OSFP

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Class: Se-5B

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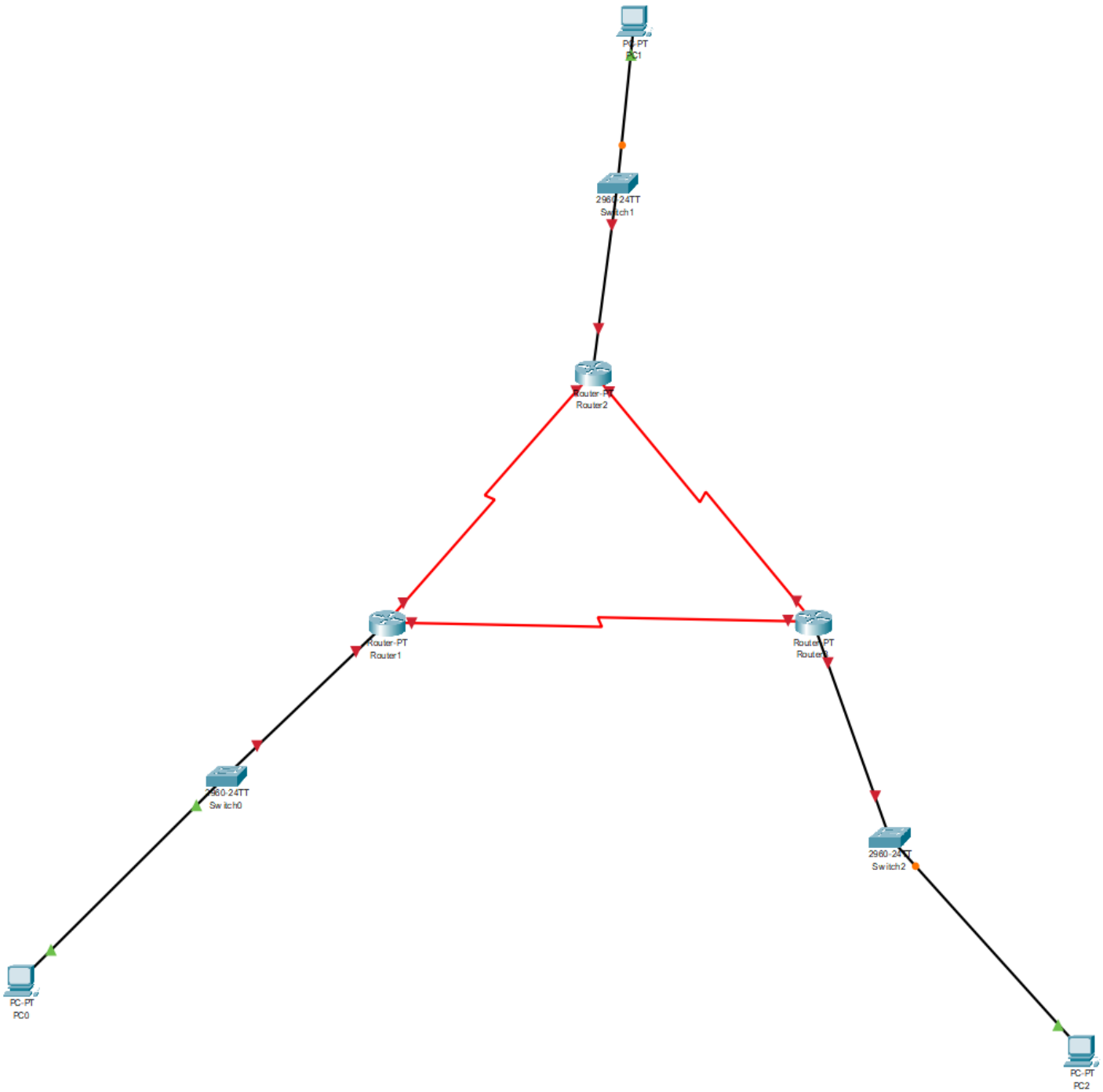
Course: ***Computer Networks***
By ***Sir Wilayat***

OSPF (Open Shortest Path First) : A dynamic routing protocol used in IP networks for finding the best path between routers.

