Institute of Computer Technology

B. Tech Computer Science and Engineering

Sub: Computer Networks

Course Code:-2CSE502

Sem-V(CS)

Class:-A

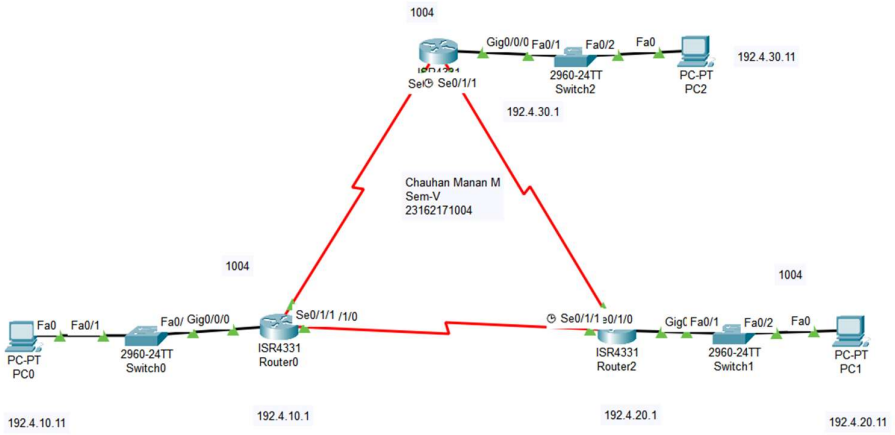
Practical:10

Aim: To design a network using Border Gateway Protocol (BGP).

Scenario:

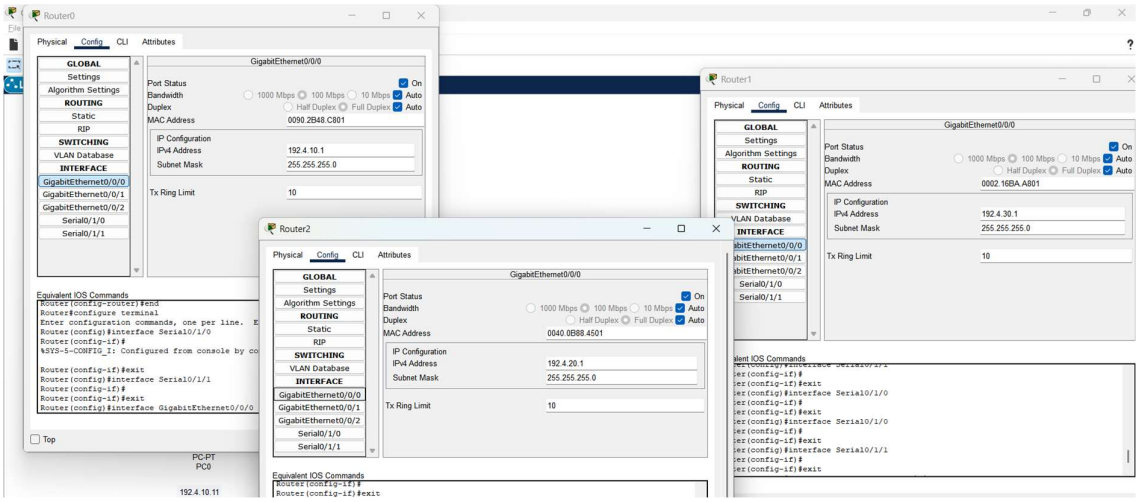
Consider that organization has three departments and as routing protocol Border Gateway Protocol (BGP) is to be implemented. Configure network as shown in figure below and implement Border Gateway Protocol (BGP).Procedure:

