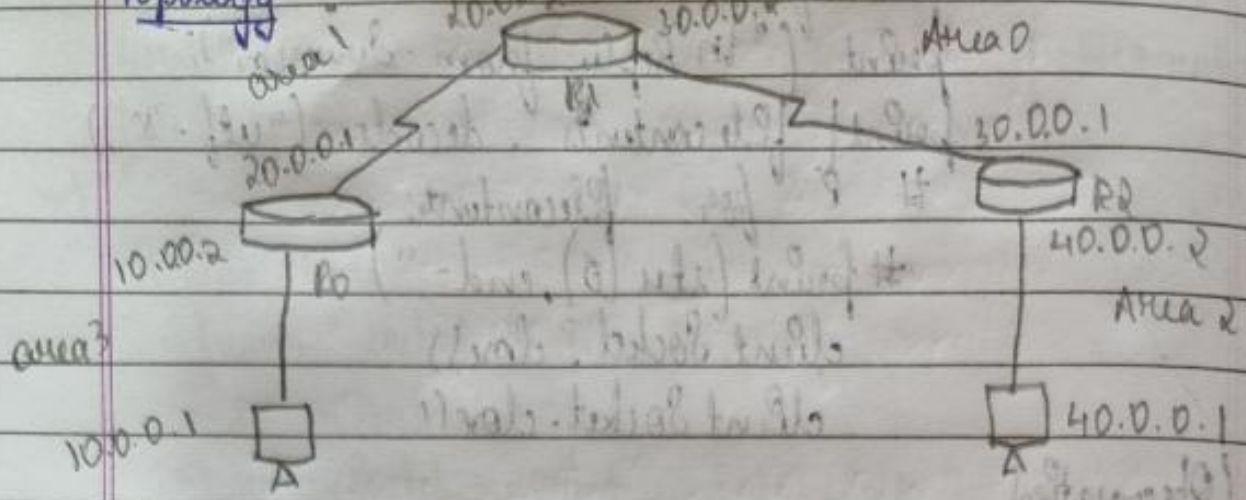
1) Configure OSPF routing protocol

Topology:



Procedure: 1) Create the topology as given above with 2 PC's and 3 routers

2) Configure the IP addresses for PC's 10.0.0.1 and 40.0.0.1 respectively

3) Configure the routers with IP addresses for all the interfaces

4) All the serial port of router's configure "encapsulation ppp" & clock rate 64000 command at ports.

Router:0,

router (config)# interface serial 2/0
router (config)# ip address encapsulation ppp
↳ no shut
↑ exit

se
↳ te 3/0
↳ encapsulation ppp
↳ clock rate 64000
↳ no shut.

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5) Now, enable ip routing by configuring ospf routing protocol in all routers.
In router R0,
↳ router ospf 1
↳ 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
Repeat same for R1 & R2

6) Checking the routing table.
↳ show ip route
Codes C-connected, S-static, R-RIP, M-Mobile, B-BGP
O-OSPF, IA-OSPF inter area N2-OSPF NSSA

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
O IA 40.0.0.0/8 via 20.0.0.2, 00:04:23, se 2/0
O IA 30.0.0.0/8 via 20.0.0.2, 00:07:29, se 2/0
R2 knows the network area 0, and R2 is connected to R1 via 20.0.0.0

7) Now forming the loopback function as follow,
↳ interface loopback 0
↳ ip address 172.16.1.252 255.255.0.0
↳ no shut
Similarly for R2 & R3
There must be one interface up to keep ospf process up.

8) Routing table:

Codes C = connected S-state O-OSPF IA=OSPF
gateway at last resort is not set
O IA 20.0.0.0/8 via 30.0.0.1, 00:18:58, se1/0
C 40.0.0.0/8 directly connected, a 0/0
C 30.0.0.0/8 directly connected se2/0

9) Now to create virtual link b/w R1 & R3
→ Router ospf 1
→ area 1 virtual link 2.2.2.2

- Similarly in router2;
→ area 1 virtual link 1.1.1.1

10) Now check the route of R3 and you can see the update on the area 3.

