



**Faculty of Engineering & Technology**  
**Electrical & Computer Engineering Department**

**ENCS4130**

**Todo3 Exp4**

**Dynamic Routing 2 (Link State Routing Protocols)**  
**Open Shortest Path First (OSPF)**

**Prepared by:**

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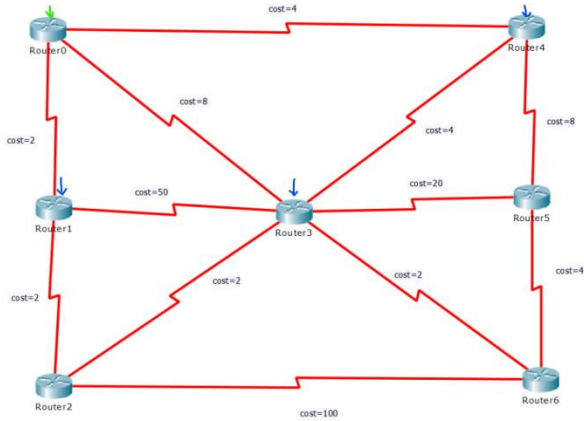
**Instructor:** Ismail Khater

**Assistant:** Burhan Dar Assi

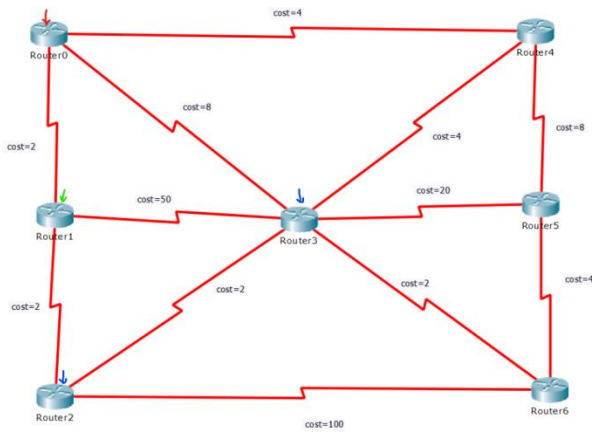
**Section:** 3

**Date:** 2022/7/31

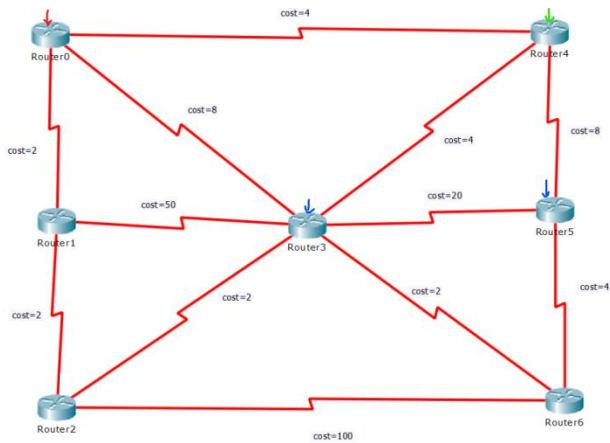
## Part1



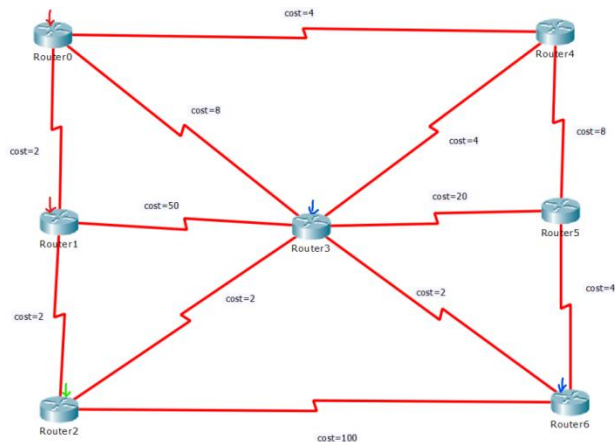
R0: 0  
 R1:  $\infty$  2  
 R2:  $\infty$   
 R3:  $\infty$  8  
 R4:  $\infty$  4  
 R5:  $\infty$   
 R6:  $\infty$



