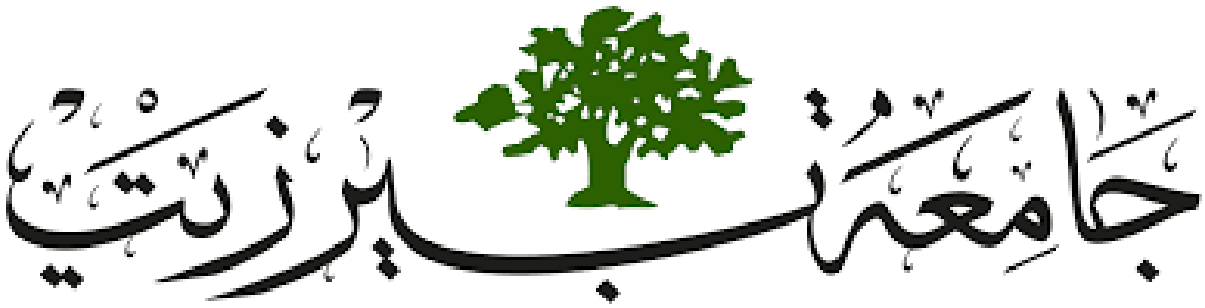

BIRZEIT UNIVERSITY

Faculty of Engineering & Technology

Department of Electrical & Computer Engineering

ENCS4130-Computer network laboratory

To DO #1 : Subnetting, Router Configuration and static Routing

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Date:

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Contents

Table of Figures

Question 1:

Question 1: Given the following topology, divide the given class C address 192.168.1.0/24 range on the networks A, B, C, D, E using minimum number of IPs.

Net A = 2

Net E = 5

B, C and D represent the last six digits of your university ID.

For example: if your university ID 1170302

1170302			
1	17	03	02
Not Use	B	C	D
	Net B Host	Net C Host	Net D Host

→First I solve it in hand write to show all steps of the work:

Solve Q.2 , To Do 1 — Saja - 1210737

my ID is 121 07 37 (B C D)

So the number of host in each networks-

Net A = 2 → fixed

Net B = 21

Net C = 7

Net D = 37

Net E = 5 → fixed

we have the Ip 192.168.1.0 /24

① Start with the largest number of host (Net D = 37)

$2^n - 2 \stackrel{?}{=} 37$ ⇒ we need n = 6 ⇒ The requires subnet mask is /26

So we need 2 bit more = 192.168.1.0000 0000

1st subnet 192.168.1.0 /26 → give it to Net D

② Next , Net B (21 hosts)

$2^n - 2 \stackrel{?}{=} 21$ ⇒ n=5 we need 1 bit more (/27)

2^{nd} subnet is 192.168.1.0100 0000 ⇒ 192.168.1.64/26

and we can divied it into 2 subnets-

192.168.1.0100 0000 ⇒ 192.168.1.64/27 ⇒ I give it to Net B

192.168.1.0110 0000 ⇒ 192.168.1.96/27

③ Next , Net C (7 host)

$2^n - 2 \stackrel{?}{=} 7$ ⇒ n = 4 ⇒ we need 1 bit more (/28)

we can divied the subnet 192.168.1.96 /27 into 2 subnet

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192.168.1.0110 0000 ⇒ 192.168.1.96/28 ⇒ we give it to Net C

192.168.1.0111 0000 ⇒ 192.168.1.112/28

④ Next, Net E (5 hosts)

$2^n - 2 \stackrel{?}{=} 5 \Rightarrow n = 3 \Rightarrow$ we need 1 bit more (/29)

we can divied 192.168.1.112/28 into 2 subnets

192.168.1.0111 0000 ⇒ 192.168.1.112/29 ⇒ give it to Net E

192.168.1.0111 1000 ⇒ 192.168.1.120/29

⑤ Next, Net A (2 hosts)

$2^n - 2 \stackrel{?}{=} 2 \Rightarrow n = 2 \Rightarrow$ we need 1 bit more (/30)

