Config OSPF routing Protocol & connect Areas.

Topology.


```
              20.0.0.2        se 1/0  30.0.0.1
     Area                se2/0              Area 2

     20.0.0.                          se2/0  30.0.0.2



     10.0.0.1  Fa0/0               fa0/0   40.0.0.1
   Area 3                                     Area 2

     Fa0                                       Fa0



       PC 0                          PC 1
      10.0.0.2                       40.0.0.2
```
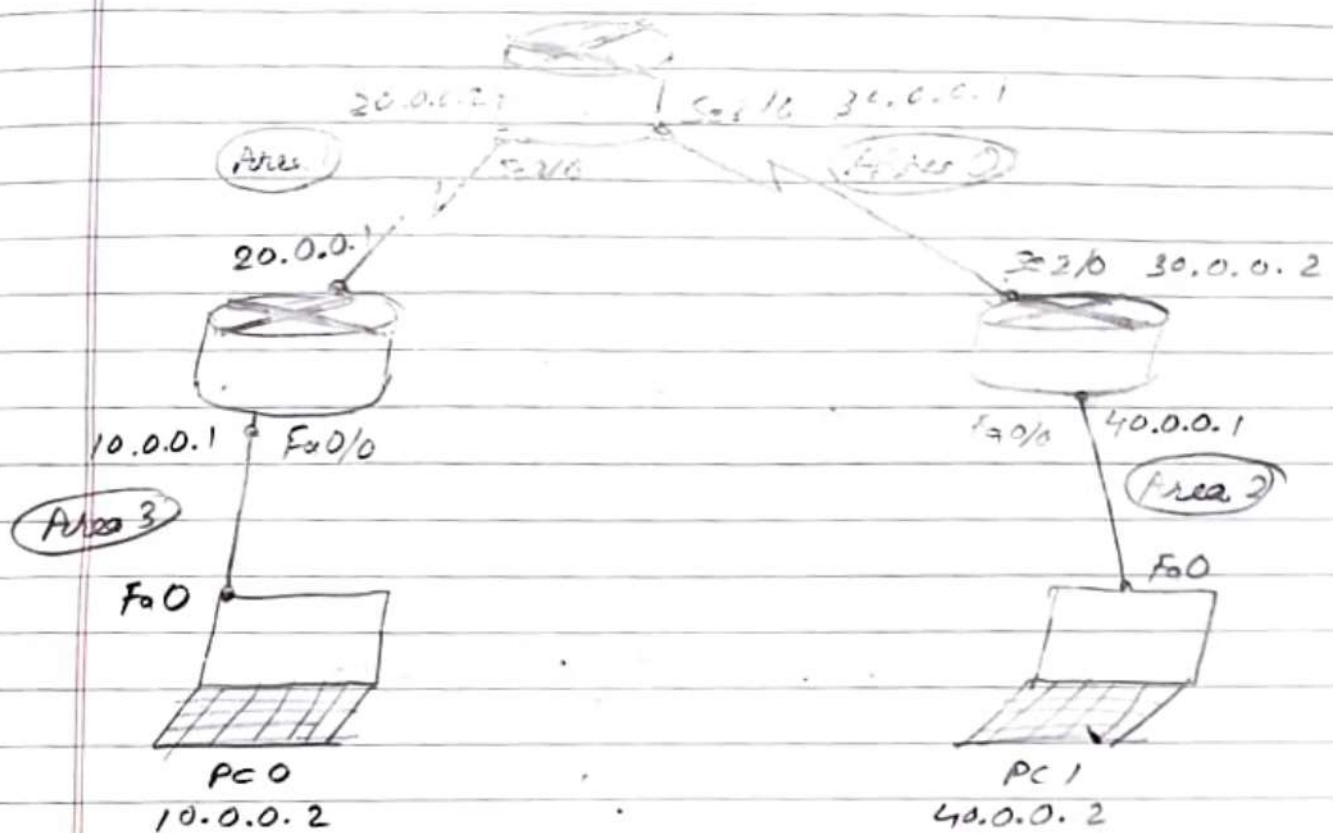
PROCEDURE :

① Create the topology as given above with 2 PCs
   & 3 routers.
② Config the ip address. for PCs as 10.0.0.2
   & 40.0.0.2 resp.
③ Config. the routers with ip address for all
   interfaces.
④ Now, for all Se port of routers, config using cmd
   "encapsulation ppp" & give "clock rate 64000"
   command at ports having clock symbol.

Eg:- For Router 2
   router (config)# interface se2/0
   router (config-if)# ip encapsulation ppp

router (config-if) # no shut
router (config-if) # exit

router (config) # interface Se 3/0
router (config-if) # encapsulation ppp
router (config-if) # clock rate 64000
router (config-if) # no shut

⑤ Now, enable ip routing by configuring OSPF
routing protocol in all routers.

In Router R_1,
Router (config) # router ospf 1
Route (config-router) # router-id 1.1.1.1   area 3
Route (config-router) # network 10.0.0.0 0255.255.255.
Route (config-router) # network 20.0.0.0 0.255255.255 area1
Router (config-router) # exit
III'ly config four Router 2 & 3.

⑥ Check the routing table of R1
Router # show ip route.
codes: c-connected, s-static, R-RIP, M-Mobile,
B-BGP, O-OSPF, IA-OSPF, inter area
N1-OSPF NSSA extend. type 1.

Gateway of last resort is NOT set
c   10.0.0.0/8 is directly connected, fa 2/0
c   20.0.0.0/8 is directly connected, se 2/0
OIA 40.0.0.0/8 via 20.0.0.2, 00:04:23, Se 2/0
OIA 30.0.0.0/8 via 20.0.0.2, 00:07:29, Se 2/0
⊘ R_2 knows area 0, network 20.0.0.0 connected
to R_2 from R_1, so R_1 learns through this
network.

