



FACULTY OF ENGINEERING AND TECHNOLOGY
ENCS4130, COMPUTER NETWORK LABORATORY

Experiment 4 problem

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-
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 - **Section: 6**

Part1:

1- Dijkstra's Algorithm:

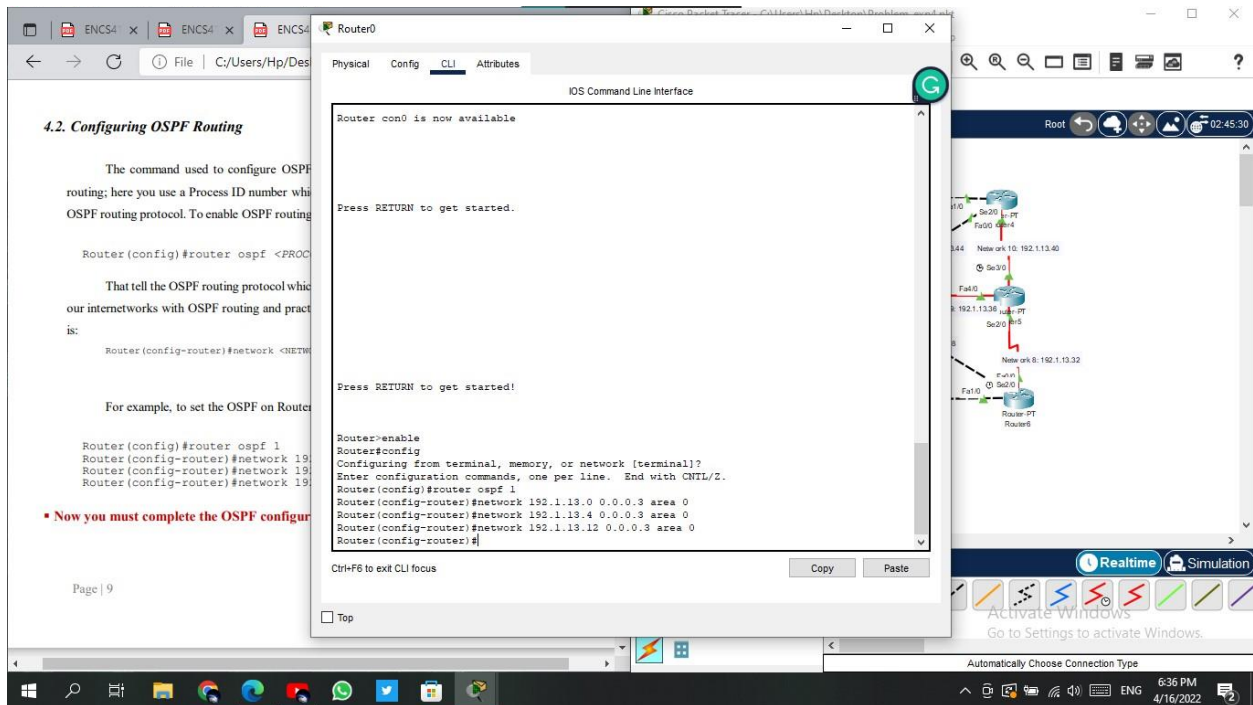
Step	N'	R1(P1)	R2(P2)	R3(P3)	R4(P4)	R5(P5)	R6 (P6)
0	R0	2,R0	∞	8,R0	4,R0	∞	∞
1	R0,R1		4,R1	8,R0	4,R0	∞	∞
2	R0,R1,R2			6,R2	4,R0	∞	104,R2
3	R0,R1,R2,R3				80,R3	24,R3	6,R3

- According to dijkstra's table, the shortest path from R0 to R6 with the least cost will be: R0, R1, R2, R3, R6 with the cost equals 8

2- The cost between R0 and R6 = the cost from R0 to R1 + the cost from R1 to R2 + the cost from R2 to R3 + the cost from R3 to R6 which equals $2+2+2+2 = 8$