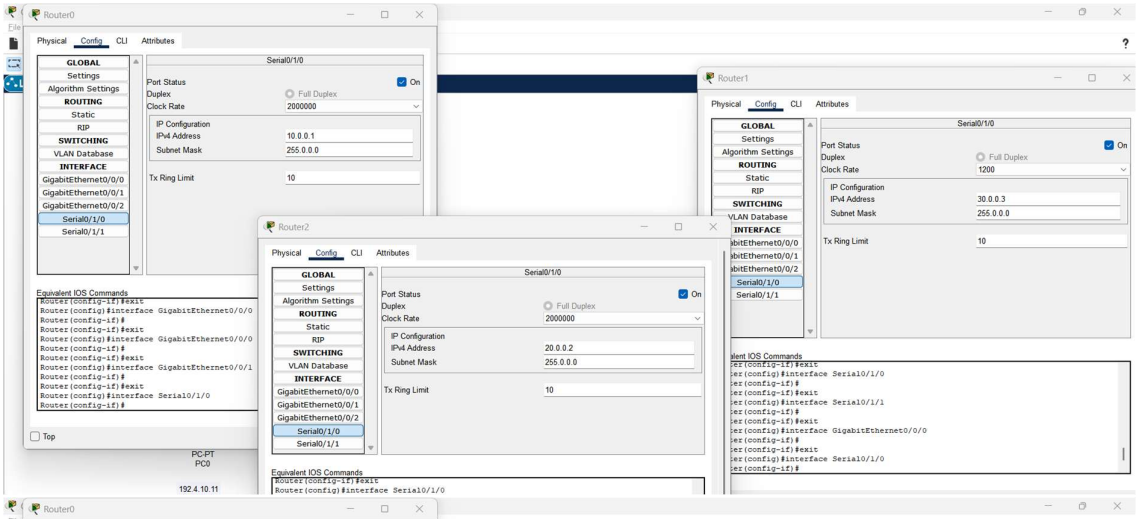
1) Create network as given below:-

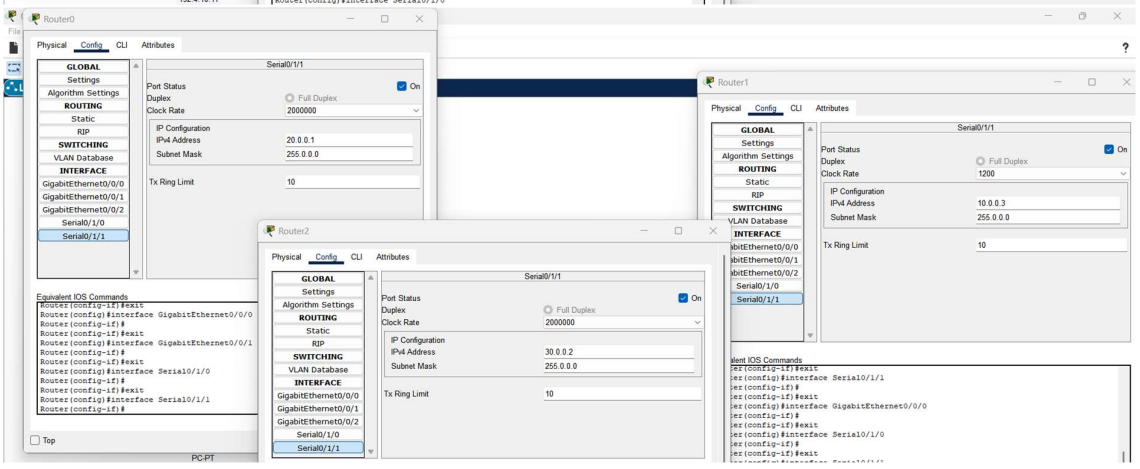


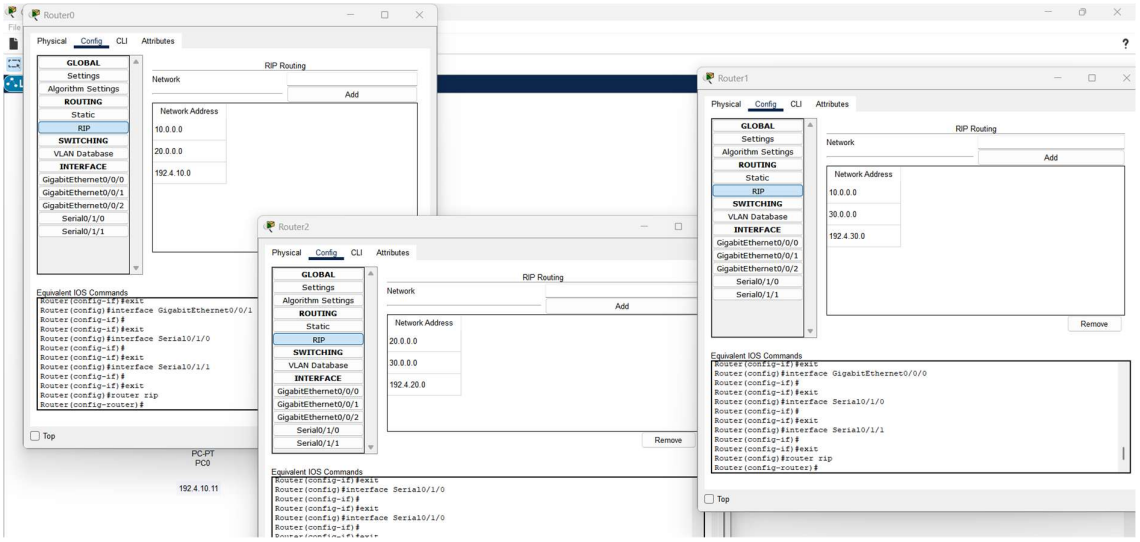
2) Configure IP address (All Devices, Routers)

