Solutions to Assignment Unit 4

Answer the following questions in your own words:

1. For each IPv4 network prefix given (with length), identify which of the subsequent IPv4 addresses are part of the same subnet.

   (a). 10.0.130.0/23: 10.0.130.23, 10.0.129.1, 10.0.131.12, 10.0.132.7
   (b). 10.0.132.0/22: 10.0.130.23, 10.0.135.1, 10.0.134.12, 10.0.136.7
   (c). 10.0.64.0/18: 10.0.65.13, 10.0.32.4, 10.0.127.3, 10.0.128.4
   (d). 10.0.168.0/21: 10.0.166.1, 10.0.170.3, 10.0.174.5, 10.0.177.7
   (e). 10.0.0.64/26: 10.0.0.125, 10.0.0.66, 10.0.0.130, 10.0.0.62

   ANS –
   (a). 10.0.130.0/23: 10.0.130.23, 10.0.131.12
   (b). 10.0.132.0/22: 10.0.135.1, 10.0.134.12
   (c). 10.0.64.0/18: 10.0.65.13, 10.0.127.3
   (d). 10.0.168.0/21: 10.0.170.3, 10.0.174.5
   (e). 10.0.0.64/26: 10.0.0.125, 10.0.0.66

2. Convert the following subnet masks to /k notation, and vice-versa:

   (a). 255.255.240.0
   (b). 255.255.248.0
   (c). 255.255.255.192
   (d). /20
   (e). /22
   (f). /27

   ANS –
   (a). 255.255.240.0 = /20
   (b). 255.255.248.0 = /21
   (c). 255.255.255.192 = /26
   (d). /20 = 255.255.240.0
   (e). /22 = 255.255.252.0
   (f). /27 = 255.255.255.224

3. Suppose an Ethernet packet represents a TCP acknowledgment; that is, the packet contains an IPv4 header with no options and a 20-byte TCP header but nothing else. Is the IPv4 packet here smaller than the Ethernet minimum packet size, and, if so, by how much? What if the packet is IPv6 with no extension headers?

   ANS – Yes, it is. Because 20 + 20 + 18 (Ethernet header+CRC) = 58 which is 6 bytes shorter than the minimum Ethernet size of 64. For IPv6, we have: 20 + 40 (IPv6 fixed header) + 18 (Ethernet header+CRC) = 78 which is bigger than the minimum of 64.

4. In newer implementations, repeat ARP queries about a timed out entry are first sent unicast, in order to reduce broadcast traffic. What would have to happen to create a situation where the repeated unicast query for a given IP address fails, but a follow up broadcast query for that same IP address succeeds?

   ANS – the LAN (MAC) address of the interface that has the given IP address changed. E.g. the NIC got swapped.