

Homework 2

*Assigned: September 7**Due: September 14*

1. Consider the following IP addresses. For each address, state the class of the address (A-E). For classes A-C, give the network ID and host ID. For class D, give the multicast address.
 - (a) 128.36.199.3
 - (b) 21.12.240.17
 - (c) 183.194.76.253
 - (d) 192.12.69.248
 - (e) 89.3.0.1
 - (f) 230.3.6.2

2. Write a C routine that converts a 32-bit IP address into a character string in dotted quad notation. The signature of the routine is as follows:

```
char * IPtoDQ(u_long ip)
```

Demonstrate the operation of your routine on addresses (b), (c), and (f) from Question 1. Turn in a printout of the source code for the routine with your homework.

3. Write a C routine that computes the IP checksum (i.e., 16 bit ones complement), given a pointer to a block of memory and the number of bytes in the block. (Your routine should complain if the number of bytes is not a multiple of 16 bits.) The signature of the routine is as follows:

```
u_short checksum(u_short *m, int sizeofm)
```

Demonstrate the operation of your routine on the following three messages (expressed in hex, with spacing to enhance readability): (1) f312 fa88 0234 (2) 791 (3) 9145 ffff efab.

4. Consider an IP packet that has a 20-byte header, an initial totalLength of 2000 bytes and an initial identification value of 3251. Assume the packet traverses two networks, one with an MTU of 1500 bytes and the next with an MTU of 620 bytes. Give the values of the totalLength, identification, moreFlag and fragmentationOffset for each fragment received at the destination.
5. IPv6 uses 16-byte addresses. If a block of 1 million addresses is allocated every picosecond (a second is 10^{18} picoseconds), how long will the addresses last? Do you think this means that we will never see another version of IP?