Routers:-

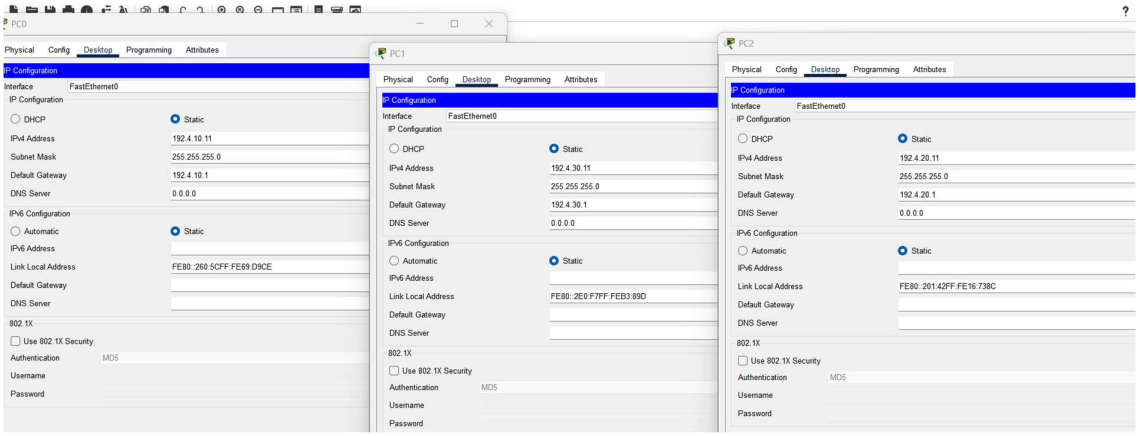








PC's Configuration:-



3) Configure EIGRP

Router 0

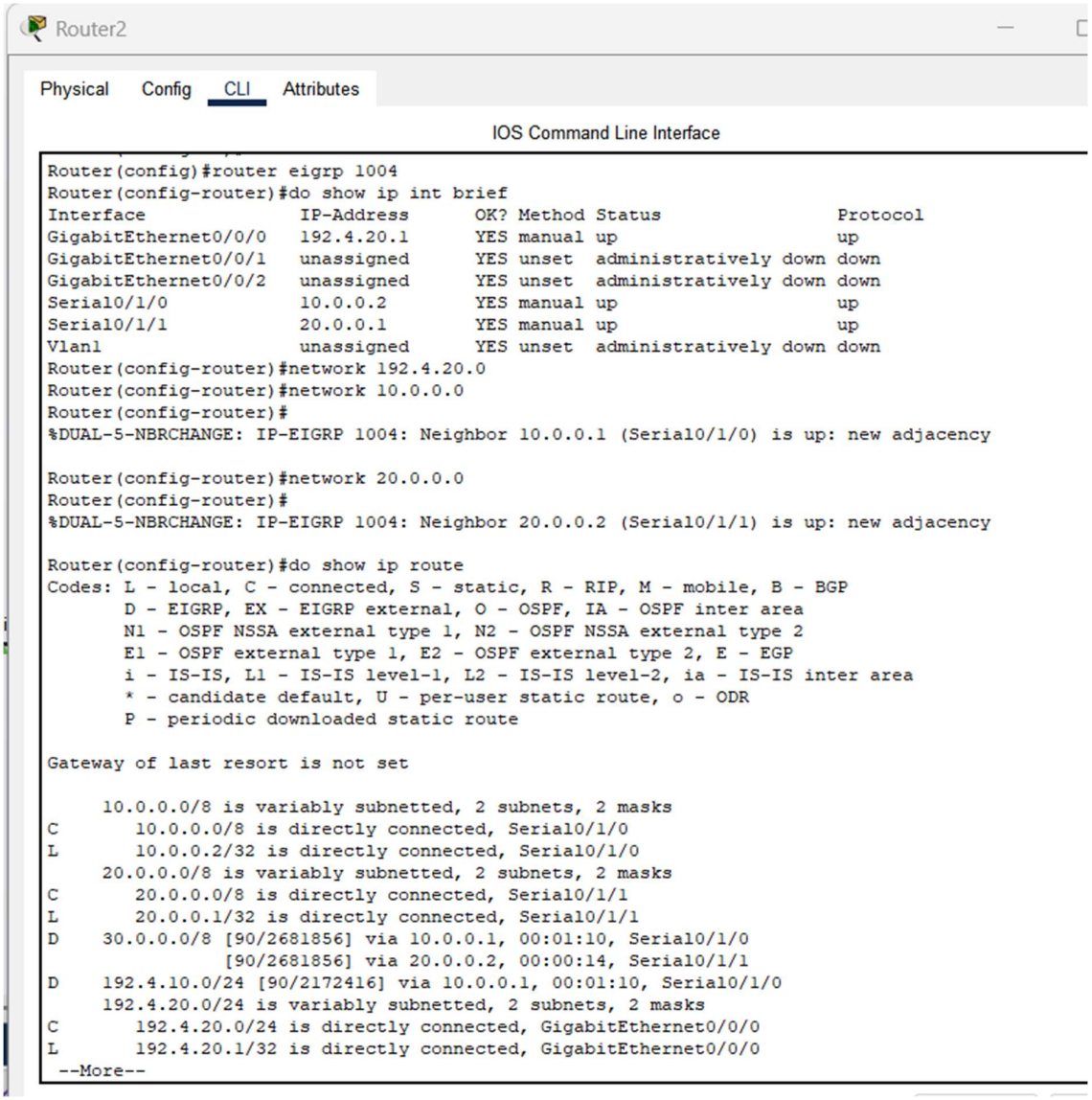
Router0

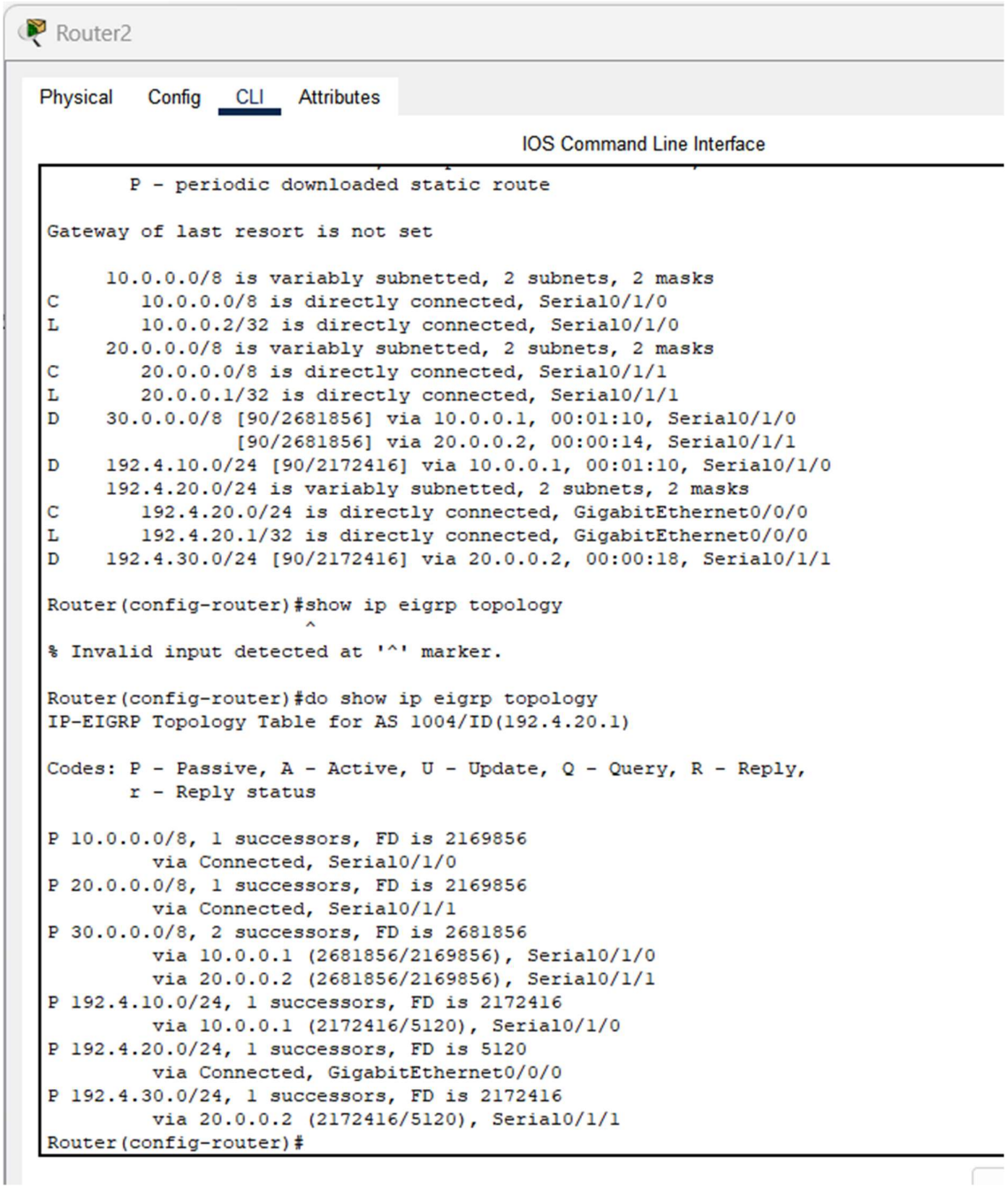
Physical Config CLI Attributes

IOS Command Line Interface

```
       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, 2 subnets, 2 masks
C       10.0.0.0/8 is directly connected, Serial0/1/0
L       10.0.0.1/32 is directly connected, Serial0/1/0
D    20.0.0.0/8 [90/2681856] via 10.0.0.2, 00:01:15, Serial0/1/0
                [90/2681856] via 30.0.0.1, 00:00:25, Serial0/1/1