we can divied the subnet 192.168.1.120/29 into two subnets

192.168.1.0111 1000 ⇒ 192.168.1.120/30 ⇒ give it to Net A

192.168.1.0111 1100 ⇒ 192.168.1.124/30

* All subnets

Net D ⇒ 192.168.1.0/26

Net B ⇒ 192.168.1.64/27

Net C ⇒ 192.168.1.96/28

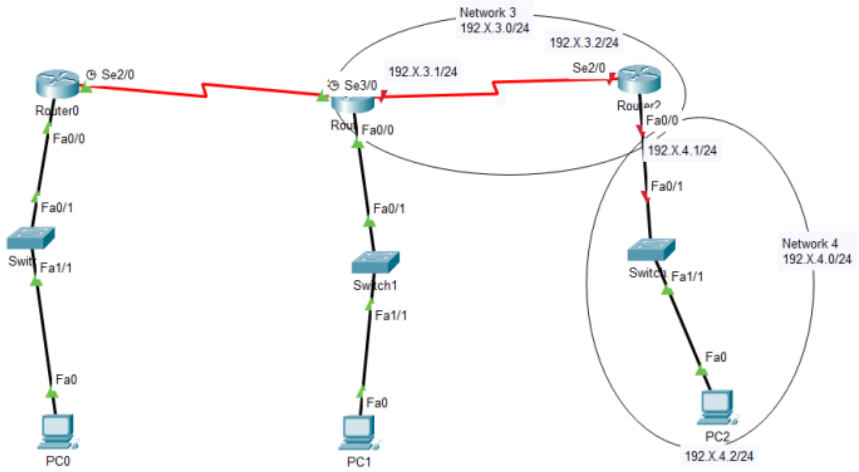
Net E ⇒ 192.168.1.112/29

Net A ⇒ 192.168.1.120/30

→ then complete the table:

Network symbol	Network IP	Broadcast IP	First allowed IP= Network IP +1	Last allowed IP= Broadcast IP -1	Number of Hosts
A	192.168.1.01111000 →192.168.1.120 /30	192.168.1.01111011 192.168.1.123	192.168.1.01111001 192.168.1.121	192.168.1.01111010 192.168.1.122	2^2-2 = 4-2 =2
B	192.168.1.01000000 →192.168.1.64/ 27	192.168.1.01011111 →192.168.1.95	192.168.1.01000001 →192.168.1.65	192.168.1.01011110 →192.168.1.94	2^5-2 = 32-2 =30
C	192.168.1.01100000 →192.168.1.96/ 28	192.168.1.01101111 →192.168.1.111	192.168.1.01100001 →192.168.1.97	192.168.1.01101110 →192.168.1.110	2^4-2 = 16-2 =14
D	192.168.1.00000000 →192.168.1.0/ 26	192.168.1.00111111 →192.168.1.63	192.168.1.00000001 →192.168.1.1	192.168.1.00111110 →192.168.1.62	2^6-2 =64-2 =62
E	192.168.1.01110000 →192.168.1.112 /29	192.168.1.01110111 →192.168.1.119	192.168.1.01110001 →192.168.1.113	192.168.1.01110110 →192.168.1.118	2^3-2 =8-2 =6

Question 2:



Do the following:

1- Add a new router, switch, and PC to the topology of **EXP#2** that you have done.
2- Complete the static routing, check the connectivity of this new network!
   a. Add screenshots of the steps you took with the time and date shown.
   b. Show the routing table on the new router with the time and date shown.

→I give the IPs for each network as shown in Figure 1

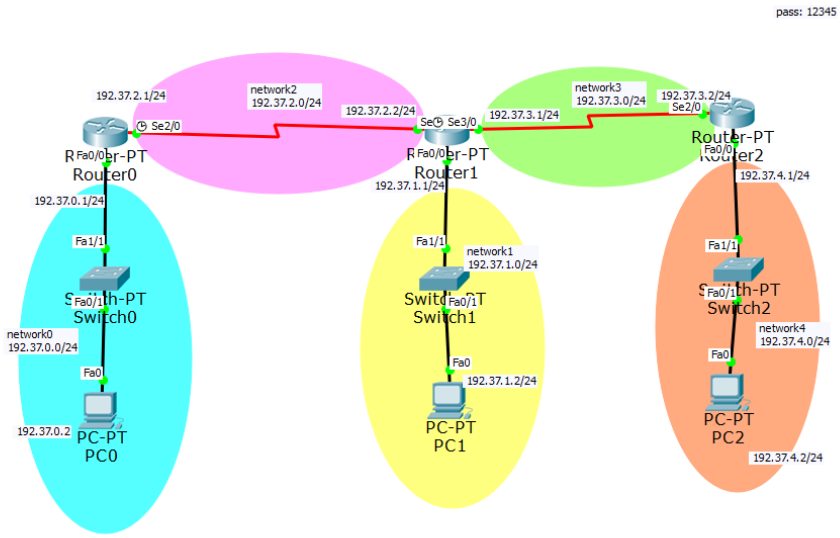


Figure 1:The topology

→ make the IP configuration for PC2:

