

## 18.310 Exam 1 - Take Home Part

### **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.