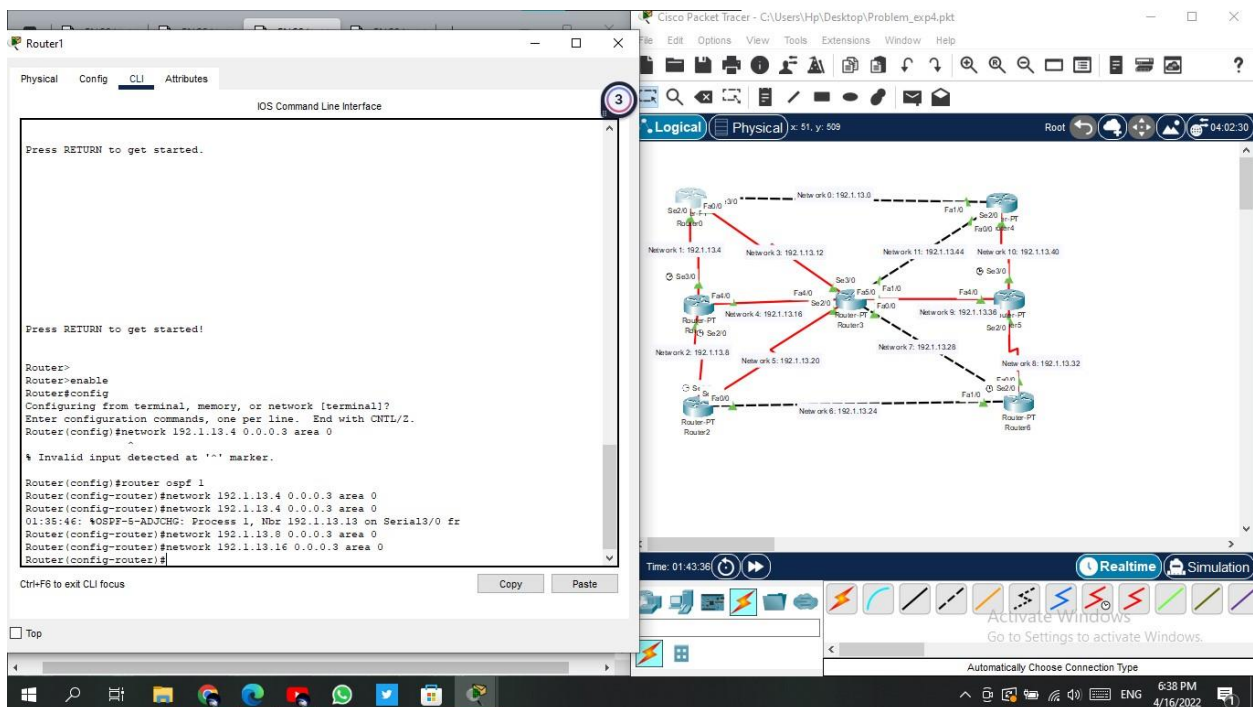
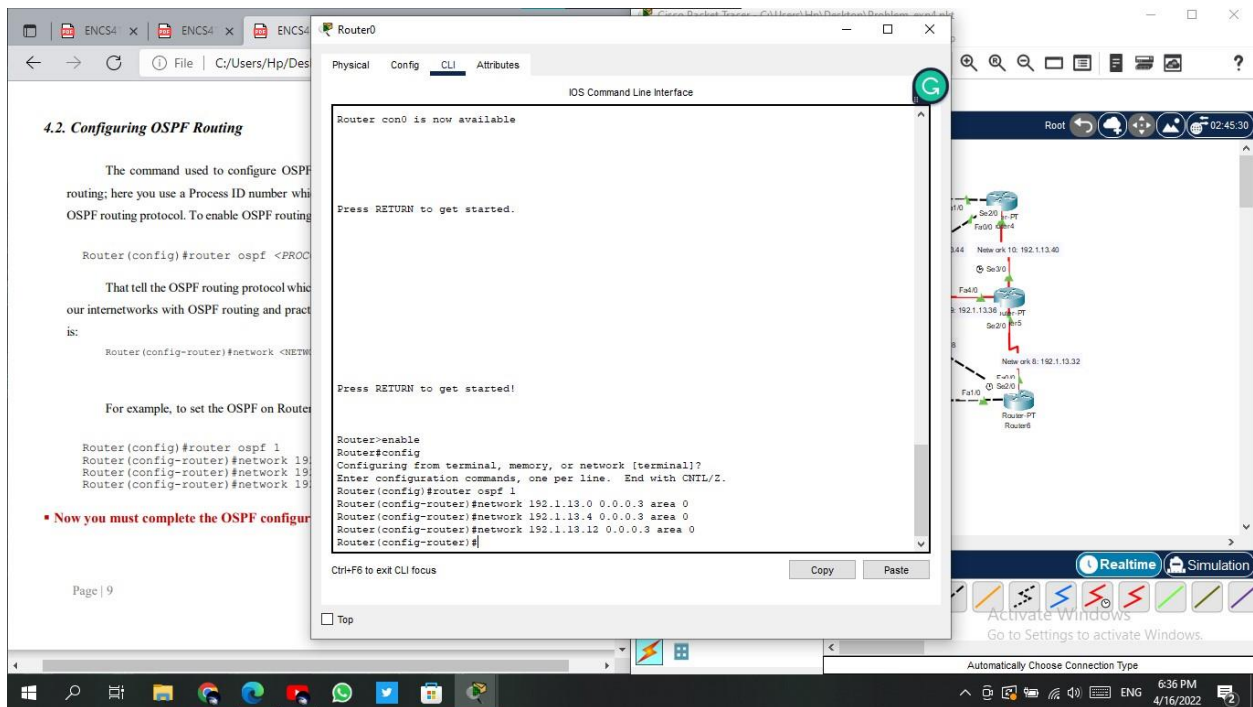
Part 2

The Topology:



Enabling OSPF for each router with suitable network

NOTE: I used the Config screen to fill the IPs for the interfaces which is faster to fill, but you can fill them by using CLI commands by entering the interface in the configured router to have the access for adding the required IPs.



4.2. Configuring OSPF Routing

The command used to configure OSPF routing: here you use a Process ID number which identifies the OSPF routing protocol. To enable OSPF routing on a router, use the `router ospf <Process ID>` command in global configuration mode.

That tell the OSPF routing protocol which interfaces to advertise to other routers in the network. Use the `network <IP address> <wildcard mask>` command in router configuration mode.

For example, to set the OSPF on Router 4:

```
Router(config)#router ospf 1
Router(config-router)#network 192.1.13.0 0.0.0.3 area 0
Router(config-router)#network 192.1.13.40 0.0.0.3 area 0
Router(config-router)#network 192.1.13.44 0.0.0.3 area 0
Router(config-router)#
```

▪ Now you must complete the OSPF configuration on Router 5.

Page | 9

Router4

IOS Command Line Interface

```
Press RETURN to get started.

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Press RETURN to get started!

Router>enable
Router#configure terminal
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 192.1.13.0 0.0.0.3 area 0
Router(config-router)#network 192.1.13.40 0.0.0.3 area 0
Router(config-router)#network 192.1.13.44 0.0.0.3 area 0
Router(config-router)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Network Diagram:

Network 11: 192.1.13.44, Network 10: 192.1.13.40, Network 9: 192.1.13.36, Network 7: 192.1.13.28, Network 8: 192.1.13.32

Router-PT, Router-PT, Router-PT, Router-PT, Router-PT

Realtime Simulation

Activate Windows

Go to Settings to activate Windows.

Automatically Choose Connection Type

9:24 PM 4/16/2022

4.2. Configuring OSPF Routing

The command used to configure OSPF routing: here you use a Process ID number which identifies the OSPF routing protocol. To enable OSPF routing on a router, use the `router ospf <Process ID>` command in global configuration mode.

That tell the OSPF routing protocol which interfaces to advertise to other routers in the network. Use the `network <IP address> <wildcard mask>` command in router configuration mode.

For example, to set the OSPF on Router 5:

```
Router(config)#router ospf 1
Router(config-router)#network 192.1.13.0 0.0.0.3 area 0
Router(config-router)#network 192.1.13.40 0.0.0.3 area 0
Router(config-router)#network 192.1.13.44 0.0.0.3 area 0
Router(config-router)#
```

▪ Now you must complete the OSPF configuration on Router 4.

Page | 9

Router5

IOS Command Line Interface

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Press RETURN to get started!

Router>enable
Router#configure terminal
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 192.1.13.32 0.0.0.3 area 0
Router(config-router)#network 192.1.13.36 0.0.0.3 area 0
Router(config-router)#network 192.1.13.40 0.0.0.3 area 0
Router(config-router)#network 192.1.13.44 0.0.0.3 area 0
04:26:26: %OSPF-6-ADJCHG: Process 1, Nbr 192.1.13.45 on FastEthernet4/0 from LOADING to FULL, Loading Done
Router(config-router)#network 192.1.13.40 0.0.0.3 area 0
Router(config-router)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Network Diagram:

Network 11: 192.1.13.44, Network 10: 192.1.13.40, Network 9: 192.1.13.36, Network 7: 192.1.13.28, Network 8: 192.1.13.32

Router-PT, Router-PT, Router-PT, Router-PT, Router-PT

Realtime Simulation

Activate Windows

Go to Settings to activate Windows.

Automatically Choose Connection Type

9:28 PM 4/16/2022

4.2. Configuring OSPF Routing

The command used to configure OSPF routing; here you use a Process ID number which identifies the OSPF routing protocol. To enable OSPF routing on the router, use the following command:

