18.310 Exam 1 - Take Home Part

Due: Thursday, October 19, 2006

Problem 1 (20 points)

A) Find a prime polynomial of degree 7.

B) Construct a 2 error correction code.

C) Construct a 3 error correction code.

We only want the encoder. Your encoder for 2 errors Problem 1(B) will be used for Problem 2(A).

Problem 2 (80 points) Make a spreadsheet that:

A) With your 2 error correcting code, accepts any input message, and encodes it with your 2 error correcting code.

B) Allows insertion of errors.

C) Corrects up to 2 errors.

C) Decodes the corrected result to find the original message.

This will be graded by testing to see if it works. Please point out at the top of the spreadsheet where everything is.

Problem 3 (20 points) Show that there are is no 2-error correcting code with 15 message bits and 8 check bits. The total codeword length is 23 (15 information message bits and 8 check bits). Hint: Think about the space of total codewords.