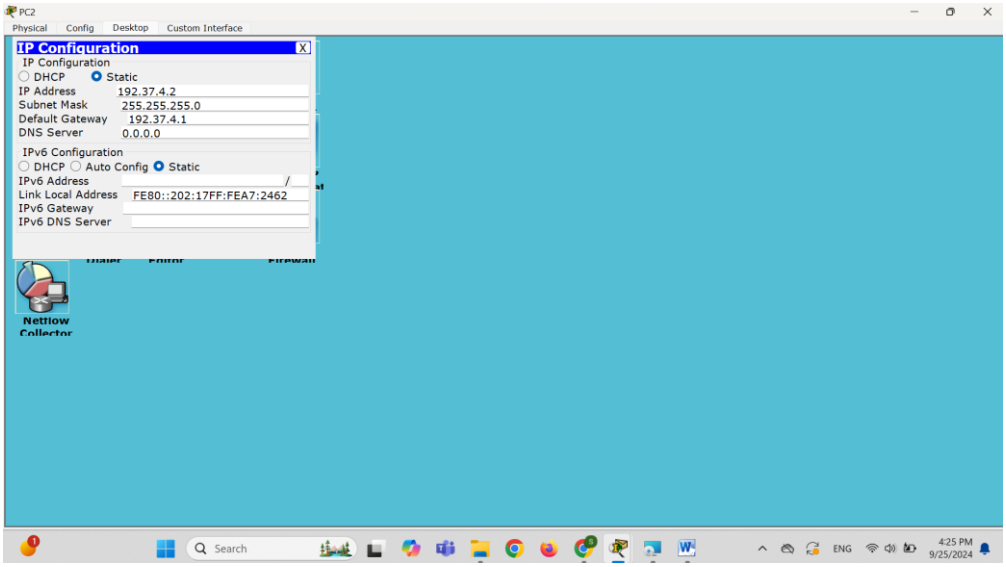


Figure 2: IP configuration for PC2

→add serial3/0 for router1:

```
User Access Verification

Password:
Router>enable
Password:
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial3/0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial3/0, changed state to down
Router(config-if)#ip address 192.37.3.1 255.255.255.0
Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up
```

→ then add new static route for all routers:

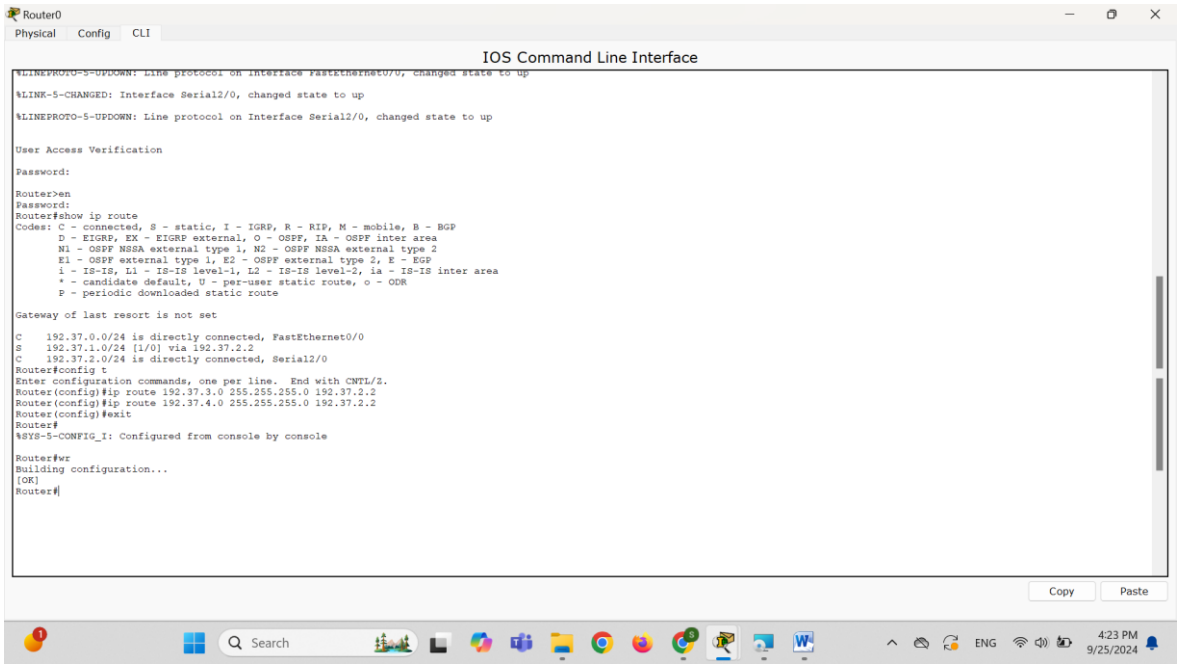


Figure 3: steps to complete static routing for router0

Note that in figure 3 , the routing table is before the update.

