Computer Networking
Homework#6

1. If all the links in the Internet were to provide reliable delivery service, would the TCP reliable delivery service be redundant? Why or why not?

2. 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?

3. In CSMA/CD, after the fifth collision, what is the probability that a node chooses $K = 4$? The result $K = 4$ corresponds to a delay of how many seconds on a 10 Mbps Ethernet?

4. Consider the CRC code. If the generator, G=1001, and suppose that D has the value of 11010111011. What is the value of R=? What is the actual bit pattern sent by the transmitter.?

5. In the textbook, we provided an outline of the derivation of the efficiency of slotted ALOHA. In this problem we'll complete the derivation.
    a. Recall that when there are N active nodes, the efficiency of slotted ALOHA is $Np(1 - p)^{N-1}$. Find the value of p that maximizes this expression.
    b. Using the value of p found in (a), find the efficiency of slotted ALOHA by letting N approach infinity. *Hint*: $(1 — 1/N)^N$ approaches $1/e$ as N approaches infinity.