

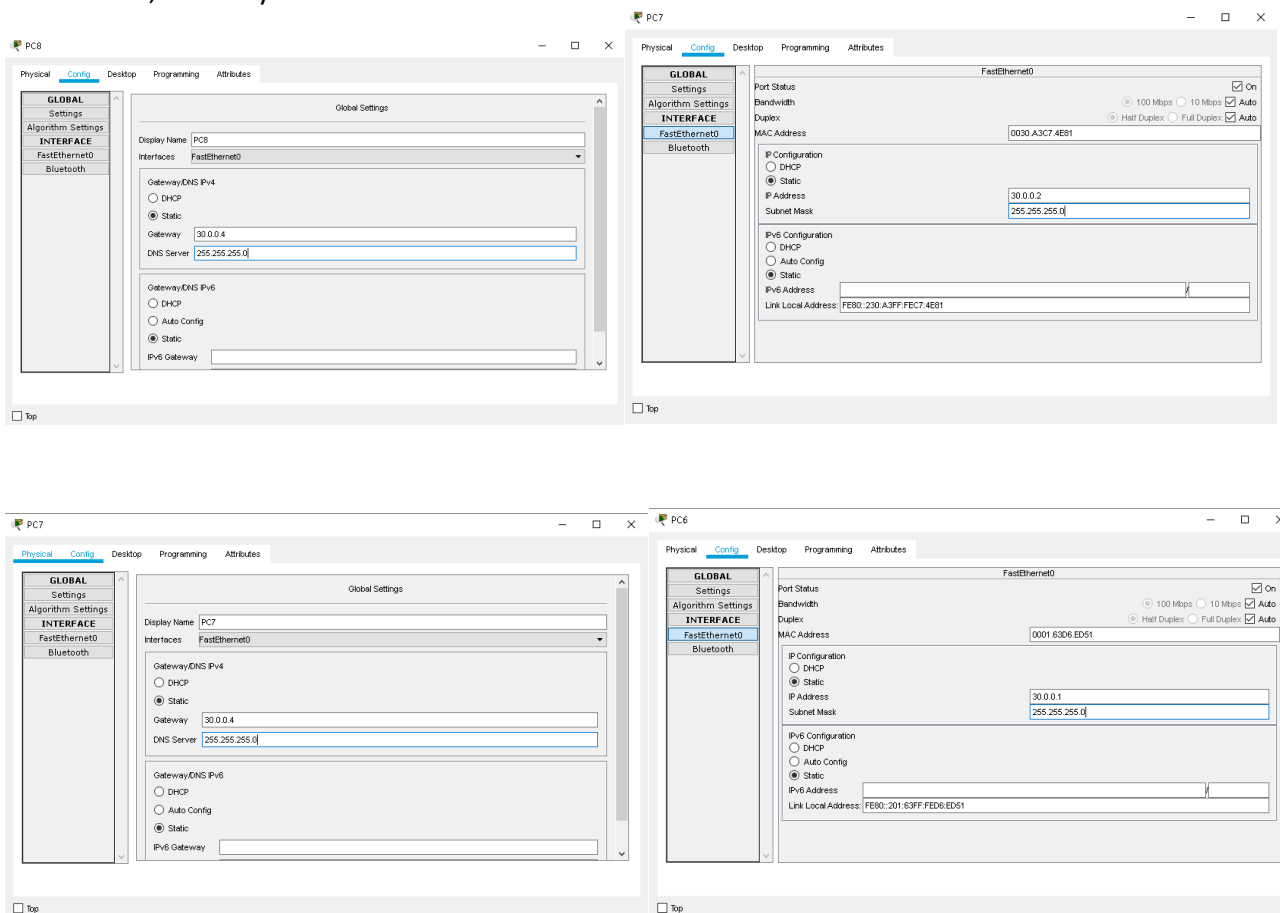
## PRACTICAL - 2

Aim - Create a network with three routers with OSPF and each router associated network will have minimum three PC. Show connectivity.

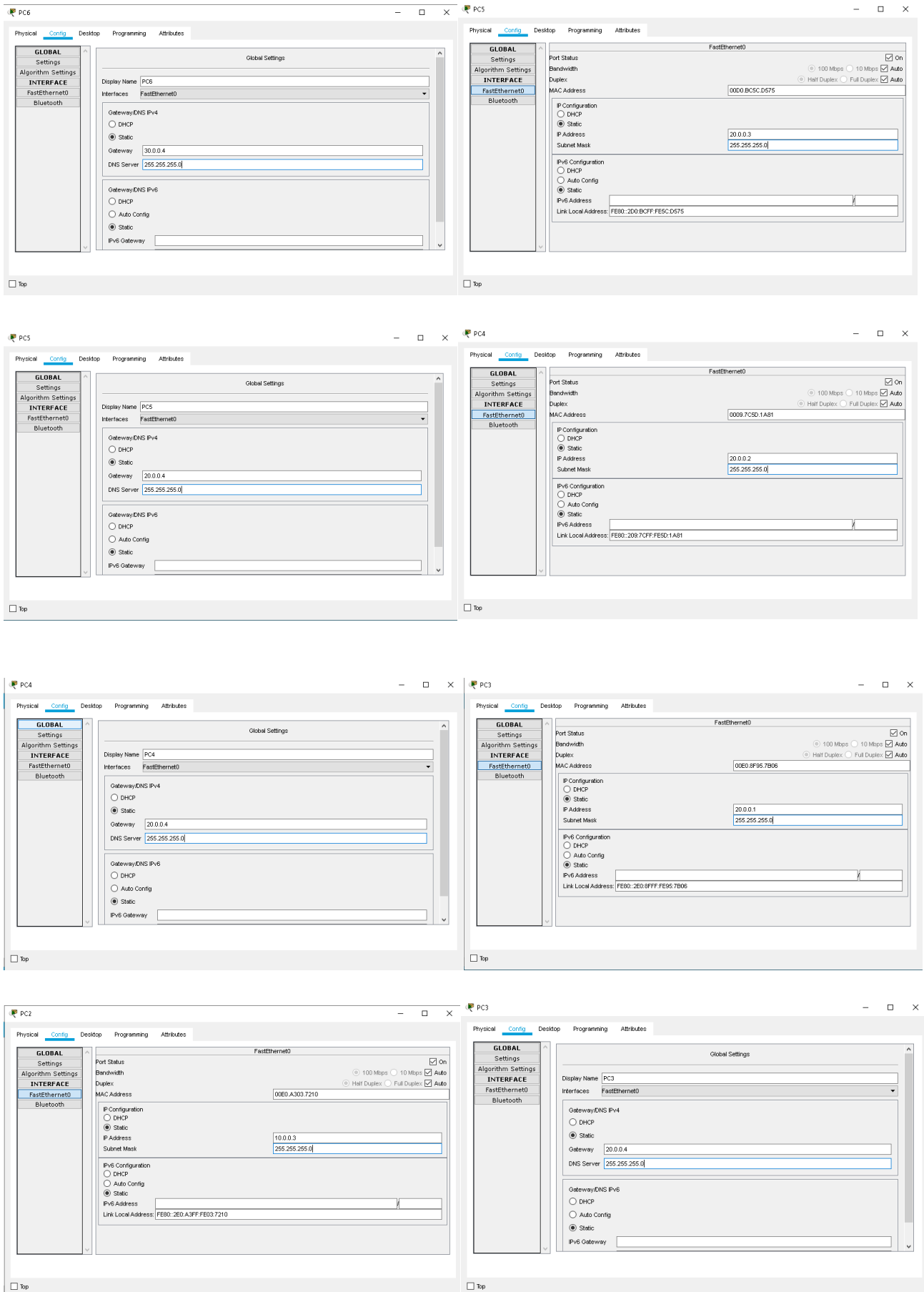
1. Align 9 end-devices as follows:



2. Set the DNS, Gateway and Fast Ethernet connections for all the PCs as follows:



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07 - MSc. CS. Part – 1  
Advanced Networking Concepts



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PC2

Physical Config Desktop Programming Attributes

GLOBAL Settings Algorithm Settings INTERFACE FastEthernet0 Bluetooth

Global Settings

Display Name: PC2

Interfaces: FastEthernet0

Gateway/DNS IPv4: Static 10.0.0.4 255.255.255.0

Gateway/DNS IPv6: Static

Top

PC1

Physical Config Desktop Programming Attributes

GLOBAL Settings Algorithm Settings INTERFACE FastEthernet0 Bluetooth

FastEthernet0

Port Status: On

Bandwidth: 100 Mbps

Duplex: Full Duplex

MAC Address: 0000.475B.B616

IP Configuration: Static 10.0.0.2 255.255.255.0

IPv6 Configuration: Static FE80:260:47FF:FE5B:B616

Top

PC1

Physical Config Desktop Programming Attributes

GLOBAL Settings Algorithm Settings INTERFACE FastEthernet0 Bluetooth

Global Settings

Display Name: PC1

Interfaces: FastEthernet0

Gateway/DNS IPv4: Static 10.0.0.4 255.255.255.0

Gateway/DNS IPv6: Static

Top

PC0

Physical Config Desktop Programming Attributes

GLOBAL Settings Algorithm Settings INTERFACE FastEthernet0 Bluetooth

FastEthernet0

Port Status: On

Bandwidth: 100 Mbps

Duplex: Full Duplex

MAC Address: 000C.85DE.25AC

IP Configuration: Static 10.0.0.1 255.255.255.0

IPv6 Configuration: Static FE80:20C:85FF:FEDE:25AC

Top

PC0

Physical Config Desktop Programming Attributes

GLOBAL Settings Algorithm Settings INTERFACE FastEthernet0 Bluetooth

Global Settings

Display Name: PC0

Interfaces: FastEthernet0

Gateway/DNS IPv4: Static 10.0.0.4 255.255.255.0

Gateway/DNS IPv6: Static

Top

PC8

Physical Config Desktop Programming Attributes

GLOBAL Settings Algorithm Settings INTERFACE FastEthernet0 Bluetooth

FastEthernet0

Port Status: On

Bandwidth: 100 Mbps

Duplex: Full Duplex

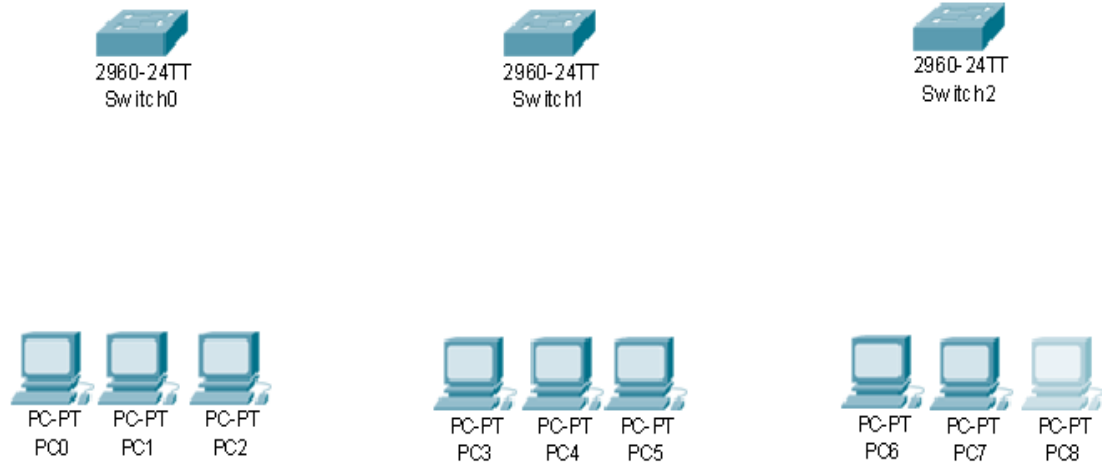
MAC Address: 0090.0C10.A370

IP Configuration: Static 30.0.0.3 255.255.255.0

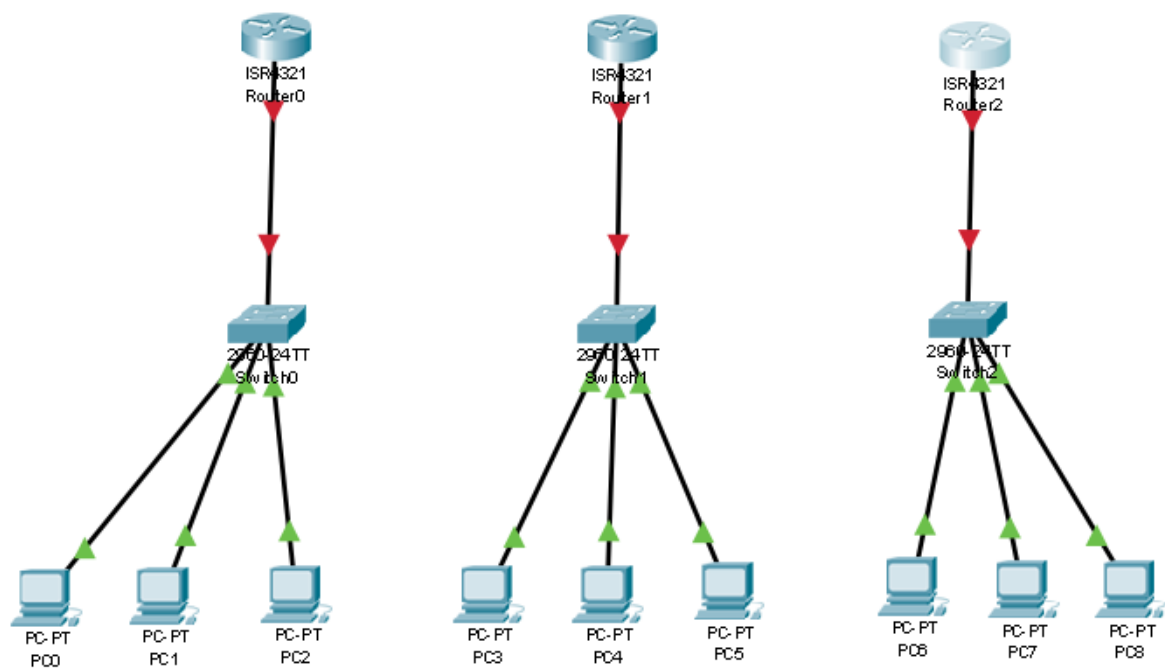
IPv6 Configuration: Static FE80:290:0FF:FE10:A370

