CS224 (m): Computer Networks (minor)
Tutorial 08, 21/23 Oct 2016

Concepts tested: IP addressing, Address allocation

1. The address 236.15.34.17 belongs to which class of IP addresses?

2. How many Class C network addresses are there?

3. When showing the routing table employed by the kernels of a host, a mask field was used to indicate the network portion of the address. When using class-based addressing (A, B and C classes), is this field necessary? Explain.

4. Postal addresses are geographical i.e. given an address, one can pinpoint the location on a map. Are IP addresses geographical too?

5. A network assigned an IP prefix of 108.25.232.0/21 can support how many hosts in practice?

6. An organization has been assigned a class C address 217.20.12.0/24. This organization has 5 physical networks belonging to 5 departments. One is a large department made up of 100 hosts, while others are small and have hosts all under 30. Give two possible valid subnet allocation to the large department. Note that allocating this should ensure that the small departments also get subnet assignments that match their requirement.

7. A router can reach four different organizations via the same interface. The IP prefixes used by the different organizations are 108.25.224.0/21, 108.25.232.0/21, 108.25.240.0/21 and 108.25.248.0/21
Can the router aggregate the prefixes? If so to what?

8. An organization with 4000 hosts, that is assigned 16 class C addresses has an efficiency of how much?

9. The routing table at a router is as shown in the figure. The prefixes/addresses are represented in hexadecimal for ease of conversion to binary.

Prefix	NextHop
C4.5E.2.0/23	A
C4.5E.4.0/22	B
C4.5E.C0.0/19	C
C4.5E.40.0/18	D
C4.4C.0.0/14	E
C0.0.0.0/2	F
80.0.0.0/1	G

Figure 1: Routing table

   (a) Which next hop will a packet with destination address C4.4B.31.2E be routed to?
   (b) Which next hop will a packet with destination address C4.5E.05.09 be routed to?
   (c) Which next hop with a packet with destination address C4.4D.31.2E be routed to?

10. A DHCP reply message (from server) can be sent as (select all that apply): Broadcast, Multicast, Unicast

11. Observe the operation of DHCP, as shown in the video, using wireshark. Specifically, find the IP source address of a DHCP discover message.