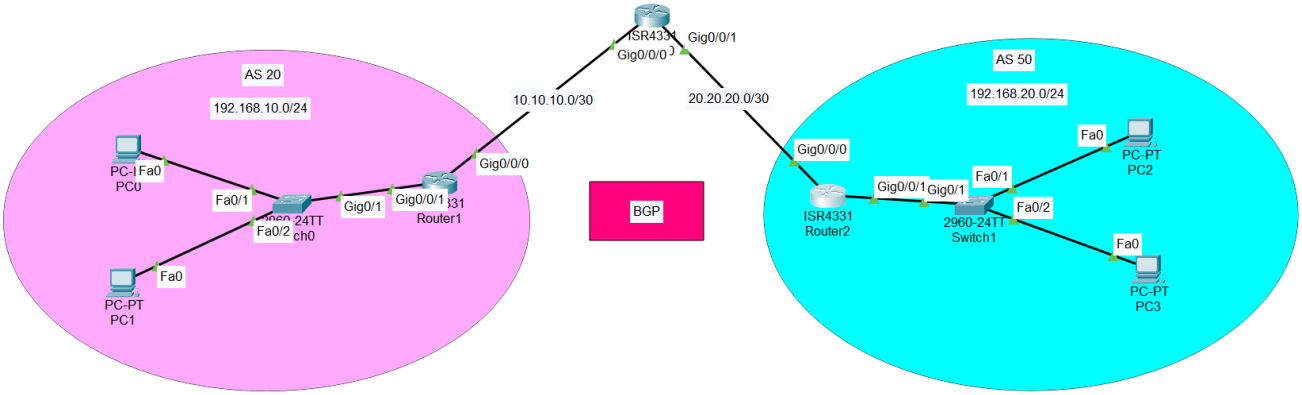
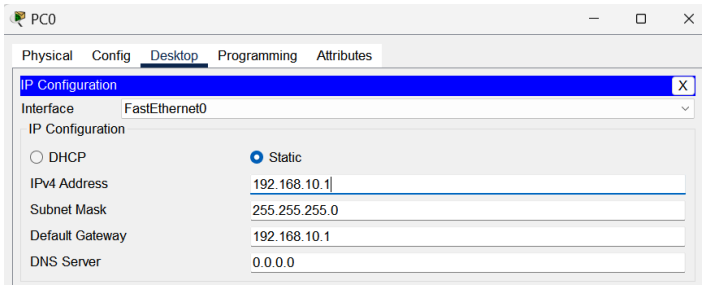
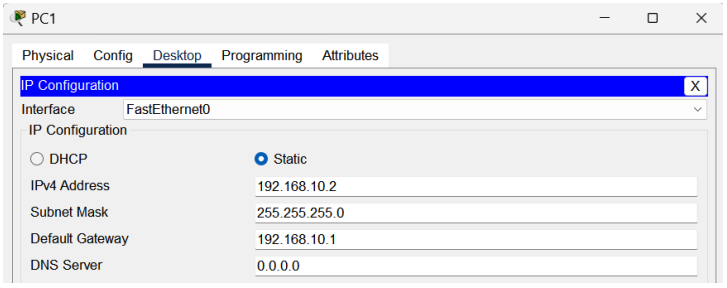
Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Computer Networks (01CT0503)	**Aim: Design WAN as per the given scenario and get the connectivity between all PCs using BGP.**	
Experiment No: 08	**Date: 08-10-2025**	**Enrolment No: 92301733024**

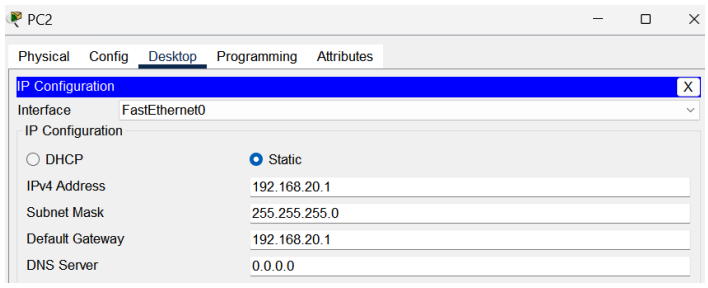
Step – 1:- Open the Cisco Packet tracer and take three routers, two switch and four PC's.Connect r-r Using copper straight-through cable(gigabitethernet), Connect r-sw Using copper straight-through cable(gigabitethernet, Connect sw-pc Using copper straight-through cable(Fastethernet).

