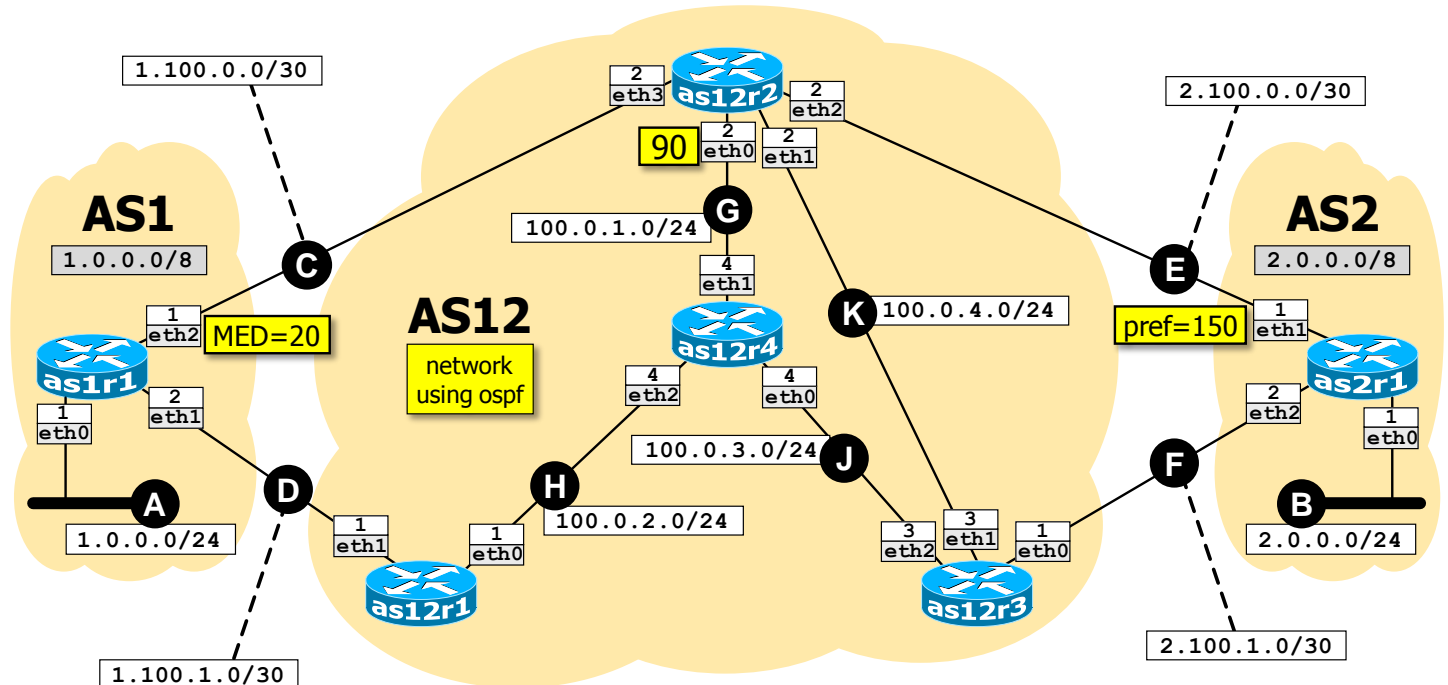




Available time: 80 minutes.



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

- Routing within AS12 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 `eth0` of `as12r2` is assigned the indicated cost.
- The BGP configuration is as follows:
 - Border routers within AS12 establish I-BGP peerings with each other (remember to establish the peerings between interfaces that are consistent with the internal routing of AS12; in particular, use the IP address of `as12r2`'s `eth1` interface for all the peerings with `as12r2`).
 - All peering LANs are announced in BGP. Routers do not filter any updates. No routers announce the default route.
 - AS1's and AS2's border routers also announce their own subnet, as an aggregated prefix indicated in the gray box.
 - `as1r1` sets the indicated Multi Exit Discriminator (MED) value on outgoing updates.
 - `as2r1` 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 `as2r1` to `1.0.0.1` must traverse routers `as12r2`, `as12r3`, `as12r4`, and `as12r1`.
 Internal routers of AS12 do not need to be visible from outside the AS.