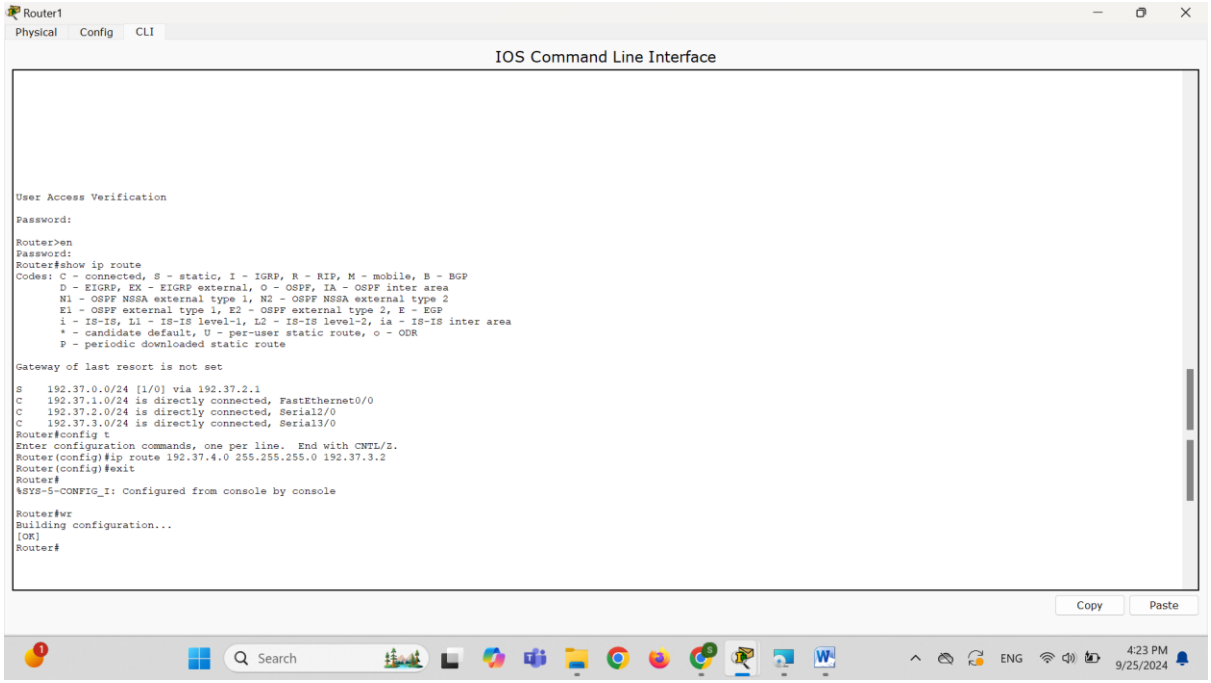


Figure 4:steps to complete static routing for router1

Note that in figure 4 , the routing table is before the update.