Top

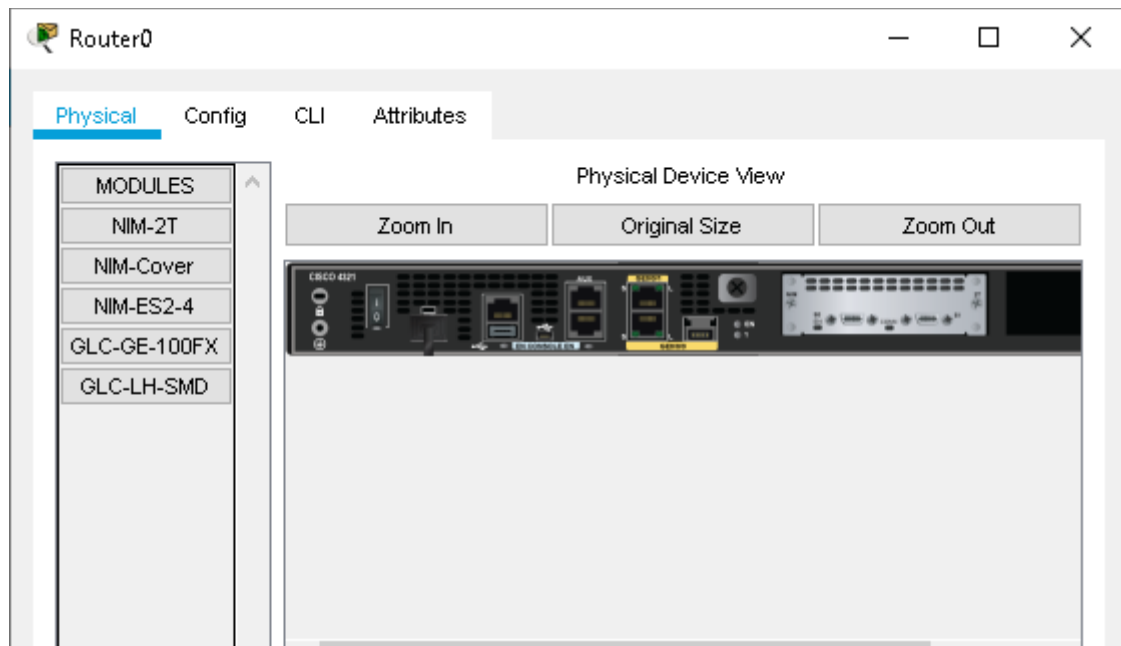
3. Add 3 Switches as follows:



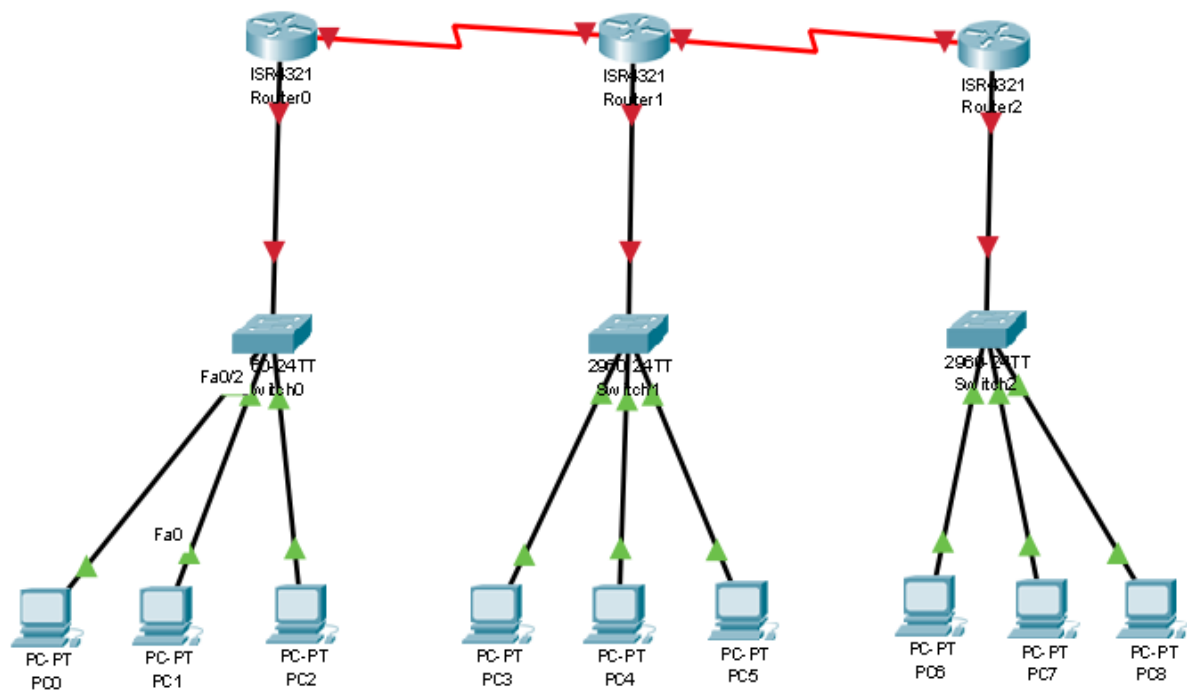
4. Add 3 Routers and connect all the components using Fast Ethernet connection as follows:



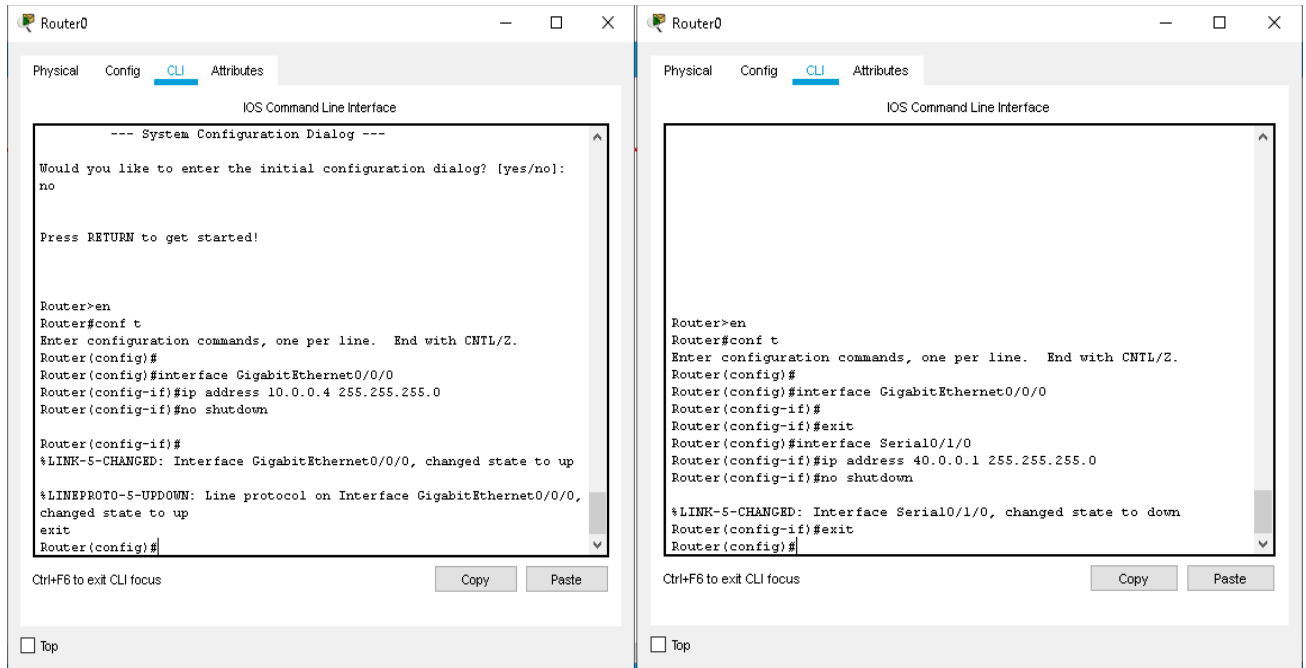
5. Power off each of the Routers and add the NIM-2T Module to all the Routers as follows:



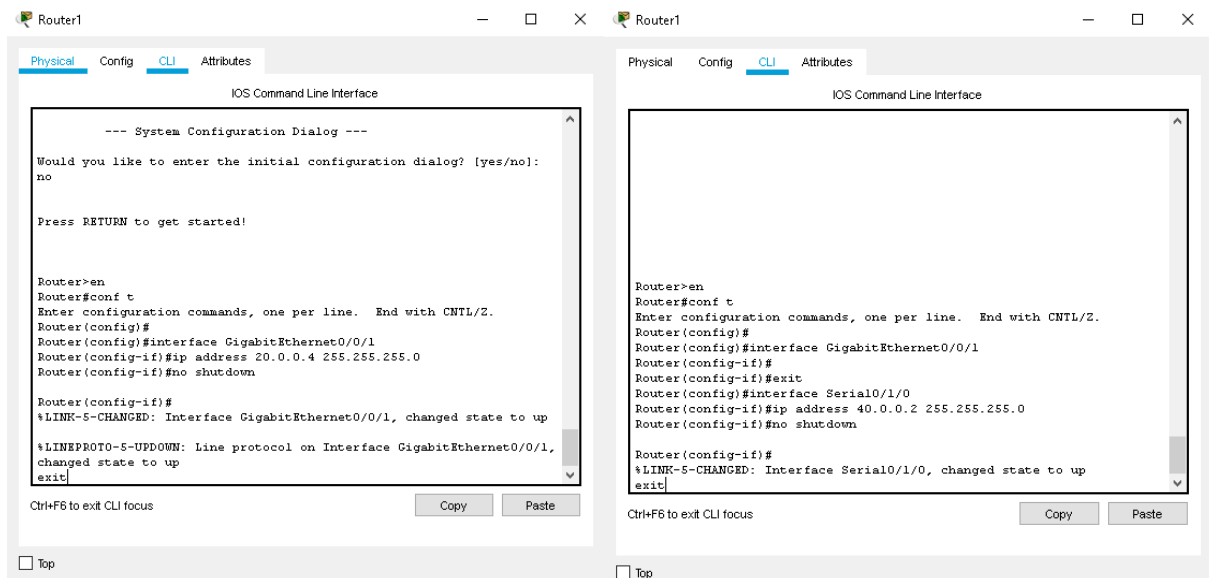
6. Connect the Routers using Serial DTE wires as shown:

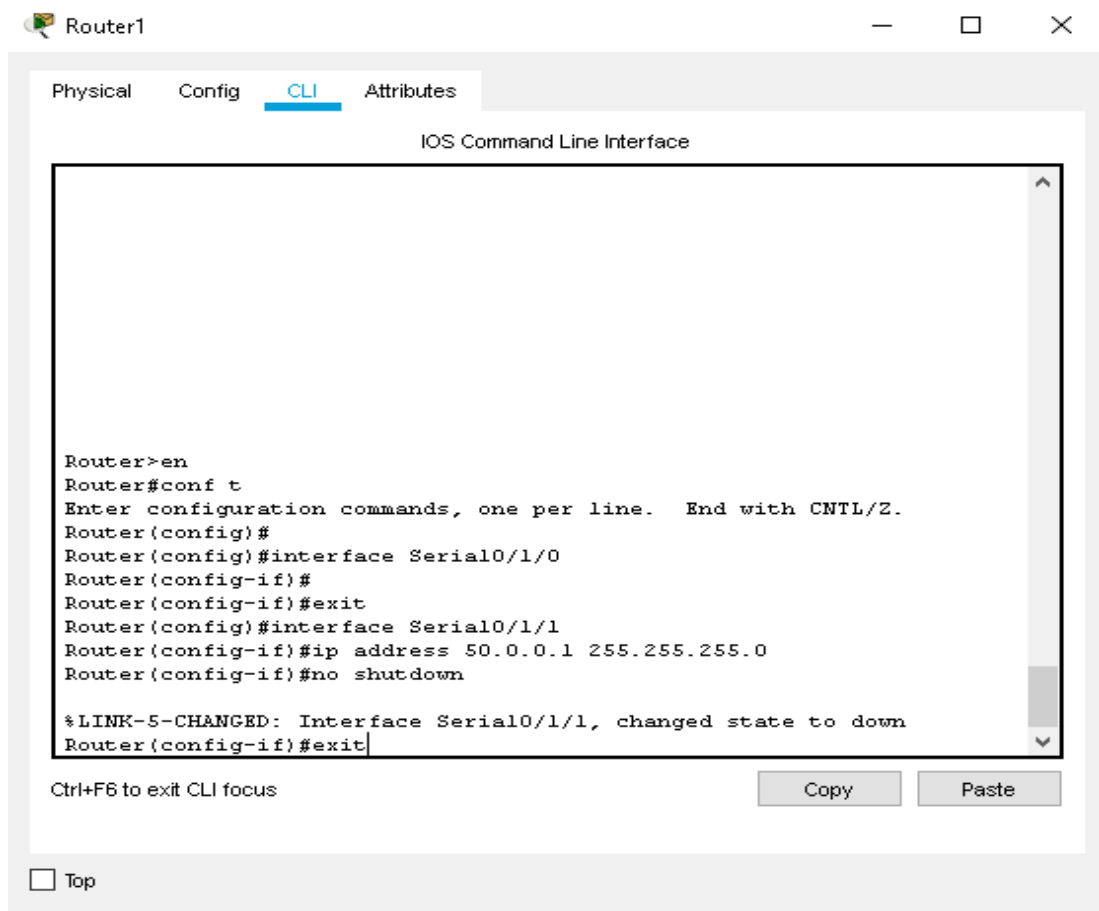


7. Configure Router0 using the Command Line Interface as follows:

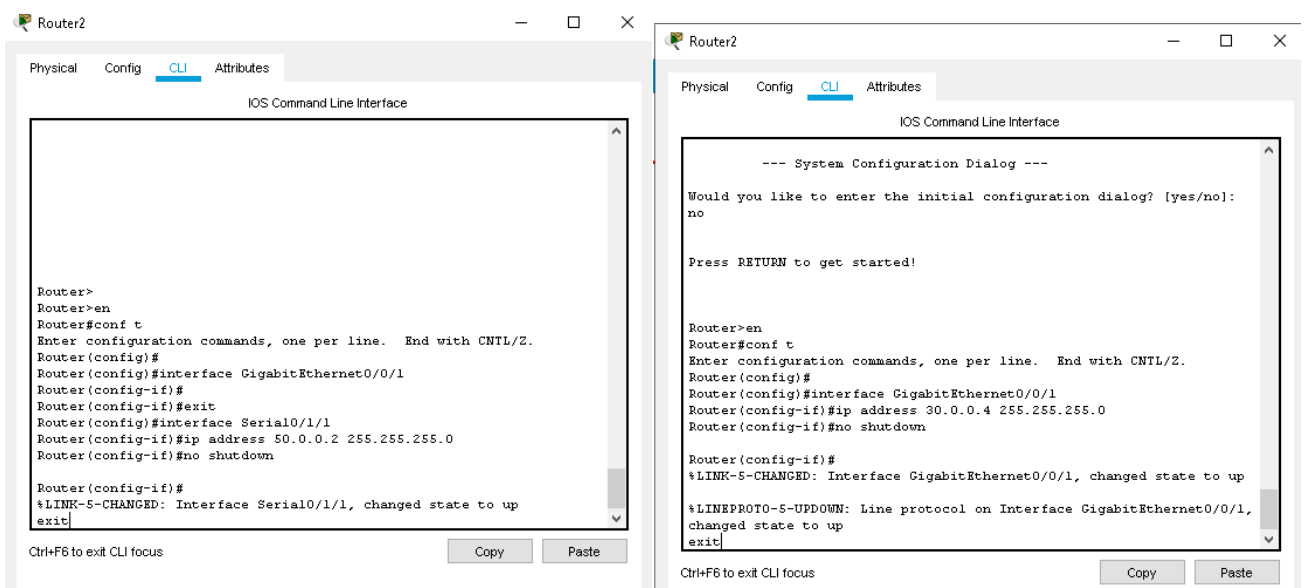


8. Configure Router0 using the Command Line Interface as follows:

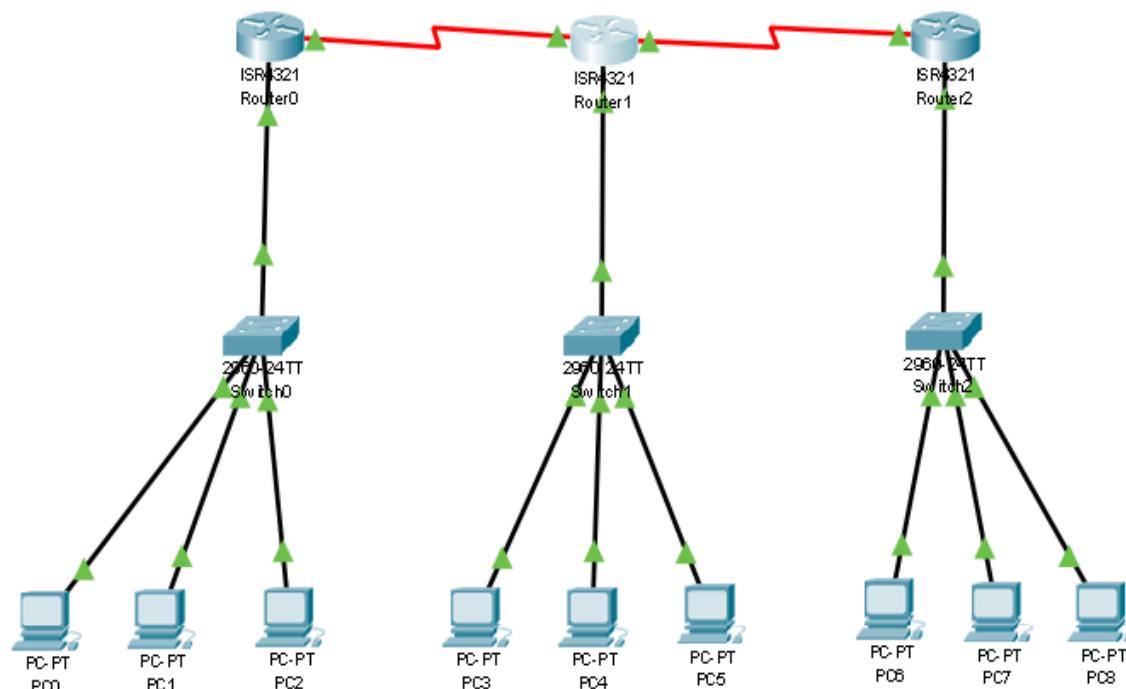




9. Configure Router0 using the Command Line Interface as follows:



10. The Final connection will look as shown:



11. Note how intra-connection packet sending succeeds and inter-connection fails:

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	PC0	PC1	ICMP	Dark Blue	0.000	N	0	(edit)
	Successful	PC3	PC4	ICMP	Blue	0.000	N	1	(edit)
	Successful	PC6	PC7	ICMP	Orange	0.000	N	2	(edit)

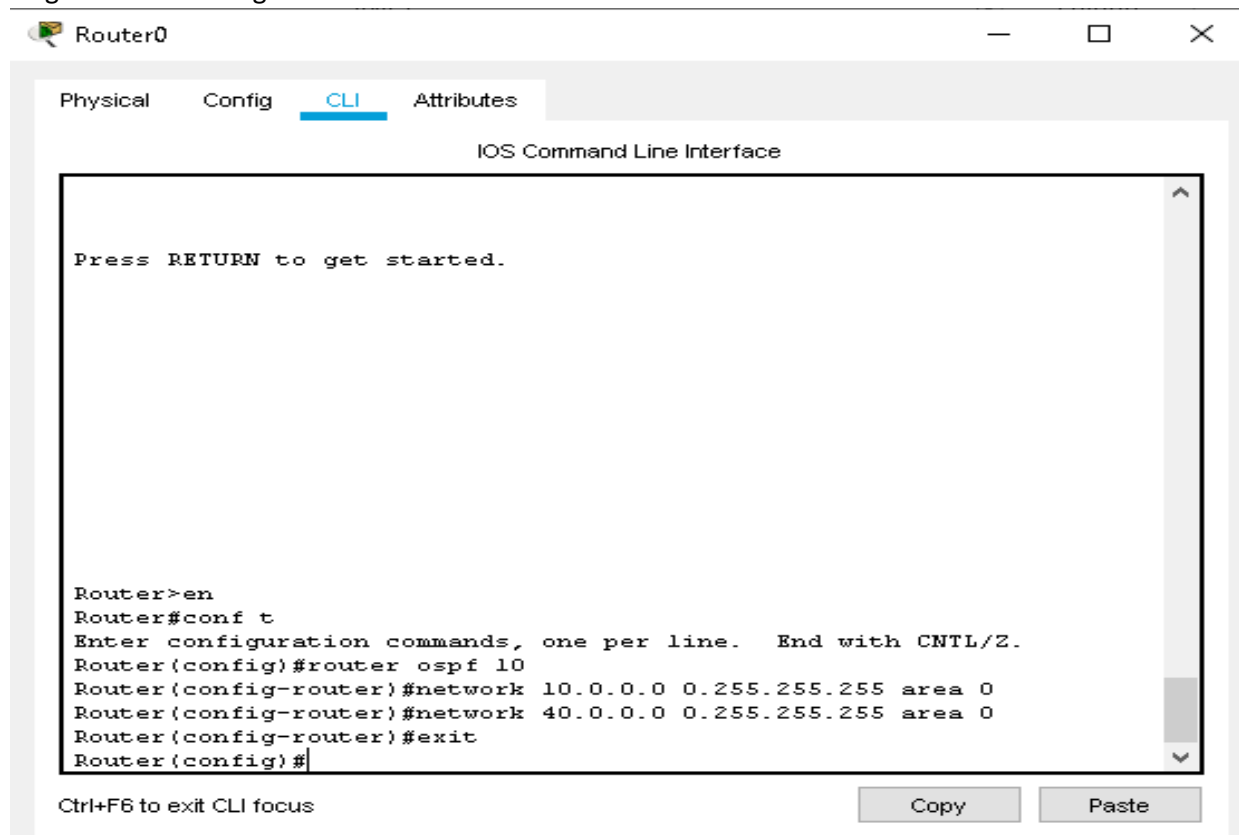
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	Router0	Router1	ICMP	Cyan	0.000	N	0	(edit)
	Successful	Router1	Router2	ICMP	Magenta	0.000	N	1	(edit)

