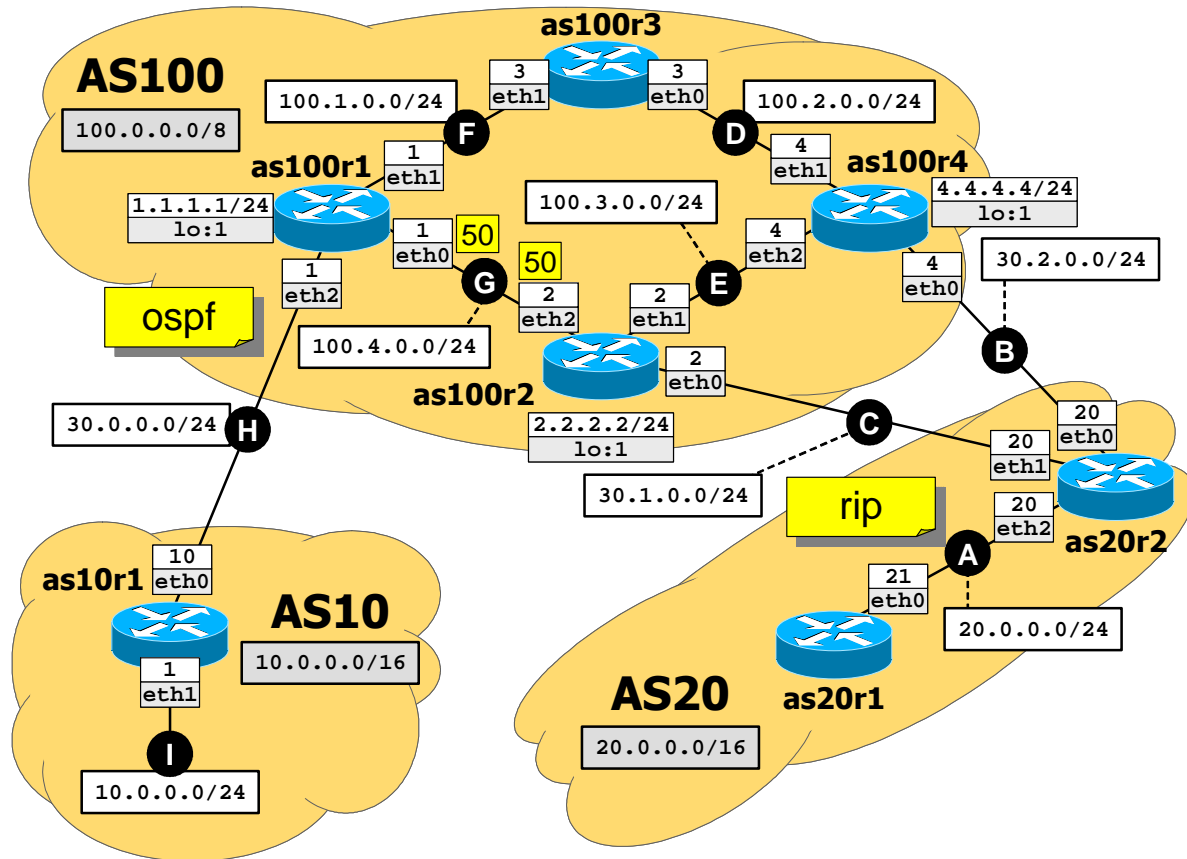**Available time: 90 minutes.**

Using Netkit, implement the network depicted in the figure and described below (you can use the following items as a checklist).
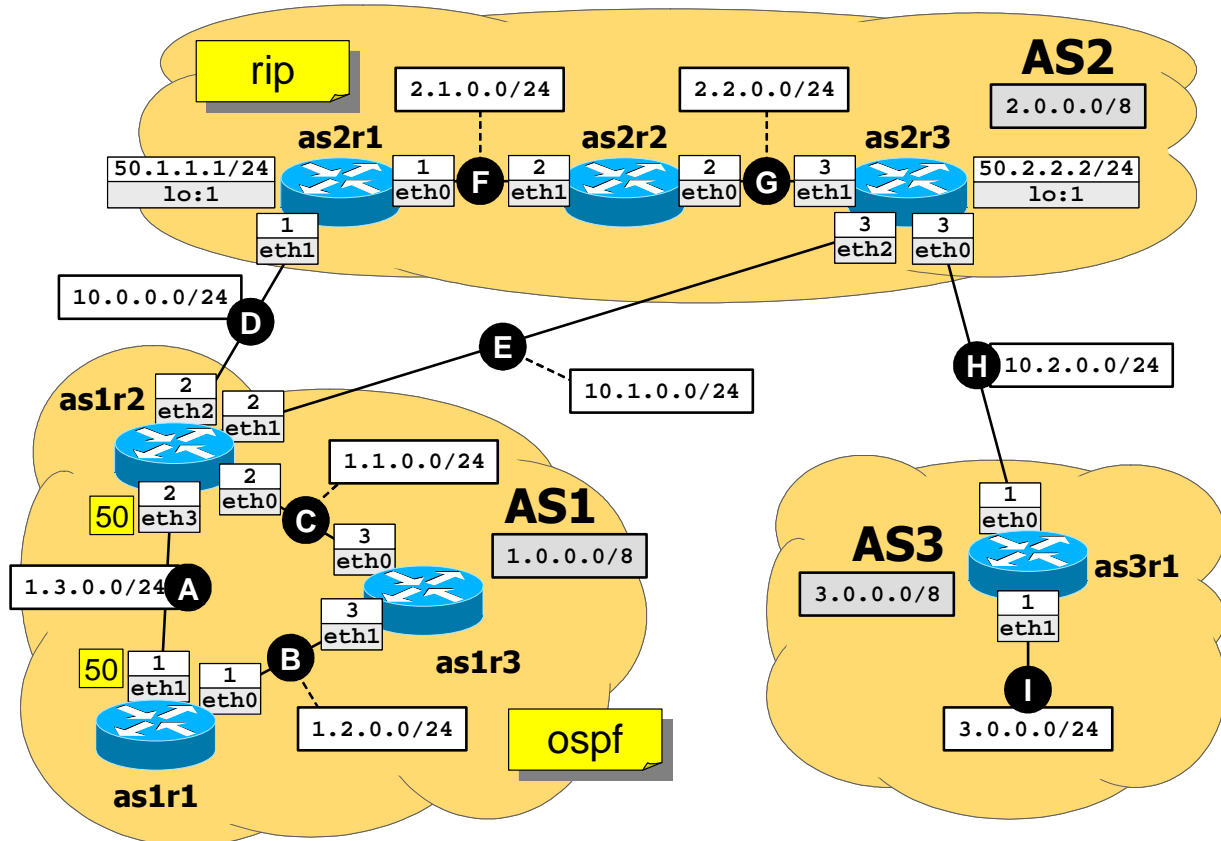
☐ Do not use static routes. No routers announce **0.0.0.0/0**, either in BGP or in RIP (no AS is customer/provider of any other AS).
☐ Routers **as100r1**, **as100r2**, and **as100r4** each have a loopback interface **lo:1**, with the specified IP address.
☐ Routing within **AS20** is implemented by using RIP.
☐ Routing within **AS100** is implemented by using OSPF (all interfaces belong to area **0.0.0.0**).
   ☐ Loopback interfaces are distribuited into OSPF.
   ☐ Interface costs are assigned as indicated.
   ☐ **as100r1**, **as100r2**, and **as100r4** are set up to redistribute eBGP in OSPF.
☐ BGP is configured with the following policies:
   ☐ All peering LANs, as well as the gray subnets, are announced in BGP.
   ☐ Border routers establish iBGP peerings, using loopback interfaces where available (remember to use **update-source**).
   ☐ **AS20** routers are configured to prefer link **C** for outgoing traffic from **AS20**.

> **USEFUL COMMANDS TO REDISTRIBUTE eBGP**
>
> ```
> redistribute bgp route-map myRM
> route-map myRM permit 10
>   match ip next-hop prefix-list myPL
> ip prefix-list myPL permit nextHop1/32
> ip prefix-list myPL permit nextHop2/32
> …
> ```

Goals:
- Every destination (IP address) must be reachable from any point in the network.
- Routing paths, especially between **AS10** and **AS20**, must be consistent with BGP policies and OSPF costs.