```
Router(config)#router ospf <Process ID>
```

That tells the OSPF routing protocol which interfaces to use for routing and what networks to advertise:

```
Router(config-router)#network <Network Address> <Subnet Mask>
```

For example, to set the OSPF on Router 6:

```
Router(config)#router ospf 1
Router(config-router)#network 192.1.13.24 0.0.0.3 area 0
Router(config-router)#network 192.1.13.28 0.0.0.3 area 0
Router(config-router)#network 192.1.13.32 0.0.0.3 area 0
```

Now you must complete the OSPF configuration by enabling the OSPF process:

```
Router(config)#enable
Router#config
Router(config)#router ospf 1
Router(config-router)#network 192.1.13.24 0.0.0.3 area 0
Router(config-router)#network 192.1.13.28 0.0.0.3 area 0
Router(config-router)#network 192.1.13.32 0.0.0.3 area 0
Router(config-router)#
```

Ctrl+F6 to exit CLI focus

4.2. Configuring OSPF

The command used to configure OSPF routing; here you use a Process ID number which identifies the OSPF routing protocol. To enable OSPF routing on the router, use the following command:

```
Router(config)#router ospf <Process ID>
```

That tells the OSPF routing protocol which interfaces to use for routing and what networks to advertise:

```
Router(config-router)#network <Network Address> <Subnet Mask>
```

For example, to set the OSPF on Router 6:

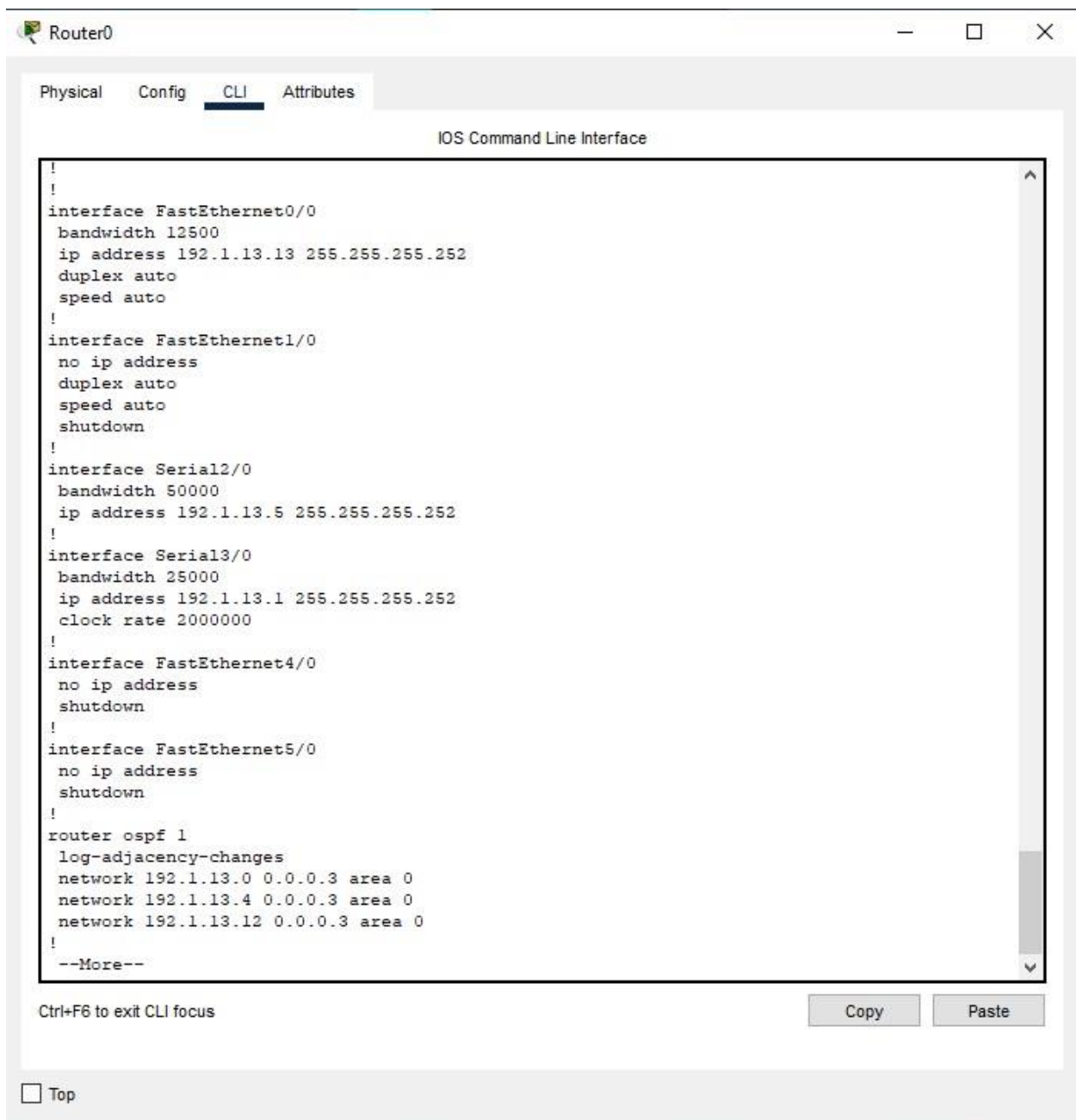
```
Router(config)#enable
Router#config
Router(config)#router ospf 1
Router(config-router)#network 192.1.13.24 0.0.0.3 area 0
Router(config-router)#network 192.1.13.28 0.0.0.3 area 0
Router(config-router)#network 192.1.13.32 0.0.0.3 area 0
Router(config-router)#
```

Ctrl+F6 to exit CLI focus

Router6 loopBack

Routers Interfaces:

- we got all interfaces IPs data by typing the command #sh run in the CLI which shows all connections for the router.



The screenshot shows a window titled "Router0" with a tabbed interface. The "CLI" tab is selected, displaying the "IOS Command Line Interface". The terminal output shows the configuration for several interfaces and OSPF settings. The configuration is as follows:

```
!
!
interface FastEthernet0/0
 bandwidth 12500
 ip address 192.1.13.13 255.255.255.252
 duplex auto
 speed auto
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial2/0
 bandwidth 50000
 ip address 192.1.13.5 255.255.255.252
!
interface Serial3/0
 bandwidth 25000
 ip address 192.1.13.1 255.255.255.252
 clock rate 2000000
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 network 192.1.13.0 0.0.0.3 area 0
 network 192.1.13.4 0.0.0.3 area 0
 network 192.1.13.12 0.0.0.3 area 0
!
--More--
```

Below the terminal output, there is a status bar with the text "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste". At the bottom left, there is a checkbox labeled "Top".

IOS Command Line Interface

