Dynamic Routing

COMPUTER NETWORKING

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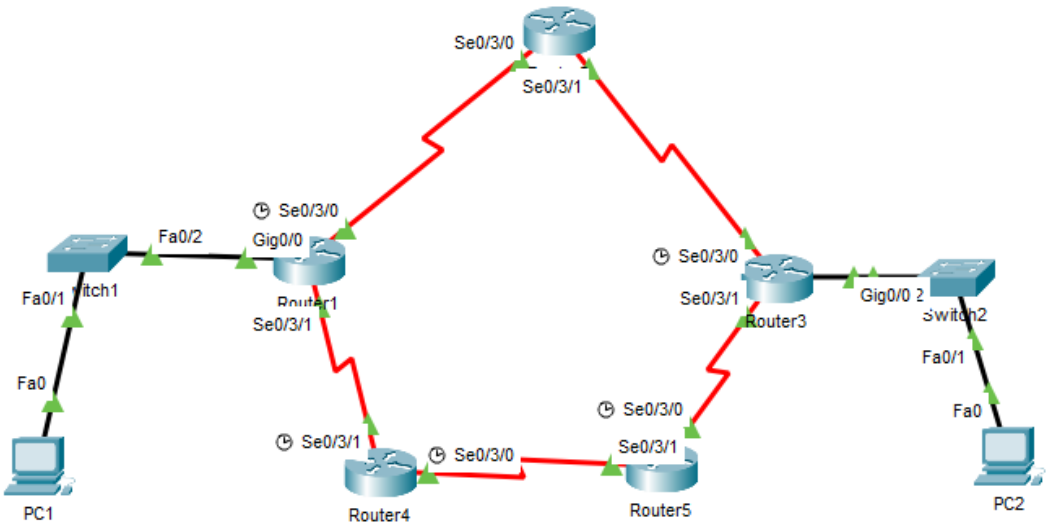
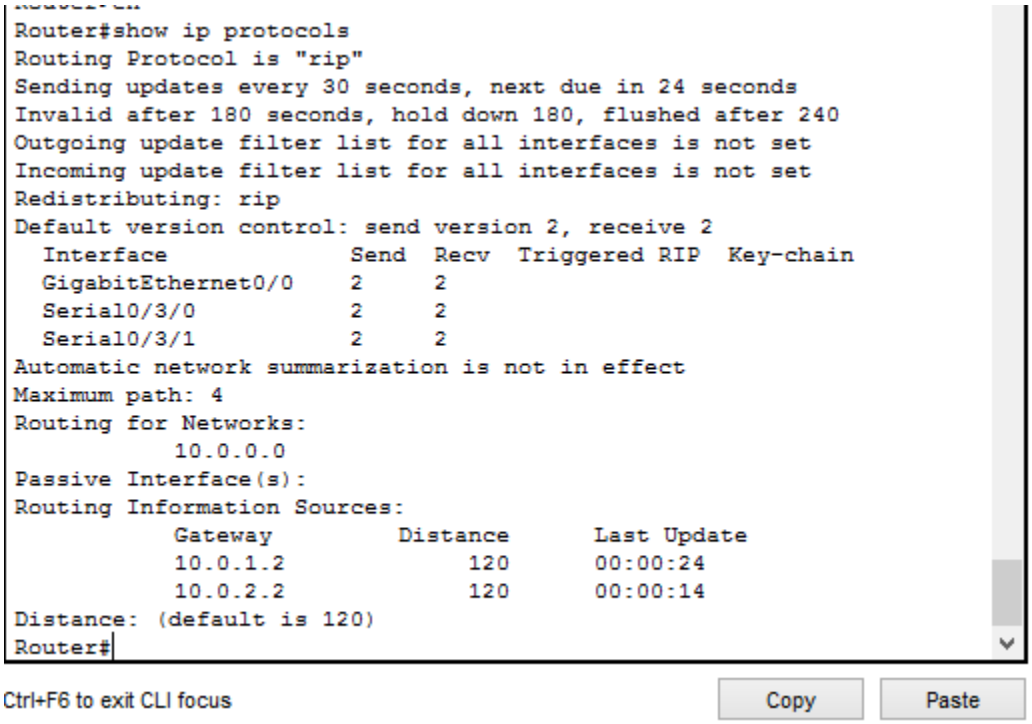
Topology



Q1. . On every router, verify which routing protocol is configured



Q2. On every router , Verify all networks are in the router's routing table.

It is the same command on every router so I picked one of them here ...

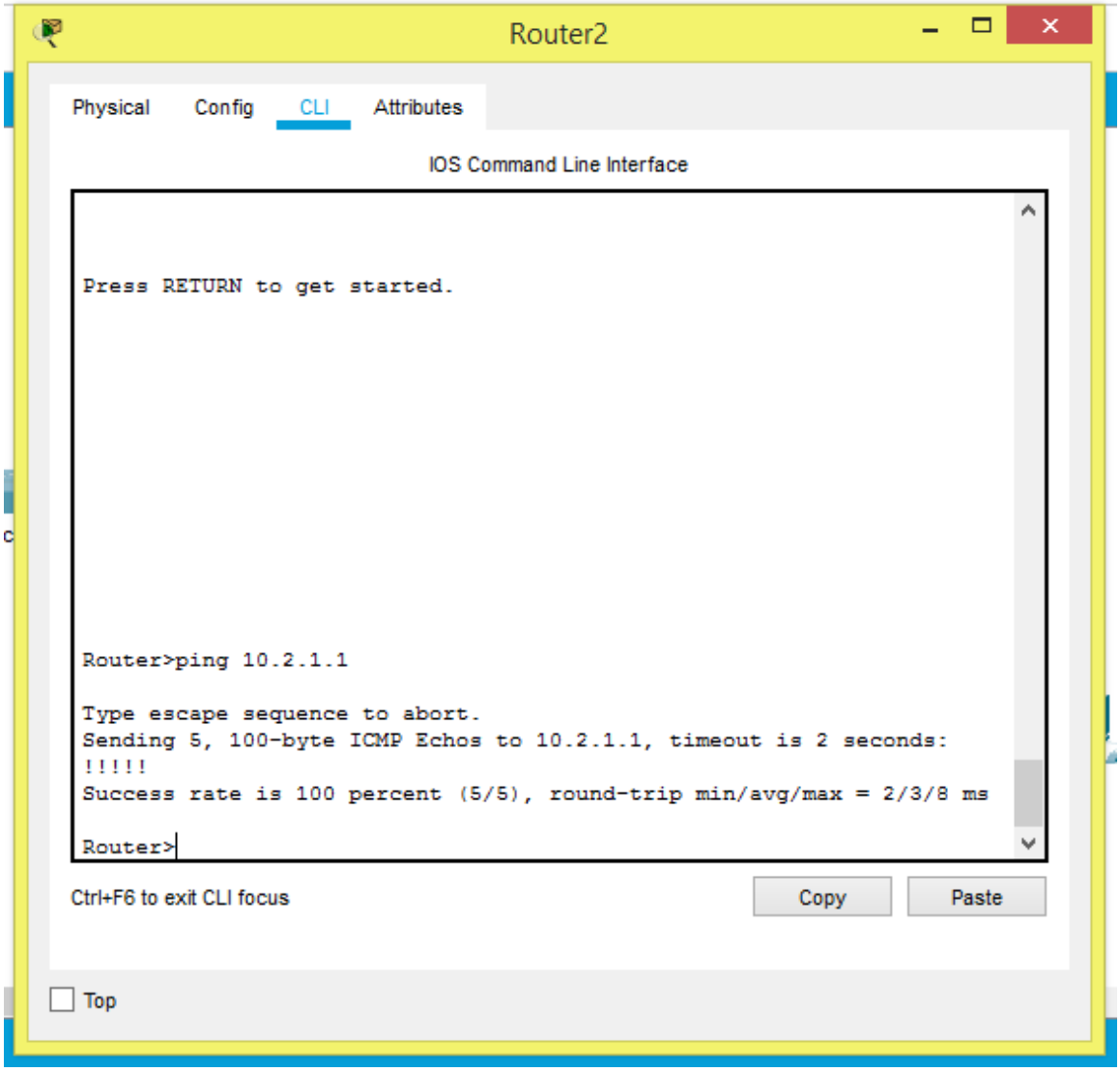
```
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B -
BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, 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

     10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks
C       10.0.1.0/24 is directly connected, Serial0/3/0
L       10.0.1.1/32 is directly connected, Serial0/3/0
C       10.0.2.0/24 is directly connected, Serial0/3/1
L       10.0.2.1/32 is directly connected, Serial0/3/1
C       10.0.3.0/24 is directly connected, GigabitEthernet0/0
L       10.0.3.1/32 is directly connected, GigabitEthernet0/0
R       10.1.1.0/24 [120/1] via 10.0.1.2, 00:00:09, Serial0/3/0
R       10.1.2.0/24 [120/2] via 10.0.1.2, 00:00:09, Serial0/3/0
                    [120/2] via 10.0.2.2, 00:00:24, Serial0/3/1
R       10.1.3.0/24 [120/2] via 10.0.1.2, 00:00:09, Serial0/3/0
R       10.2.1.0/24 [120/1] via 10.0.2.2, 00:00:24, Serial0/3/1
 --More--
```

