.1
%Inconsistent address and mask
Router(config)#
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#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
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.0.0.0/24 is directly connected, GigabitEthernet0/0
Command+F6 to exit CLI focus
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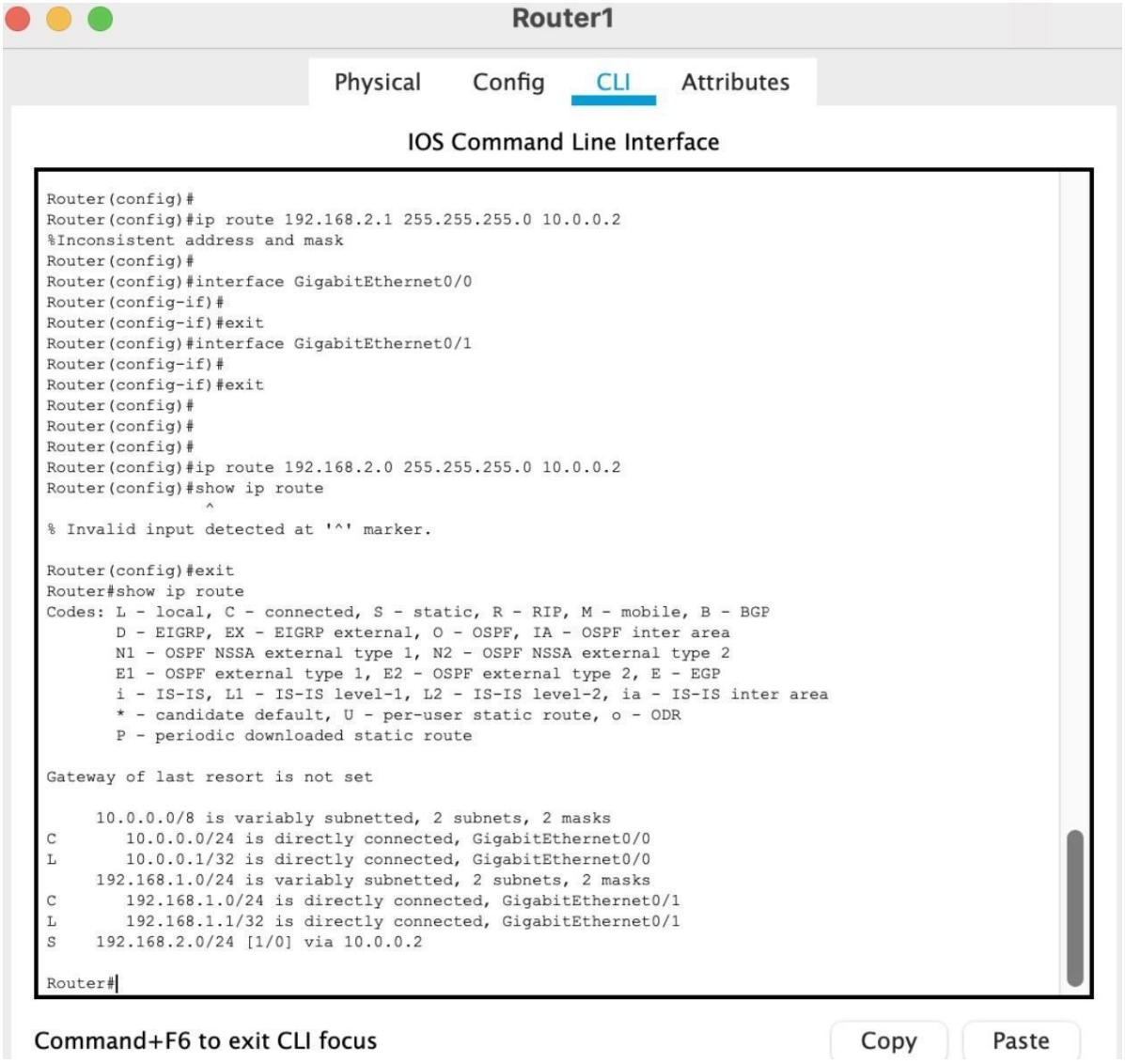
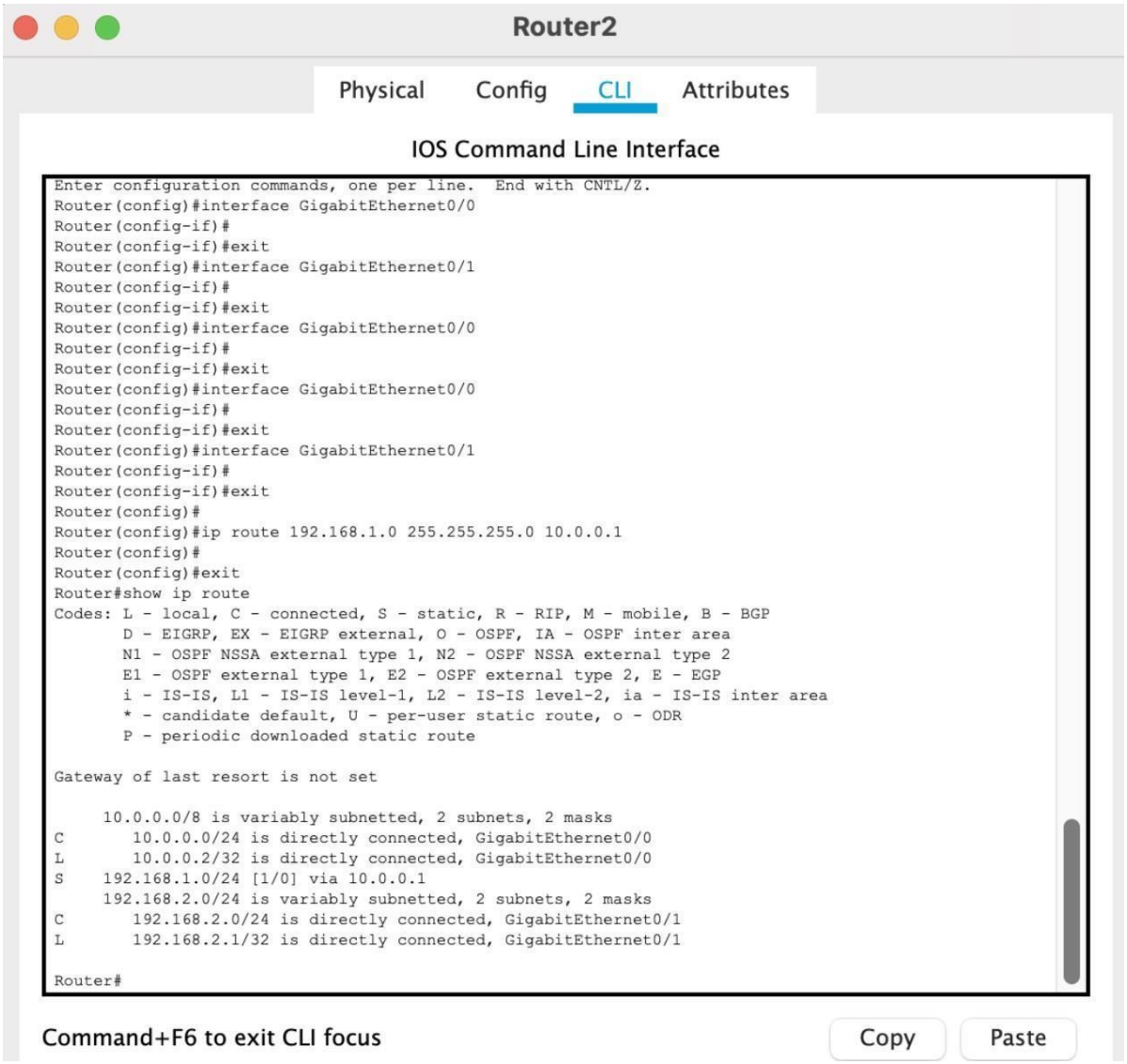
Paste