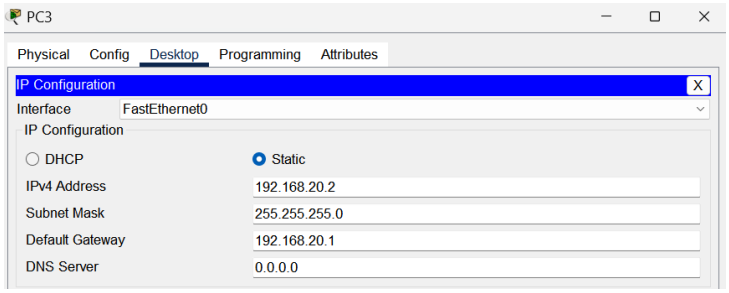


Step – 2:- Now assign the IP address And Subnet mask and Gateway to all PC's.









Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Computer Networks (01CT0503)	**Aim: Design WAN as per the given scenario and get the connectivity between all PCs using BGP.**	
Experiment No: 08	**Date: 08-10-2025**	**Enrolment No: 92301733024**

Step – 3 :- Assign IP Address to Routers

Router – 0 :-

```
Router>
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Gig0/0/0
Router(config-if)#ip address 10.10.10.2 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

Router(config-if)#exit
Router(config)#interface Gig0/0/1
Router(config-if)#ip address 20.20.20.1 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

Router(config-if)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Router – 1 :-

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#10.10.10.1 255.255.255.252
               ^
% Invalid input detected at '^' marker.

Router(config)#interface Gig0/0/0
Router(config-if)#ip address 10.10.10.1 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

Router(config-if)#exit
Router(config)#interface Giga0/0/1
Router(config-if)#ip address 192.168.10.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

Router(config-if)#exit
Router(config)#
```

Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Computer Networks (01CT0503)	**Aim: Design WAN as per the given scenario and get the connectivity between all PCs using BGP.**	
Experiment No: 08	**Date: 08-10-2025**	**Enrolment No: 92301733024**

Router – 2 :-

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Gig0/0/0
Router(config-if)#ip address 20.20.20.2 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

Router(config-if)#exit
Router(config)#interface Gig0/0/1
Router(config-if)#ip address 192.168.20.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

Router(config-if)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step – 4 :- now we will configure router for BGPP Protocol.

Router – 1

enable
configure terminal
router bgp 20
bgp router-id 1.1.1.1
neighbor 10.10.10.2 remote-as 35
network 192.168.10.0 mask 255.255.255.0
network 10.10.10.0 mask 255.255.255.252
exit
end

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router bgp 20
Router(config-router)#bgp router-id 1.1.1.1
Router(config-router)#neighbor 10.10.10.2 remote-as 35
Router(config-router)#%BGP-5-ADJCHANGE: neighbor 10.10.10.2 Up

Router(config-router)#network 192.168.10.0 mask 255.255.255.0
Router(config-router)#network 10.10.10.0 mask 255.255.255.252
Router(config-router)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Computer Networks (01CT0503)	**Aim: Design WAN as per the given scenario and get the connectivity between all PCs using BGP.**	
Experiment No: 08	**Date: 08-10-2025**	**Enrolment No: 92301733024**

Router – 0 :-

```
enable
  configure terminal
  router bgp 35
  bgp router-id 3.3.3.3
  neighbor 10.10.10.1 remote-as 20
  neighbor 20.20.20.2 remote-as 50
  network 10.10.10.0 mask 255.255.255.252
  network 20.20.20.0 mask 255.255.255.252
  exit
  end
```

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router bgp 35
Router(config-router)#bgp router-id 3.3.3.3
Router(config-router)#neighbor 10.10.10.1 remote-as 20
Router(config-router)#neighbor 20.20.20.2 remote-as 50
Router(config-router)#%BGP-5-ADJCHANGE: neighbor 20.20.20.2 Up