⑦ ~~There There~~ There must be one interface up to keep osbf process up. So its better to confg loopback addres to routers. It is virtual interface ~~or~~, never goes down once we configure it.

For Router 1 :
Router (confg -if) # interface loopback 0
Router (confg -if) # ip add 172.16.1.252 255.3550.0
Router (confg -if) # no shut

Do III^{ly} for Router 2 & Router 3. Using these cmds. we add loopback address to the routers

⑧ Now, if we check the routing table for R3,
R3 # show ip route
Codes : C - Connected, s - static, O - OSPF,
IA - OSPF
Gateway of last resort is not set
O IA 20.0.0.0/8 [110/128] via 30.0.0.1, 00:18:53, Se 2/0
C 40.0.0.0/8 is directly connected, fa 0/0
C 30.0.0.0/8 is directly connected Se 0/0

R3 (Router 3) doesn't know about area 3, so we will create virtual link between Router 1 & Router 3

⑨ Now, we have to create virtual link b/w Router 1 & 2; with this we create a virtual link to connect area 3 to area 0.

In Router R1 :
    Router(config)# router ospf 1
    Router (config-router)# area 1 virtual link 2.2.2.2

In Router R2 :

    Router (config)# router ospf 1
    Router (config-router)# area 1 virtual link 1.1.1.1
    Router (config-router)# exit.

⑩ R_2 & R_3 get updates about area 3,
    check routing table for R_3.

    Router# show ip route.
    Codes: c - connected, O - OSPF, IA - OSPF,

    Gateway of last resort is NOT set

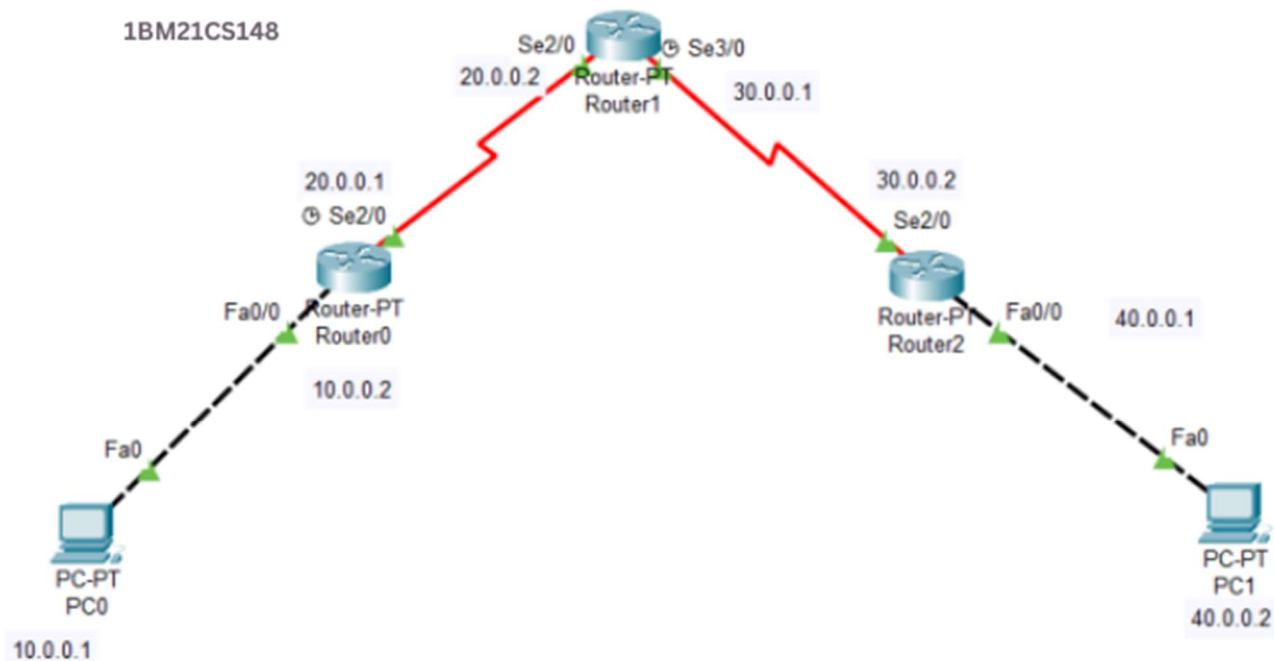   O IA 20.0.0.0/8 [110/123] via 30.0.0.1, 00:01:56, Se 2/0
    C   40.0.0.0/8 is directly connected Fa 0/0
    O IA 10.0.0.0/8 [110/128] via 30.0.0.1, 00:01:56, Se 2/0
    C   30.0.0.0/8 is directly connected, Se 2/0

⑪ Now ping 10.0.0.2 to 40.0.0.2

1BM21CS148

Se2/0   Se3/0
20.0.0.2 Router-PT
          Router1   30.0.0.1

20.0.0.1   30.0.0.2
Se2/0   Se2/0

Fa0/0 Router-PT   Router-PT Fa0/0 40.0.0.1
       Router0   Router2

10.0.0.2

Fa0   Fa0

PC-PT   PC-PT
PC0   PC1
10.0.0.1   40.0.0.2

Physical   Config   Desktop   Programming   Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 40.0.0.2

Pinging 40.0.0.2 with 32 bytes of data:

Request timed out.
Reply from 40.0.0.2: bytes=32 time=2ms TTL=125
Reply from 40.0.0.2: bytes=32 time=21ms TTL=125
Reply from 40.0.0.2: bytes=32 time=24ms TTL=125

Ping statistics for 40.0.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 24ms, Average = 15ms

C:\>
```