

18.310 Exam #1: Take Home Part

Due Tuesday, October 14, 2008 on Stellar

Problem 1. 10 points

Find a primitive polynomial $p(x)$ of degree 7 which is not $1 + x + x^7$, and construct its remainder table.

Problem 2. 10 points

Find the polynomial $p_3(x)$ associated with the polynomial you chose in problem 1.

Problem 3. 40 points

Construct an encoder and decoder spreadsheet for the two-error-correcting BCH code associated with this polynomial. It should:

- a. Have a place to enter the appropriate length message.
- b. Create an encoded message from it.
- c. Allow introduction of errors.
- d. Compute t_1 and t_3 from the encoded message by using the appropriate remainder tables.
- e. Compute the error locator polynomial from t_1 and t_3 and the appropriate tables.
- f. Compute the locations of the errors and correct up to two errors.
- g. Check to see if the corrected received message has no errors, (in case there were three original errors)
- h. Find the original message by dividing the corrected message by the encoding polynomials.