     30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       30.0.0.0/8 is directly connected, Serial0/1/1
L       30.0.0.2/32 is directly connected, Serial0/1/1
     192.4.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.4.10.0/24 is directly connected, GigabitEthernet0/0/0
L       192.4.10.1/32 is directly connected, GigabitEthernet0/0/0
D    192.4.20.0/24 [90/2172416] via 10.0.0.2, 00:01:21, Serial0/1/0
D    192.4.30.0/24 [90/2172416] via 30.0.0.1, 00:00:25, Serial0/1/1

Router(config-router)#do show ip eigrp topology
IP-EIGRP Topology Table for AS 1004/ID(192.4.10.1)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - Reply status

P 10.0.0.0/8, 1 successors, FD is 2169856
         via Connected, Serial0/1/0
P 20.0.0.0/8, 2 successors, FD is 2681856
         via 10.0.0.2 (2681856/2169856), Serial0/1/0
         via 30.0.0.1 (2681856/2169856), Serial0/1/1
P 30.0.0.0/8, 1 successors, FD is 2169856
         via Connected, Serial0/1/1
P 192.4.10.0/24, 1 successors, FD is 5120
         via Connected, GigabitEthernet0/0/0
P 192.4.20.0/24, 1 successors, FD is 2172416
         via 10.0.0.2 (2172416/5120), Serial0/1/0
P 192.4.30.0/24, 1 successors, FD is 2172416
         via 30.0.0.1 (2172416/5120), Serial0/1/1
Router(config-router)#
```