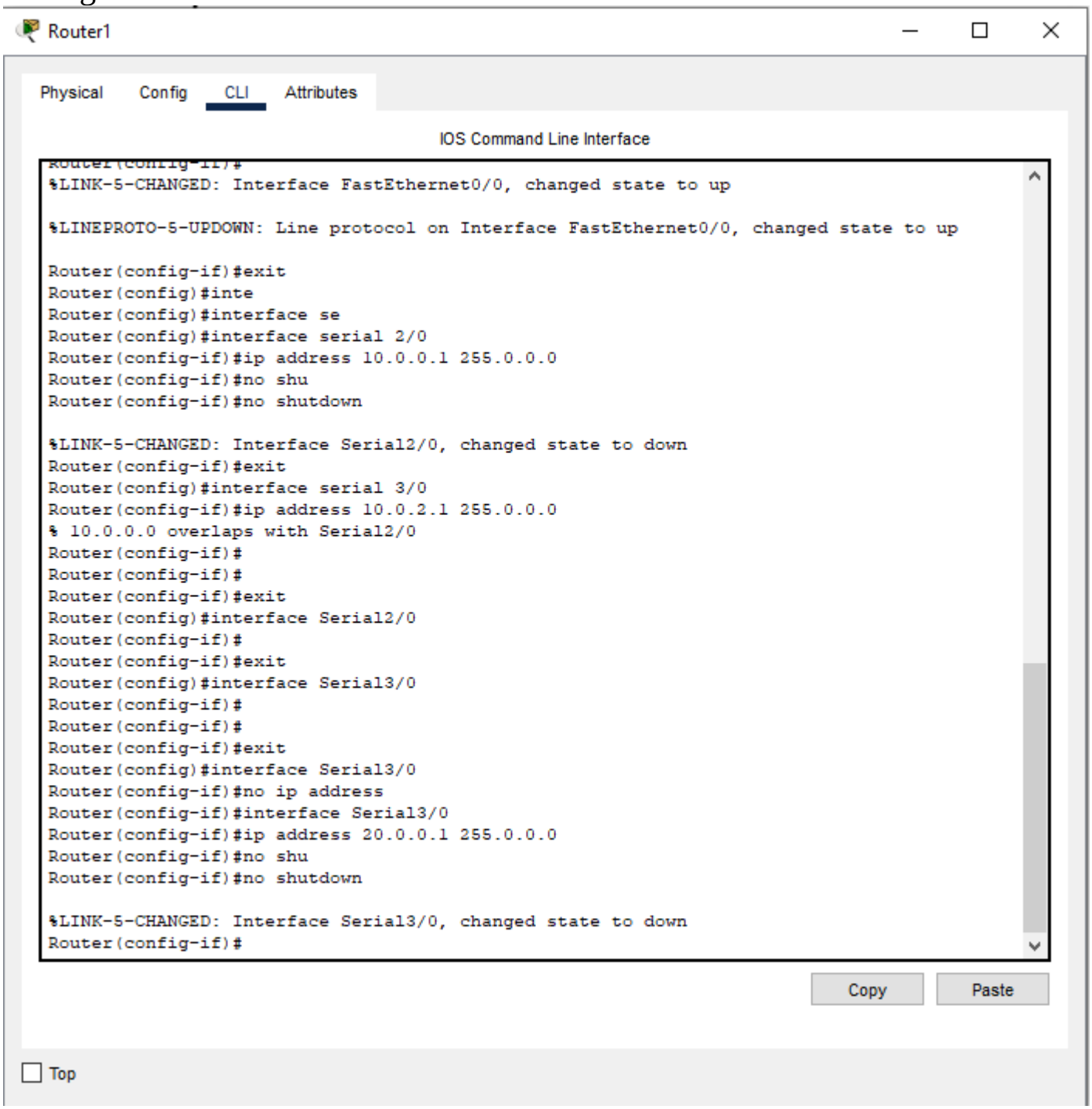
We will create a topology with **three routers** (R1, R2, R3) and **three PCs** (PC1, PC2, PC3). The routers will be connected in a triangular fashion to demonstrate OSPF's ability to find the shortest path dynamically.

It is a **link-state protocol** and works within a single **Autonomous System (AS)**.

OSPF divides the network into **areas** (e.g., Area 0), reducing the size of routing tables and making routing efficient.


PC-PT
PC1
2960-24TT
Switch1
Router-PT
Router2
Router-PT
Router1
Router-PT
Router3
2960-24TT
Switch0
2960-24TT
Switch2
PC-PT
PC0
PC-PT
PC2