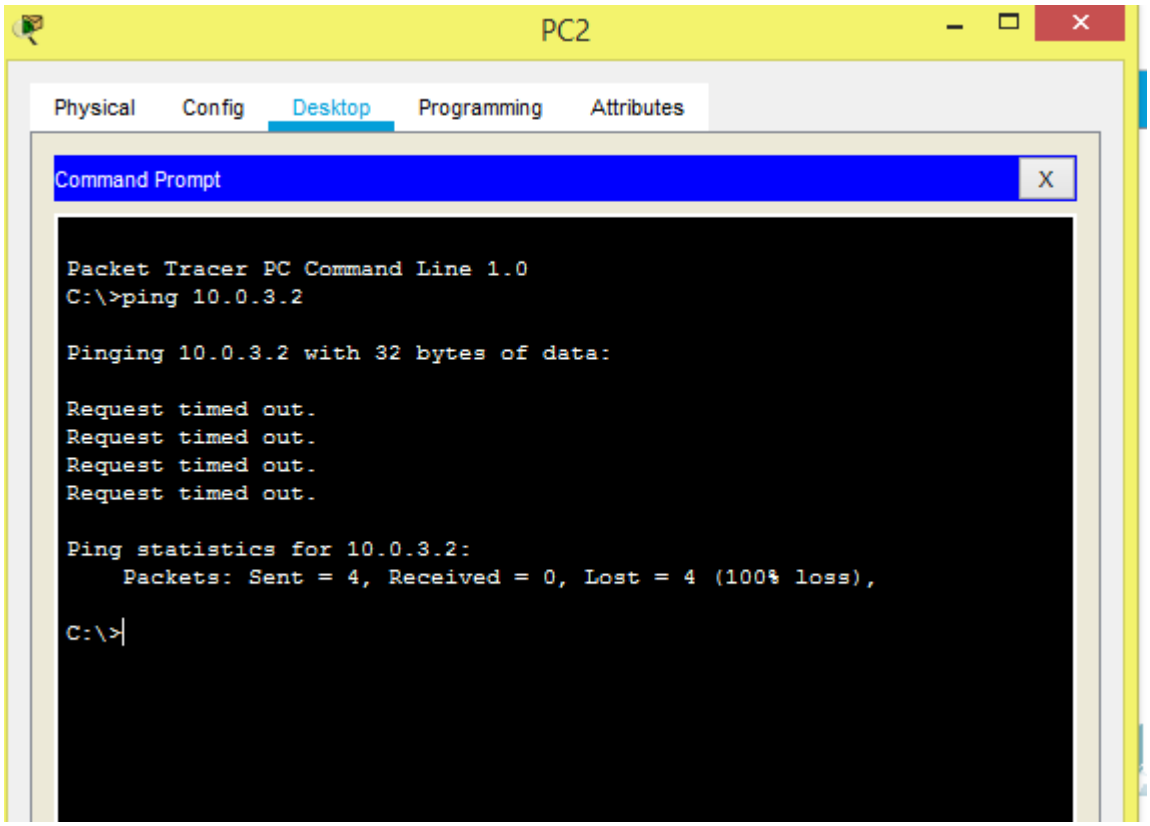
Q3. Can R2 ping any other interface of R4?

Yes, it can .



