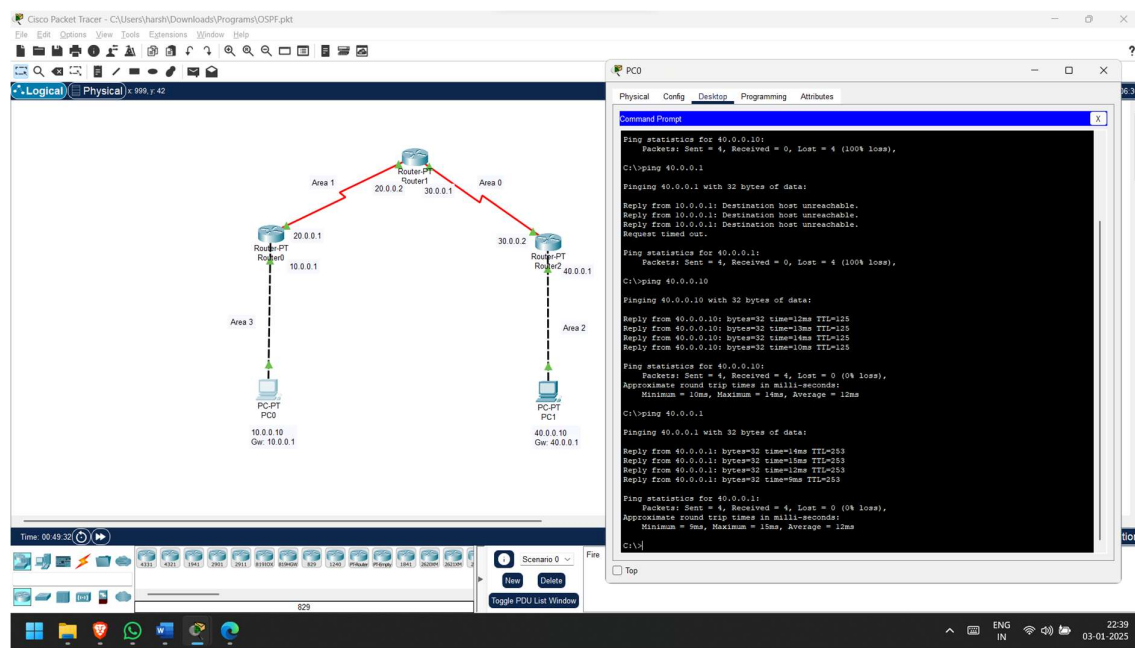
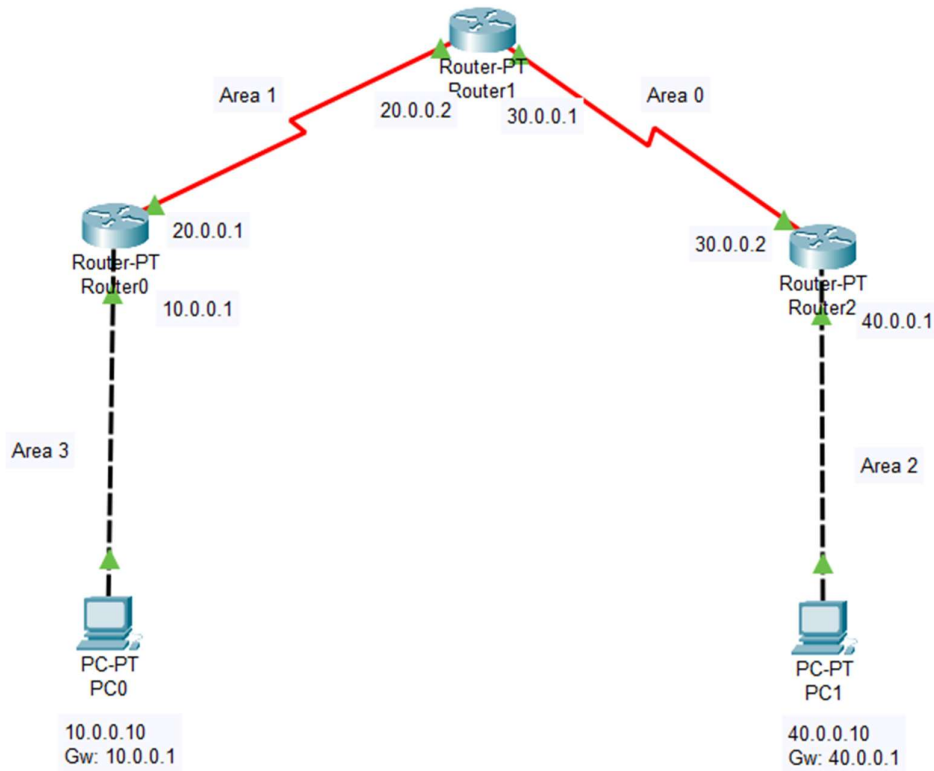