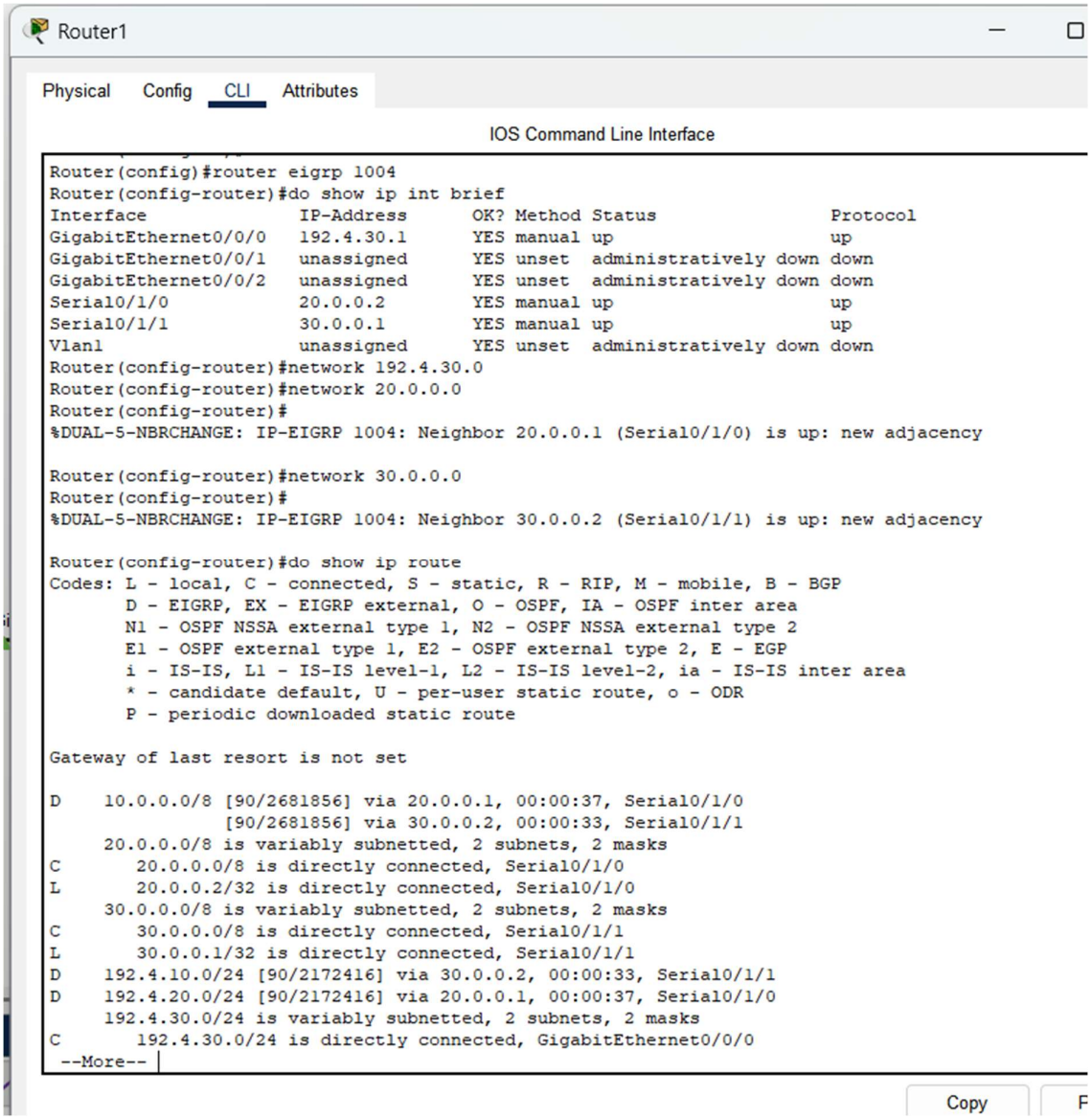
Router 2


Router2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router(config)#router eigrp 1004
Router(config-router)#do show ip int brief
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0/0 192.4.20.1 YES manual up up
GigabitEthernet0/0/1 unassigned YES unset administratively down down
GigabitEthernet0/0/2 unassigned YES unset administratively down down
Serial0/1/0 10.0.0.2 YES manual up up
Serial0/1/1 20.0.0.1 YES manual up up
Vlan1 unassigned YES unset administratively down down
Router(config-router)#network 192.4.20.0
Router(config-router)#network 10.0.0.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1004: Neighbor 10.0.0.1 (Serial0/1/0) is up: new adjacency
Router(config-router)#network 20.0.0.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1004: Neighbor 20.0.0.2 (Serial0/1/1) is up: new adjacency
Router(config-router)#do 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, 2 subnets, 2 masks
C 10.0.0.0/8 is directly connected, Serial0/1/0
L 10.0.0.2/32 is directly connected, Serial0/1/0
20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.0.0.0/8 is directly connected, Serial0/1/1
L 20.0.0.1/32 is directly connected, Serial0/1/1
D 30.0.0.0/8 [90/2681856] via 10.0.0.1, 00:01:10, Serial0/1/0
[90/2681856] via 20.0.0.2, 00:00:14, Serial0/1/1
D 192.4.10.0/24 [90/2172416] via 10.0.0.1, 00:01:10, Serial0/1/0
192.4.20.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.4.20.0/24 is directly connected, GigabitEthernet0/0/0
L 192.4.20.1/32 is directly connected, GigabitEthernet0/0/0
--More--




```