Available time: <u>90 minutes</u>.

rip

AS2

2.1.0.0/24   2.2.0.0/24   2.0.0.0/8

as2r1   as2r2   as2r3

50.1.1.1/24
lo:1

1   2   2   3
eth0 F eth1   eth0 G eth1

50.2.2.2/24
lo:1

1
eth1

3   3
eth2 eth0

10.0.0.0/24 D

E   10.1.0.0/24

H 10.2.0.0/24

as1r2

2
eth2   2
eth1

2
eth0 C   1.1.0.0/24

AS1

1.0.0.0/8

3
eth0

50 2
eth3

1.3.0.0/24 A

B   3
eth1   as1r3

1
eth0

AS3

3.0.0.0/8

1
eth0

as3r1

50 1
eth1

1
eth1

1.2.0.0/24   ospf

I

3.0.0.0/24

as1r1

Using Netkit, implement the network depicted in the figure and described below (you can use the following items as a checklist).

☐ <u>Do not use static routes</u>. <u>No routers announce **0.0.0.0/0**, either in BGP or in OSPF (no AS is customer/provider of any other AS)</u>.
☐ Routers **as2r1** and **as2r3** each have a loopback interface **lo:1**, with the specified IP address.
☐ Routing within **AS2** is implemented by using RIP.
    ☐ Loopback interfaces are distribuited into RIP.
    ☐ **as2r1** and **as2r3** are set up to redistribute <u>eBGP</u> in RIP.
☐ Routing within **AS1** is implemented by using OSPF (all interfaces belong to area **0.0.0.0**).
    ☐ Interface costs are assigned as indicated.
☐ BGP is configured with the following policies:
    ☐ All peering LANs, as well as the gray subnets, are announced in BGP.
    ☐ Border routers establish iBGP peerings, <u>using loopback interfaces</u> where available (remember to use **update-source**).
    ☐ **AS1** routers are configured to <u>prefer</u> link **D** for <u>outgoing traffic</u> from **AS1**.

**USEFUL COMMANDS TO REDISTRIBUTE EBGP**

```
redistribute bgp route-map myRM
route-map myRM permit 10
  match ip next-hop prefix-list myPL
ip prefix-list myPL permit nextHop1/32
ip prefix-list myPL permit nextHop2/32
…
```

Goals:
• Every destination (IP address) must be reachable from any point in the network.
• Routing paths, especially between **AS1** and **AS3**, must be consistent with BGP policies and OSPF costs.
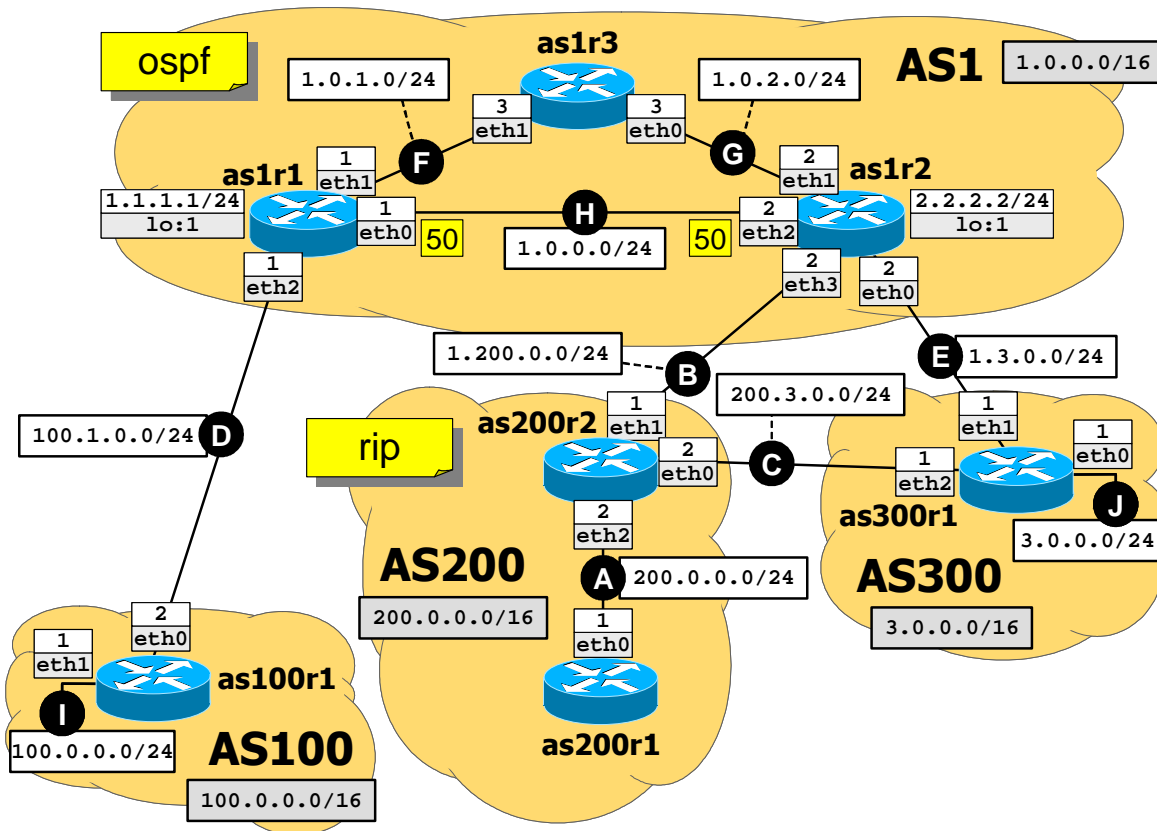
Available time: 90 minutes.