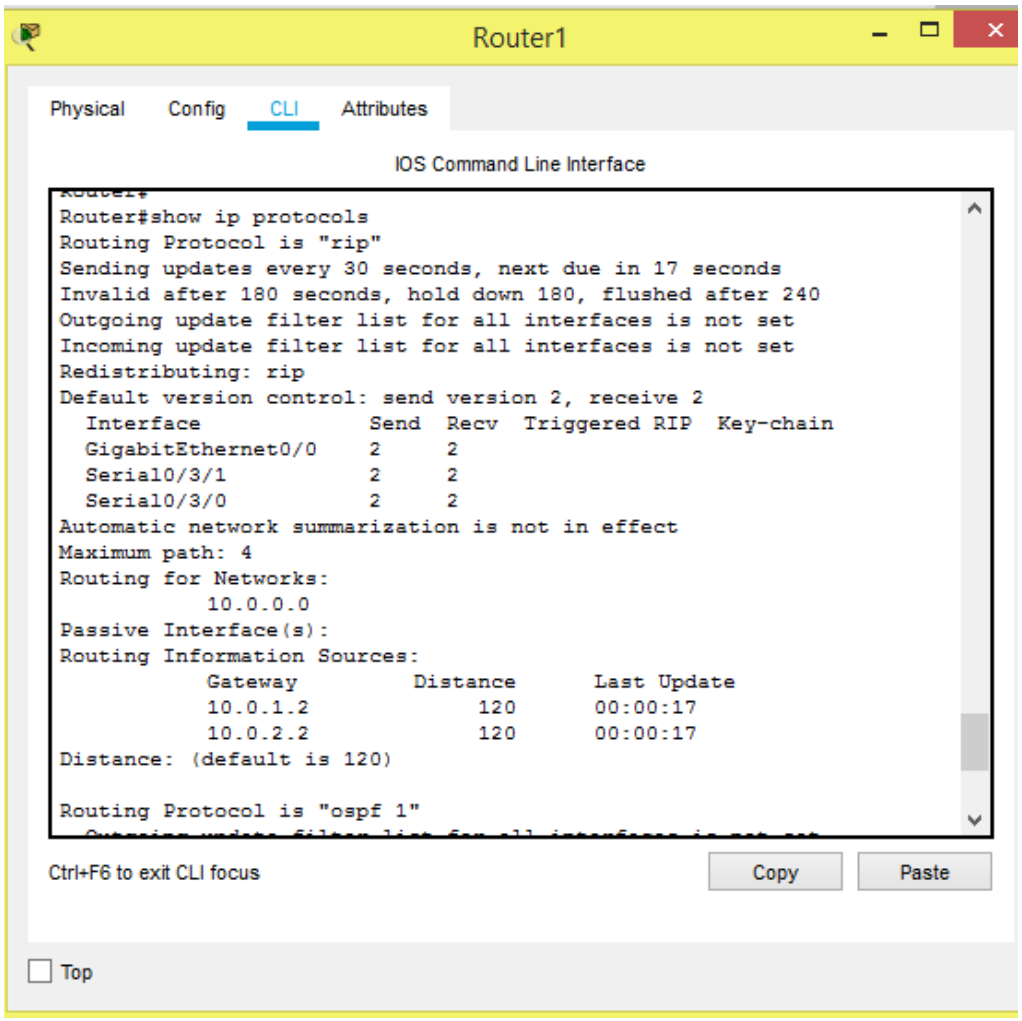
Q4. Can PC2 now ping PC1?

Although I expected that pinging will be successful but it is not. .This could be due to error number entry.



It tells you that Request timed out.

vQ5. On every router , verify which routing protocol is configured, Verify your answer , Take screenshots


Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 17 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
GigabitEthernet0/0 2 2
Serial0/3/1 2 2
Serial0/3/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
10.0.0.0
Passive Interface(s):
Routing Information Sources:
Gateway Distance Last Update
10.0.1.2 120 00:00:17
10.0.2.2 120 00:00:17
Distance: (default is 120)
Routing Protocol is "ospf 1"
Ctrl+F6 to exit CLI focus
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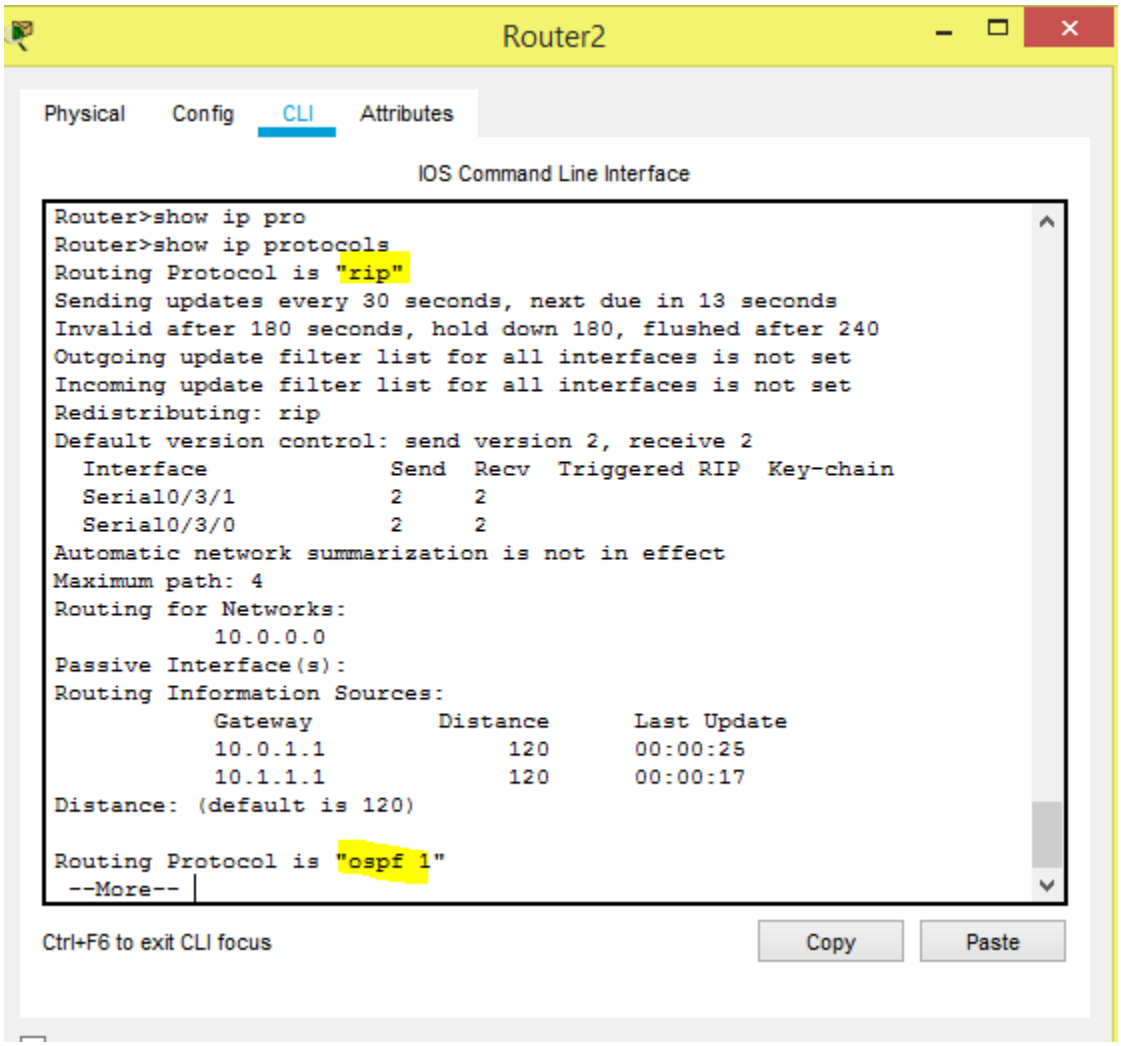
Router2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>show ip pro
Router>show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 13 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/3/1 2 2
Serial0/3/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
10.0.0.0
Passive Interface(s):
