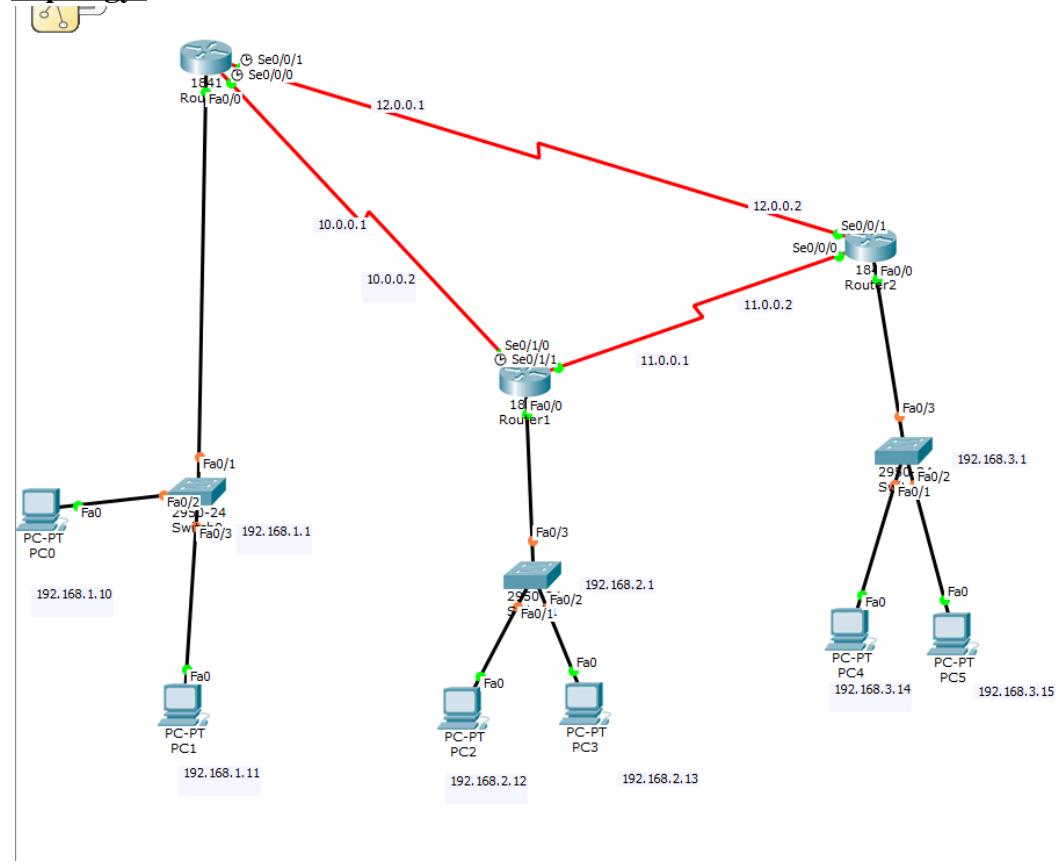


Program – 11:

Aim: Configure OSPF routing protocol.

Topology:



Procedure:

1. Topology

- Three routers R0, R1, R2 connected using Serial DCE links.
- Each router connected to its own LAN via a switch.
- PCs connected as per diagram:
 - PC0 → 192.168.1.10
 - PC1 → 192.168.1.11
 - PC2 → 192.168.2.12
 - PC3 → 192.168.2.13
 - PC4 → 192.168.3.14
 - PC5 → 192.168.3.15

2. Initial Steps

1. On each router:
 - Go to **Physical tab**
 - Turn OFF the router
 - Insert **HWIC-2T module** (2 times)
 - Turn router ON
2. Create topology using:
 - **Serial DCE** for router-to-router links
 - **Normal copper** for router-to-switch connections

3. Do IP configuration for all PCs as per diagram with switch's IP as default gateway.

3. Router Configuration

Router R0

CLI Steps

- enable
- configure terminal
- hostname R0

Fa0/0

- interface Fa0/0
- ip address 192.168.1.1 255.255.255.0
- no shutdown
- exit

Serial Se0/1/0

- interface Se0/1/0
- ip address 10.0.0.1 255.0.0.0
- clock rate 64000
- no shutdown
- exit

Serial Se0/1/1

- interface Se0/1/1
- ip address 12.0.0.1 255.0.0.0
- clock rate 64000
- no shutdown
- exit

Configure OSPF

- router ospf 1
- network 192.168.1.0 0.0.0.255 area 0
- network 10.0.0.0 0.255.255.255 area 0
- network 12.0.0.0 0.255.255.255 area 0
- exit
- wr

Router R1

CLI Steps

- enable
- configure terminal
- hostname R1

Fa0/0

- interface Fa0/0
- ip address 192.168.2.1 255.255.255.0
- no shutdown
- exit

Se0/1/0

- interface Se0/1/0
- ip address 10.0.0.2 255.0.0.0
- no shutdown
- exit

Se0/1/1

- interface Se0/1/1

- ip address 11.0.0.1 255.0.0.0
- clock rate 64000
- no shutdown
- exit

Configure OSPF

- router ospf 1
- network 192.168.2.0 0.0.0.255 area 0
- network 10.0.0.0 0.255.255.255 area 0
- network 11.0.0.0 0.255.255.255 area 0
- exit
- wr

Router R2

CLI Steps

- enable
- configure terminal
- hostname R2

Fa0/0

- interface Fa0/0
- ip address 192.168.3.1 255.255.255.0
- no shutdown
- exit

Se0/1/0

- interface Se0/1/0
- ip address 11.0.0.2 255.0.0.0
- no shutdown
- exit

Se0/1/1

- interface Se0/1/1
- ip address 12.0.0.2 255.0.0.0
- no shutdown
- exit

Configure OSPF

- router ospf 1
- network 192.168.3.0 0.0.0.255 area 0
- network 11.0.0.0 0.255.255.255 area 0
- network 12.0.0.0 0.255.255.255 area 0
- exit
- wr

Output:

```

Router#configure terminal
Router(config)#interface serial0/0/1
Router(config-if)#ip address 12.0.0.1 255.0.0.0
Router(config-if)#clock rate 64000
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#exit
Router#
*Sep 3 09:45:11.000 2010: %LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#router ospf 1
Router(config-router)#network 192.168.1.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.0.0.255 area 0
Router(config-router)#network 0.0.0.0 0.0.0.255 area 0
Router(config-router)#exit
Router(config)#exit
Router#
*Sep 3 09:45:11.000 2010: %LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
*Sep 3 09:45:11.000 2010: %LINK-5-CHANGED: Line protocol on Interface Serial0/0/0, changed state to up
*Sep 3 09:45:11.000 2010: %LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
*Sep 3 09:45:11.000 2010: %LINK-5-CHANGED: Line protocol on Interface Serial0/0/1, changed state to up
*Sep 3 09:45:11.000 2010: %OSPF-5-ADDSCHG: Process 1, Nbr 192.168.2.1 on Serial0/0/0 from LOADING to FULL, Loading Done
*Sep 3 09:45:11.000 2010: %OSPF-5-ADDSCHG: Process 1, Nbr 192.168.3.1 on Serial0/0/1 from LOADING to FULL, Loading Done
Router#
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 - IS-IS
       L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter areas
       * - candidate default, p - periodic downloaded static route
       P - periodic downloaded static route

Gateway of last resort is not set

```

Fig 11.1 OSPF configuration in Router0

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.13

Pinging 192.168.2.13 with 32 bytes of data:
Reply from 192.168.2.13: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.2.13:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 16ms, Average = 5ms
C:\>

```

Fig 11.2 ping PC0 to PC3