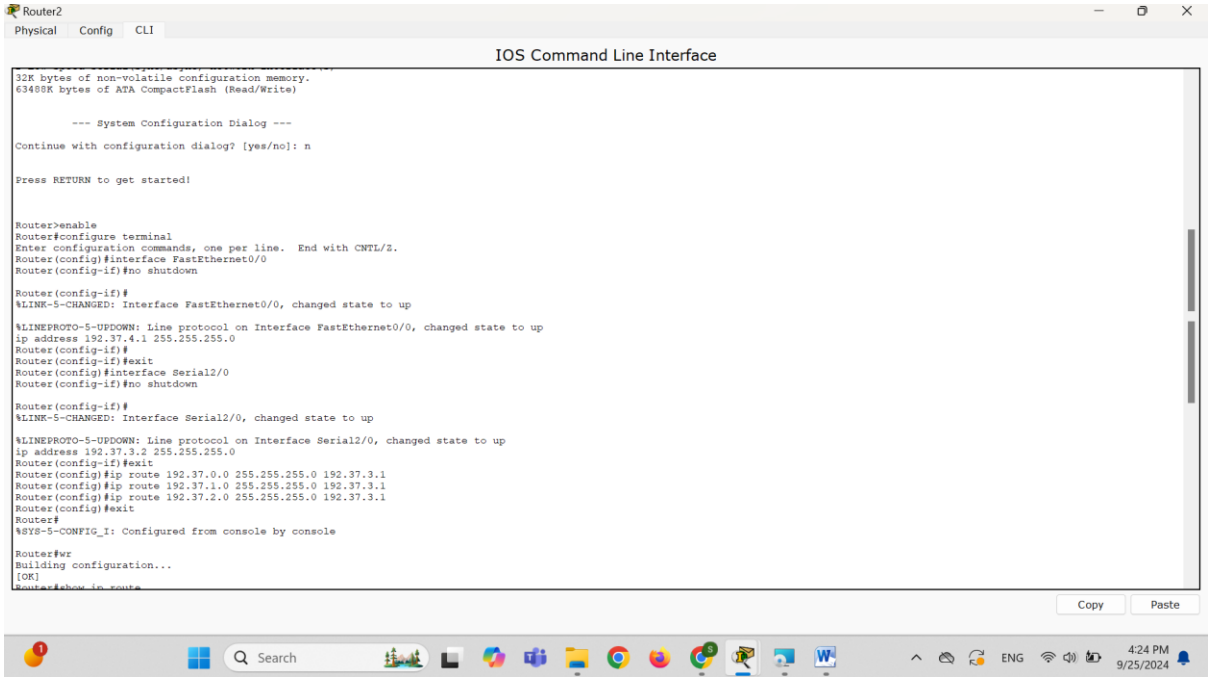
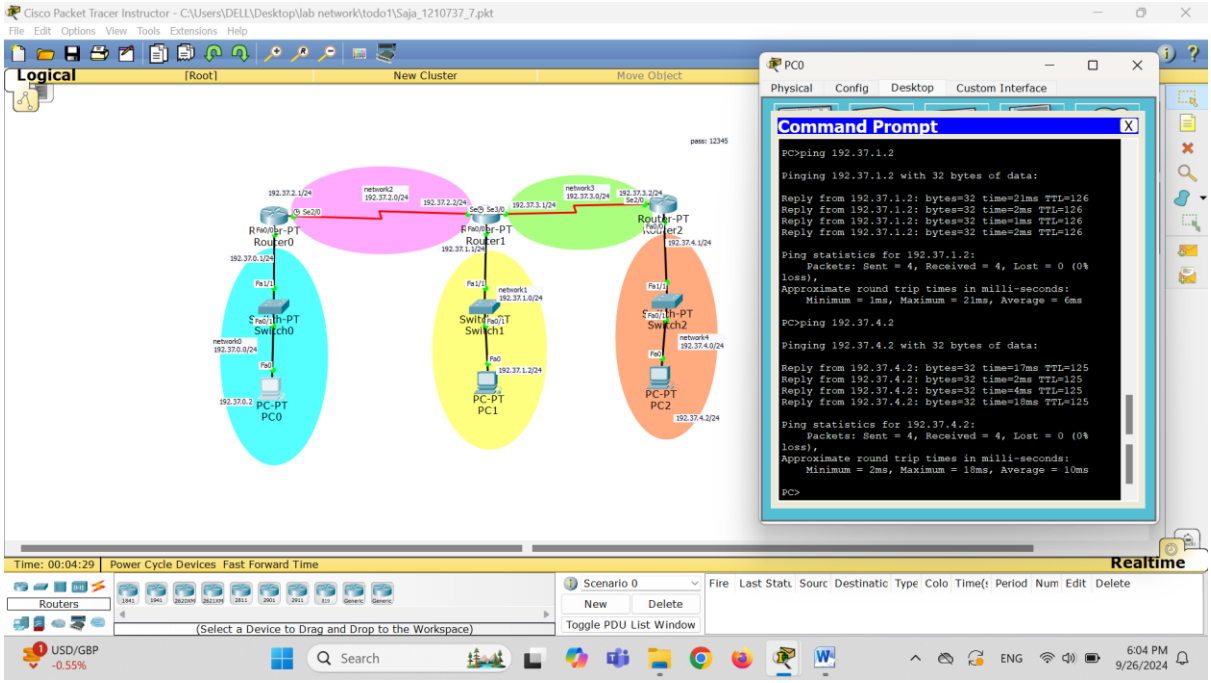