Router(config-router)#network 10.10.10.0 mask 255.255.255.252
Router(config-router)#network 20.20.20.0 mask 255.255.255.252
Router(config-router)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Router-2 :-

```
  enable
  configure terminal
  router bgp 50
  bgp router-id 2.2.2.2
  neighbor 20.20.20.1 remote-as 35
  network 192.168.20.0 mask 255.255.255.0
  network 20.20.20.0 mask 255.255.255.252
  exit
  end
```

Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Computer Networks (01CT0503)	**Aim: Design WAN as per the given scenario and get the connectivity between all PCs using BGP.**	
Experiment No: 08	**Date: 08-10-2025**	**Enrolment No: 92301733024**

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router bgp 50
Router(config-router)#bgp router-id 2.2.2.2
Router(config-router)#neighbor 20.20.20.1 remote-as 35
Router(config-router)#network 192.168.20.0 mask 255.255.255.0
Router(config-router)#network 20.20.20.0 mask 255.255.255.252
Router(config-router)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Step – 5 :- now we will check the BGP Neighbour using the command **show ip bgp neighbor**

Router-0 :-

```
Router#show ip bgp neighbors
BGP neighbor is 10.10.10.1,  remote AS 20, external link
  BGP version 4, remote router ID 1.1.1.1
  BGP state = Established, up for 00:04:49
  Last read 00:04:49, last write 00:04:49, hold time is 180, keepalive interval is 60 seconds
  Neighbor capabilities:
    Route refresh: advertised and received(new)
    Address family IPv4 Unicast: advertised and received
  Message statistics:
    InQ depth is 0
    OutQ depth is 0

                         Sent       Rcvd
    Opens:                  1          1
    Notifications:          0          0
    Updates:                5          3
    Keepalives:             5          5
    Route Refresh:          0          1
    Total:                 11         10
  Default minimum time between advertisements runs is 30 seconds

 For address family: IPv4 Unicast
  BGP table version 7, neighbor version 6/0
 --More--
```

Router-1 :-

```
Router#show ip bgp neighbors
BGP neighbor is 10.10.10.2,  remote AS 35, external link
  BGP version 4, remote router ID 3.3.3.3
  BGP state = Established, up for 00:02:59
  Last read 00:02:59, last write 00:02:59, hold time is 180, keepalive interval is 60 seconds
  Neighbor capabilities:
    Route refresh: advertised and received(new)
    Address family IPv4 Unicast: advertised and received
  Message statistics:
    InQ depth is 0
    OutQ depth is 0

                         Sent       Rcvd
    Opens:                  1          1
    Notifications:          0          0
    Updates:                3          5
    Keepalives:             3          3
    Route Refresh:          0          2
    Total:                  7         11
  Default minimum time between advertisements runs is 30 seconds

 For address family: IPv4 Unicast
  BGP table version 6, neighbor version 6/0
 --More--
```

Router-2 :-

```
Router#show ip bgp neighbors
BGP neighbor is 20.20.20.1,  remote AS 35, external link
  BGP version 4, remote router ID 3.3.3.3
  BGP state = Established, up for 00:09:31
  Last read 00:09:31, last write 00:09:31, hold time is 180, keepalive interval is 60 seconds
  Neighbor capabilities:
    Route refresh: advertised and received(new)
    Address family IPv4 Unicast: advertised and received
  Message statistics:
    InQ depth is 0
    OutQ depth is 0

                         Sent       Rcvd
    Opens:                  1          1
    Notifications:          0          0
    Updates:                3          5
    Keepalives:            10         10
    Route Refresh:          0          2
    Total:                 14         18
  Default minimum time between advertisements runs is 30 seconds

 For address family: IPv4 Unicast
  BGP table version 6, neighbor version 6/0
 --More-- |
```

Step – 6 :- now we will check summary of bgp using the command **show ip bgp summary**