Configuration of R1



Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
        --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no
```

Router3

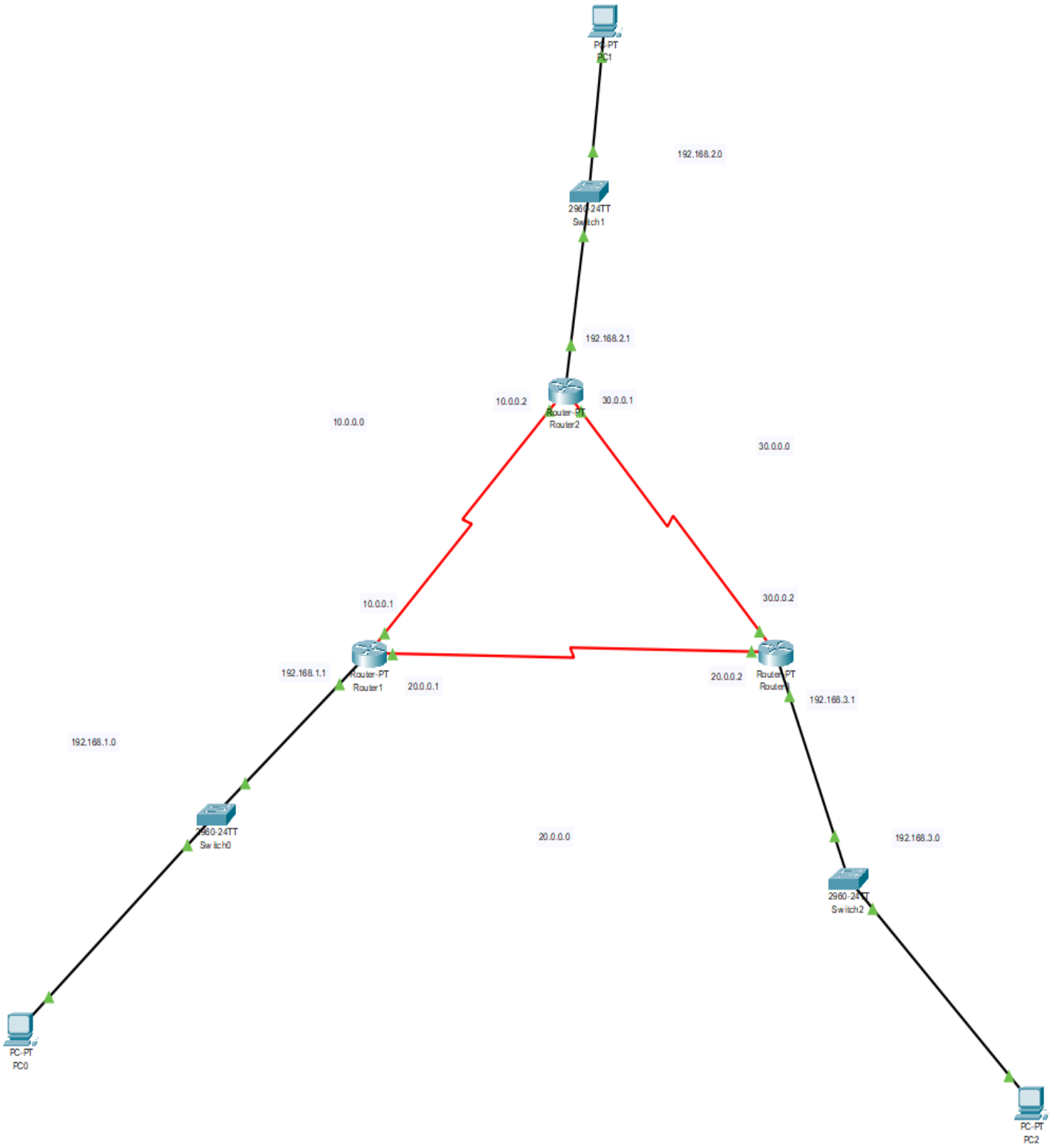
Physical Config CLI Attributes

IOS Command Line Interface

```
Would you like to enter the initial configuration dialog? [yes/no]: no


Press RETURN to get started!