Here, before configuring the routers as static, I have checked and pinged to the interfaces of the routers and I got reply only for the interface that is present between router and switch of both sides and both the PC's and I didn't get reply from the other interfaces with both PC-1 and PC-2.

AFTER CONFIGURING THE STATIC ROUTERS : ROUTER - 1 :



ROUTER - 2 :


Router2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#ip route 192.168.1.0 255.255.255.0 10.0.0.1
Router(config)#
Router(config)#exit
Router#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
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.0.0.0/24 is directly connected, GigabitEthernet0/0
L 10.0.0.2/32 is directly connected, GigabitEthernet0/0
S 192.168.1.0/24 [1/0] via 10.0.0.1
192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.2.0/24 is directly connected, GigabitEthernet0/1
L 192.168.2.1/32 is directly connected, GigabitEthernet0/1
Router#
Command+F6 to exit CLI focus
Copy
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AFTER CONFIGURING THE STATIC ROUTERS :

ROUTING TABLES OF BOTH THE ROUTERS IS :

Routing Table for Router1

Type	Network	Port	Next Hop IP	Metric
C	10.0.0.0/24	GigabitEthernet0/0	---	0/0
L	10.0.0.1/32	GigabitEthernet0/0	---	0/0
C	192.168.1.0/24	GigabitEthernet0/1	---	0/0
L	192.168.1.1/32	GigabitEthernet0/1	---	0/0
S	192.168.2.0/24	---	10.0.0.2	1/0

Routing Table for Router2

Type	Network	Port	Next Hop IP	Metric
C	10.0.0.0/24	GigabitEthernet0/0	---	0/0
L	10.0.0.2/32	GigabitEthernet0/0	---	0/0
S	192.168.1.0/24	---	10.0.0.1	1/0
C	192.168.2.0/24	GigabitEthernet0/1	---	0/0
L	192.168.2.1/32	GigabitEthernet0/1	---	0/0

AFTER CONFIGURING THE STATIC ROUTERS :

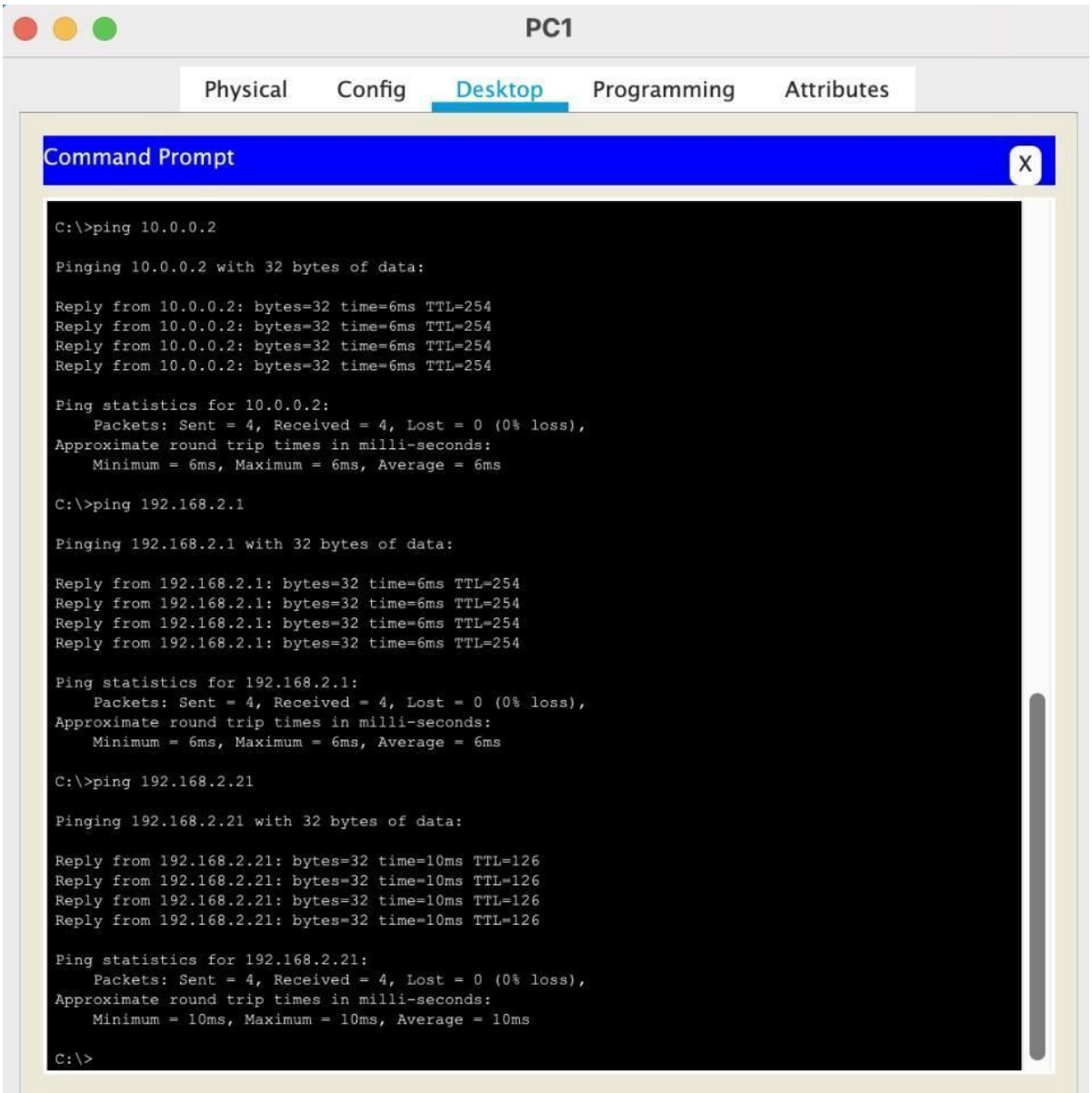
PINGING ALL THE INTERFACES WITH PC - 1 :

```
Ping statistics for 192.168.2.21:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 10ms, Average = 10ms

C:\>ping 192.168.2.21

Pinging 192.168.2.21 with 32 bytes of data:

Reply from 192.168.2.21: bytes=32 time=10ms TTL=126
Reply from 192.168.2.21: bytes=32 time=10ms TTL=126
Reply from 192.168.2.21: bytes=32 time=10ms TTL=126
Reply from 192.168.2.21: bytes=32 time=10ms TTL=126

Ping statistics for 192.168.2.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 10ms, Average = 10ms

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=4ms TTL=255
Reply from 192.168.1.1: bytes=32 time=4ms TTL=255
Reply from 192.168.1.1: bytes=32 time=4ms TTL=255
Reply from 192.168.1.1: bytes=32 time=4ms TTL=255

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

C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=4ms TTL=255
Reply from 10.0.0.1: bytes=32 time=4ms TTL=255
Reply from 10.0.0.1: bytes=32 time=4ms TTL=255
Reply from 10.0.0.1: bytes=32 time=4ms TTL=255

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 4ms, Average = 4ms

C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=6ms TTL=254
Reply from 10.0.0.2: bytes=32 time=6ms TTL=254
Reply from 10.0.0.2: bytes=32 time=6ms TTL=254
Reply from 10.0.0.2: bytes=32 time=6ms TTL=254

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 6ms, Average = 6ms

C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time=6ms TTL=254
Reply from 192.168.2.1: bytes=32 time=6ms TTL=254
Reply from 192.168.2.1: bytes=32 time=6ms TTL=254
Reply from 192.168.2.1: bytes=32 time=6ms TTL=254

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 6ms, Average = 6ms
```