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/8 is directly connected, Serial0/1/0
L       10.0.0.2/32 is directly connected, Serial0/1/0
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       20.0.0.0/8 is directly connected, Serial0/1/1
L       20.0.0.1/32 is directly connected, Serial0/1/1
D    30.0.0.0/8 [90/2681856] via 10.0.0.1, 00:01:10, Serial0/1/0
                [90/2681856] via 20.0.0.2, 00:00:14, Serial0/1/1
D    192.4.10.0/24 [90/2172416] via 10.0.0.1, 00:01:10, Serial0/1/0
     192.4.20.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.4.20.0/24 is directly connected, GigabitEthernet0/0/0
L       192.4.20.1/32 is directly connected, GigabitEthernet0/0/0
D    192.4.30.0/24 [90/2172416] via 20.0.0.2, 00:00:18, Serial0/1/1

Router(config-router)#show ip eigrp topology
                     ^
% Invalid input detected at '^' marker.

Router(config-router)#do show ip eigrp topology
IP-EIGRP Topology Table for AS 1004/ID(192.4.20.1)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - Reply status

P 10.0.0.0/8, 1 successors, FD is 2169856
         via Connected, Serial0/1/0
P 20.0.0.0/8, 1 successors, FD is 2169856
         via Connected, Serial0/1/1
P 30.0.0.0/8, 2 successors, FD is 2681856
         via 10.0.0.1 (2681856/2169856), Serial0/1/0
         via 20.0.0.2 (2681856/2169856), Serial0/1/1
P 192.4.10.0/24, 1 successors, FD is 2172416
         via 10.0.0.1 (2172416/5120), Serial0/1/0
P 192.4.20.0/24, 1 successors, FD is 5120
         via Connected, GigabitEthernet0/0/0
P 192.4.30.0/24, 1 successors, FD is 2172416
         via 20.0.0.2 (2172416/5120), Serial0/1/1
Router(config-router)#
```