Router>en
Router#inte
Router#config
Router#configure ter
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int
Router(config)#interface fas
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 192.168.3.1 255.255.255.0
Router(config-if)#no sj
Router(config-if)#no sh
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#
Router(config-if)#exit
Router(config)#inte
Router(config)#interface se
Router(config)#interface serial 3/0
Router(config-if)#ip address 20.0.0.2 255.0.0.0
Router(config-if)#no sh
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up
exit
Router(config)#inte
Router(config)#interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed st
Router(config)#inte
Router(config)#interface ser
Router(config)#interface serial 2/0
Router(config-if)#exit
Router(config)#interface serial 3/0
Router(config-if)#exit
Router(config)#interface serial 2/0
Router(config-if)#ip address 30.0.0.2 255.0.0.0
Router(config-if)#no shu
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
```

Copy Paste

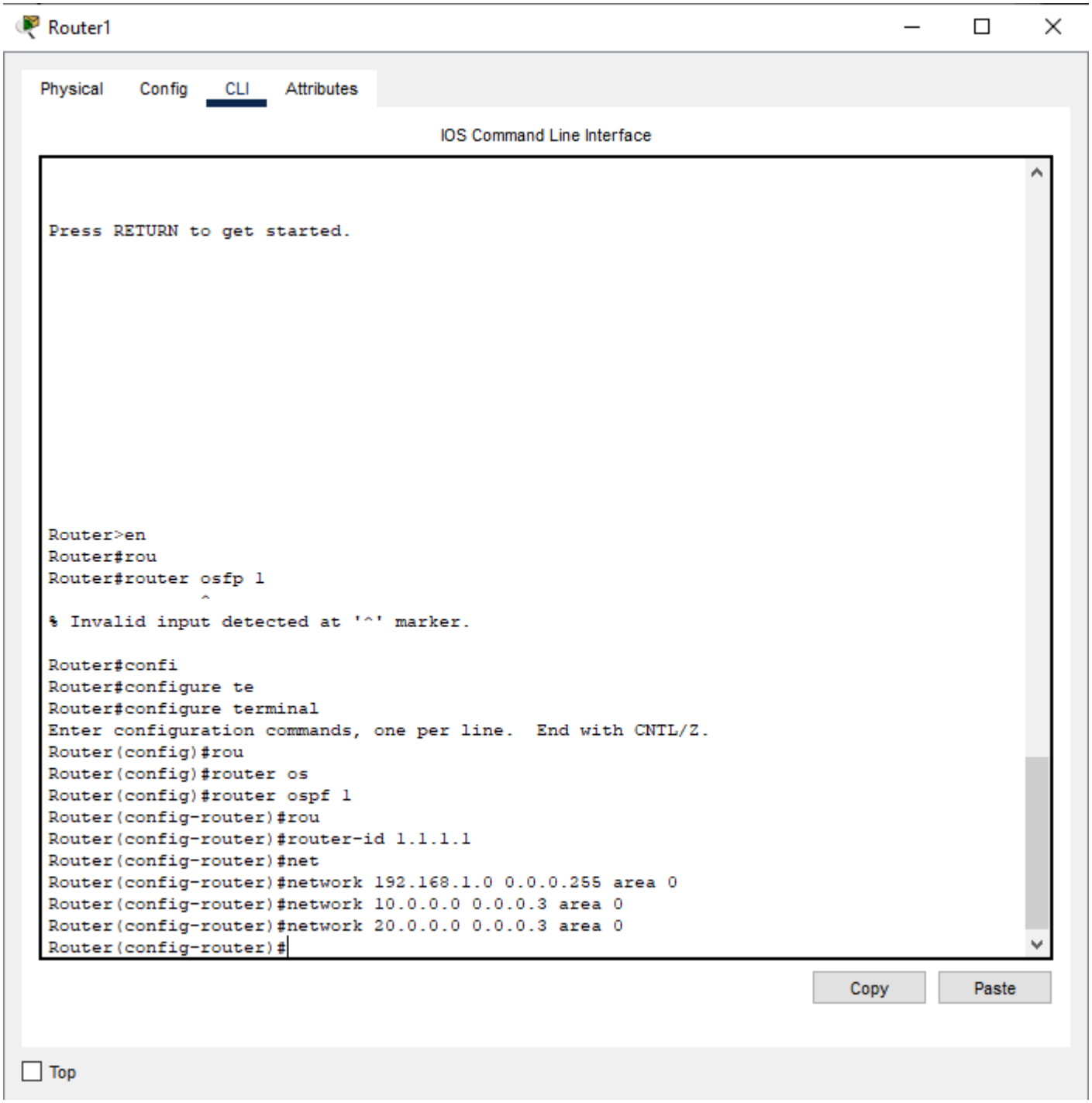
Top



Enter OSPF Configuration Mode:

On each router, use the command:

Router 1:


Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Press RETURN to get started.