Router-0 :-

```
Router#show ip bgp summary
BGP router identifier 3.3.3.3, local AS number 35
BGP table version is 7, main routing table version 6
6 network entries using 792 bytes of memory
6 path entries using 312 bytes of memory
4/2 BGP path/bestpath attribute entries using 552 bytes of memory
3 BGP AS-PATH entries using 72 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
Bitfield cache entries: current 1 (at peak 1) using 32 bytes of memory
BGP using 1760 total bytes of memory
BGP activity 4/0 prefixes, 6/0 paths, scan interval 60 secs

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.10.10.1      4    20      16      13        7    0    0 00:11:24        4
20.20.20.2      4    50      19      16        7    0    0 00:14:18        4
```

Router-1 :-

```
Router#show ip bgp summary
BGP router identifier 1.1.1.1, local AS number 20
BGP table version is 6, main routing table version 6
5 network entries using 660 bytes of memory
5 path entries using 260 bytes of memory
3/2 BGP path/bestpath attribute entries using 460 bytes of memory
3 BGP AS-PATH entries using 72 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
Bitfield cache entries: current 1 (at peak 1) using 32 bytes of memory
BGP using 1484 total bytes of memory
BGP activity 4/0 prefixes, 5/0 paths, scan interval 60 secs

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.10.10.2      4    35      20      15        6    0    0 00:13:15        4
```

Router-2 :-

```
Router#show ip bgp summary
BGP router identifier 2.2.2.2, local AS number 50
BGP table version is 6, main routing table version 6
5 network entries using 660 bytes of memory
5 path entries using 260 bytes of memory
3/2 BGP path/bestpath attribute entries using 460 bytes of memory
3 BGP AS-PATH entries using 72 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
Bitfield cache entries: current 1 (at peak 1) using 32 bytes of memory
BGP using 1484 total bytes of memory
BGP activity 4/0 prefixes, 5/0 paths, scan interval 60 secs

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
20.20.20.1      4    35      18      13        6    0    0 00:11:07        4

Router#
```

Step – 7 :- now we will check bgp using the command **show ip bgp**

Router-0 :-

```
Router#show ip bgp
BGP table version is 7, local router ID is 3.3.3.3
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 10.10.10.0/30    0.0.0.0                  0     0 32768 i
*                   10.10.10.1               0     0     0 20 i
*  20.20.20.0/30    20.20.20.2               0     0     0 50 i
*>                  0.0.0.0                  0     0 32768 i
*> 192.168.10.0/24  10.10.10.1               0     0     0 20 i
*> 192.168.20.0/24  20.20.20.2               0     0     0 50 i

Router#
```

Router-1 :-

```
Router#show ip bgp
BGP table version is 6, local router ID is 1.1.1.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 10.10.10.0/30    0.0.0.0                  0     0 32768 i
*                   10.10.10.2               0     0     0 35 i
*> 20.20.20.0/30    10.10.10.2               0     0     0 35 i
*> 192.168.10.0/24  0.0.0.0                  0     0 32768 i
*> 192.168.20.0/24  10.10.10.2               0     0     0 35 50 i
```

