CSC360 Homework 4

Due May 1st

Name: Jake Orben

1. Why is an ARP query sent within a broadcast frame? Why is an ARP response sent within a frame with a specific destination MAC address? (16 points)

An ARP query is sent in a broadcast frame because the querying host does not know which adapter address corresponds to the IP address in question. For the response, the sending node knows the adapter address to which the response should be sent, so there is no need to send a broadcast frame (which would have to be processed by all the other nodes on the LAN).

2. For the network in Figure of our slides, the router has two ARP modules, each with its own ARP table. Is it possible that the same MAC address appears in both tables? (16 points)

It is theoretically possible, however, no two machines can have the same MAC address, if a system were to be connected to multiple networks at once, this effect could be achieved.

3. Give an example other than the one in Figure of the slides that two-dimensional parity checks can correct and detect a single bit error. Give an example of a double-bit error that can be detected but not corrected. (16 points)

0000 0000 0000

11110 11010 10010

0101 0101 0101

1010 1010 1010

00 0 00

4. Recall that the CSMA/CD protocol, the adapter waits K·512 bit times after a collision, where K is drawn randomly. For K = 100, how long does the adapter wait until returning to step 2 for a 10Mbps Ethernet? For a 100 Mbps Ethernet?

For 10 Mbps, the waiting time is 51200 bits / 10 Mbps = 5.12 msec.  
For 100 Mbps, the waiting time is 51200 bits / 100 Mbps = 512 μsec.