Router>en
Router#rou
Router#router osfp 1
^
% Invalid input detected at '^' marker.
Router#confi
Router#configure te
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#rou
Router(config)#router os
Router(config)#router ospf 1
Router(config-router)#rou
Router(config-router)#router-id 1.1.1.1
Router(config-router)#net
Router(config-router)#network 192.168.1.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.0.0.3 area 0
Router(config-router)#network 20.0.0.0 0.0.0.3 area 0
Router(config-router)#
Copy
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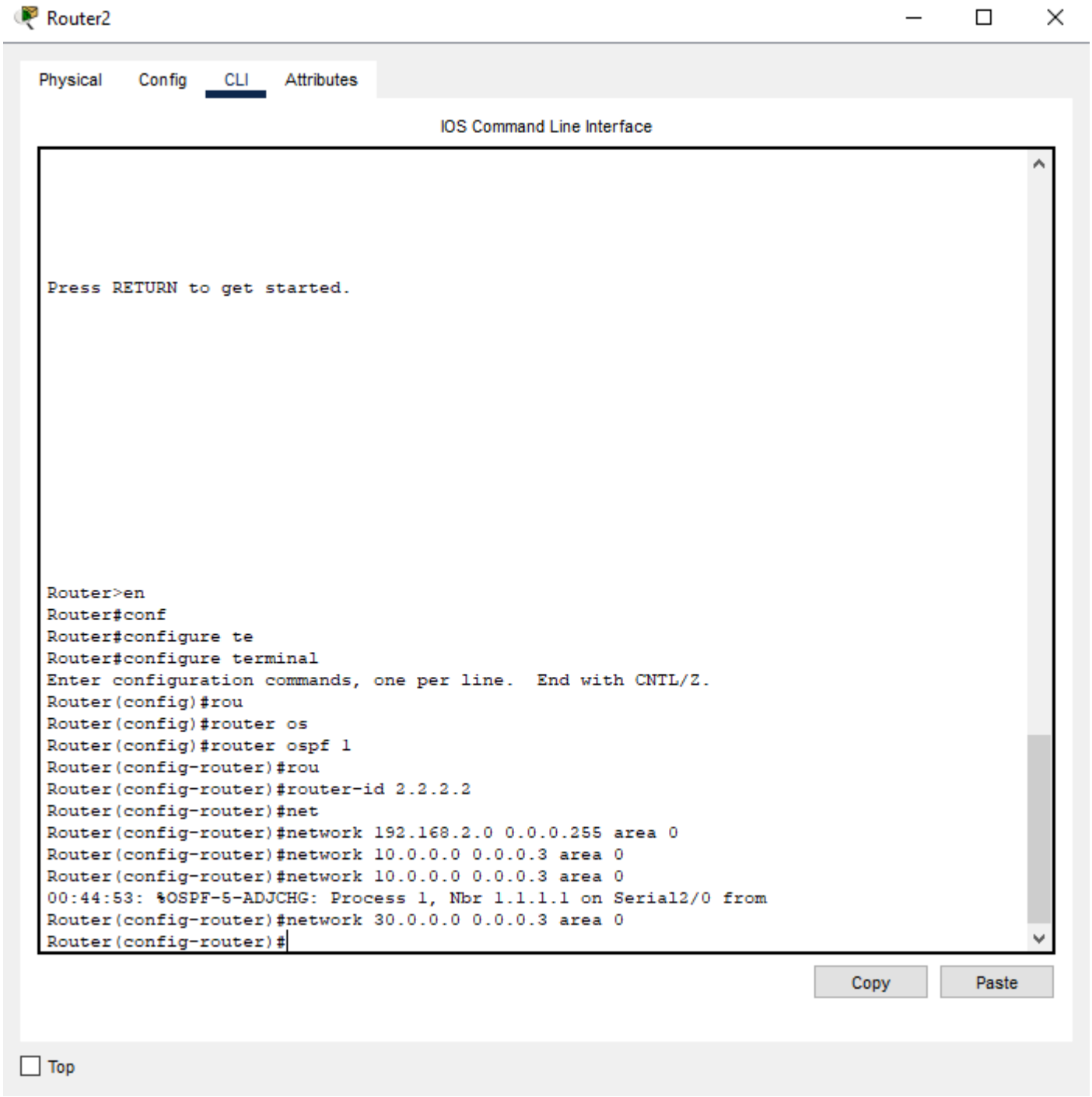
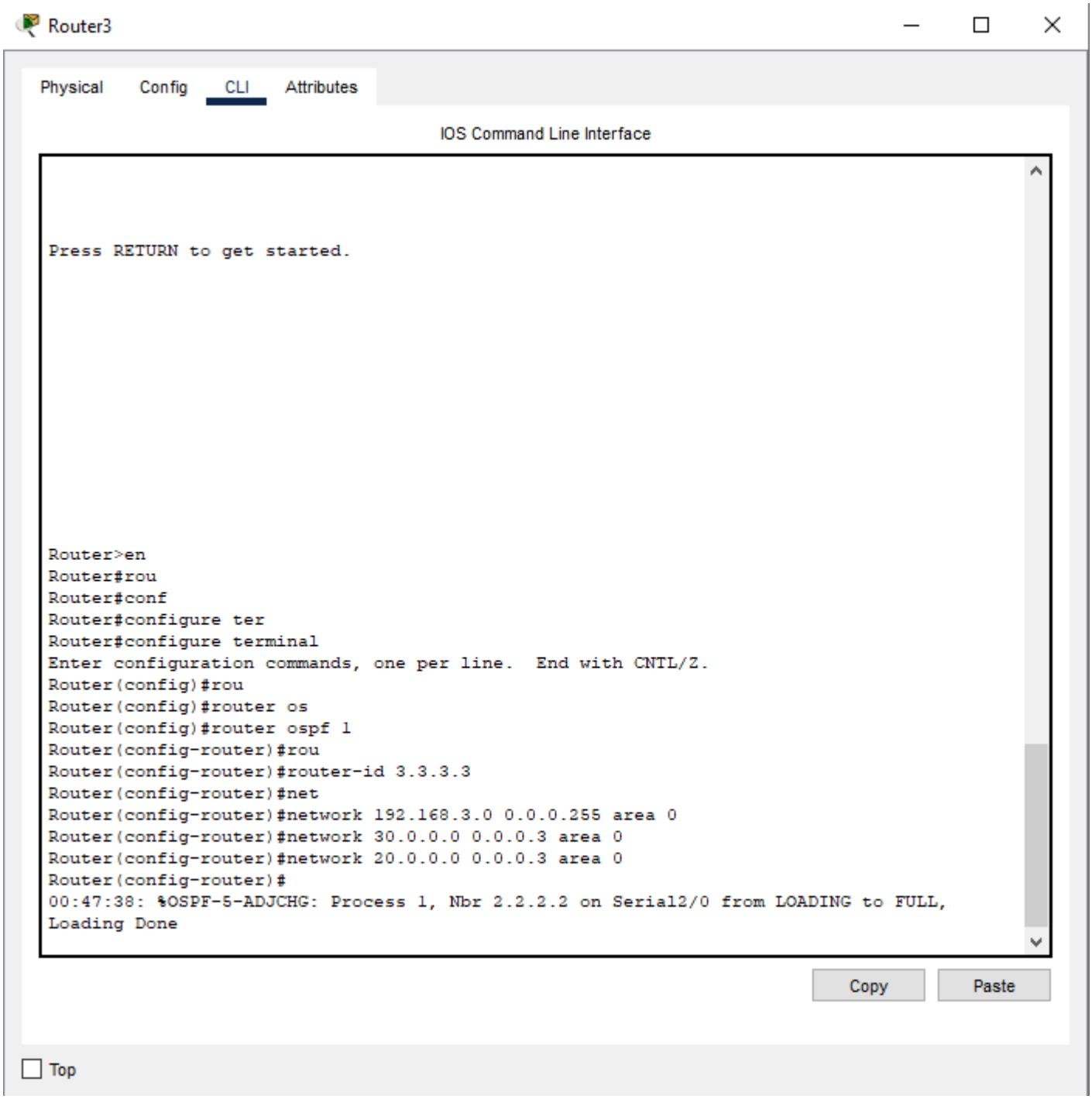
Top

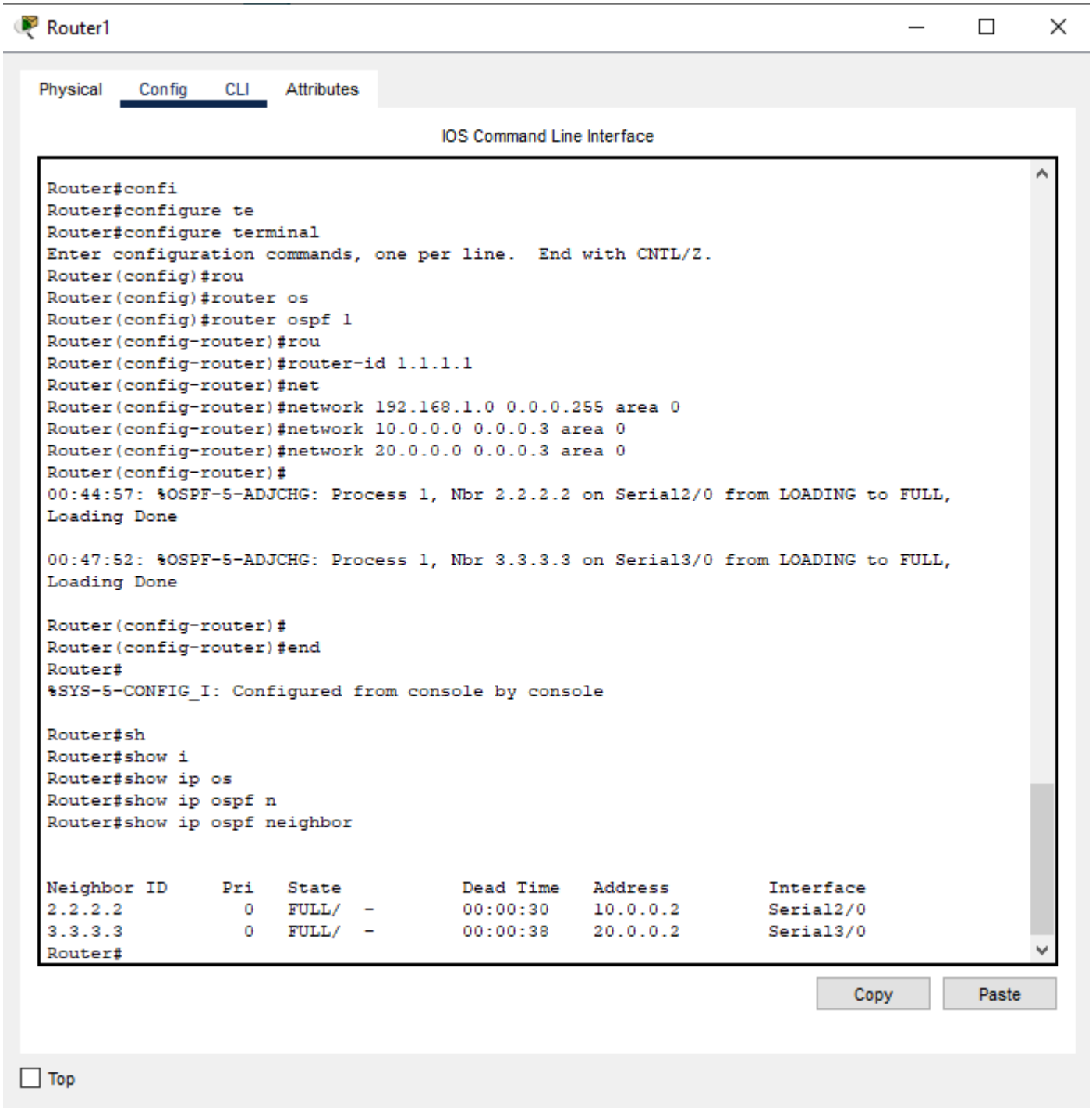
Router2:

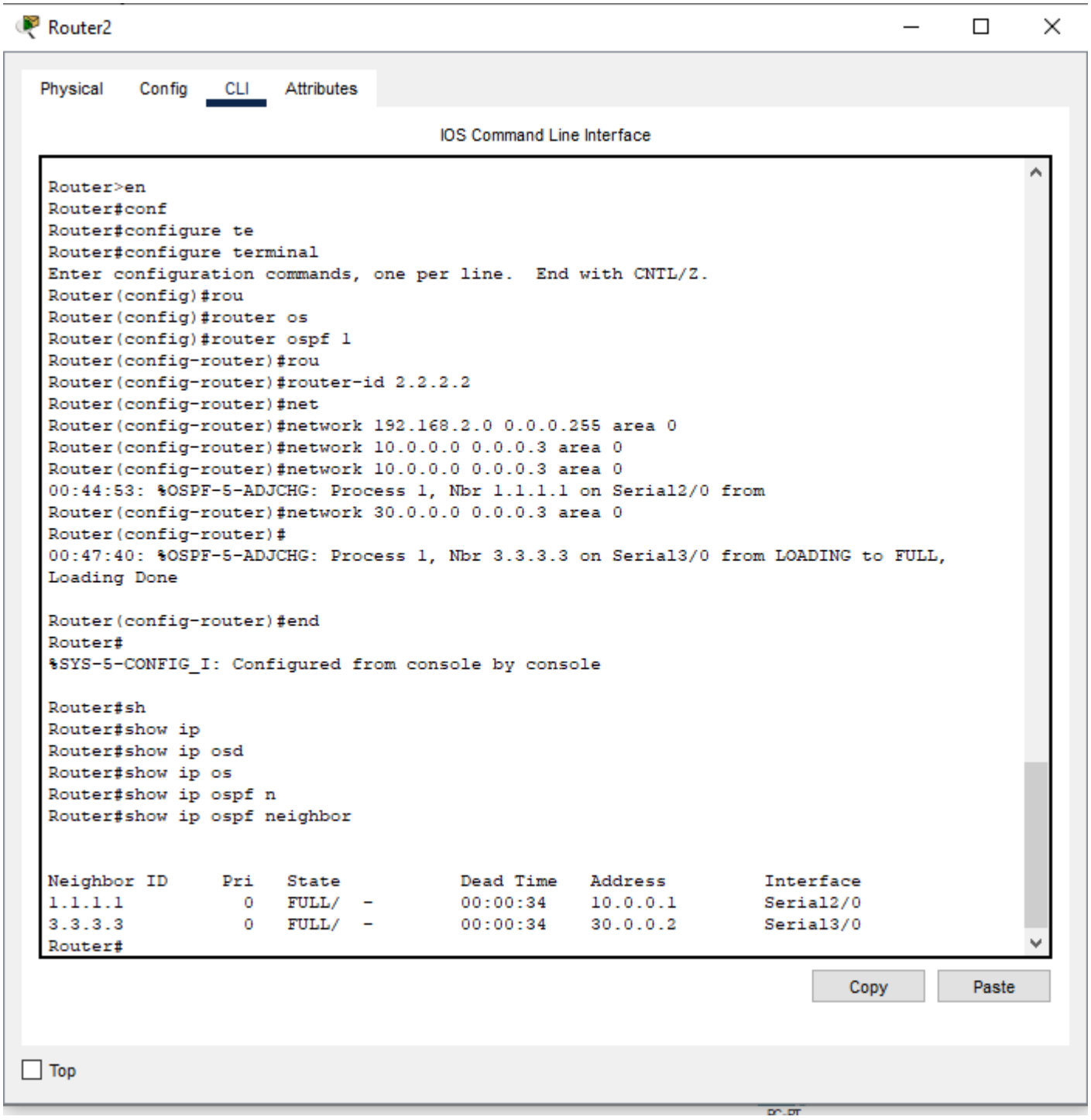

Router2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Press RETURN to get started.
Router>en
Router#conf
Router#configure te
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#rou
Router(config)#router os
Router(config)#router ospf 1
Router(config-router)#rou
Router(config-router)#router-id 2.2.2.2
Router(config-router)#net
Router(config-router)#network 192.168.2.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.0.0.3 area 0