Routing Information Sources:
Gateway Distance Last Update
10.0.1.1 120 00:00:25
10.1.1.1 120 00:00:17
Distance: (default is 120)
Routing Protocol is "ospf 1"
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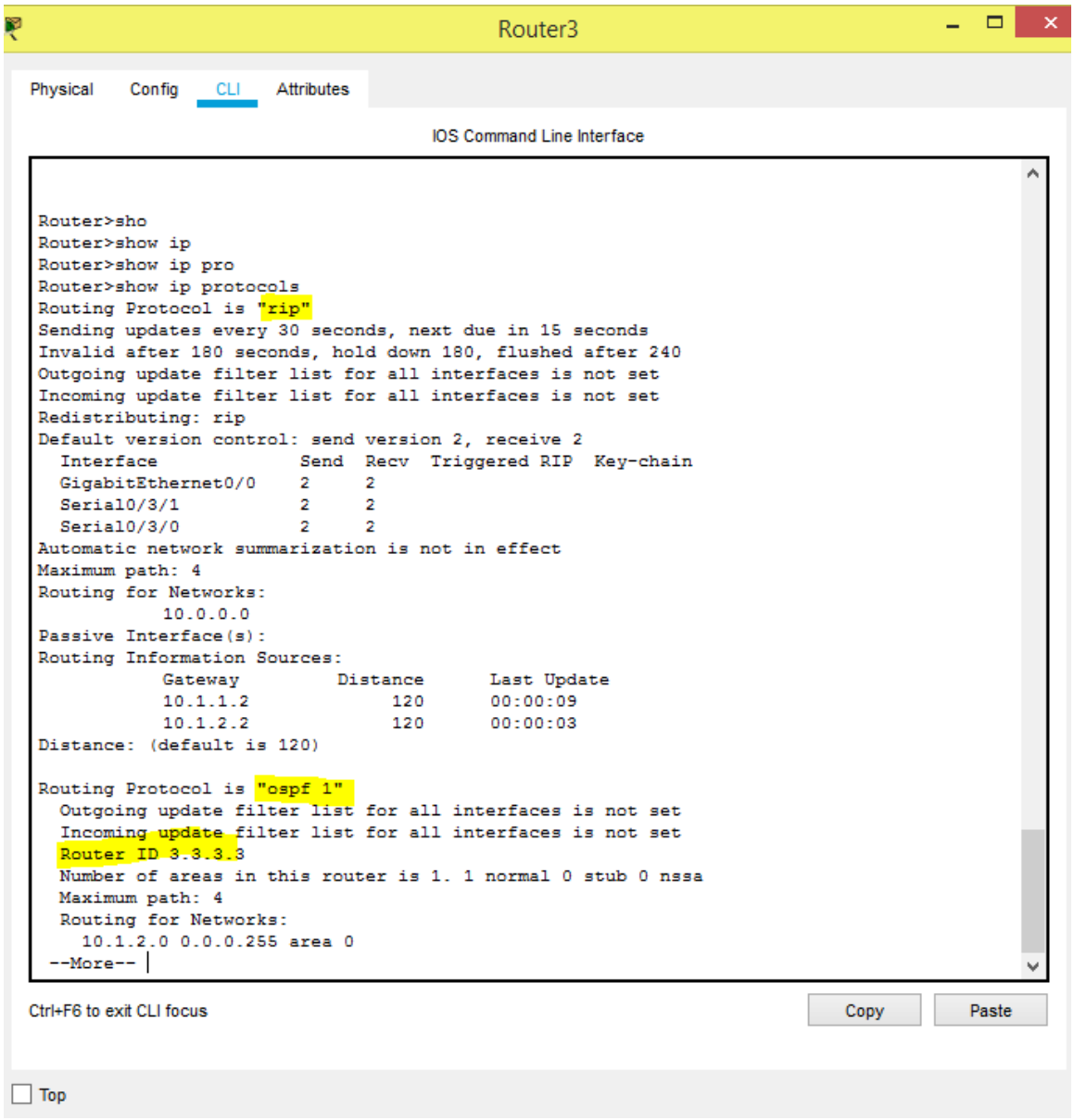
Router3
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>sho
Router>show ip
Router>show ip pro
Router>show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 15 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
GigabitEthernet0/0 2 2
Serial0/3/1 2 2
Serial0/3/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
10.0.0.0
Passive Interface(s):
Routing Information Sources:
Gateway Distance Last Update
10.1.1.2 120 00:00:09
10.1.2.2 120 00:00:03
Distance: (default is 120)
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 3.3.3.3
