HOMEWORK : CHAPTER 4

Notes: We only accept homework in pdf format written in English or Chinese. All submissions will have to be uploaded in Tsinghua University Web Learning. All submissions after ddl will not be accepted.

Exercise 1

We made a distinction between the forwarding function and the routing function performed in the network layer. What are the key differences between routing and forwarding?

Exercise 2

Consider a datagram network using 8-bit host addresses. Suppose a router uses longest prefix matching and has the following forwarding table:

Prefix Match	Interface
00	0
010	1
011	2
10	2
11	3

For each of the four interfaces, give the associated range of destination host addresses and the number of addresses in the range.

Exercise 3

Consider the topology shown in the Figure. 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.

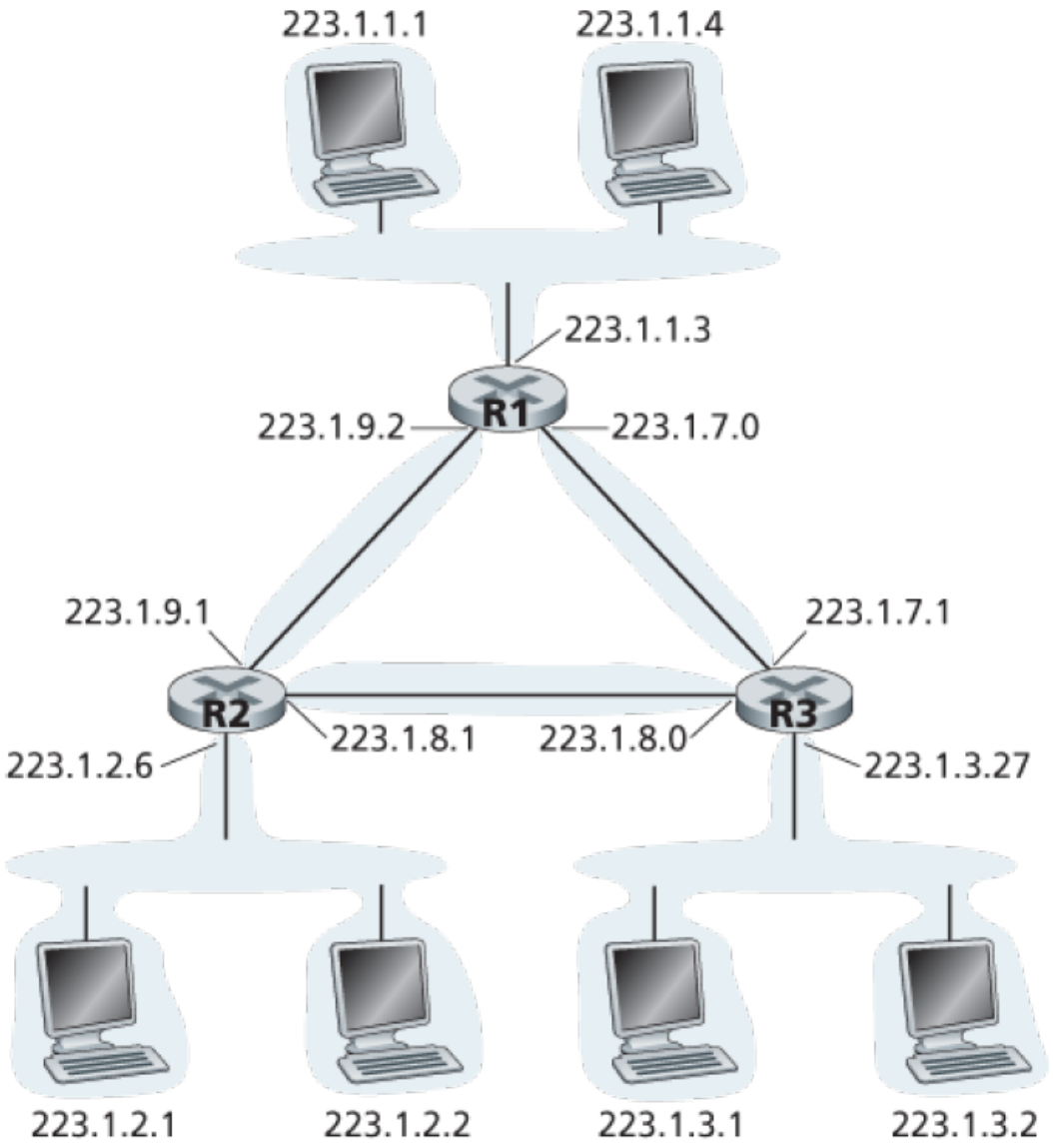

Figure **Three routers interconnecting six subnets**

Exercise 4

Consider sending a 2400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are the values in the various fields in the IP datagram(s) generated related to fragmentation?

Exercise 5

How does generalized forwarding differ from destination-based forwarding?