Capítulo 4 – Kurose – Exercícios

1) What is the difference between routing and forwarding?

2) Discuss why each input port in a high-speed router stores a shadow copy of the forwarding table.

3) Describe how packet loss can occur at input ports. Describe how packet loss at input ports can be eliminated (without using infinite buffers).

4) Describe how packet loss can occur at output ports. Can this loss be prevented by increasing the switch fabric speed?

5) What is HOL blocking? Does it occur in input ports or output ports?

6) Do routers have IP addresses? If so, how many?

7) Suppose there are three routers between a source host and a destination host. Ignoring fragmentation, an IP datagram sent from the source host to the destination host will travel over how many interfaces? How many forwarding tables will be indexed to move the datagram from the source to the destination?

8) Suppose you purchase a wireless router and connect it to your cable modem. Also suppose that your ISP dynamically assigns your connected device (that is, your wireless router) one IP address. Also suppose that you have five PCs at home that use 802.11 to wirelessly connect to your wireless router. How are IP addresses assigned to the five PCs? Does the wireless router must use NAT? Why or why not?

9) Compare and contrast link-state and distance-vector routing algorithms.

10) Is it necessary that every autonomous system use the same intra-AS routing algorithm? Why or why not?

11) Consider the topology shown in Figure 4.17. Denote the three subnets with hosts (starting clockwise at 12:00) as Networks A, B, and C. Denote the subnets without hosts as Networks D, E, and F.
a. Assign network addresses to each of these six subnets, with the following constraints: All addresses must be allocated from 214.97.254/23; Subnet A should have enough addresses to support 250 interfaces; Subnet B should have enough addresses to support 120 interfaces; and Subnet C should have enough addresses to support 120 interfaces. Of course, subnets D, E and F should each be able to support two interfaces. For each subnet, the assignment should take the form a.b.c.d/x or a.b.c.d/x – e.f.g.h/y.
b. Using your answer to part (a), provide the forwarding tables (using longest prefix matching) for each of the three routers.

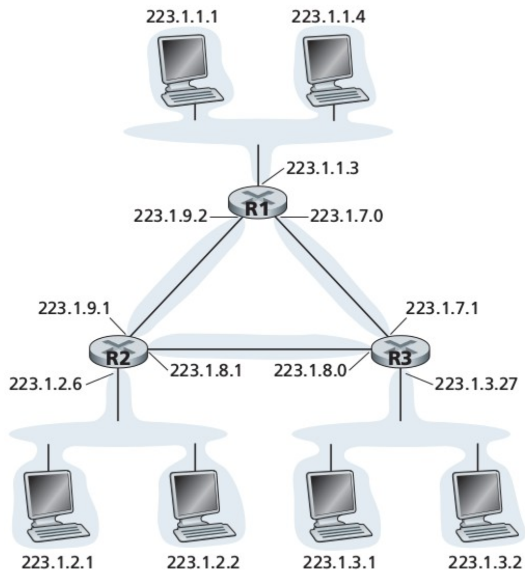
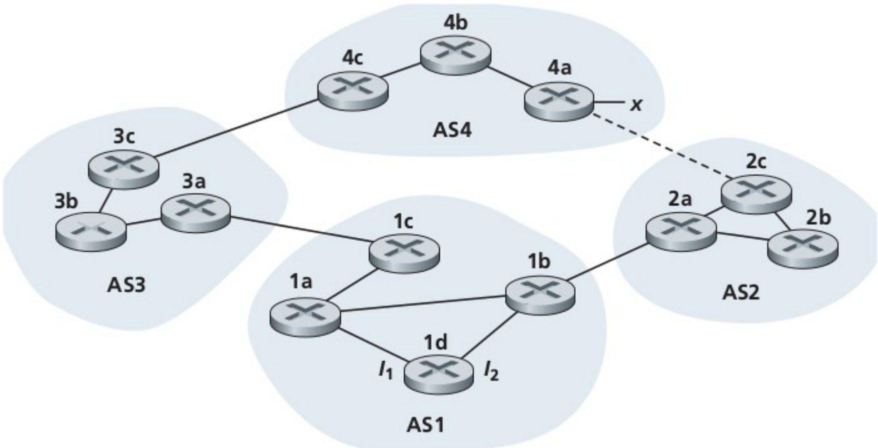


Figure 4.17 ♦ Three routers interconnecting six subnets

12) Consider the network shown below. Suppose AS3 and AS2 are running OSPF for their intra-AS routing protocol. Suppose AS1 and AS4 are running RIP for their intra-AS routing protocol. Suppose eBGP and iBGP are used for the inter-AS routing protocol. Initially suppose there is no physical link between AS2 and AS4.

a. Router 3c learns about prefix x from which routing protocol: OSPF, RIP, eBGP, or iBGP?
b. Router 3a learns about x from which routing protocol?
c. Router 1c learns about x from which routing protocol?
d. Router 1d learns about x from which routing protocol?



13) Referring to the previous problem, once router 1d learns about x it will put an entry (x, I) in its forwarding table.
a. Will I be equal to I 1 or I 2 for this entry? Explain why in one sentence.
b. Now suppose that there is a physical link between AS2 and AS4, shown by the dotted line. Suppose router 1d learns that x is accessible via AS2 as well as via AS3. Will I be set to I 1 or I 2 ? Explain why in one sentence.
c. Now suppose there is another AS, called AS5, which lies on the path between AS2 and AS4 (not shown in diagram). Suppose router 1d learns that x is accessible via AS2 AS5 AS4 as well as via AS3 AS4. Will I be set to I 1 or I 2 ? Explain why in one sentence.

14) Consider the following network. With the indicated link costs, use Dijkstra’s shortest-path algorithm to compute the shortest path from x to all network nodes. Show how the algorithm works by computing a table for node x.