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
10.1.2.0 0.0.0.255 area 0
--More--
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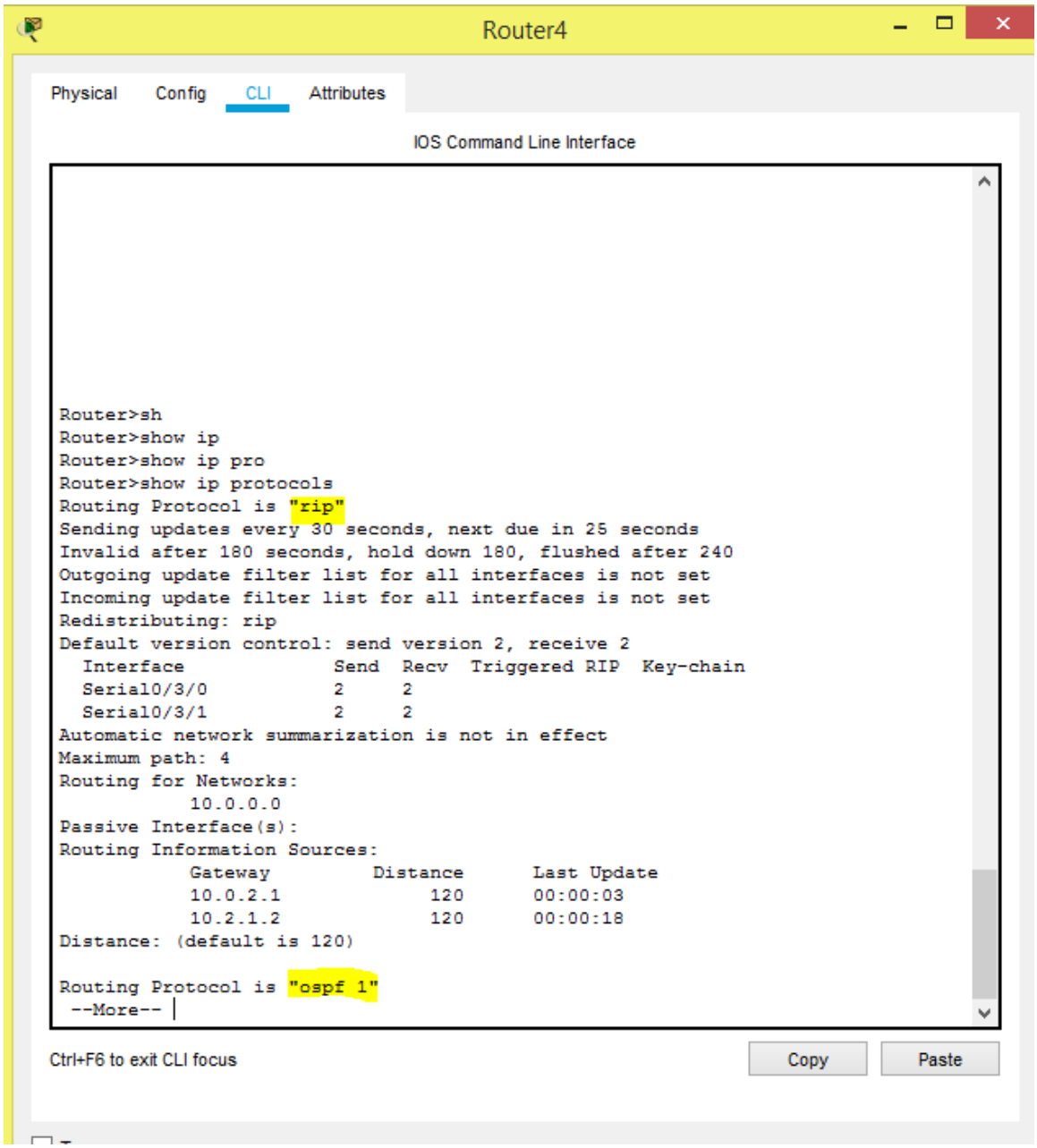
Router4
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>sh
Router>show ip
Router>show ip pro
Router>show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 25 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/3/0 2 2
Serial0/3/1 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
10.0.0.0
Passive Interface(s):
Routing Information Sources:
Gateway Distance Last Update
10.0.2.1 120 00:00:03
10.2.1.2 120 00:00:18
Distance: (default is 120)
Routing Protocol is "ospf 1"
--More--
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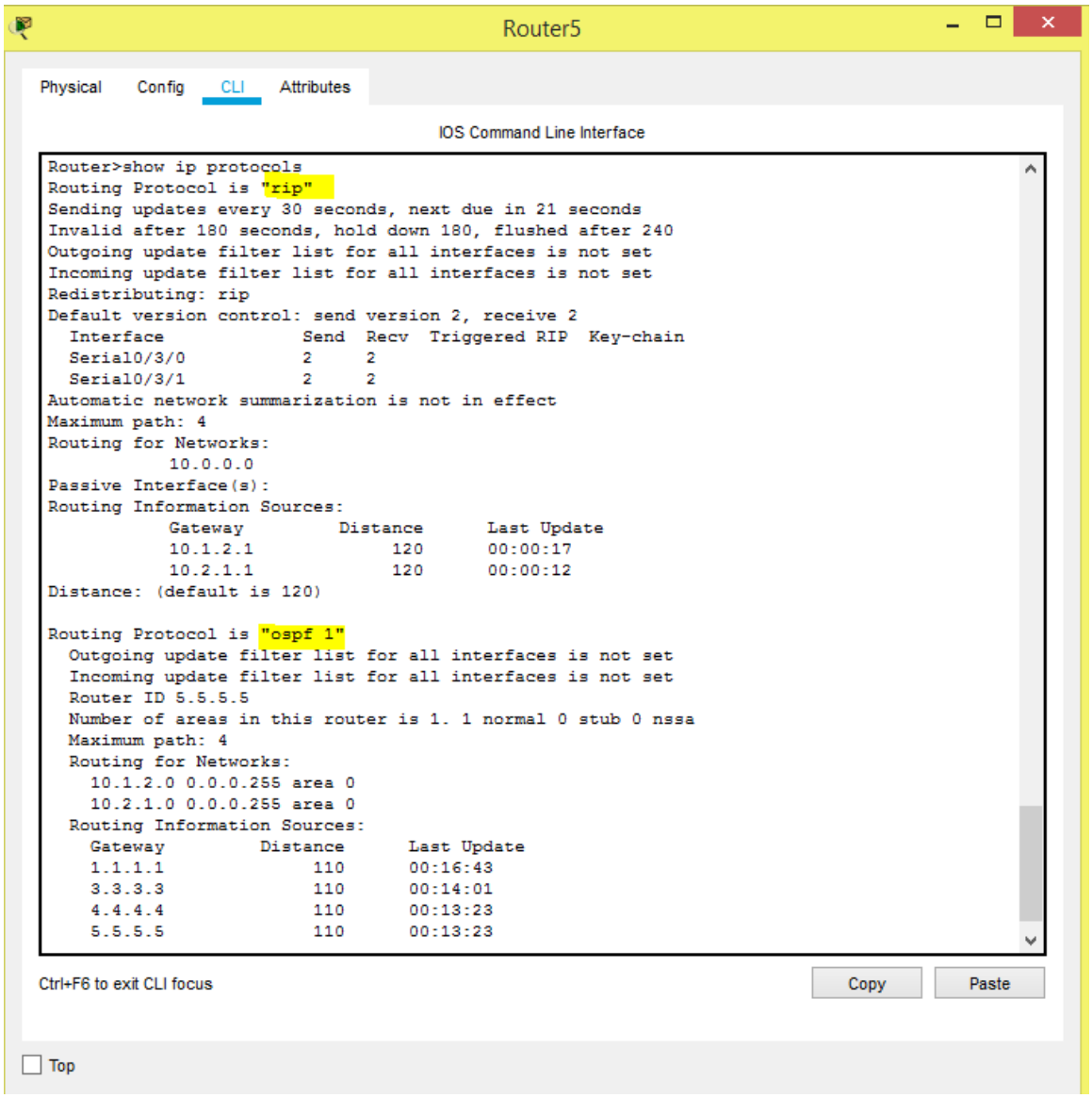
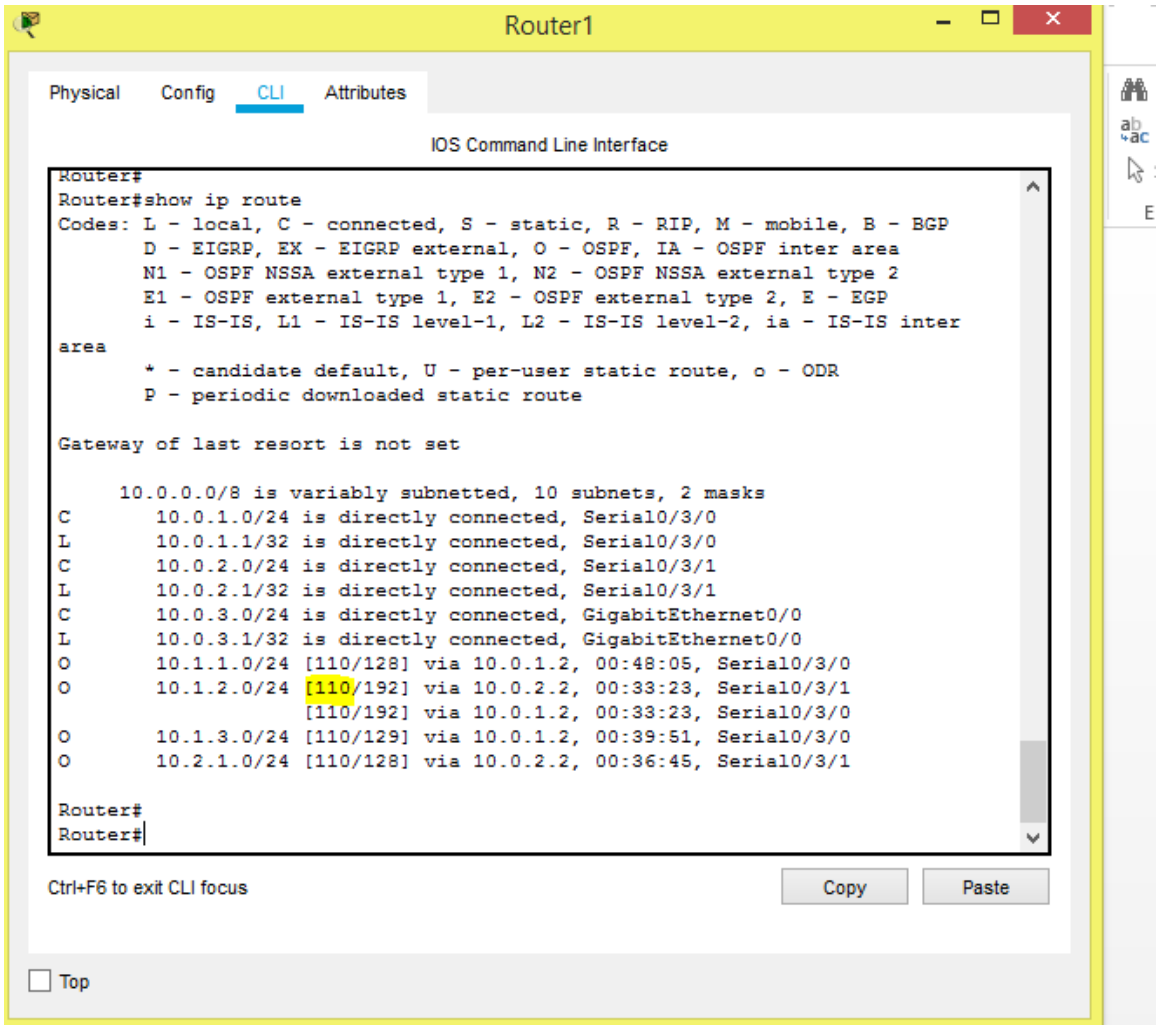