## Program 6

### Configure OSPF routing Protocol

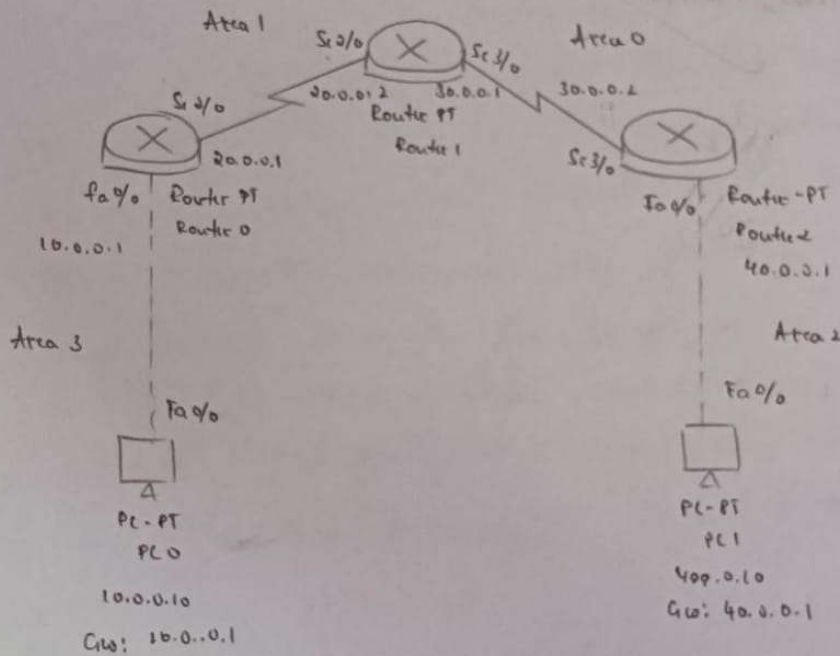


## Experiment No 6:

Configure OSPF routing protocol.

Aim: To configure OSPF routing Protocol in Routers and verify connectivity.

Topology:



Procedure:

1. Establish the network connection as shown in the topology.
2. Set the IP address of the PC and the gateway address respectively.

3. Open CLI in Router 0

```
Router0(config)# interface FastEthernet 0/0
```

```
Router0(config-if)# ip address 10.0.0.1 255.255.255.0
```

```
Router0(config-if)# no shutdown
```

```
Router0(config-if)# exit
```

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R0(config) # interface serial 2/0  
R0(config-if) # ip address 20.0.0.1 255.0.0.0  
R0(config-if) # encapsulation PPP  
R0(config-if) # clock rate 64000

Open CLI in router 01

R1(config) # interface serial 2/0  
R1(config-if) # ip address 20.0.0.2 255.0.0.0  
R1(config-if) # encapsulation PPP  
R1(config-if) # no shutdown  
R1(config-if) # exit

R1(config) # interface serial 3/0  
R1(config-if) # ip address 30.0.0.1 255.0.0.0  
R1(config-if) # encapsulation PPP  
R1(config-if) # clock rate 64000  
R1(config-if) # no shutdown  
R1(config-if) # exit

Open CLI in router 2

R2(config) # interface fastethernet 0/0  
R2(config-if) # ip address 40.0.0.1 255.0.0.0  
R2(config-if) # no shutdown  
~~R2(config-if) # exit~~

R2(config) # interface serial 3/0  
R2(config-if) # ip address 30.0.0.2 255.0.0.0  
R2(config-if) # encapsulation PPP  
R2(config-if) # no shutdown  
R2(config-if) # exit

Step 3: Enable ip routing by configuring ospf routing protocol.

In Router R0.

```
R0(Config) # router ospf 1
```

```
R0(Config-router) # router-id 1.1.1.1
```

```
# network 10.0.0.0 0.255.255.255 area 3
```

```
# network 20.0.0.0 0.255.255.255 area 1
```

```
# exit.
```

In Router R1,

```
R1(Config) # router ospf 1
```

```
R1(Config-router) # router-id 2.2.2.2
```

```
# network 20.0.0.0 0.255.255.255 area 1
```

```
# network 30.0.0.0 0.255.255.255 area 0
```

```
# exit.
```

In Router R2,

```
R2(Config) # router ospf 1
```

```
R2(Config-router) # router-id 3.3.3.3
```

```
# network 30.0.0.0 0.255.255.255 area 0
```

```
# network 40.0.0.0 0.255.255.255 area 2
```

```
# exit.
```

Step 4: Check the routing table.

Router # show ip route.

You can see the code O which stands for OSPF connection, where Area 0 exists.

There must be one interface up to keep ospf process up. So its better to configure loopback address to (25) router.

```
R0(Config) # interface loopback 0
R0(Config-if) # ip add 172.16.1.252 255.255.0.0
# no shutdown.
```

```
R1(Config) # interface loopback 0
R1(Config-if) # ip add 172.16.1.253 255.255.0.0
# no shutdown.
```

```
R2(Config) # interface loopback 0
R2(Config-if) # ip add 172.16.1.254 255.255.0.0
# no shutdown.
```

Step 5: Check Routing table of R3

You can see the route 0 here now.

Step 6: Create virtual link between R1, R2 and R2, R3

```
R1(Config) # router ospf 1
R1(Config-router) # area 1 virtual-link 2.2.2.2
```

```
R2(Config) # router ospf 1
R2(Config-router) # area 1 virtual-link 1.1.1.1
# area 0 virtual-link 3.3.3.3
```

```
R3(Config) # router ospf 1
R3(Config-router) # area 0 virtual-link 2.2.2.2
```



Step 8: Check connectivity between host  
10.0.0.10 to 40.0.0.10.

Observation: After configuring the OSPF routing protocol and establishing the virtual link, the two end hosts can communicate seamlessly.

Output:

PC0:

PC> ping 40.0.0.10

Pinging 40.0.0.10 with 32 bytes of data:

Reply from 40.0.0.10: bytes = 32 time = 9ms TTL = 125.  
(4 times)

Ping statistics for 40.0.0.10

Packets: Sent = 4 Received = 3 lost = 1

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