Router-2 :-

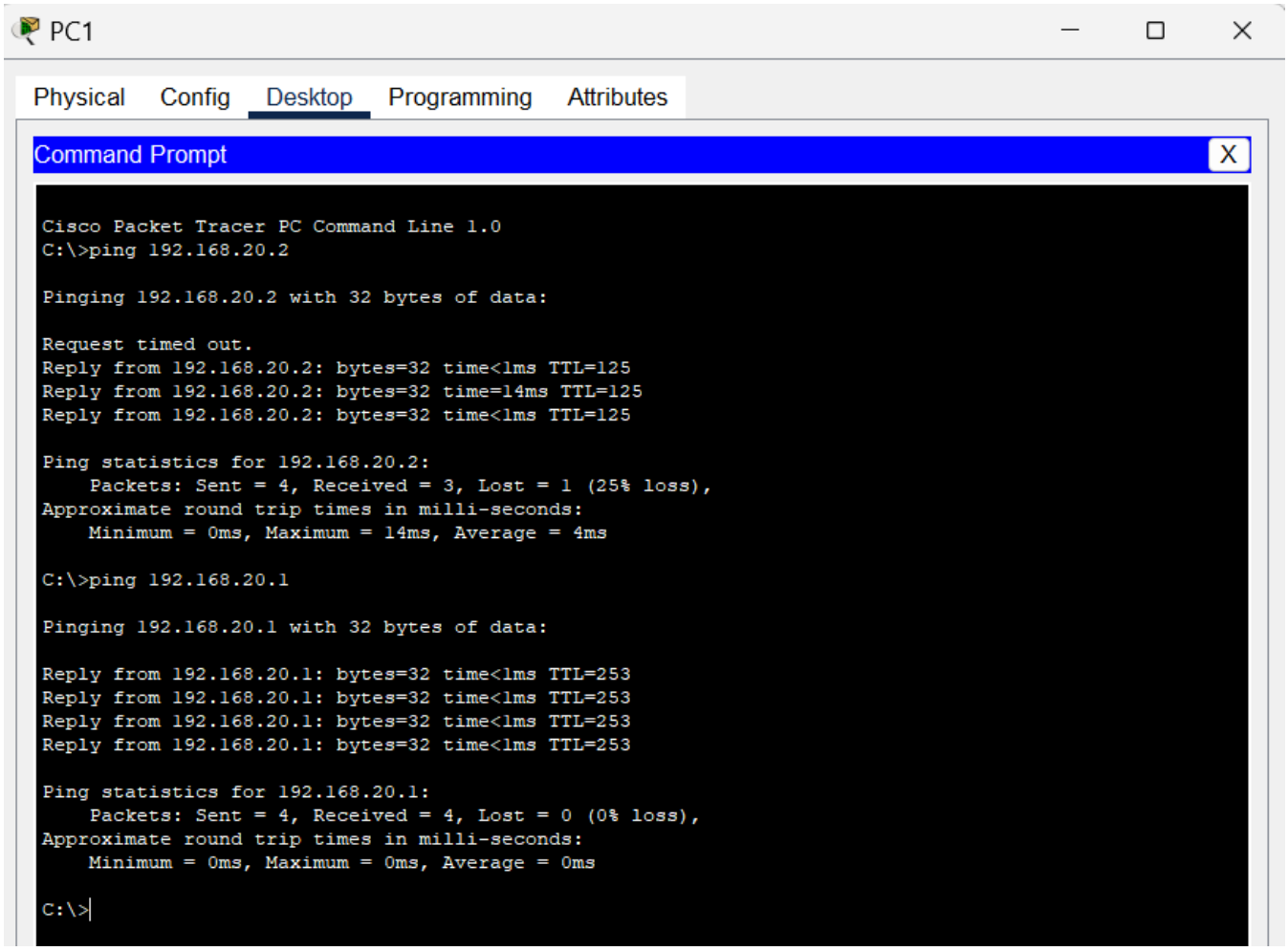
```
Router#show ip bgp
BGP table version is 6, local router ID is 2.2.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 10.10.10.0/30    20.20.20.1               0     0     0 35 i
*> 20.20.20.0/30    0.0.0.0                  0     0 32768 i
*                   20.20.20.1               0     0     0 35 i
*> 192.168.10.0/24  20.20.20.1               0     0     0 35 20 i
*> 192.168.20.0/24  0.0.0.0                  0     0 32768 i

Router#
```

Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Computer Networks (01CT0503)	**Aim: Design WAN as per the given scenario and get the connectivity between all PCs using BGP.**	
Experiment No: 08	**Date: 08-10-2025**	**Enrolment No: 92301733024**

Step – 8 :- now we will check the connection using the ping dest_ip command



Conclusion :-

In this experiment of BGP, we connected all PCs using BGP routers from three Autonomous Systems AS20, AS35, and AS50. Each router was assigned a unique router ID for identification. AS20 was connected to AS35 via 10.10.10.1, and AS35 was connected to AS50 via 20.20.20.1. I learned new commands such as bgp router-id to assign IDs, neighbor <ip> remote-as <AS> to define neighbors, network <ip> mask <mask> to advertise networks, and verification commands like show ip bgp neighbor and show ip bgp summary to check BGP connectivity and status.