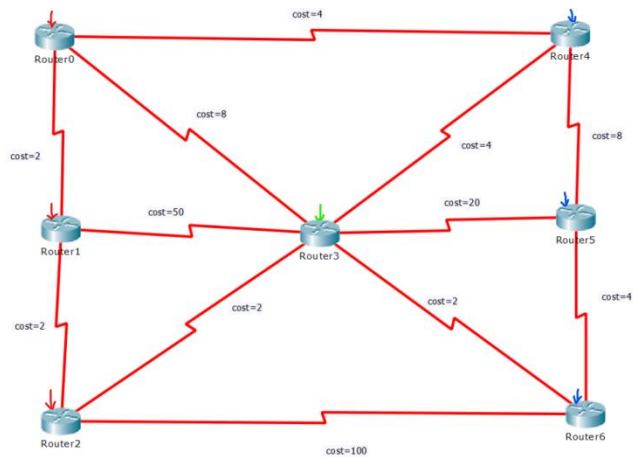
R0: 0  
 R1:  $\infty$  2  
 R2:  $\infty$  4  
 R3:  $\infty$  8  
 R4:  $\infty$  4  
 R5:  $\infty$   
 R6:  $\infty$



R0: 0  
 R1:  $\infty$  2  
 R2:  $\infty$  4  
 R3:  $\infty$  8  
 R4:  $\infty$  4  
 R5:  $\infty$  12  
 R6:  $\infty$



R0: 0  
R1:  $\infty$  2  
R2:  $\infty$  4  
R3:  $\infty$  8 6  
R4:  $\infty$  4  
R5:  $\infty$  12  
R6:  $\infty$  104



R0: 0  
R1:  $\infty$  2  
R2:  $\infty$  4  
R3:  $\infty$  8 6  
R4:  $\infty$  4  
R5:  $\infty$  12  
R6:  $\infty$  104 8

**Shortest path:**  $R_0 \rightarrow R_1 \rightarrow R_2 \rightarrow R_3 \rightarrow R_6$

**Shortest path cost:** 8

## Part2

5)