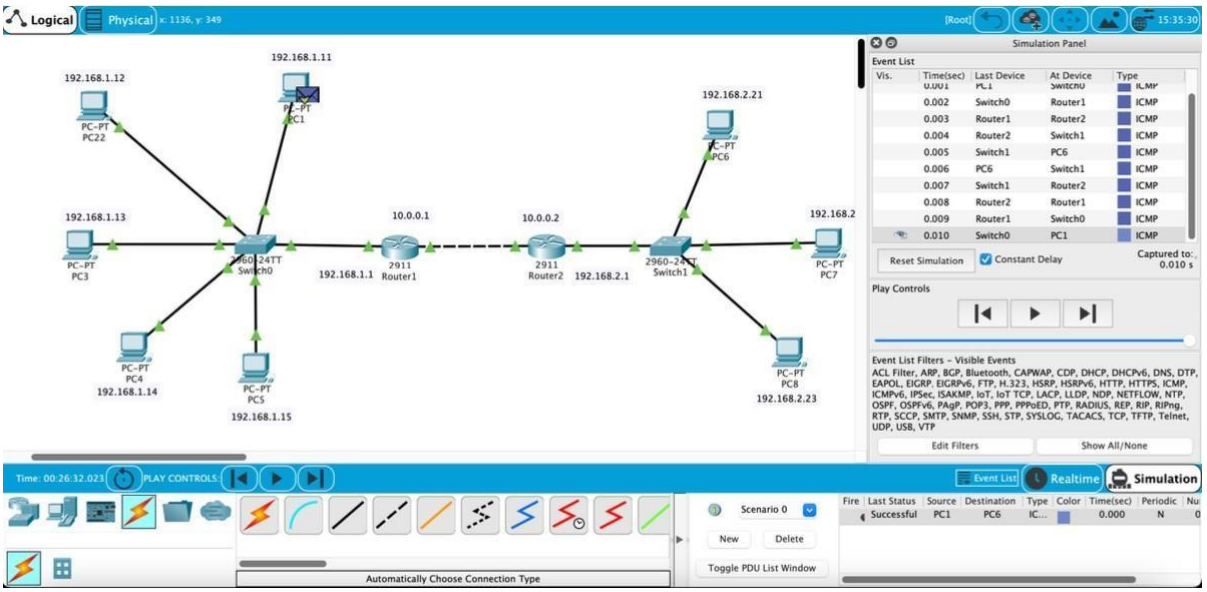
PINGING ALL THE INTERFACES WITH PC - 2 :

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time=4ms TTL=255
Reply from 192.168.2.1: bytes=32 time=4ms TTL=255
Reply from 192.168.2.1: bytes=32 time=4ms TTL=255
Reply from 192.168.2.1: bytes=32 time=4ms TTL=255

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 4ms, Average = 4ms

C:\>pinhg 10.0.0.2
Invalid Command.

