Review Questions 23

Please print out this form (two-sided, if you can) and write your answers *legibly* in the spaces provided. If you can't write legibly, type.

1. Write out the complete unabbreviated IPv6 addresses that correspond to 6721:0:4a::ce1:0 and ff0e:37bd::2:c9:ce1:7a. Is either of these a multicast address? If so, which one?

The first address is of the form: 6721:0000:004a:0000:0000:0000:0ce1:0000

The second address is of the form: ff0e:37bd: 0000:0000:0002:00c9:0ce1:007a

The second address starts with ff and therefore belongs to the ff00::/8 range reserved for multicast addresses. The next four bits are 0000, which indicates a well-known multicast address, while the value of e=1110 for the next four bits corresponds to a global multicast address.

2. How does the hop limit in IPv6 differ from the TTL in IPv4? How significant is this difference, in practice?

Both the IPv4 TTL field and the IPv6 HL field are 8-bit long, and therefore span the same range of values. The only difference, which is reflected in the name change from TTL to HL, is that in IPv4 the field was meant to specify a quantity measured in seconds (a bona fide time-to-live) with routers possibly decrementing it by more than 1. In contrast, the IPv6 field reflects the actual use of the TTL field in practice, namely, a hop count value that is decremented by 1 at each router. Hence, there are no practical differences between the two.

3. Identify two distinct mechanisms through which an IPv6 host would be able to *automatically* acquire an IP address when booting up, and provide at least one distinct advantage that each mechanism would have over the other.

Both DHCPv6 and NDP can be used by hosts to automatically acquire an IPv6 address. The advantage of DHCPv6 is that it affords network administrator greater control over how IPv6 addresses are assigned to hosts. The advantage of NDP is that it does not require the presence and configuration of a separate DHCP server, and allows hosts to acquire their IP address simply by listening for messages multicast by their local gateway router.