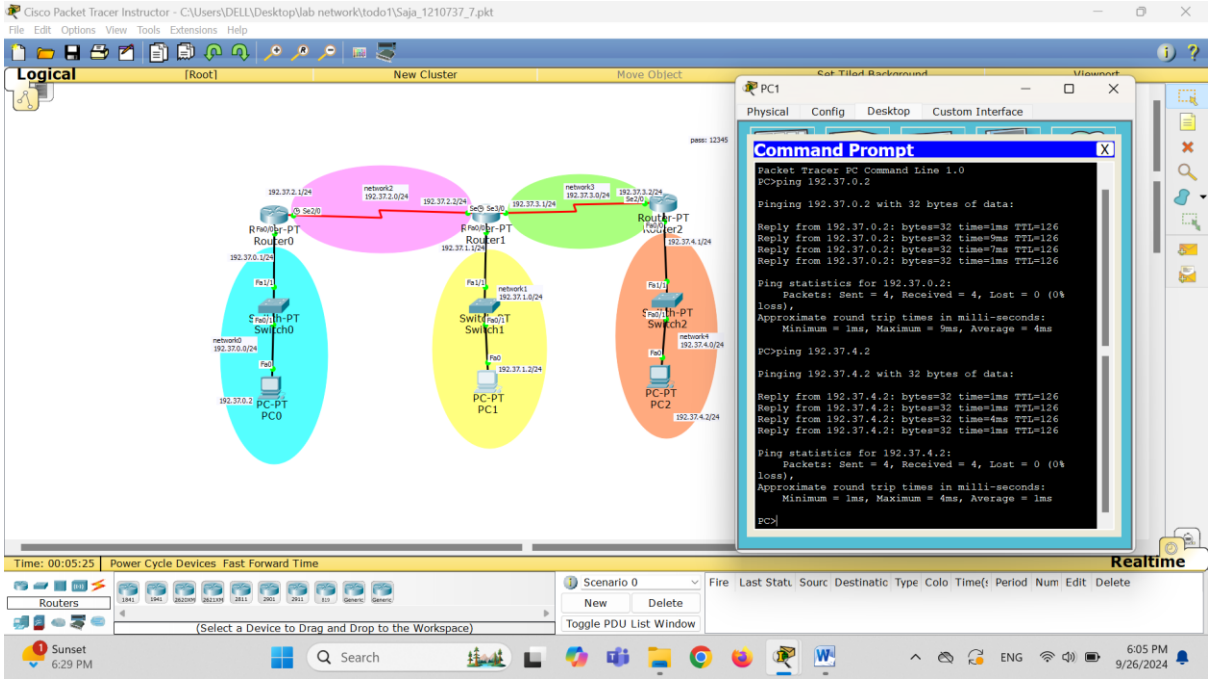
Figure 5:steps to complete static routing for router2

→ check connection by ping command:

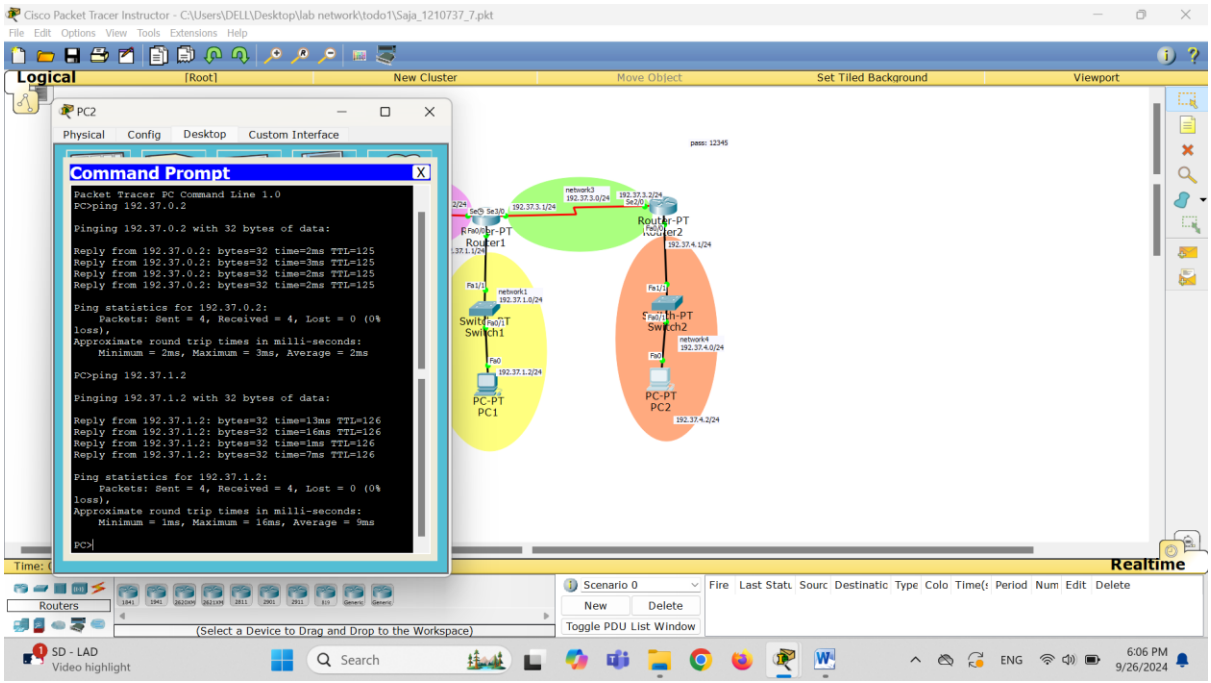
PC0:



PC1:



PC2:



→ show the routing table on all router:

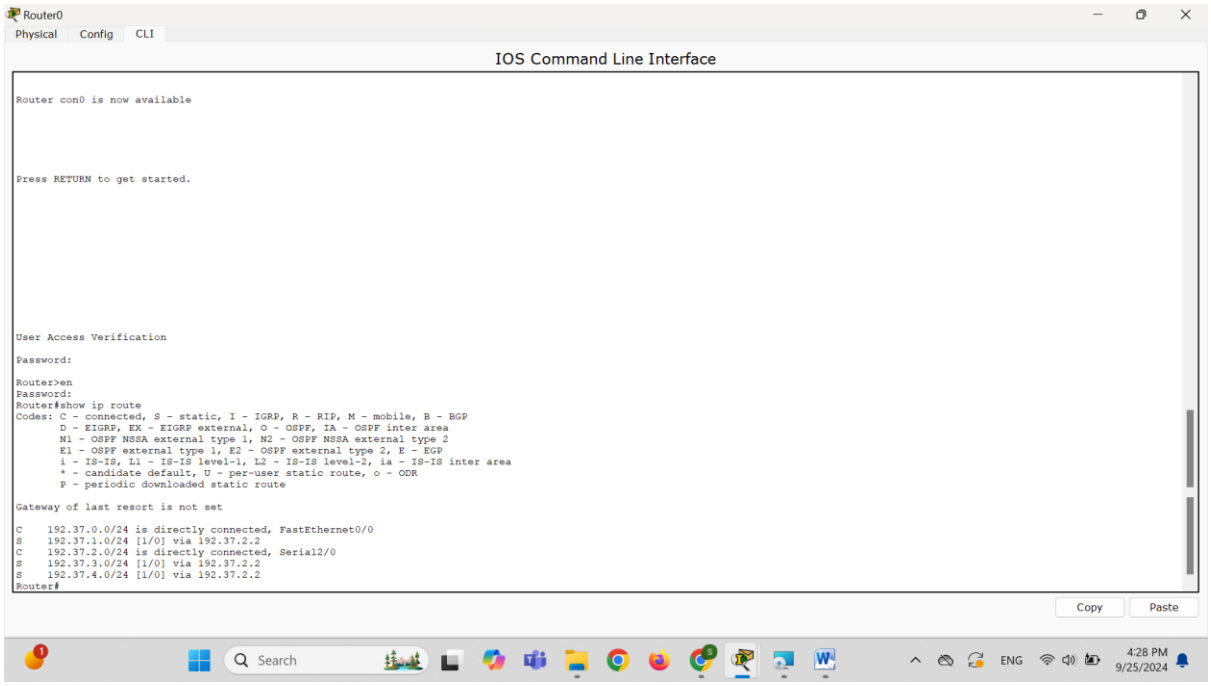


Figure 6: Routing table for router0