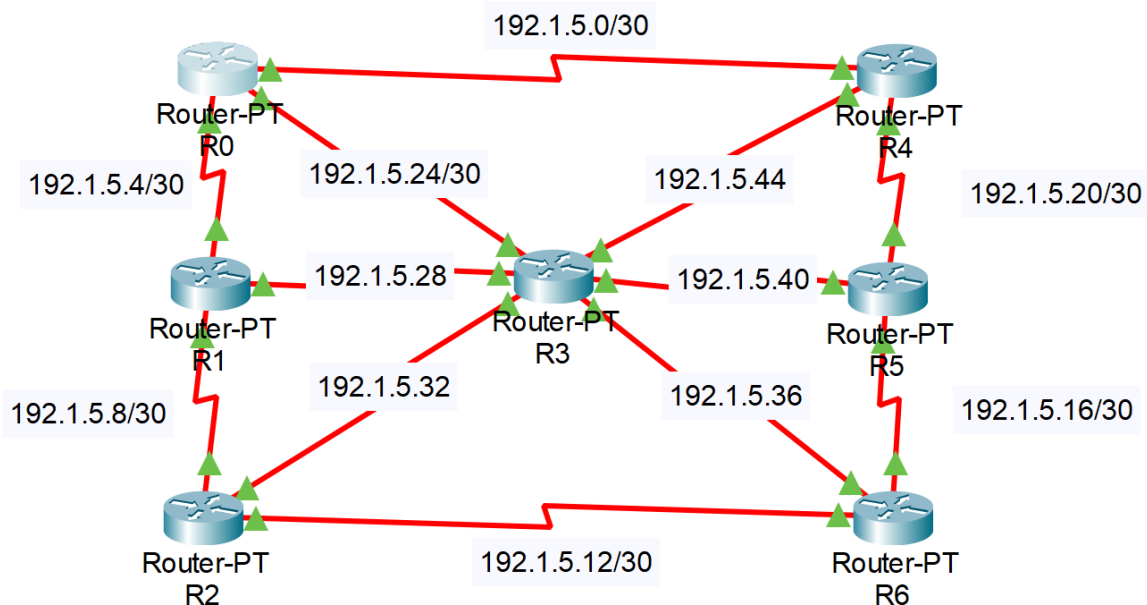
R0

Physical Config CLI Attributes

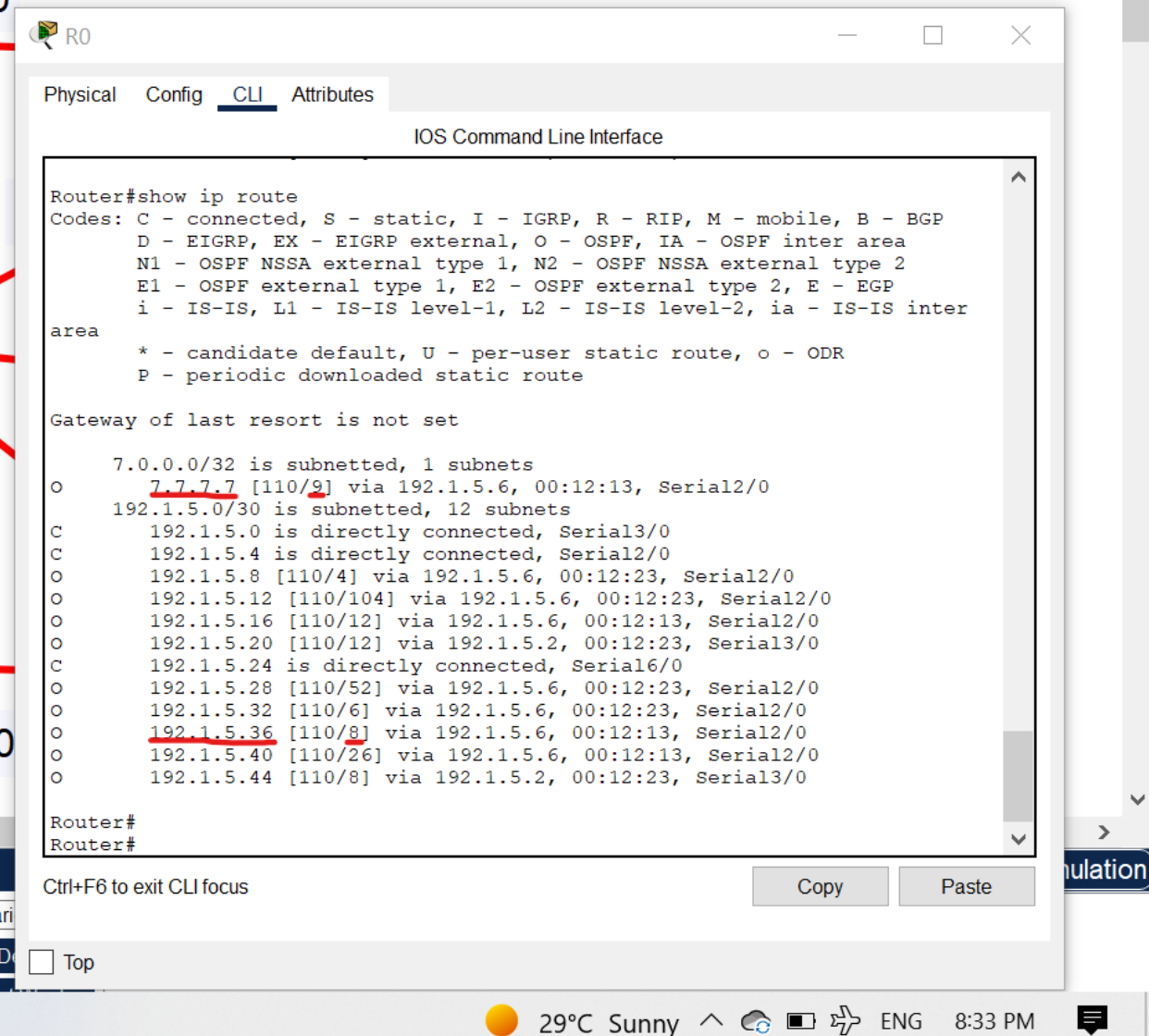
IOS Command Line Interface

```
Router>
Router>e?
enable exit
Router>en
Router#tr?
traceroute
Router#traceroute 7.7.7.7
Type escape sequence to abort.
Tracing the route to 7.7.7.7

 1  192.1.5.6          12 msec   1 msec   1 msec   R1
 2  192.1.5.10         2 msec   1 msec   2 msec   R2
 3  192.1.5.34         2 msec   3 msec   1 msec   R3
 4  192.1.5.37         3 msec   4 msec   68 msec  R6
Router#
Router#
Router#
```