Q6. On every router, Verify all networks are in the router's routing table. Verify your answer, Take screenshots

Since it is the same idea "Show ip route command", I will show the case of 2 routers..


Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router#
Router#show ip route
Codes: L - local, C - connected, S - static, 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
10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks
C 10.0.1.0/24 is directly connected, Serial0/3/0
L 10.0.1.1/32 is directly connected, Serial0/3/0
C 10.0.2.0/24 is directly connected, Serial0/3/1
L 10.0.2.1/32 is directly connected, Serial0/3/1
C 10.0.3.0/24 is directly connected, GigabitEthernet0/0
L 10.0.3.1/32 is directly connected, GigabitEthernet0/0
O 10.1.1.0/24 [110/128] via 10.0.1.2, 00:48:05, Serial0/3/0
O 10.1.2.0/24 [110/192] via 10.0.2.2, 00:33:23, Serial0/3/1
[110/192] via 10.0.1.2, 00:33:23, Serial0/3/0
O 10.1.3.0/24 [110/129] via 10.0.1.2, 00:39:51, Serial0/3/0
O 10.2.1.0/24 [110/128] via 10.0.2.2, 00:36:45, Serial0/3/1
Router#
Router#
Ctrl+F6 to exit CLI focus
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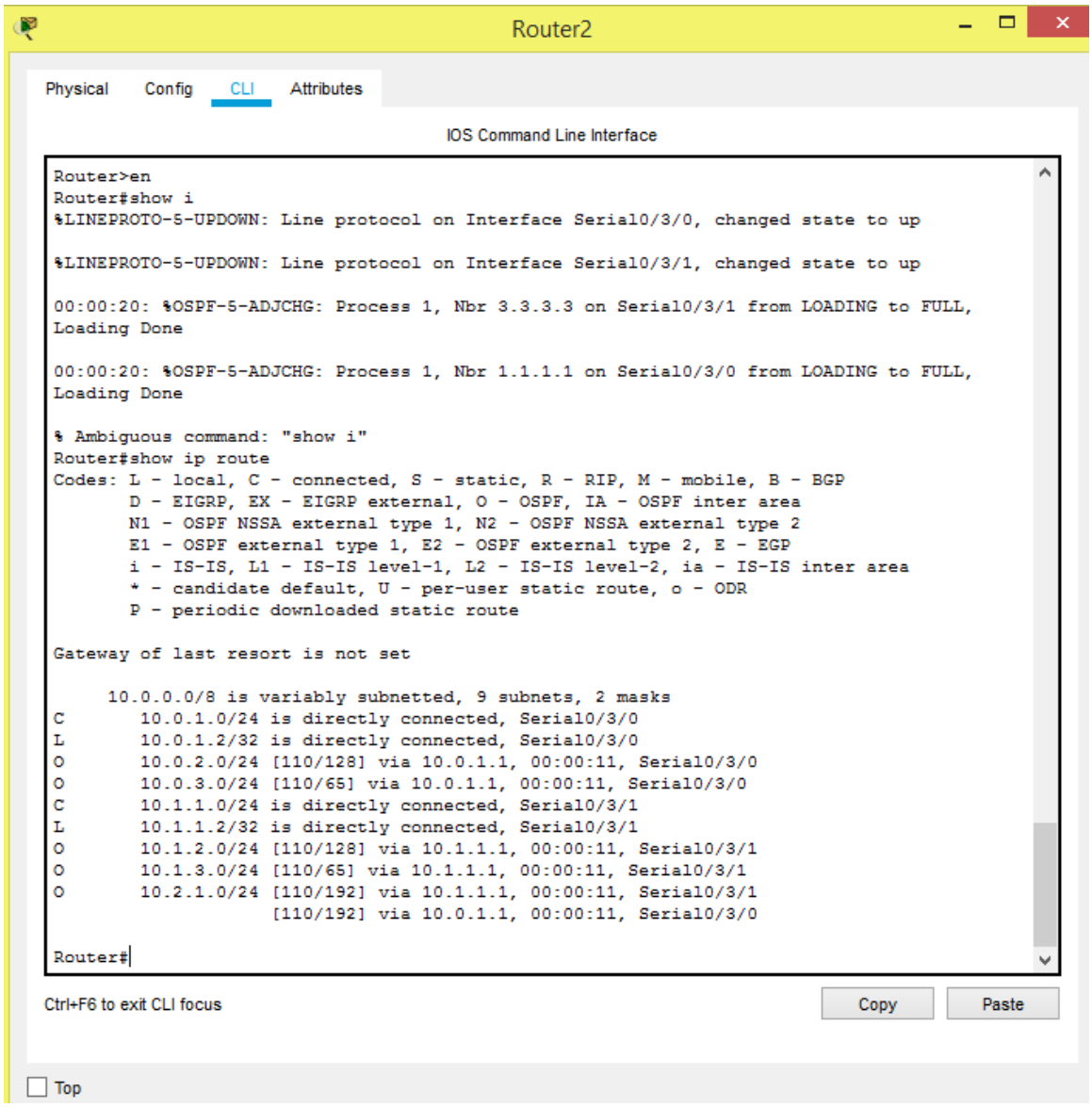
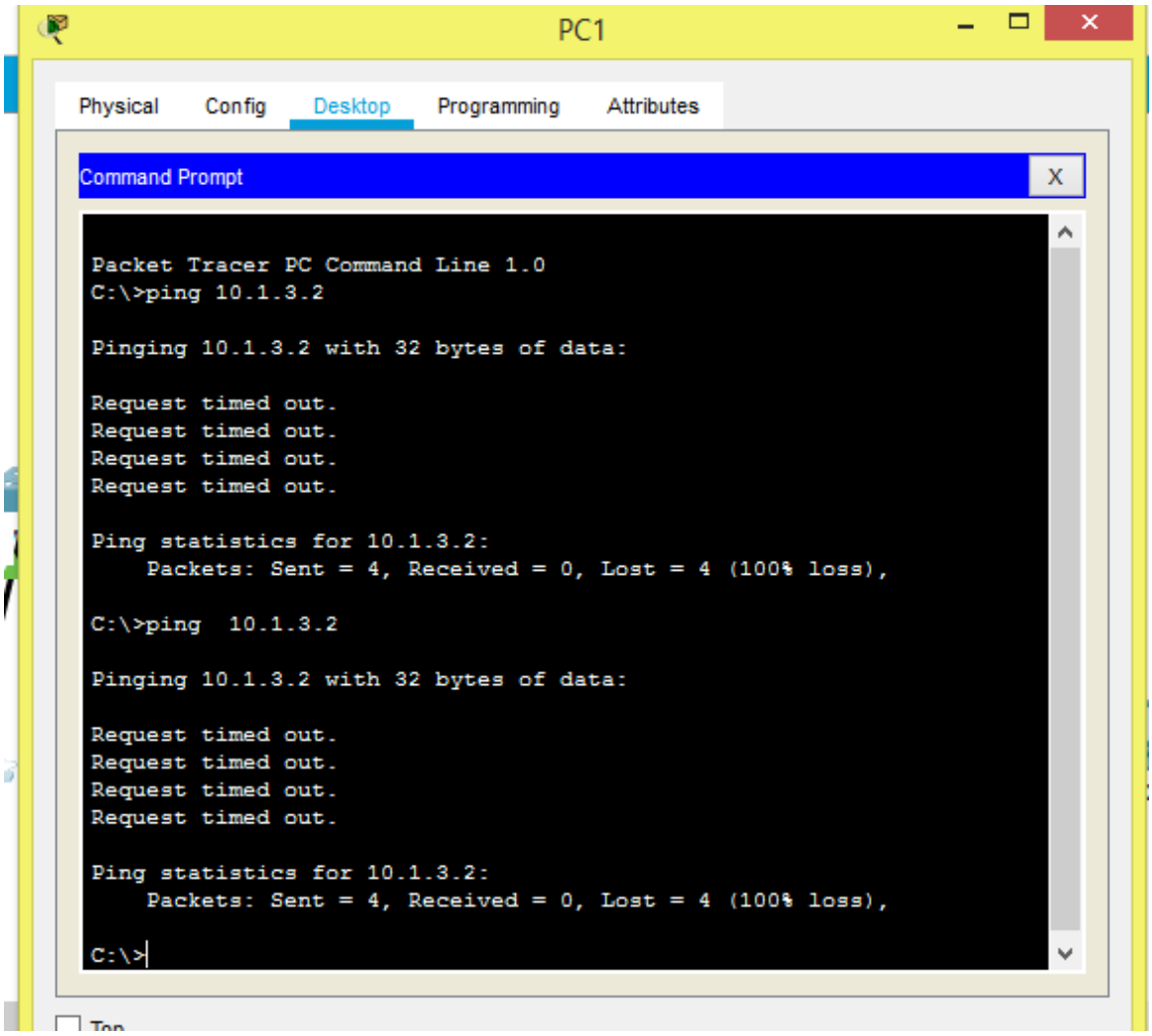


