EGR 270
Fundamentals of Computer Engineering
File: N270O1

Test #1 Overview

Related Homework Assignments: Homework #1 - 2
Textbook material: Ch 1 & 2 in Logic and Computer Design Fundamentals, 4th Edition, by Mano (omit section 2.10)
Note: ***No calculators of any type will be allowed on the test***

Ch. 1 Number Systems and Binary Codes

Bases, conversions, fractional numbers
Complements: r's and (r-1)'s
Direct arithmetic operations in any base
Binary codes

- General information, number of bits needed
- BCD code
- Parity
- Other codes given if needed (excess-3, Gray, ASCII, etc)

Ch. 2 Combinational Logic

Boolean algebra

- Theorem and postulate names are unimportant, but be able to use them to minimize expressions
- Some test problems will ***require*** the use of Boolean algebra.

Truth tables, complements, minterms, maxterms
Canonical forms (sum of minterms, product of maxterms), Standard forms (SOP, POS), and non-standard forms
Expressing a function as a sum of minterms, product of maxterms, SOP, or POS
Logic gates

- Truth tables and symbols for AND, OR, NOT, NAND, NOR, XOR, and EQUIVALENCE
- Determining output expressions for circuits using the basic logic gates listed above
- Implementing Boolean expressions using AND, OR, and NOT gates

Karnaugh Maps

- General structure, minterm ordering, 2 - 5 variables
- Finding minimal SOP and minimal POS expressions using Kmaps
- Prime implicants and essential prime implicants
- Don't care conditions
- XOR expressions using Kmaps

Cost Criteria - evaluating efficiency of designs using

- Literal cost
- Gate input cost
- Number of gate delays

Multiple-Level Circuit Optimization – using the following techniques to reduce gate input cost:

- Factoring
- Decomposition
- Extraction

Other (anything covered in class could appear on the test)