C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=4ms TTL=255
Reply from 10.0.0.2: bytes=32 time=4ms TTL=255
Reply from 10.0.0.2: bytes=32 time=4ms TTL=255
Reply from 10.0.0.2: bytes=32 time=4ms TTL=255

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 4ms, Average = 4ms

C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=6ms TTL=254
Reply from 10.0.0.1: bytes=32 time=6ms TTL=254
Reply from 10.0.0.1: bytes=32 time=6ms TTL=254
Reply from 10.0.0.1: bytes=32 time=6ms TTL=254

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 6ms, Average = 6ms

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=6ms TTL=254
Reply from 192.168.1.1: bytes=32 time=6ms TTL=254
Reply from 192.168.1.1: bytes=32 time=6ms TTL=254
Reply from 192.168.1.1: bytes=32 time=6ms TTL=254

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 6ms, Average = 6ms
```

Here after configuring the static routers, I have pinged with both the PC's to the interfaces present in the network connection and I got reply from the interfaces that packets are successfully sent. Here I also checked whether pc - 1 is pinging with the pc - 2 or not. And for this also I have got a reply and shown me that packets are successfully sent.



PACKET SENT FROM PC - 1 TO PC - 2 :



Here, the packet also successfully transmitted from PC-1 to PC-2 after making the configuration of static routers for both the routers.

MAC ADDRESS TABLES OF BOTH THE SWITCHES :

MAC Table for Switch0

VLAN	Mac Address	Port
1	0001.6411.2BA4	FastEthernet0/5
1	0001.97B8.D402	GigabitEthernet0/1
1	000C.8551.7803	FastEthernet0/1

MAC Table for Switch1

VLAN	Mac Address	Port
1	0000.0CB5.6CB7	FastEthernet0/1
1	0001.4226.4702	GigabitEthernet0/1

ROUTING TABLE OF BOTH THE ROUTERS :

Routing Table for Router1

Type	Network	Port	Next Hop IP	Metric
C	10.0.0.0/24	GigabitEthernet0/0	---	0/0
L	10.0.0.1/32	GigabitEthernet0/0	---	0/0
C	192.168.1.0/24	GigabitEthernet0/1	---	0/0
L	192.168.1.1/32	GigabitEthernet0/1	---	0/0
S	192.168.2.0/24	---	10.0.0.2	1/0