Router 1


Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router(config)#router eigrp 1004
Router(config-router)#do show ip int brief
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0/0 192.4.30.1 YES manual up up
GigabitEthernet0/0/1 unassigned YES unset administratively down down
GigabitEthernet0/0/2 unassigned YES unset administratively down down
Serial0/1/0 20.0.0.2 YES manual up up
Serial0/1/1 30.0.0.1 YES manual up up
Vlan1 unassigned YES unset administratively down down
Router(config-router)#network 192.4.30.0
Router(config-router)#network 20.0.0.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1004: Neighbor 20.0.0.1 (Serial0/1/0) is up: new adjacency
Router(config-router)#network 30.0.0.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1004: Neighbor 30.0.0.2 (Serial0/1/1) is up: new adjacency
Router(config-router)#do 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
D 10.0.0.0/8 [90/2681856] via 20.0.0.1, 00:00:37, Serial0/1/0
[90/2681856] via 30.0.0.2, 00:00:33, Serial0/1/1
20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.0.0.0/8 is directly connected, Serial0/1/0
L 20.0.0.2/32 is directly connected, Serial0/1/0
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, Serial0/1/1
L 30.0.0.1/32 is directly connected, Serial0/1/1
D 192.4.10.0/24 [90/2172416] via 30.0.0.2, 00:00:33, Serial0/1/1
D 192.4.20.0/24 [90/2172416] via 20.0.0.1, 00:00:37, Serial0/1/0
192.4.30.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.4.30.0/24 is directly connected, GigabitEthernet0/0/0
--More--
Copy

Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
D    10.0.0.0/8 [90/2681856] via 20.0.0.1, 00:00:37, Serial0/1/0
                [90/2681856] via 30.0.0.2, 00:00:33, Serial0/1/1
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       20.0.0.0/8 is directly connected, Serial0/1/0
L       20.0.0.2/32 is directly connected, Serial0/1/0
     30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       30.0.0.0/8 is directly connected, Serial0/1/1
L       30.0.0.1/32 is directly connected, Serial0/1/1
D    192.4.10.0/24 [90/2172416] via 30.0.0.2, 00:00:33, Serial0/1/1
D    192.4.20.0/24 [90/2172416] via 20.0.0.1, 00:00:37, Serial0/1/0
     192.4.30.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.4.30.0/24 is directly connected, GigabitEthernet0/0/0
L       192.4.30.1/32 is directly connected, GigabitEthernet0/0/0

Router(config-router)#show ip eigrp topology
                     ^
% Invalid input detected at '^' marker.

Router(config-router)#doshow ip eigrp topology
                      ^
% Invalid input detected at '^' marker.

Router(config-router)#do show ip eigrp topology
IP-EIGRP Topology Table for AS 1004/ID(192.4.30.1)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - Reply status

P 10.0.0.0/8, 2 successors, FD is 2681856
         via 20.0.0.1 (2681856/2169856), Serial0/1/0
         via 30.0.0.2 (2681856/2169856), Serial0/1/1
P 20.0.0.0/8, 1 successors, FD is 2169856
         via Connected, Serial0/1/0
P 30.0.0.0/8, 1 successors, FD is 2169856
         via Connected, Serial0/1/1
P 192.4.10.0/24, 1 successors, FD is 2172416
         via 30.0.0.2 (2172416/5120), Serial0/1/1
P 192.4.20.0/24, 1 successors, FD is 2172416
         via 20.0.0.1 (2172416/5120), Serial0/1/0
P 192.4.30.0/24, 1 successors, FD is 5120
         via Connected, GigabitEthernet0/0/0
Router(config-router)#
```

Conclusion:-