```
!  
interface FastEthernet0/0  
  no ip address  
  duplex auto  
  speed auto  
  shutdown  
!  
interface FastEthernet1/0  
  no ip address  
  duplex auto  
  speed auto  
  shutdown  
!  
interface Serial2/0  
  bandwidth 50000  
  ip address 192.1.13.9 255.255.255.252  
  clock rate 2000000  
!  
interface Serial3/0  
  ip address 192.1.13.6 255.255.255.252  
  clock rate 2000000  
!  
interface FastEthernet4/0  
  bandwidth 2000  
  ip address 192.1.13.17 255.255.255.252  
!  
interface FastEthernet5/0  
  no ip address  
  shutdown  
!  
router ospf 1  
  log-adjacency-changes  
  network 192.1.13.4 0.0.0.3 area 0  
  network 192.1.13.8 0.0.0.3 area 0  
  network 192.1.13.16 0.0.0.3 area 0  
!  
ip classless  
!
```

Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

ENC54 x ENC54 x ENC54 x

File | C:/Users/Hp/Desktop/3rd...

To configure the loopback IPs, you first need to create the IP address to the loopback. The configuration below is for loopback 0:

```
Router(config)#interface loopback 0
%LINK-5-CHANGED: Interface loopback0, changed state to up
Router(config-if)#ip address 172.16.0.1 255.255.255.0
```

4.2. Configuring OSPF Routing

The command used to configure OSPF is different from other routing; here you use a Process ID number which can take any value. To enable OSPF routing on a router the command is:

```
Router(config)#router ospf <PROCESS-ID>
```

That tells the OSPF routing protocol which networks to advertise to our internetworks with OSPF routing and practice that. The command is:

```
Router(config-router)#network <NETWORK-ID> <OSPF-PROCESS-ID>
```

For example, to set the OSPF on Router 3, we use the following configuration:

```
Router(config)#router ospf 1
Router(config-router)#network 192.168.0.8 0.0.0.3 area 0
Router(config-router)#network 192.168.0.12 0.0.0.3 area 0
Router(config-router)#network 192.168.2.0 0.0.0.3 area 0
```

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
!
interface FastEthernet0/0
ip address 192.1.13.25 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet1/0
no ip address
duplex auto
speed auto
shutdown
!
interface Serial12/0
ip address 192.1.13.10 255.255.255.252
clock rate 2000000
!
interface Serial13/0
ip address 192.1.13.21 255.255.255.252
!
interface FastEthernet4/0
no ip address
shutdown
!
interface FastEthernet5/0
no ip address
shutdown
!
router ospf 1
log-adjacency-changes
network 192.1.13.8 0.0.0.3 area 0
network 192.1.13.20 0.0.0.3 area 0
network 192.1.13.24 0.0.0.3 area 0
!
ip classless
!
ip flow-export version 9
!
```

Ctrl+F6 to exit CLI focus

Copy Paste

Root

92.113.40

AK 8: 192.1.13.32

PT

Realtime Simulation

Activate Windows
Go to Settings to activate Windows.

Choose Connection Type

6:44 PM
4/16/2022

Physical Config CLI Attributes

IOS Command Line Interface


```
!  
!  
interface FastEthernet0/0  
  ip address 192.1.13.29 255.255.255.252  
  duplex auto  
  speed auto  
!  
interface FastEthernet1/0  
  ip address 192.1.13.45 255.255.255.252  
  duplex auto  
  speed auto  
!  
interface Serial2/0  
  ip address 192.1.13.22 255.255.255.252  
!  
interface Serial3/0  
  ip address 192.1.13.14 255.255.255.252  
!  
interface FastEthernet4/0  
  ip address 192.1.13.18 255.255.255.252  
!  
interface FastEthernet5/0  
  ip address 192.1.13.37 255.255.255.252  
!  
router ospf 1  
  log-adjacency-changes  
  network 192.1.13.12 0.0.0.3 area 0  
  network 192.1.13.16 0.0.0.3 area 0  
  network 192.1.13.20 0.0.0.3 area 0  
  network 192.1.13.28 0.0.0.3 area 0  
  network 192.1.13.36 0.0.0.3 area 0  
  network 192.1.13.44 0.0.0.3 area 0  
!  
ip classless  
--More--
```

Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

 Router4

Physical

Config

CLI

Attributes

IOS Command Line Interface

```
interface FastEthernet0/0
ip address 192.1.13.41 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 192.1.13.2 255.255.255.252
duplex auto
speed auto
!
interface Serial12/0
ip address 192.1.13.46 255.255.255.252
!
interface Serial13/0
no ip address
shutdown
!
interface FastEthernet4/0
no ip address
shutdown
!
interface FastEthernet5/0
no ip address
shutdown
!
router ospf 1
log-adjacency-changes
network 192.1.13.0 0.0.0.3 area 0
network 192.1.13.40 0.0.0.3 area 0
network 192.1.13.44 0.0.0.3 area 0
!
ip classless
!
ip flow-export version 9
!
!
!
```

Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

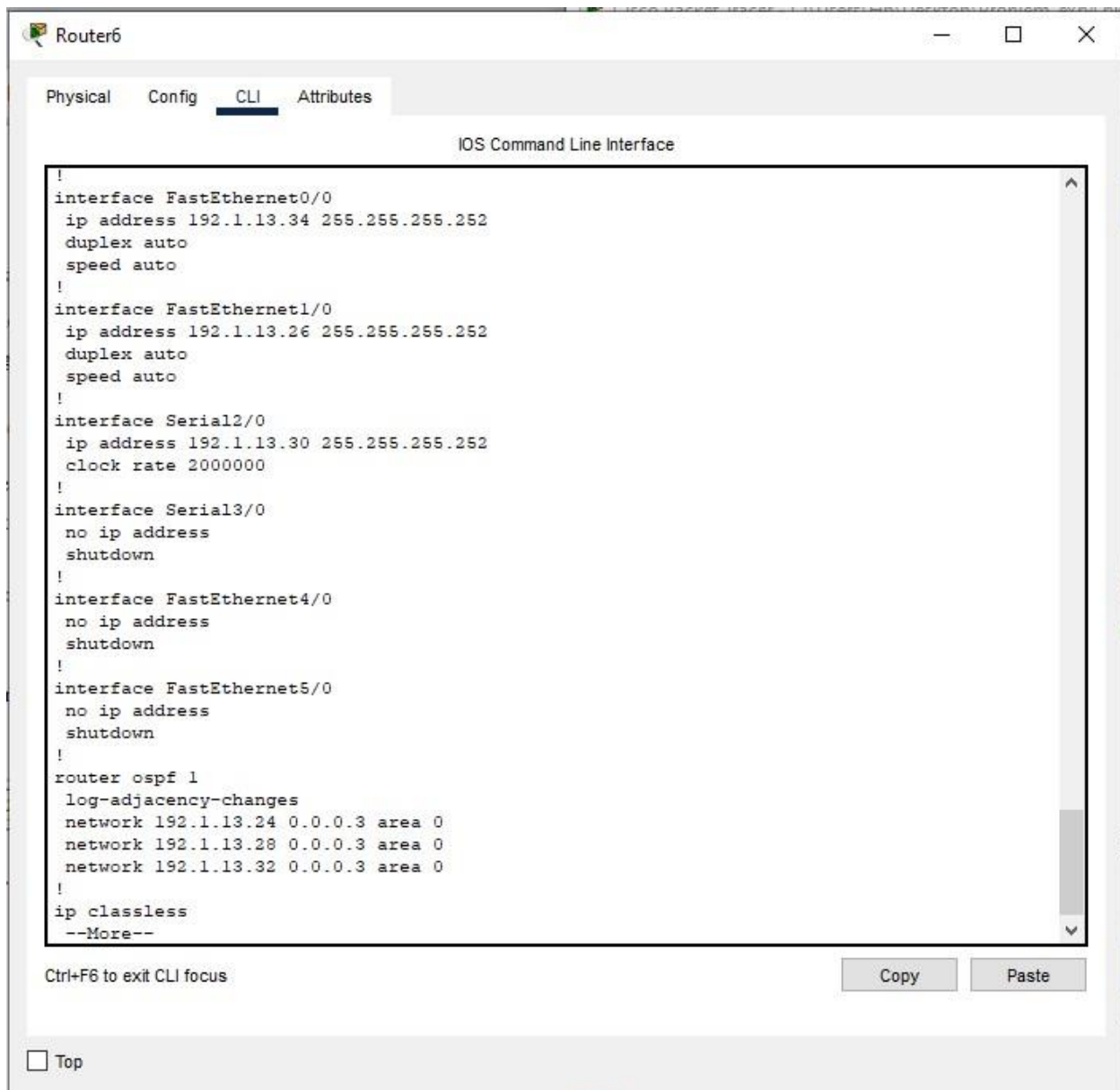
IOS Command Line Interface

```
!
interface FastEthernet0/0
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface FastEthernet1/0
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface Serial2/0
  ip address 192.1.13.33 255.255.255.252
!
interface Serial3/0
  ip address 192.1.13.42 255.255.255.252
  clock rate 2000000
!
interface FastEthernet4/0
  ip address 192.1.13.38 255.255.255.252
!
interface FastEthernet5/0
  no ip address
  shutdown
!
router ospf 1
  log-adjacency-changes
  network 192.1.13.32 0.0.0.3 area 0
  network 192.1.13.36 0.0.0.3 area 0
  network 192.1.13.40 0.0.0.3 area 0
!
ip classless
!
ip flow-export version 9
!
--More-- |
```

Ctrl+F6 to exit CLI focus

Copy

Paste



Setting Costs

BandWidth = $(100 * 10^6) / \text{cost}$ and the result should be written in Kilobits in the CLI screen.

Here are screenshots for each router while setting the cost for each one.

The image is a composite of three screenshots from a computer screen. On the left is a document with text explaining how to set bandwidth and cost on a router interface. In the center is a screenshot of a Cisco IOS CLI window for 'Router0' showing the configuration of interfaces se2/0, se3/0, and fa0/0 with specific bandwidth values. On the right is a network diagram showing three routers (Router-PT1, Router-PT2, Router-PT3) connected in a triangle topology with various interfaces and IP addresses.

You can see the routing tables for each router by executing `show ip route`. We also can see that to go to a Network is through interface example this path.

You also can change the cost from an interface by changing the bandwidth. For example, to reduce the cost for going from PC0 to PC4 through Routers R0→R1 and from R1→R2 by changing the bandwidth of Se3/0 for R1. The routing table for router0 after changing the cost on an interface to 5 we can set the bandwidth to 20000Kbits.

Therefore, to set the cost to 5 the bandwidth should be 20000Kbits. To set the bandwidth on an interface first we should change the bandwidth using the following command:

```
Router(config-if)#bandwidth <BANDWIDTH-IN-KILOBITS>
```

For example, to change the cost to 5 for interface Se2/0 commands:

```
Router(config)#interface se2/0
Router(config-if)#bandwidth 20000
```

The end-to-end cost is the summation of the cost through the path.

▪ Note that the serial interface to the switch has a cost of 1.

```
Router0
Physical Config CLI Attributes
IOS Command Line Interface

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
04:08:01: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.17 on Serial2/0 from LOADING to FULL, Loading Done

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down
05:28:07: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.17 on Serial2/0 from FULL to DOWN, Neighbor Down: Interface down or detached

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
05:28:17: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.17 on Serial2/0 from LOADING to FULL, Loading Done

Router#en
Router#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface se2/0
Router(config-if)#bandwidth 50000
Router(config-if)#exit
Router(config)#interface se3/0
Router(config-if)#bandwidth 25000
Router(config-if)#exit
Router(config)#interface fa0/0
Router(config-if)#bandwidth 12500
Router(config-if)#exit
Router(config)#
```

Network Diagram:

```
graph TD
    R1[Router-PT1] ---|Fa1/0| S1[Switch-PT1]
    S1 ---|Fa0/0| R2[Router-PT2]
    R2 ---|Fa1/0| S2[Switch-PT2]
    S2 ---|Fa0/0| R3[Router-PT3]
    R3 ---|Fa1/0| S3[Switch-PT3]
    S3 ---|Fa0/0| R1
```

You can see the routing tables for each router. We also can see that to go to a Network is through this path.

You also can change the cost from an interface so to reduce the cost for going from PC0 to PC4 cost from R0→R1 and from R1→R2 by changing the cost on R1. The routing table for router0 at change the cost on an interface to 5 we can set it.