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Failed	PC0	PC3	ICMP	Blue	0.000	N	0	(edit)
	Failed	PC3	PC6	ICMP	Blue	0.000	N	1	(edit)
	Failed	PC8	PC2	ICMP	Magenta	0.000	N	2	(edit)

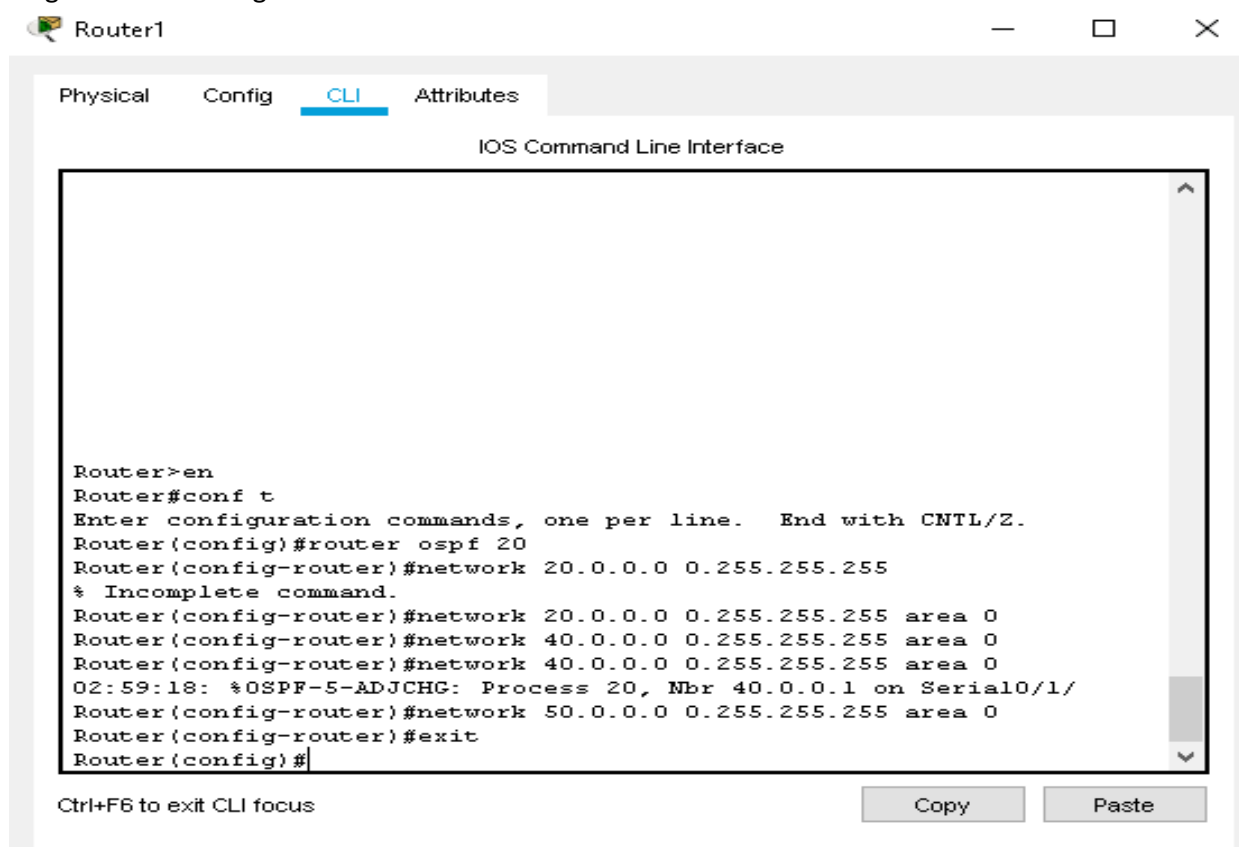
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Failed	Router0	Router2	ICMP	Green	0.000	N	0	(edit)



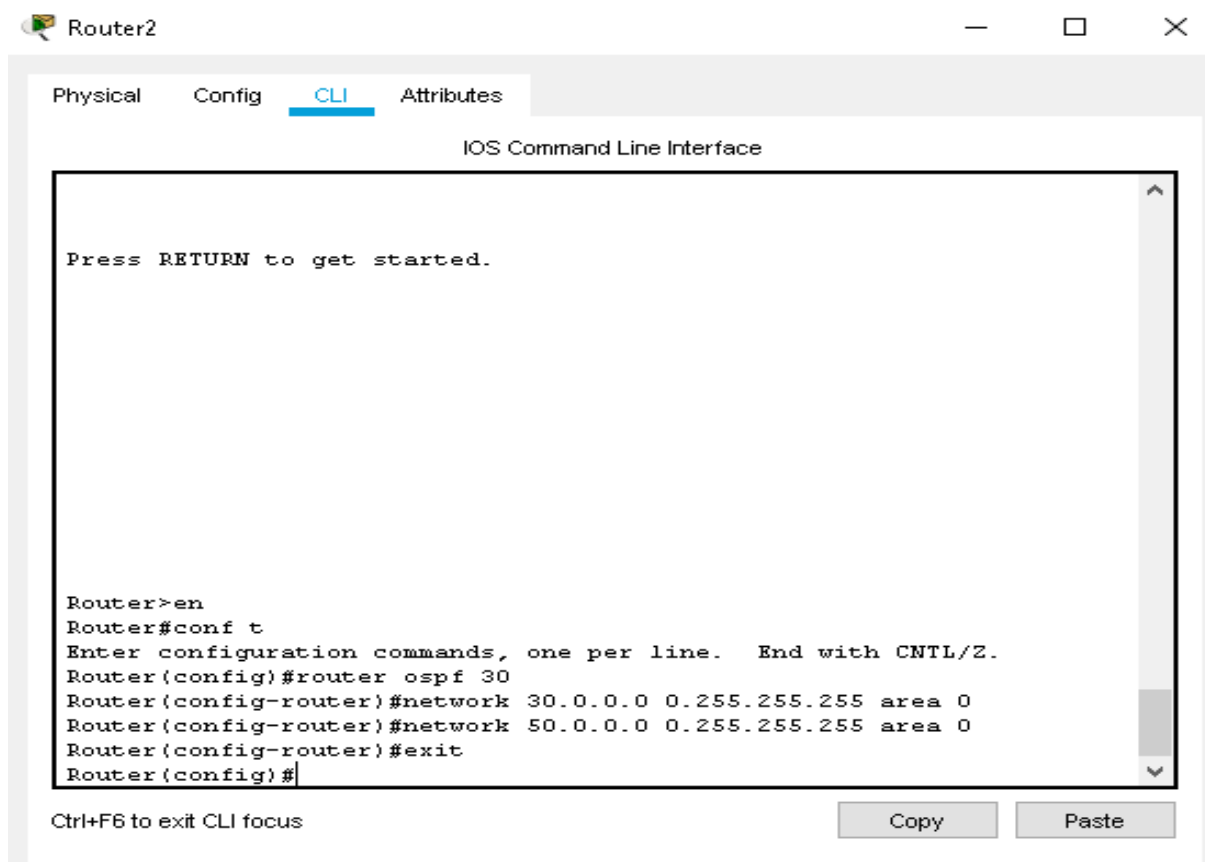
12. Configure OSPF Routing in Router0 as follows:



13. Configure OSPF Routing in Router 1 as follows:



14. Configure OSPF Routing in Router 2 as follows;



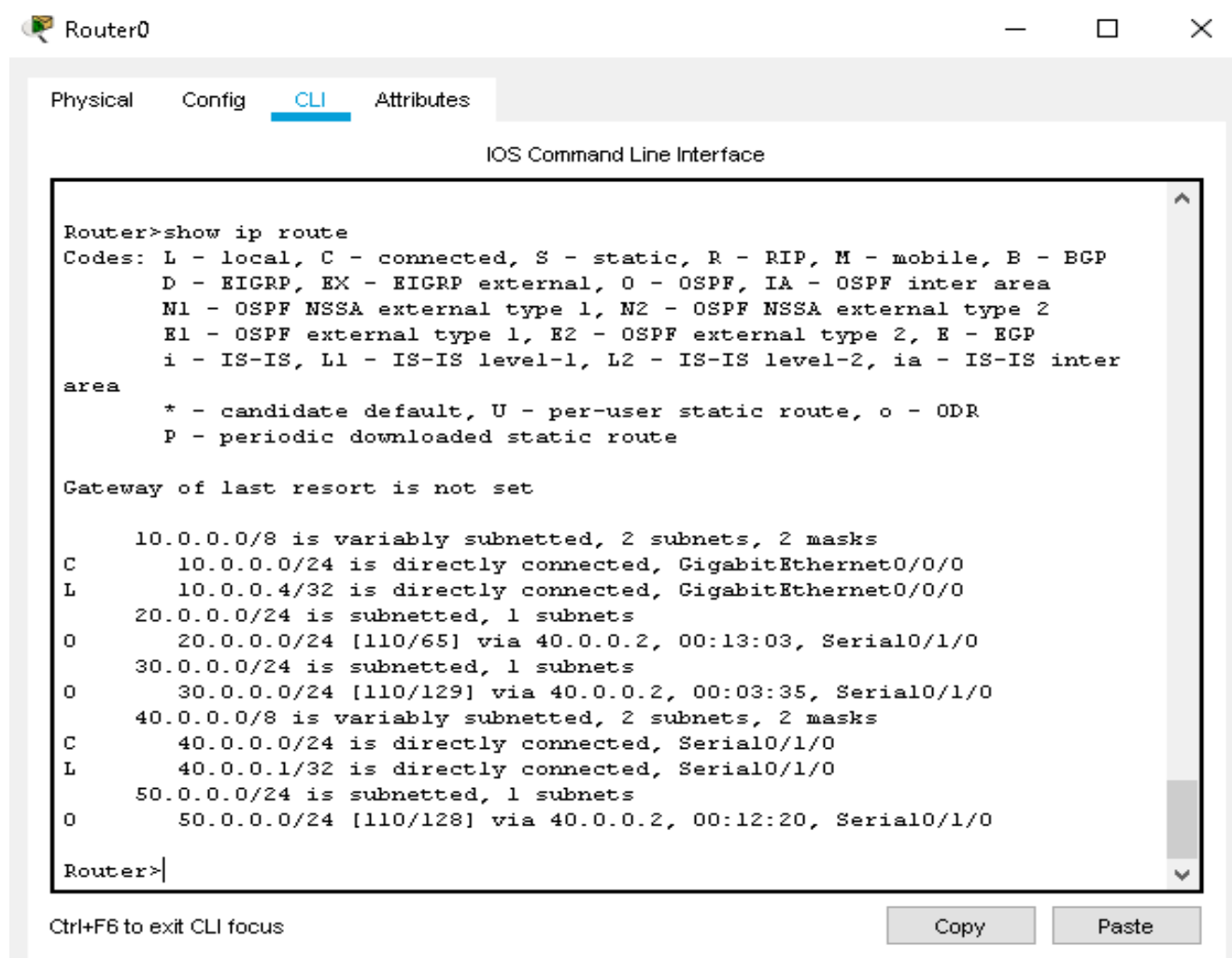
15. After successful OSPF configuration, send packets over the inter-connected network :

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	PC0	PC3	ICMP		0.000	N	0	(edit)
	Failed	PC0	PC6	ICMP		0.000	N	1	(edit)
	Successful	PC0	PC6	ICMP		0.000	N	2	(edit)