And so on …

Q7. Can PC2 now ping PC1? Verify your answer, Take screenshot



The pinging is not successful. However I think it should be successful .This could be due to error number entry.

Q8. Use the following commands to gather information about your OSPFv2 implementation. In all routers

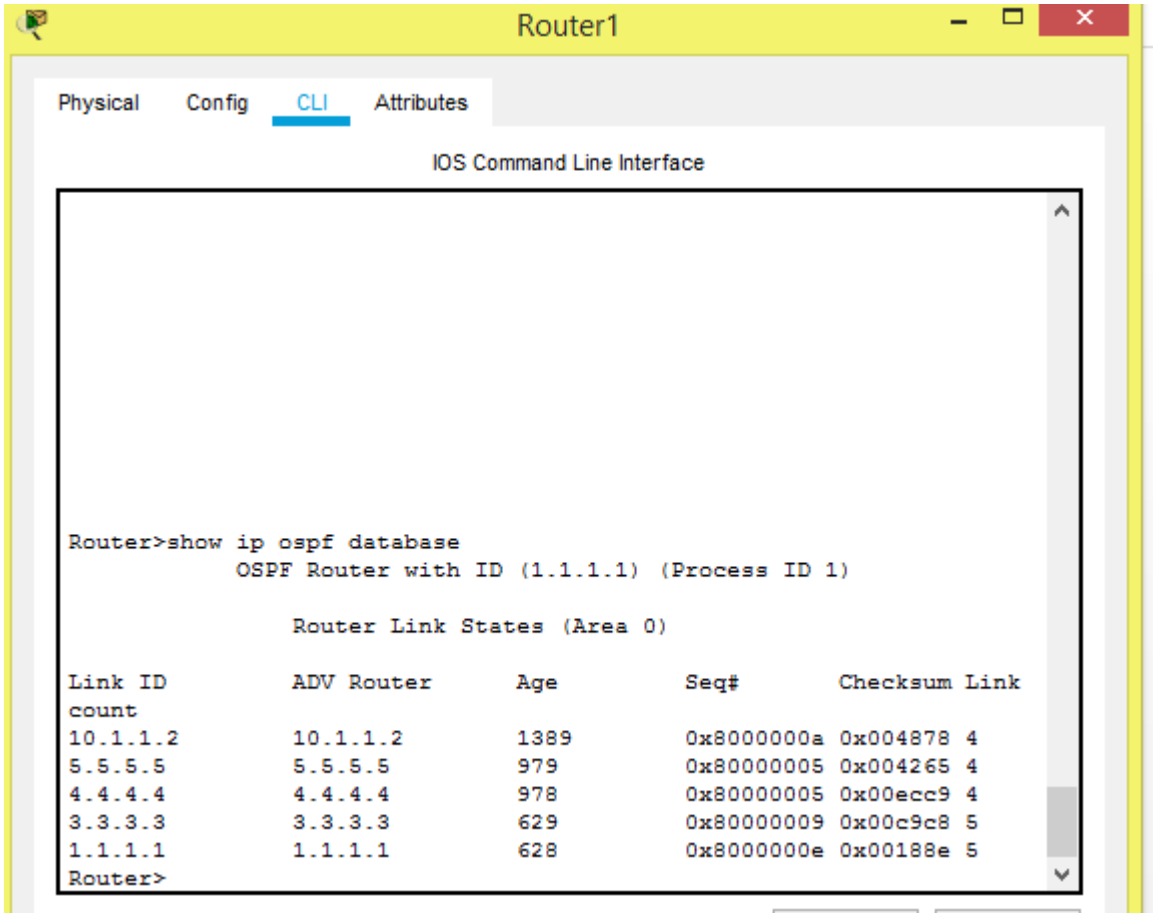
show ip ospf database

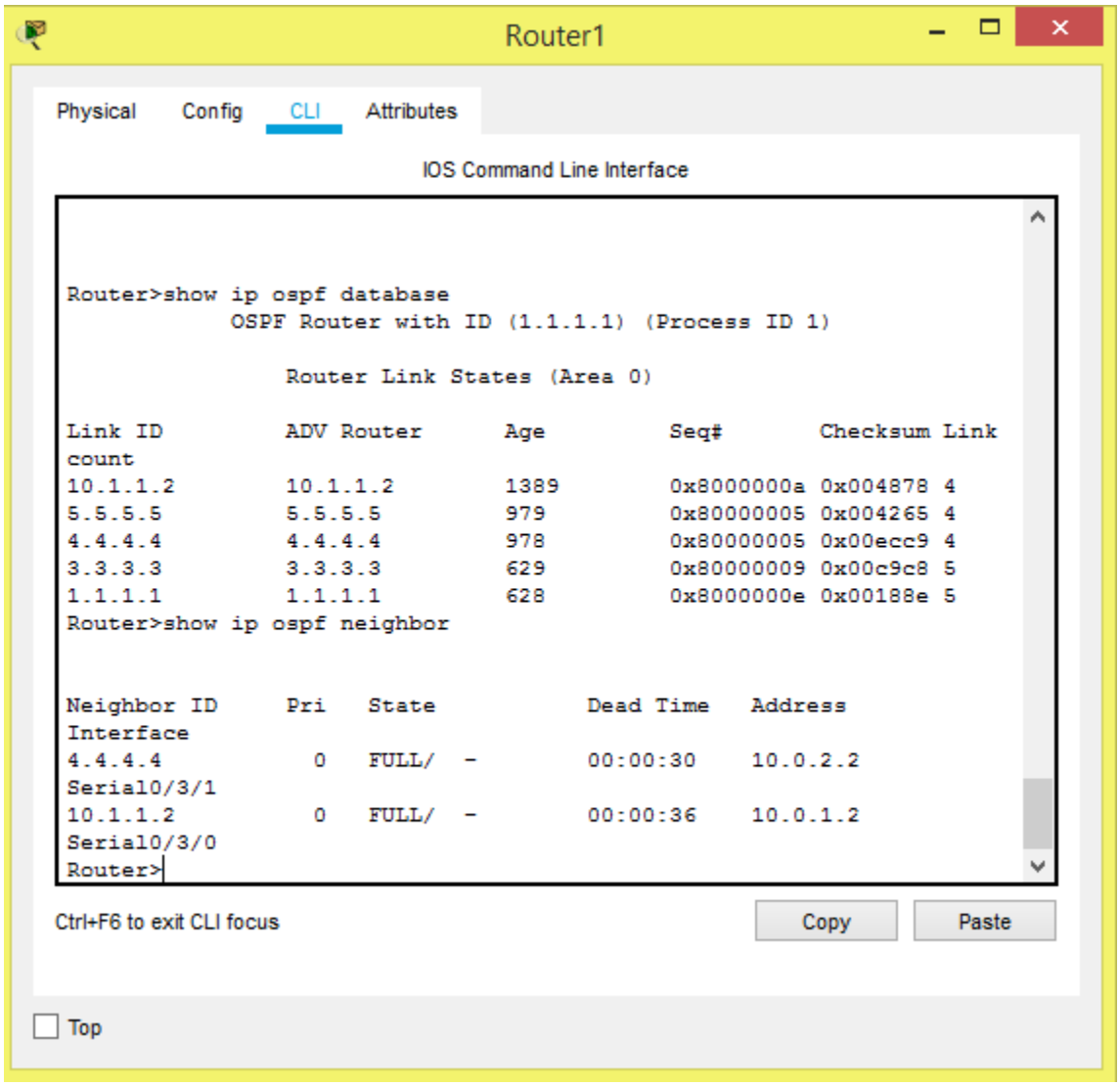
show ip ospf neighbor

Verify your answer, Take screenshots

To avoid redundancy, I have taken screenshots for router 1 & 2 only.

Router 1




Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>show ip ospf database
OSPF Router with ID (1.1.1.1) (Process ID 1)
Router Link States (Area 0)
Link ID ADV Router Age Seq# Checksum Link count
10.1.1.2 10.1.1.2 1389 0x8000000a 0x004878 4
5.5.5.5 5.5.5.5 979 0x80000005 0x004265 4
4.4.4.4 4.4.4.4 978 0x80000005 0x00ecc9 4
3.3.3.3 3.3.3.3 629 0x80000009 0x00c9c8 5
1.1.1.1 1.1.1.1 628 0x8000000e 0x00188e 5
Router>show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
4.4.4.4 0 FULL/ - 00:00:30 10.0.2.2 Serial0/3/1
10.1.1.2 0 FULL/ - 00:00:36 10.0.1.2 Serial0/3/0
Router>
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Router 2

```
Router>show ip ospf database
            OSPF Router with ID (10.1.1.2) (Process ID 1)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum Link
count
3.3.3.3         3.3.3.3         858         0x80000009 0x00c9c8 5
5.5.5.5         5.5.5.5         1209        0x80000005 0x004265 4
4.4.4.4         4.4.4.4         1208        0x80000005 0x00ecc9 4
1.1.1.1         1.1.1.1         858         0x8000000e 0x00188e 5
10.1.1.2        10.1.1.2        1619        0x8000000a 0x004878 4
Router>
```

Ctrl+F6 to exit CLI focus Copy Paste

Top

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>
Router>
Router>
Router>show ip ospf database
            OSPF Router with ID (10.1.1.2) (Process ID 1)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum Link
count
3.3.3.3         3.3.3.3         858         0x80000009 0x00c9c8 5
5.5.5.5         5.5.5.5         1209        0x80000005 0x004265 4
4.4.4.4         4.4.4.4         1208        0x80000005 0x00ecc9 4
1.1.1.1         1.1.1.1         858         0x8000000e 0x00188e 5
10.1.1.2        10.1.1.2        1619        0x8000000a 0x004878 4
Router>show ip ospf neighbor


Neighbor ID     Pri   State           Dead Time   Address
Interface
3.3.3.3           0   FULL/  -        00:00:30    10.1.1.1
Serial0/3/1
1.1.1.1           0   FULL/  -        00:00:30    10.0.1.1
Serial0/3/0
Router>
```

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Answer the following questions :

Q9. Which router(s) are backbone routers?

Since we are using area 0 , then all routers are backbone routers

Q10. Which routers are generating Type 1 LSAs?

Router 3 ,4,5

Q11. Which routers are generating Type 2 LSAs?

Router 1 is the DR , Router 2 is the BDR .