Router(config-router)#network 10.0.0.0 0.0.0.3 area 0
00:44:53: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial2/0 from
Router(config-router)#network 30.0.0.0 0.0.0.3 area 0
Router(config-router)#
Copy
Paste
Top

Router3:



Verify OSPF Configuration:


Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router#confi
Router#configure te
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#rou
Router(config)#router os
Router(config)#router ospf 1
Router(config-router)#rou
Router(config-router)#router-id 1.1.1.1
Router(config-router)#net
Router(config-router)#network 192.168.1.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.0.0.3 area 0
Router(config-router)#network 20.0.0.0 0.0.0.3 area 0
Router(config-router)#
00:44:57: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial2/0 from LOADING to FULL,
Loading Done
00:47:52: %OSPF-5-ADJCHG: Process 1, Nbr 3.3.3.3 on Serial3/0 from LOADING to FULL,
Loading Done
Router(config-router)#
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#sh
Router#show i
Router#show ip os
Router#show ip ospf n
Router#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
2.2.2.2 0 FULL/ - 00:00:30 10.0.0.2 Serial2/0
3.3.3.3 0 FULL/ - 00:00:38 20.0.0.2 Serial3/0
Router#
Copy
Paste
Top


Router2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>en
Router#conf
Router#configure te
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#rou
Router(config)#router os
Router(config)#router ospf 1
Router(config-router)#rou
Router(config-router)#router-id 2.2.2.2
Router(config-router)#net
Router(config-router)#network 192.168.2.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.0.0.3 area 0
Router(config-router)#network 10.0.0.0 0.0.0.3 area 0
00:44:53: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial2/0 from
Router(config-router)#network 30.0.0.0 0.0.0.3 area 0
Router(config-router)#
00:47:40: %OSPF-5-ADJCHG: Process 1, Nbr 3.3.3.3 on Serial3/0 from LOADING to FULL,
Loading Done
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#sh
Router#show ip
Router#show ip osd
Router#show ip os
Router#show ip ospf n
Router#show ip ospf neighbor
Neighbor ID   Pri   State   Dead Time   Address   Interface
1.1.1.1   0   FULL/ -   00:00:34   10.0.0.1   Serial2/0
3.3.3.3   0   FULL/ -   00:00:34   30.0.0.2   Serial3/0
Router#
Copy
Paste
Top

Router3

Physical Config CLI Attributes

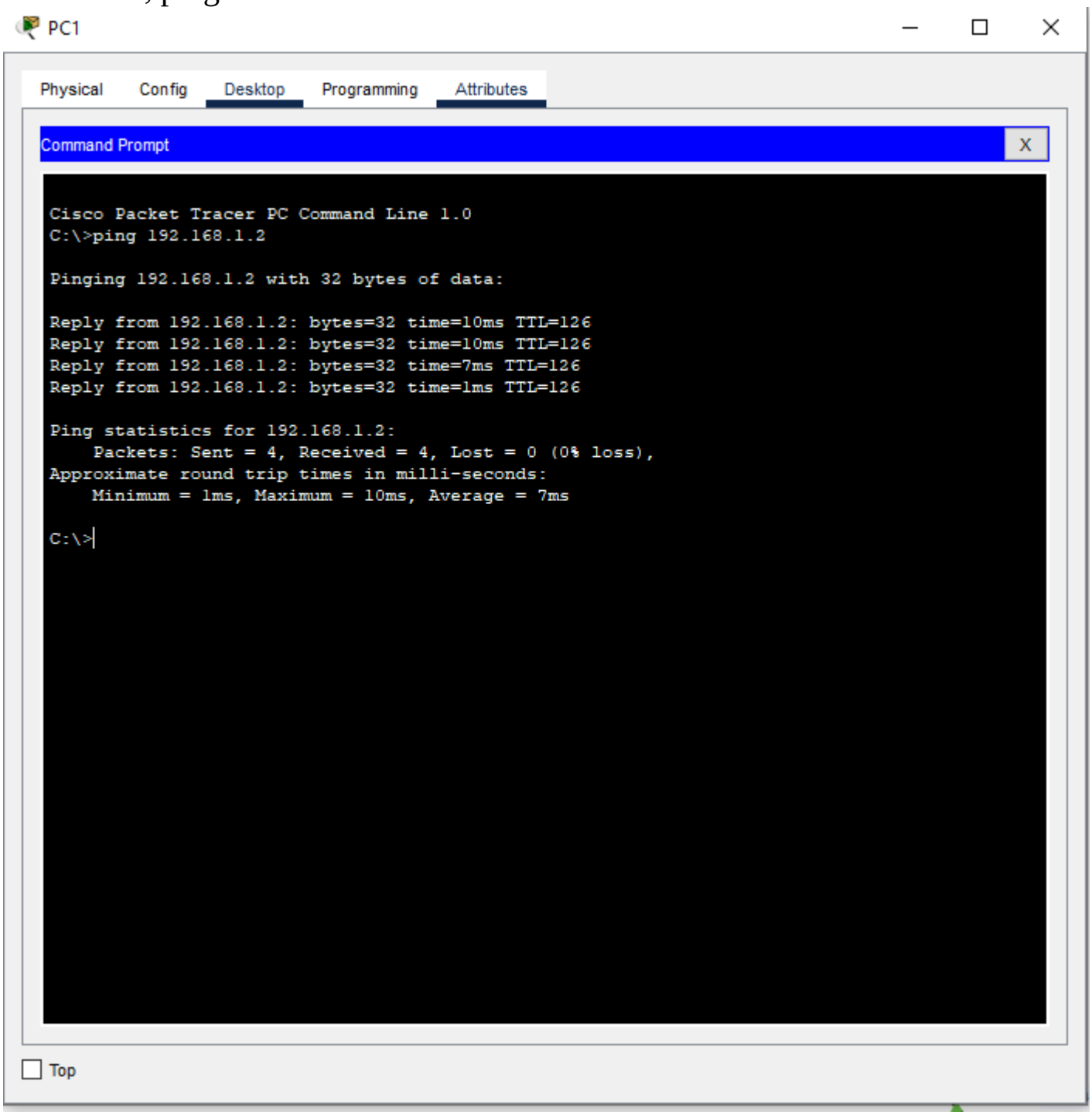
IOS Command Line Interface

