EGE 534 HW #1 *Dr. Izadi*

In doing your homework, please make sure you follow the following guidelines. Failure to follow them, will result in 0 grade:

- *Only write on one side of your paper.*
- *Problem solutions must follow in order i.e. Start with Problem 1, then Problem 2 and etc. The solutions to each section must also be in order.*
- *Unless explicitly specified, you should not explain your solution – just provide your solution.*
- *Make sure that the papers are stapled and your name is on the paper.*

Problem 1 (10 Points)
Design a one-bit 5MR voter using basic gates.

Problem 2 (20 Points)
A cyclic code is to be based on the Generator polynomial $X^7 + X^6 + X^5 + X^2 + 1$.

a. Generate a codeword for the input data 10111.
b. Using logic gates, design an appropriate encoder and decoder the given generator.

Problem 3 (20 Points)
A 2M X 16 memory system is design using 1 M X 4 chips. Assume chip failure modes are single-bit cell (45%), single-row all-0's (30%), single-column all-0's (15%), and whole-chip all-0's (10%). Also, assume 0 and 1 values are equally likely. Compare and comment on relative performance (single-error-detection coverage) and overhead of the following approaches.

a. Bit per chip
b. Bit per multiple chips
c. Duplication
d. Single precision checksum (one sum for the entire memory).

Problem 4 (No Points)
Read the paper that was handed out in class. We will talk about it in class next week.

Due June 5, 2007