Using Netkit, implement the network depicted in the figure and described below (you can use the following items as a checklist).

☐ Do not use static routes. No routers announce **0.0.0.0/0**, either in BGP or in RIP (no AS is customer/provider of any other AS).
☐ Routers **as1r1** and **as1r2** each have a loopback interface **lo:1**, with the specified IP address.
☐ Routing within **AS200** is implemented by using RIP.
☐ Routing within **AS1** is implemented by using OSPF (all interfaces belong to area **0.0.0.0**).
　　☐ Loopback interfaces are distribuited into OSPF.
　　☐ Interface costs are assigned as indicated.
　　☐ **as1r1** and **as1r2** are set up to redistribute eBGP in OSPF.
☐ BGP is configured with the following policies:
　　☐ All peering LANs, as well as the gray subnets, are announced in BGP.
　　☐ Border routers establish iBGP peerings, using loopback interfaces where available (remember to use **update-source**).
　　☐ **AS200** routers are configured to prefer link **C** for outgoing traffic from **AS200**.

> **USEFUL COMMANDS TO REDISTRIBUTE EBGP**
>
> ```
> redistribute bgp route-map myRM
> route-map myRM permit 10
>   match ip next-hop prefix-list myPL
> ip prefix-list myPL permit nextHop1/32
> ip prefix-list myPL permit nextHop2/32
> …
> ```