6)



```
Router#show ip route
Codes: C - connected, S - static, I - IGRP, 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

 7.0.0.0/32 is subnetted, 1 subnets
O   7.7.7.7 [110/9] via 192.1.5.6, 00:12:13, Serial2/0
192.1.5.0/30 is subnetted, 12 subnets
C   192.1.5.0 is directly connected, Serial3/0
C   192.1.5.4 is directly connected, Serial2/0
O   192.1.5.8 [110/4] via 192.1.5.6, 00:12:23, Serial2/0
O   192.1.5.12 [110/104] via 192.1.5.6, 00:12:23, Serial2/0
O   192.1.5.16 [110/12] via 192.1.5.6, 00:12:13, Serial2/0
O   192.1.5.20 [110/12] via 192.1.5.2, 00:12:23, Serial3/0
C   192.1.5.24 is directly connected, Serial6/0
O   192.1.5.28 [110/52] via 192.1.5.6, 00:12:23, Serial2/0
O   192.1.5.32 [110/6] via 192.1.5.6, 00:12:23, Serial2/0
O   192.1.5.36 [110/8] via 192.1.5.6, 00:12:13, Serial2/0
O   192.1.5.40 [110/26] via 192.1.5.6, 00:12:13, Serial2/0
O   192.1.5.44 [110/8] via 192.1.5.2, 00:12:23, Serial3/0

Router#
Router#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

29°C Sunny ^ ENG 8:33 PM

As shown on the image above the cost to get from router0 to router6 is 8 where the packets received on the interface that belong to 192.1.5.36/30 network and to reach loopback0 for router6 you need more 1  $\rightarrow 8 + 1 = 9$ .

7)

The screenshot shows the CLI of router R0. The command 'show ip protocols' has been executed, displaying OSPF configuration details. The router ID is highlighted as 192.1.5.25. The routing table shows several networks in area 0, including 192.1.5.0/24, 192.1.5.4/24, and 192.1.5.24/24. The routing information sources table lists gateways and their distances.

```

Router#
Router#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 192.1.5.25
  Number of areas in this router is 2. 2 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    192.1.5.0 0.0.0.3 area 0
    192.1.5.4 0.0.0.3 area 0
    192.1.5.24 0.0.0.3 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    7.7.7.7          110           00:03:03
    192.1.5.25       110           00:03:03
    192.1.5.29       110           00:03:03
    192.1.5.33       110           00:03:03
    192.1.5.41       110           00:03:03
    192.1.5.45       110           00:03:03
    192.1.5.46       110           00:02:58
  Distance: (default is 110)

Router#
  
```

The highest IP on R0 is 192.1.5.25

The screenshot shows the CLI of router R6. The command 'show ip protocol' has been executed, displaying OSPF configuration details. The router ID is highlighted as 7.7.7.7. The routing table shows several networks in area 0, including 192.1.5.12/24, 192.1.5.16/24, 192.1.5.36/24, and 7.7.7.0/24. The routing information sources table lists gateways and their distances.

```

Router>
Router>en
Router#show ip protocol

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 7.7.7.7
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    192.1.5.12 0.0.0.3 area 0
    192.1.5.16 0.0.0.3 area 0
    192.1.5.36 0.0.0.3 area 0
    7.7.7.0 0.0.0.255 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    7.7.7.7          110           00:02:15
    192.1.5.25       110           00:02:15
    192.1.5.29       110           00:02:15
    192.1.5.33       110           00:02:15
    192.1.5.41       110           00:02:15
    192.1.5.45       110           00:02:15
    192.1.5.46       110           00:02:10
  Distance: (default is 110)

Router#
  
```

Because is there a loopback on R6 then its IP is the router ID 7.7.7.7