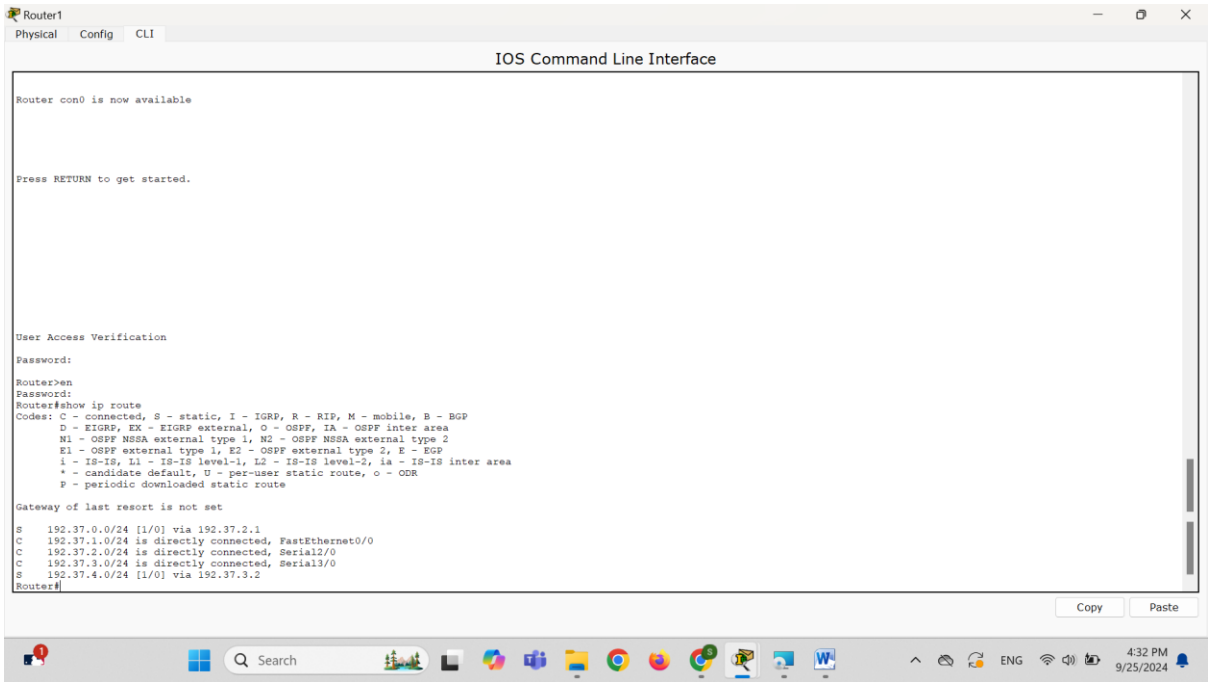


Figure 7:Routing table for router1

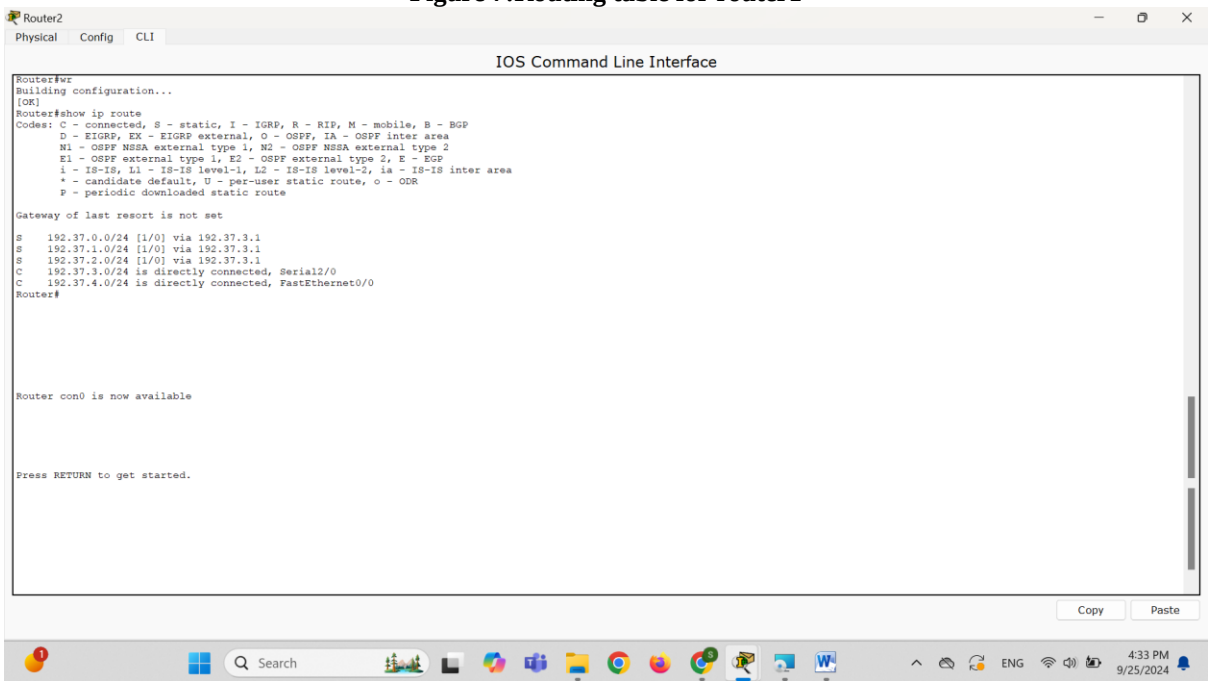


Figure 8:Routing table for router2