Routing Table for Router2

Type	Network	Port	Next Hop IP	Metric
C	10.0.0.0/24	GigabitEthernet0/0	---	0/0
L	10.0.0.2/32	GigabitEthernet0/0	---	0/0
S	192.168.1.0/24	---	10.0.0.1	1/0
C	192.168.2.0/24	GigabitEthernet0/1	---	0/0
L	192.168.2.1/32	GigabitEthernet0/1	---	0/0

ARP TABLE OF BOTH THE ROUTERS :

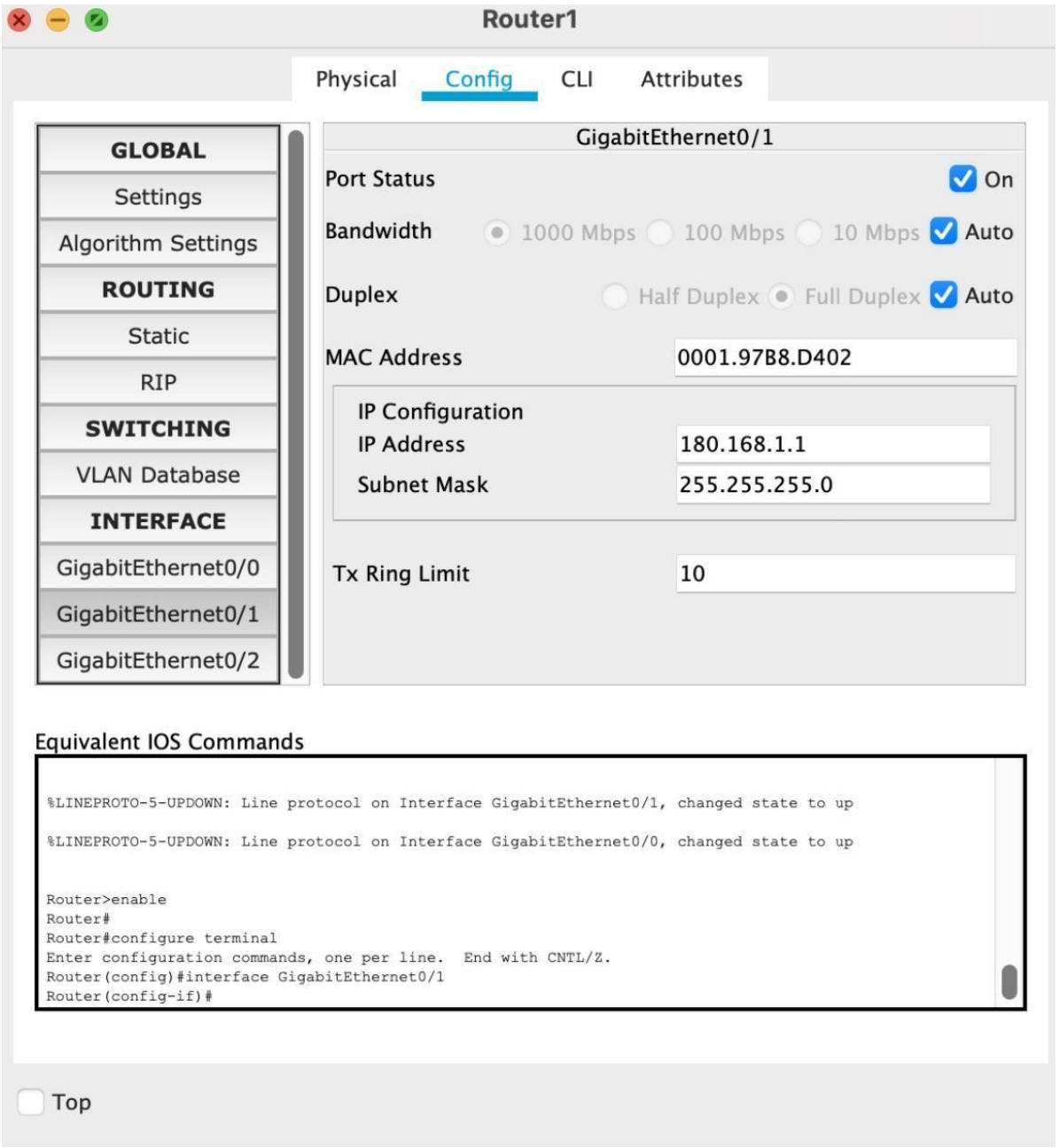
ARP Table for Router1

IP Address	Hardware Address	Interface
10.0.0.1	0001.97B8.D401	GigabitEthernet0/0
192.168.1.1	0001.97B8.D402	GigabitEthernet0/1

ARP Table for Router2

IP Address	Hardware Address	Interface
10.0.0.2	0001.4226.4701	GigabitEthernet0/0
192.168.2.1	0001.4226.4702	GigabitEthernet0/1

CHANGING THE IP ADDRESS OF ROUTER - 1 INTERFACE BETWEEN SWITCH AND ROUTER OF PORT GIG 0/1 PORT :

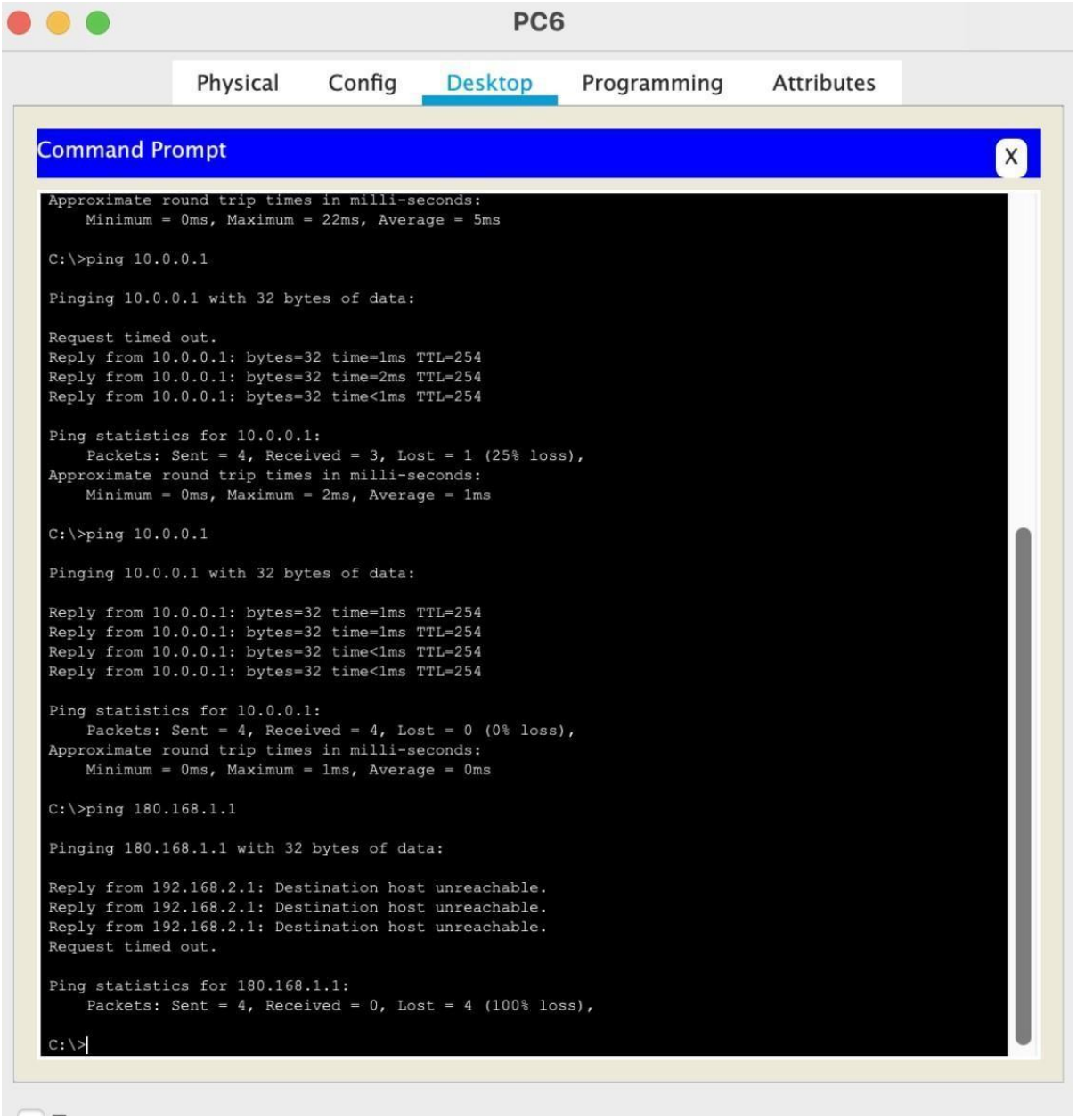


AFTER CHANGING THE IP ADDRESS OF ROUTER - 1 INTERFACE BETWEEN SWITCH AND ROUTER OF PORT GIG 0/1 PORT :

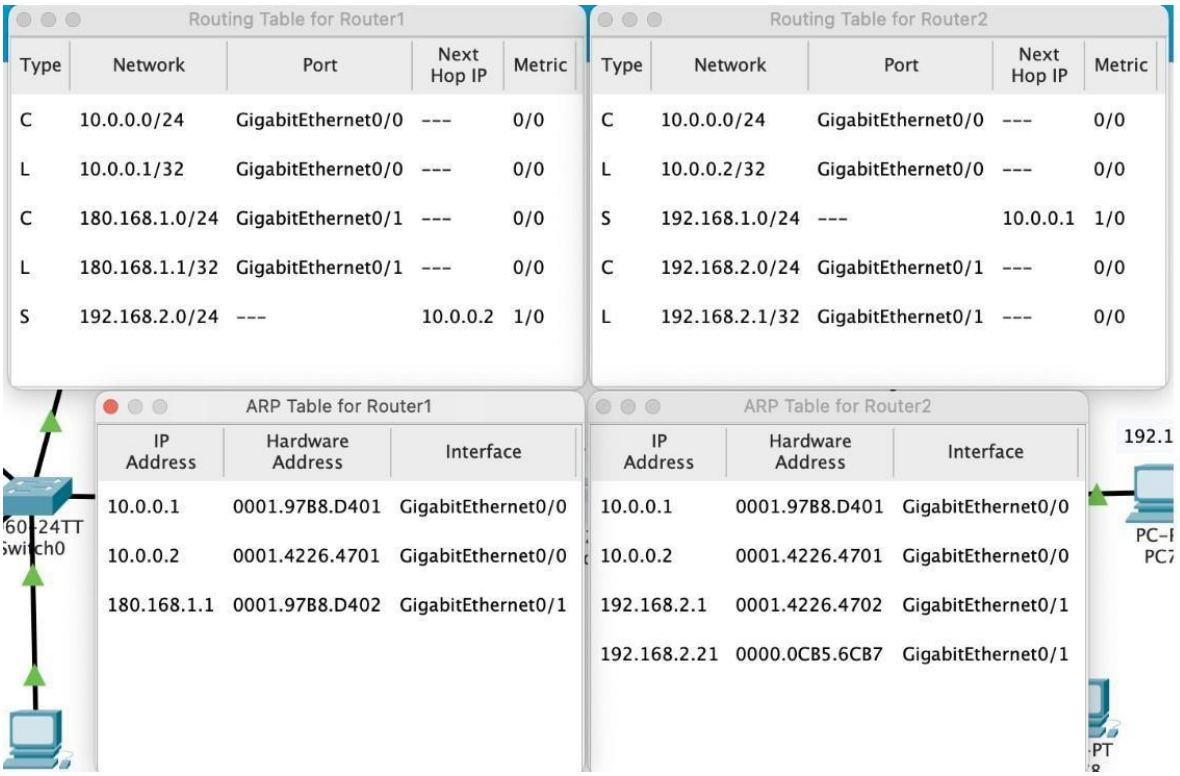
PINGING TO ALL THE INTERFACES WITH BOTH PC's : PC-1:

```
C:\>ping 180.168.1.1

Pinging 180.168.1.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 180.168.1.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 10.0-.0.1
Ping request could not find host 10.0-.0.1. Please check the name and try again.
C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.2.21

Pinging 192.168.2.21 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.2.21:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

PC-2 :



CHANGES WE ARE NOTICING IN BOTH THE ROUTERS ARE :



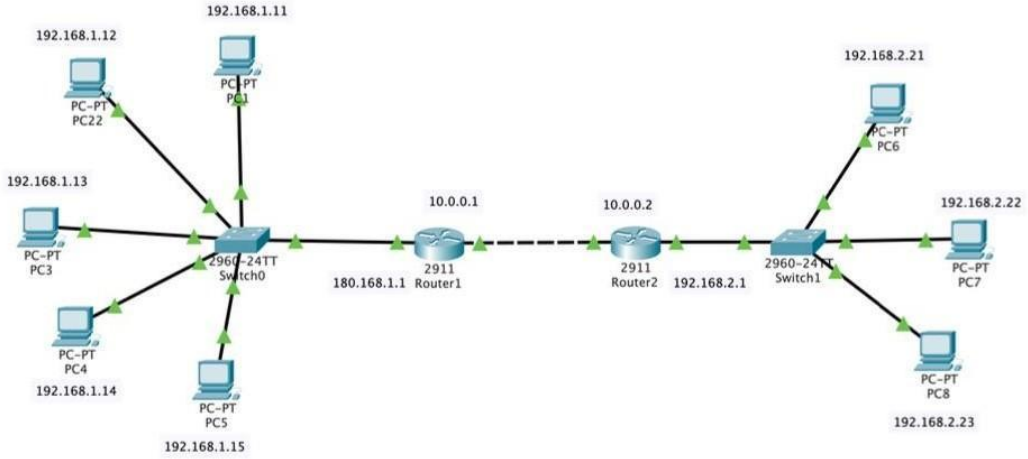
The changes I have noticed is that the ARP table has been modified with the new ip address and the interface of routers of GIG 0/0 port ip address has been added to the ARP table of router - 1.

In the ROUTER -2

The changes I have observed is that in the ARP table some new ip address are added and those are belong to the interface of between router -1 and router -2 of port GIG 0/0 and the ip address of

one of the computer that is present at router -2 has been added to the ARP table of router -2.

In the Mac address table of both the switches there are some changes happening; those are F0/5 and GIG 0/1 port Mac addresses are gone in the switch -1 and in the switch -2 nothing has changed.


192.168.1.11
192.168.1.12
PC-PT
PC1
PC-PT
PC22
192.168.2.21
PC-PT
PC6
192.168.1.13
10.0.0.1
10.0.0.2
192.168.2.22
PC-PT
PC3
2960-24TT
Switch0
2911
Router1
180.168.1.1
2911
Router2
192.168.2.1
2960-24TT
Switch1
PC-PT
PC7
PC-PT
PC4
192.168.1.14
PC-PT
PC5
192.168.1.15
PC-PT
PC8
192.168.2.23