Goals:
- Every destination (IP address) must be reachable from any point in the network.
- Routing paths, especially between **AS100** and **AS200**, must be consistent with BGP policies and OSPF costs.
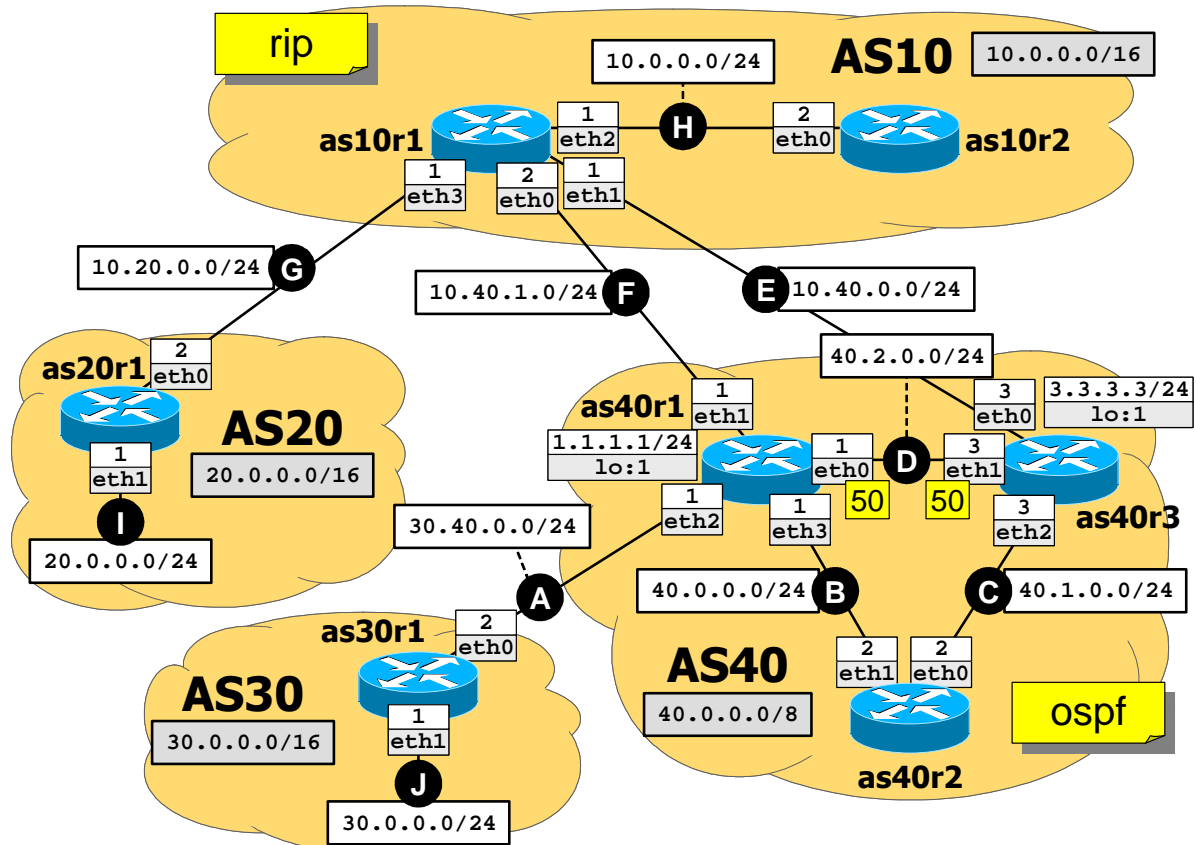
Available time: <u>90 minutes</u>.

Using Netkit, implement the network depicted in the figure and described below (you can use the following items as a checklist).

- ☐ <u>Do not use static routes</u>. <u>No routers announce **0.0.0.0/0**</u>, either in BGP or in RIP (no AS is customer/provider of any other AS).
- ☐ Routers **as40r1** and **as40r3** each have a loopback interface **lo:1**, with the specified IP address.
- ☐ Routing within **AS10** is implemented by using RIP.
- ☐ Routing within **AS40** is implemented by using OSPF (all interfaces belong to area **0.0.0.0**).
    - ☐ Loopback interfaces are distribuited into OSPF.
    - ☐ Interface costs are assigned as indicated.
    - ☐ **as40r1** and **as40r3** are set up to redistribute <u>eBGP</u> in OSPF.
- ☐ BGP is configured with the following policies:
    - ☐ All peering LANs, as well as the gray subnets, are announced in BGP.
    - ☐ Border routers establish iBGP peerings, <u>using loopback interfaces</u> where available (remember to use **update-source**).
    - ☐ **AS10** routers are configured to <u>prefer</u> link **E** for <u>outgoing traffic</u> from **AS10**.

> **USEFUL COMMANDS TO REDISTRIBUTE EBGP**
>
> ```
> redistribute bgp route-map myRM
> route-map myRM permit 10
>   match ip next-hop prefix-list myPL
> ip prefix-list myPL permit nextHop1/32
> ip prefix-list myPL permit nextHop2/32
> …
> ```

Goals:
- Every destination (IP address) must be reachable from any point in the network.
- Routing paths, especially between **AS20** and **AS30**, must be consistent with BGP policies and OSPF costs.