College of Computer Science
Northeastern University
COM 1777: Computer Communication Networks: Honors Adjunct

Spring 2003
Handout 1
28 April 2003

# Homework 1 (due May 6)

**1. (20 points)** Consider the parity check code that has two parity bits, one containing the parity of the bits in the odd positions of the data string, and the other containing the parity of the bits in the even positions of the data string. Assume that the data string is of length $K$.

**(a)** Characterize the error patterns that can be detected by this code. What is the smallest number of errors that the above parity check code cannot detect?

**(b)** What is the probability that a random $K + 2$-bit string is accepted as a valid codeword?

**(c)** Does the code detect all odd errors? Explain.

**(d)** Does it help to add a third parity check bit that is the sum of all the bits in the data string?

**2. (20 points)** Chapter 2, Exercise 38, page 164-165. This exercise explores revisions to the Ethernet protocol to avoid the Ethernet capture effect, which was discussed in class and also analyzed in Exercise 37 (assigned in Problem Set 2).