Therefore, to set the cost to 5 the bandwidth 20000Kbits. To set the bandwidth on an interface change the bandwidth using the following command:

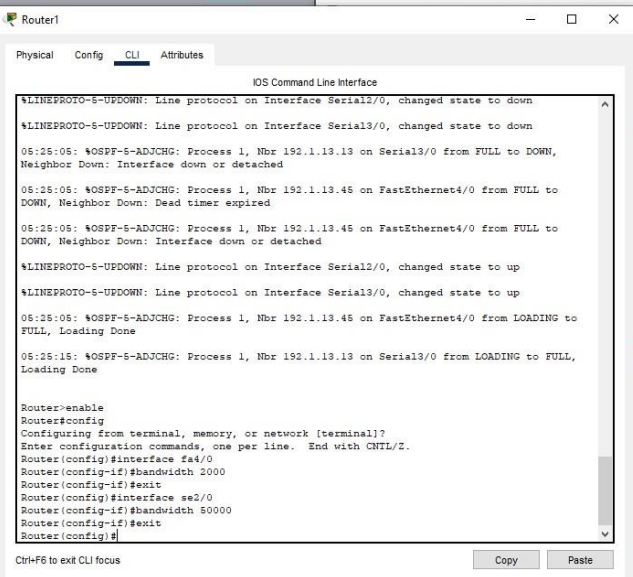
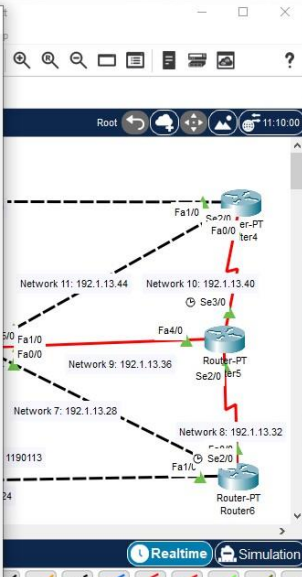
```
Router(config-if)#bandwidth <Bandwidth>
```

For example, to change the cost to 5 for the following commands:

```
Router(config)#interface se2/0
Router(config-if)#bandwidth 20000
```

The end-to-end cost is the summation of the cost of all interfaces along the path.

▪ Note that the serial interface to the switch is Fa0/0.

You can see the routing tables for each router. We also can see that to go to a Network is through this path.

You also can change the cost from an interface so to reduce the cost for going from PC0 to PC4 cost from R0→R1 and from R1→R2 by changing the cost on R1. The routing table for router0 at change the cost on an interface to 5 we can set it.

Therefore, to set the cost to 5 the bandwidth 20000Kbits. To set the bandwidth on an interface change the bandwidth using the following command:

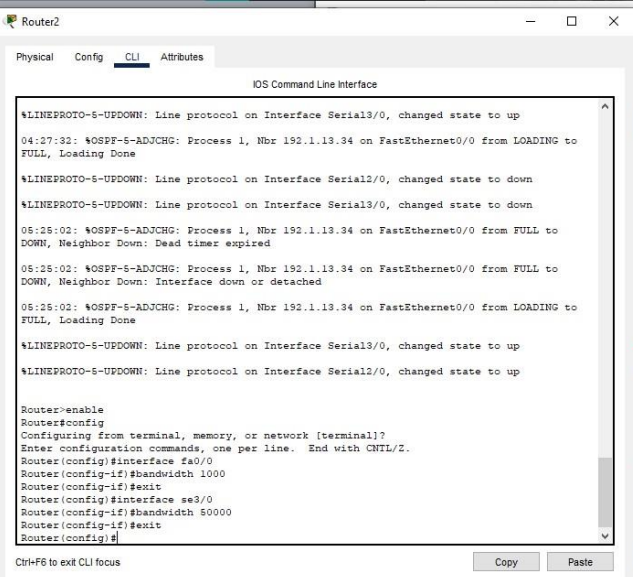
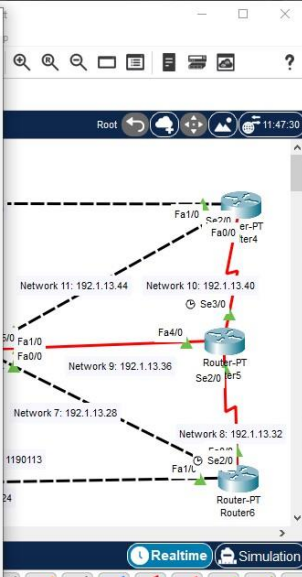
```
Router(config-if)#bandwidth <Bandwidth>
```

For example, to change the cost to 5 for the following commands:

```
Router(config)#interface se2/0
Router(config-if)#bandwidth 20000
```

The end-to-end cost is the summation of the cost of all interfaces along the path.

▪ Note that the serial interface to the switch is Fa0/0.

Router3

Physical Config CLI Attributes

IOS Command Line Interface

06:24:59: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.42 on FastEthernet5/0 from FULL to DOWN, Neighbor Down: Interface down or detached

06:24:59: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.17 on FastEthernet4/0 from FULL to DOWN, Neighbor Down: Dead timer expired

06:24:59: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.17 on FastEthernet4/0 from FULL to DOWN, Neighbor Down: Interface down or detached

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial12/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial13/0, changed state to up

06:24:59: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.42 on FastEthernet5/0 from LOADING to FULL, Loading Done

06:24:59: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.17 on FastEthernet4/0 from LOADING to FULL, Loading Done

Router>enable

Router#config

Configuring from terminal, memory, or network [terminal]?

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#interface fa1/0

Router(config-if)#bandwidth 25000

Router(config-if)#exit

Router(config)#interface fa5/0

Router(config-if)#bandwidth 5000

Router(config-if)#exit

Router(config)#interface fa0/0

Router(config-if)#bandwidth 50000

Router(config-if)#exit

Router(config)#

Ctrl+F6 to exit CLI focus

Copy Paste

Desktop\Problem_exp4.pkt

Extensions Window Help

417 Root 12:47:30

Network 0: 192.1.13.0

Network 11: 192.1.13.44

Network 10: 192.1.13.40

Network 9: 192.1.13.36

Network 7: 192.1.13.28

Network 8: 192.1.13.32

Network 6: 192.1.13.24

Router-PT Ver4

Router-PT Ver5

Router-PT Ver6

Leen Abu Omar 1190113

Realtime Simulation

Activate Windows
Go to Settings to activate Windows.

Automatically Choose Connection Type

10:51 PM 4/16/2022

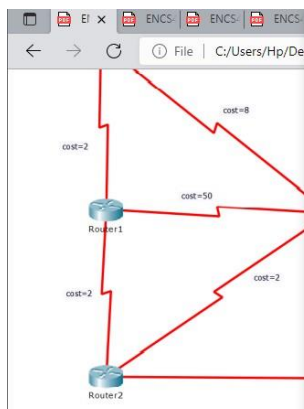


Figure 4-4 P

Part One:

- Find the shortest path from Router1 to Router2.
- What is the cost of the shortest path?

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Router4 CLI:

```

Router con0 is now available

Press RETURN to get started.

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router>enable
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#bandwidth 12500
Router(config-if)#exit
Router(config)#
  
```

Network diagram showing Router1 and Router2 connected via a central link with cost=50. Router1 is connected to a network with cost=2, and Router2 is connected to a network with cost=2. The central link has a cost of 50. The diagram is labeled Figure 4-4 P.