```
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#rou
Router(config)#router os
Router(config)#router ospf 1
Router(config-router)#rou
Router(config-router)#router-id 3.3.3.3
Router(config-router)#net
Router(config-router)#network 192.168.3.0 0.0.0.255 area 0
Router(config-router)#network 30.0.0.0 0.0.0.3 area 0
Router(config-router)#network 20.0.0.0 0.0.0.3 area 0
Router(config-router)#
00:47:38: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial2/0 from LOADING to FULL,
Loading Done

00:47:45: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial3/0 from LOADING to FULL,
Loading Done

Router(config-router)#
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
\
Translating "\"...domain server (255.255.255.255)
% Unknown command or computer name, or unable to find computer address

Router#sh
Router#show ip
Router#show ip os
Router#show ip ospf n
Router#show ip ospf neighbor


Neighbor ID     Pri   State           Dead Time   Address         Interface
2.2.2.2           0   FULL/  -        00:00:31    30.0.0.1        Serial2/0
1.1.1.1           0   FULL/  -        00:00:38    20.0.0.1        Serial3/0
Router#
```

Copy Paste

Test End-to-End Connectivity:

From **PC1**, ping **PC0**:



he successful ping from **PC1 (192.168.2.2)** to **PC0 (192.168.1.2)** confirms that OSPF is routing the traffic correctly. This shows that all configurations are working as intended, and devices across different subnets can communicate seamlessly.