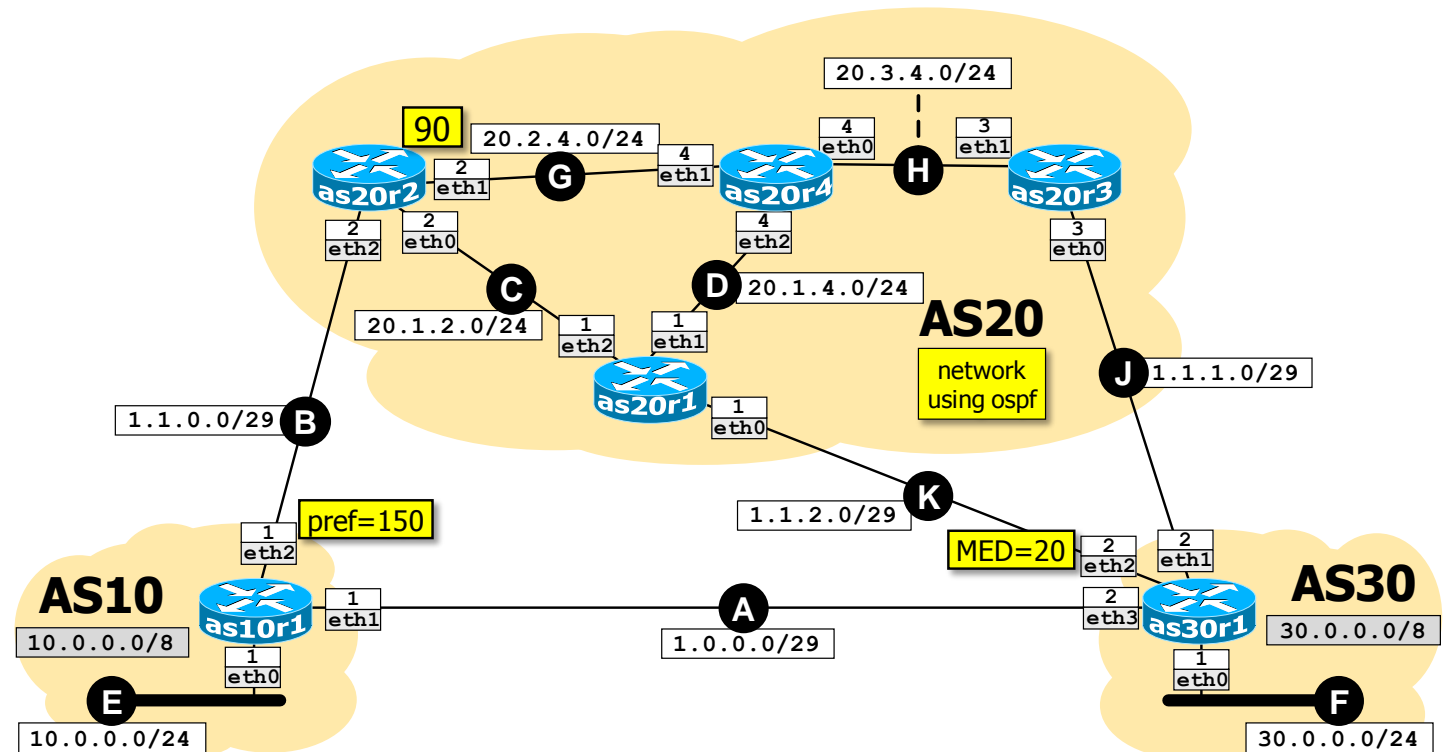




Available time: 80 minutes.



Using Netkit, implement the network depicted in the figure and described below.

- Routing within AS20 is implemented by using OSPF, with the following setup:
  - All the routers belong to the backbone area.
  - BGP is redistributed into OSPF (note: enabling redistribution automatically injects into OSPF only routes learned from E-BGP).
  - Interface **eth1** of **as20r2** is assigned the indicated cost.
- The BGP configuration is as follows:
  - Border routers within AS20 establish I-BGP peerings with each other (remember to establish the peerings between interfaces that are consistent with the internal routing of AS20; in particular, use the IP address of **as20r2**'s **eth0** interface for the peering between **as20r2** and **as20r3**).
  - All peering LANs are announced in BGP. Routers do not filter any updates. No routers announce the default route.
  - AS10's and AS30's border routers also announce their own subnet, as an aggregated prefix indicated in the gray box.
  - as30r1** sets the indicated Multi Exit Discriminator (MED) value on outgoing updates.
  - as10r1** sets the indicated local preference value on incoming updates.
- Warning:** it may take several minutes (up to 5) for the peerings to be established and for the routing protocols to converge, even if the configuration is correct!

**Goals:** All BGP peerings as well as OSPF routing must operate correctly.  
 Packets from **as10r1** to **30.0.0.1** must traverse routers **as20r2**, **as20r1**, **as20r4**, and **as20r3**.  
 Internal routers of AS20 do not need to be visible from outside the AS.