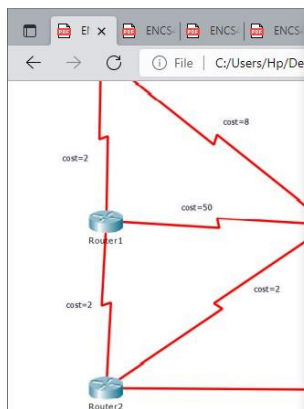


Figure 4-4 P

Part One:

- Find the shortest path from Router1 to Router2.
- What is the cost of the shortest path?

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Router5 CLI:

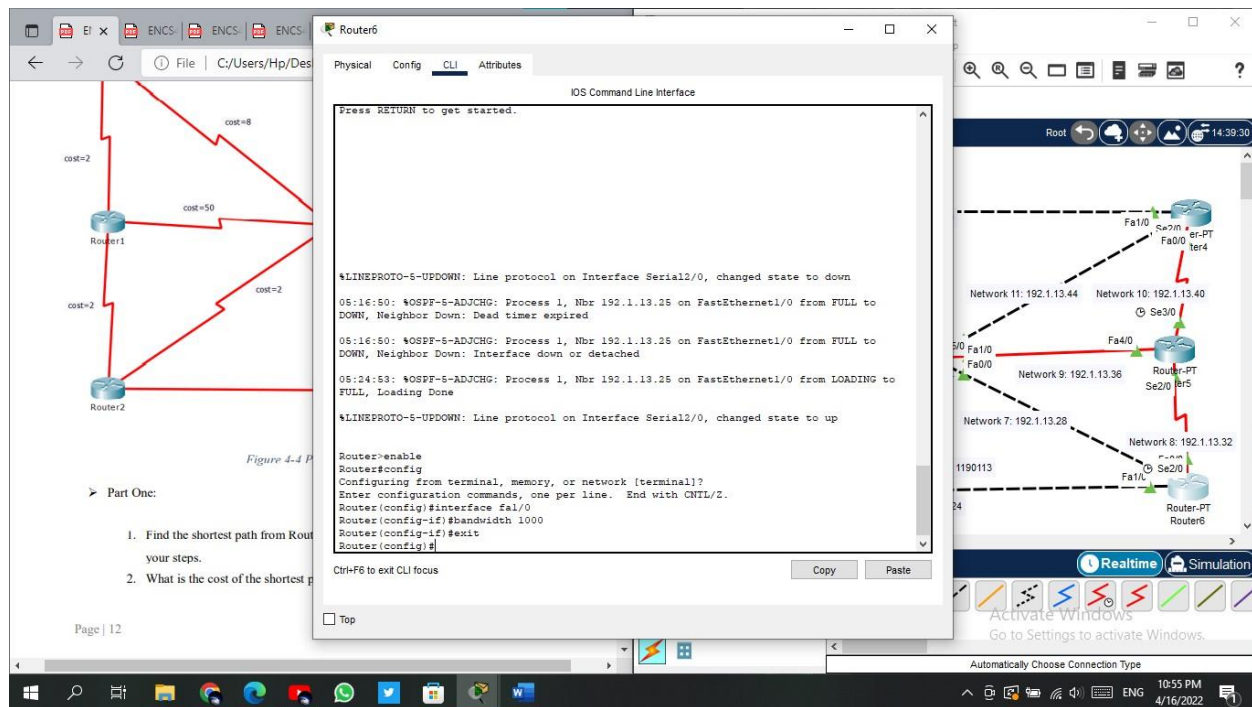
```

Press RETURN to get started.

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to down
05:24:55: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.45 on FastEthernet4/0 from FULL to DOWN, Neighbor Down: Dead timer expired
05:24:55: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.45 on FastEthernet4/0 from FULL to DOWN, Neighbor Down: Interface down or detached
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
05:24:55: %OSPF-5-ADJCHG: Process 1, Nbr 192.1.13.45 on FastEthernet4/0 from LOADING to FULL, Loading Done

Router>enable
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface se2/0
Router(config-if)#bandwidth 25000
Router(config-if)#exit
Router(config)#
  
```

Network diagram showing Router1 and Router2 connected via a central link with cost=50. Router1 is connected to a network with cost=2, and Router2 is connected to a network with cost=2. The central link has a cost of 50. The diagram is labeled Figure 4-4 P.