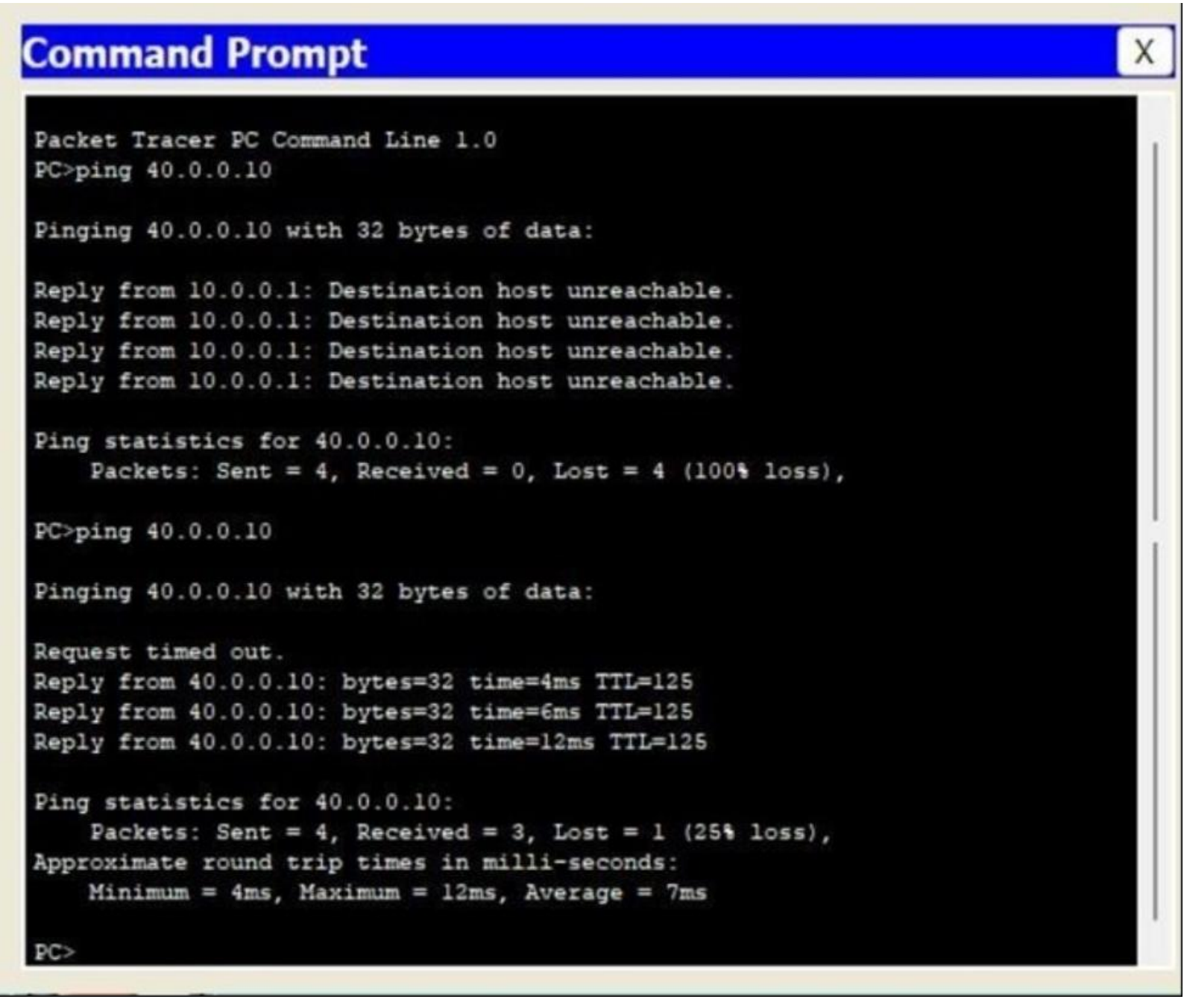
11) Try pinging from 10.0.0.1 → 40.0.0.1

Output: PC> ping 40.0.0.1

Pinging 10.0.0.1 with 32 bytes of data
Reply from 10.0.0.1 bytes=32 time=12ms TTL=128
Reply from 10.0.0.1 bytes=32 time=12 TTL=128
Reply from 10.0.0.1 bytes=32 time=12 TTL=128
Reply from 10.0.0.1 bytes=32 time=12 TTL=128

Packets sent=4 Received=4, Lost=0
Approx round trip time in ms.
Min = 0ms Max = 0ms Avg = 0ms.

Observation :- We could ping from one PC to other through OSPF protocol.


Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data:
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.10: bytes=32 time=4ms TTL=125
Reply from 40.0.0.10: bytes=32 time=6ms TTL=125
Reply from 40.0.0.10: bytes=32 time=12ms TTL=125
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 12ms, Average = 7ms
PC>