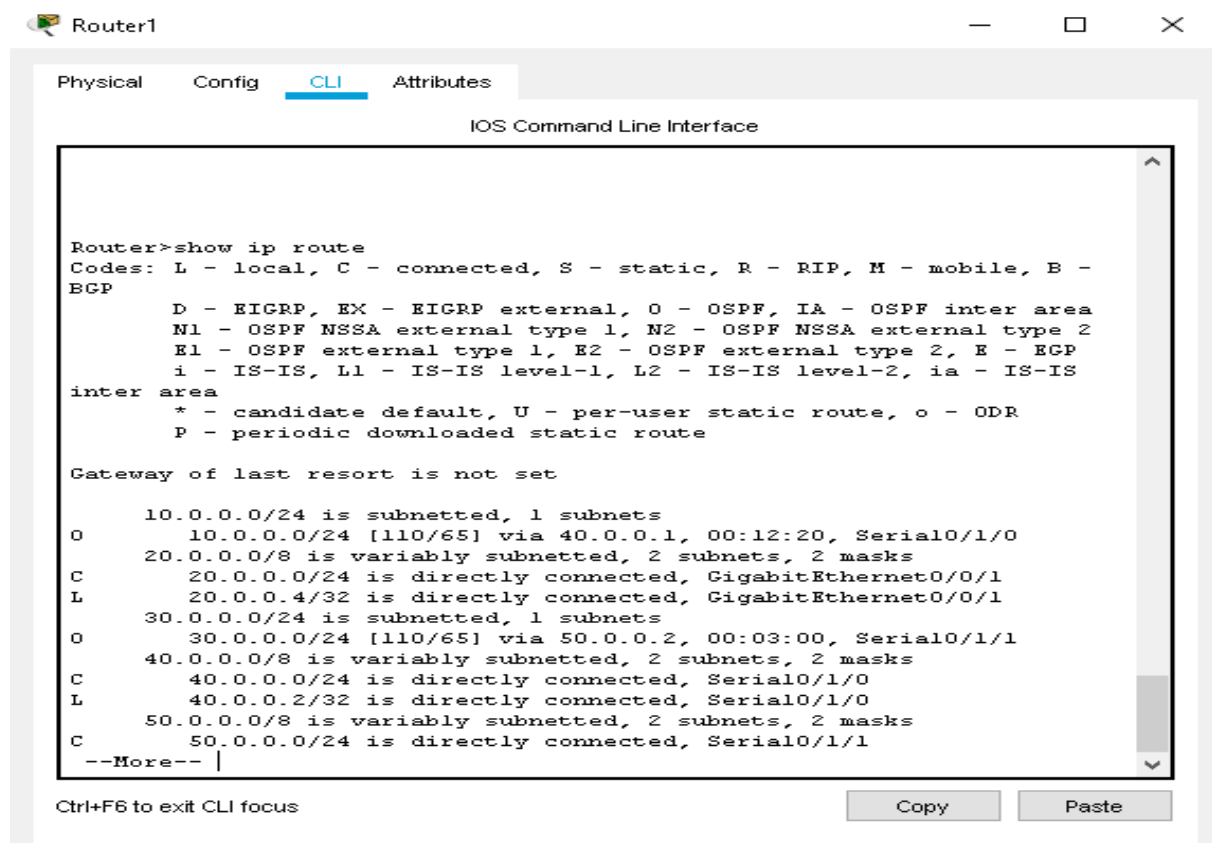
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	Router0	Router2	ICMP		0.000	N	0	(edit)
	Successful	Router1	Router0	ICMP		0.000	N	1	(edit)
	Successful	Router2	Router0	ICMP		0.000	N	2	(edit)

16. Finally, in every Router's CLI, type 'show ip route' to get the connection details:

ROUTER 0



## ROUTER 1



Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
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

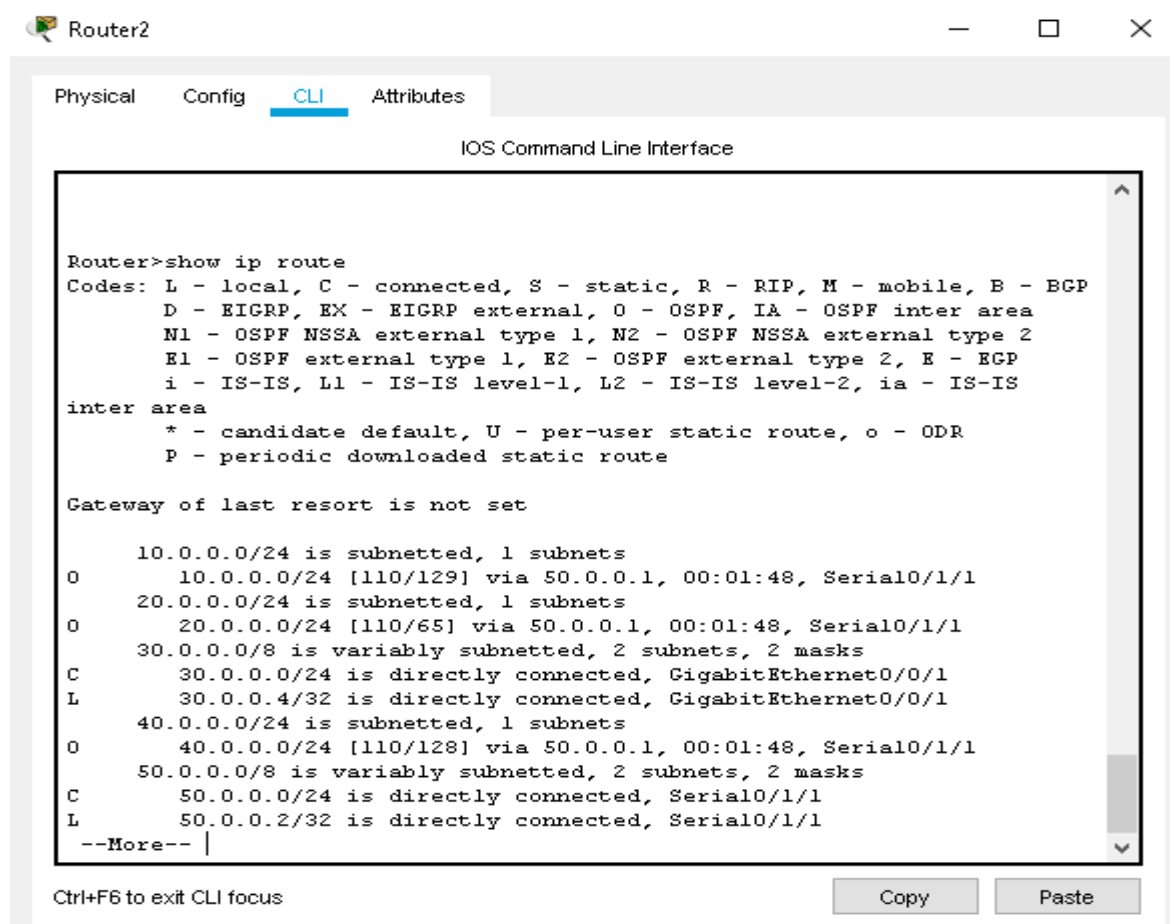
Gateway of last resort is not set

  10.0.0.0/24 is subnetted, 1 subnets
O    10.0.0.0/24 [110/65] via 40.0.0.1, 00:12:20, Serial0/1/0
  20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    20.0.0.0/24 is directly connected, GigabitEthernet0/0/1
L    20.0.0.4/32 is directly connected, GigabitEthernet0/0/1
  30.0.0.0/24 is subnetted, 1 subnets
O    30.0.0.0/24 [110/65] via 50.0.0.2, 00:03:00, Serial0/1/1
  40.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    40.0.0.0/24 is directly connected, Serial0/1/0
L    40.0.0.2/32 is directly connected, Serial0/1/0
  50.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    50.0.0.0/24 is directly connected, Serial0/1/1
--More--
```

Ctrl+F6 to exit CLI focus

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## ROUTER 2



Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
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

  10.0.0.0/24 is subnetted, 1 subnets
O    10.0.0.0/24 [110/129] via 50.0.0.1, 00:01:48, Serial0/1/1
  20.0.0.0/24 is subnetted, 1 subnets
O    20.0.0.0/24 [110/65] via 50.0.0.1, 00:01:48, Serial0/1/1
  30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    30.0.0.0/24 is directly connected, GigabitEthernet0/0/1
L    30.0.0.4/32 is directly connected, GigabitEthernet0/0/1
  40.0.0.0/24 is subnetted, 1 subnets
O    40.0.0.0/24 [110/128] via 50.0.0.1, 00:01:48, Serial0/1/1
  50.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    50.0.0.0/24 is directly connected, Serial0/1/1
L    50.0.0.2/32 is directly connected, Serial0/1/1
--More--
```

Ctrl+F6 to exit CLI focus

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