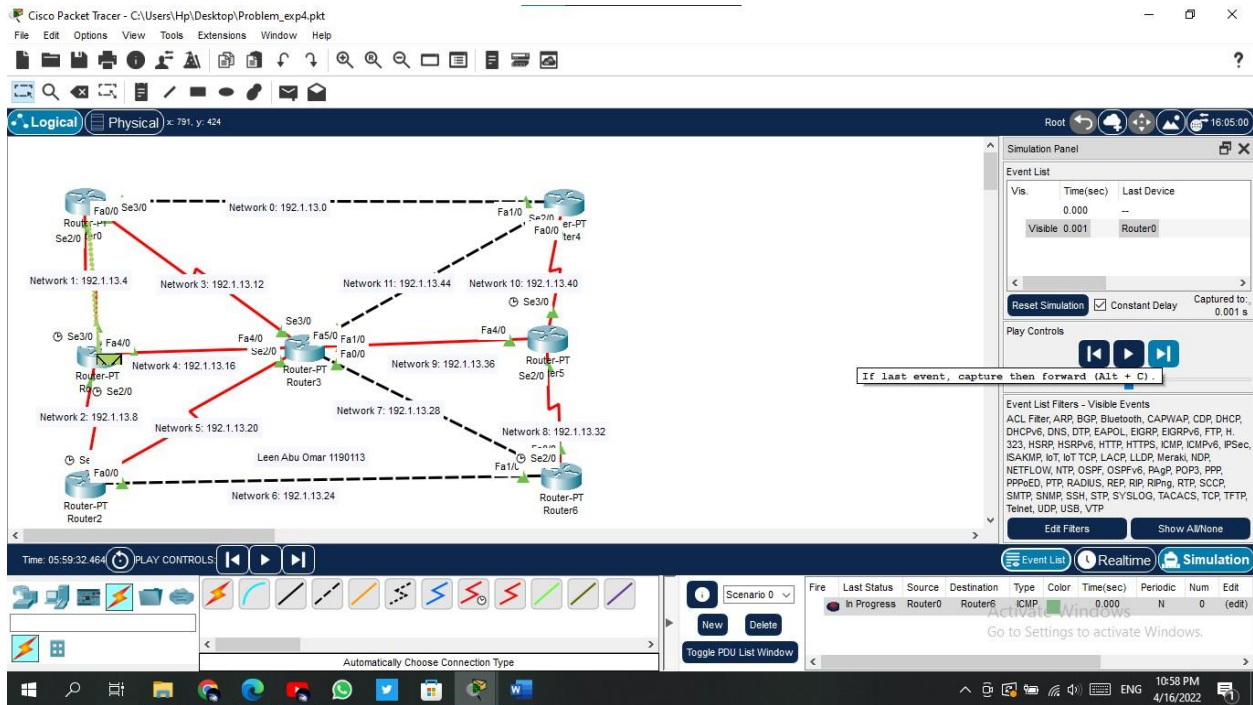


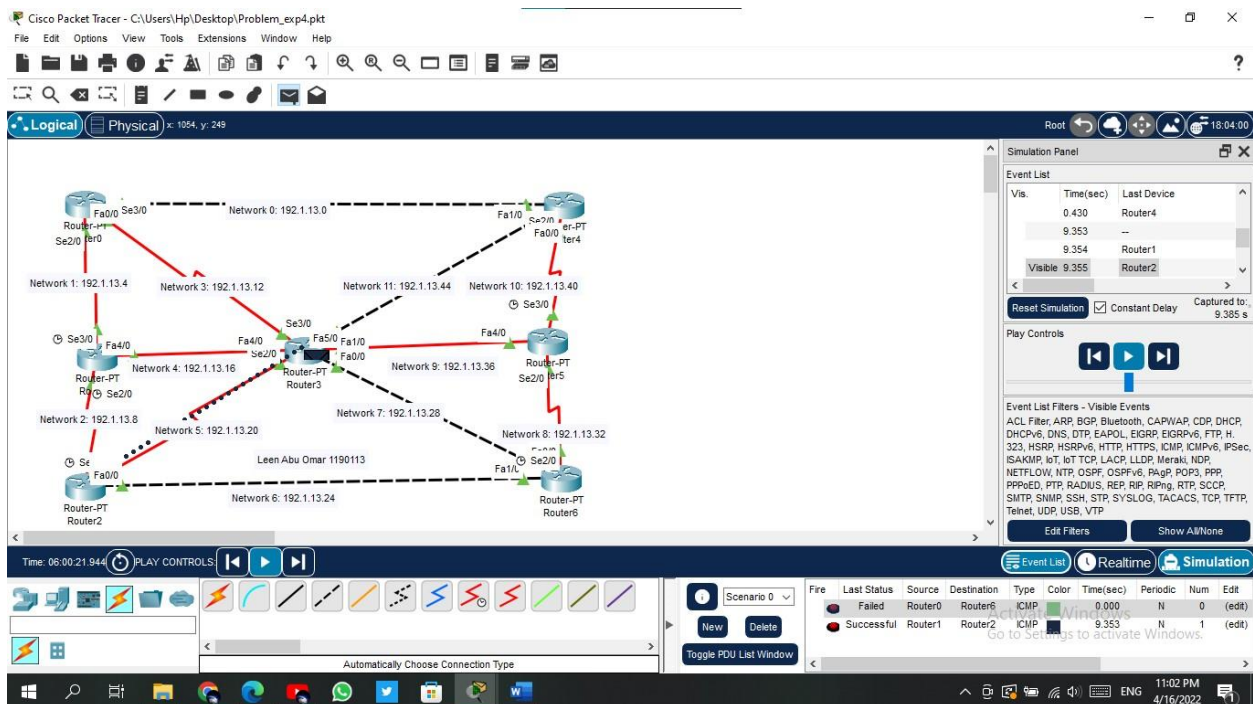
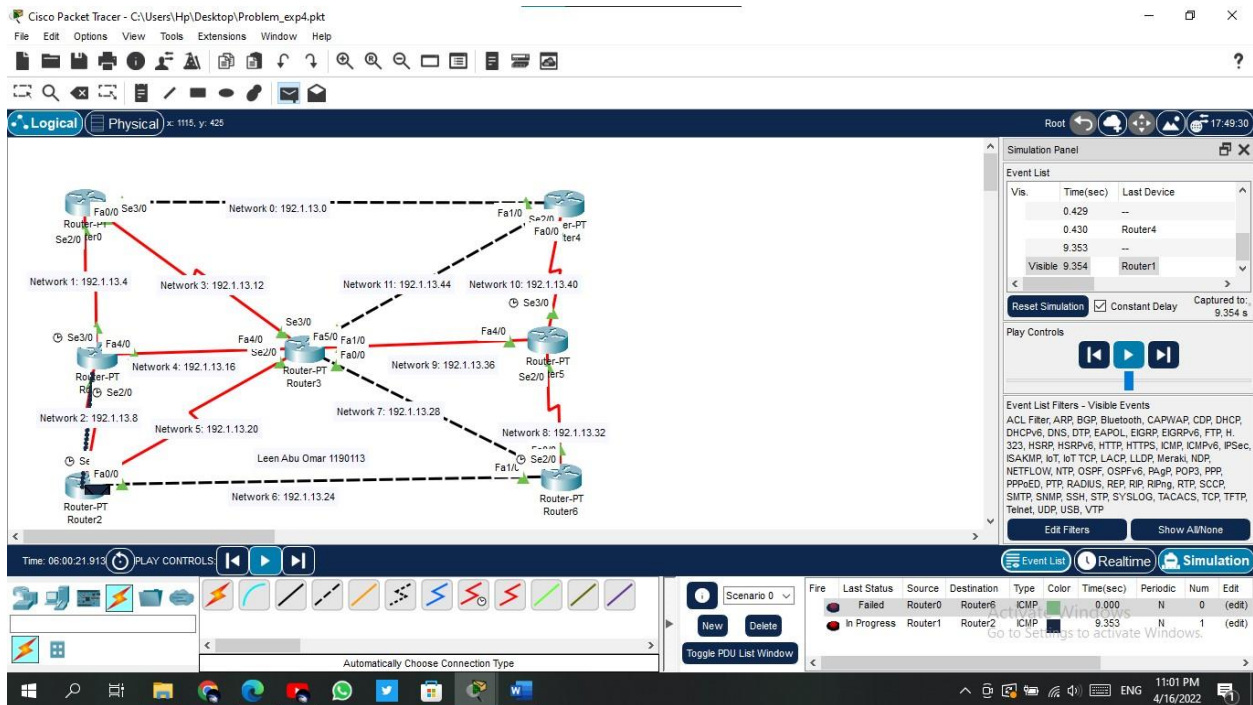
Bandwidth calculated according to the previous equation is:

- For Cost = 2, BW = 50000 Kbits
- For Cost = 4, BW = 25000 Kbits
- For Cost = 8, BW = 12500 Kbits
- For Cost = 20, BW = 5000 Kbits
- For Cost = 50, BW = 2000 Kbits
- For Cost = 100, BW = 1000 Kbits

The Final Result:

Here are screenshots implements the way of routing done according to dijkstra's algorithm (by crossing the least cost starting from R0, ending in R6 with Cost = 8)





And finally R3 reached to R6 by the shortest path with the cost of 8.