
Computer Science 2610
Introduction to Digital Systems
Assignment 3

Spring 2012

Due: Wednesday Feb. 29 at 9 a.m.

Late Penalty: -10% per day late

Do Questions 3 and 5 from the practice midterm, repeated here:

[11] 1. **K-Maps and Logic Diagrams**

For the Boolean function

$$F(A, B, C, D) = \Sigma m(0, 2, 4, 5, 8, 10, 15)$$

- (a) Show the associated Karnaugh map.
- (b) List all prime implicants.
- (c) List all essential prime implicants.
- (d) Simplify to *sum-of-products* form.
- (e) Draw the 2 level logic diagram of the function (AND-OR).
- (f) Convert the above logic diagram of the function to use only NAND gates.
- (g) Simplify into *product-of-sums* form
- (h) Draw the 2 level logic diagram of the function (OR-AND).
- (i) Convert the above logic diagram of the function to use only NOR gates.

[3] 2. **Minterms and Maxterms**

$$\text{Let } H(A, B, C, D) = \overline{A}(B + C) + \overline{B}\overline{C}D + D$$

- (a) Convert H to *sum-of-minterm* form (i.e. $\Sigma m()$).
- (b) Convert H to *product-of-Maxterm* form (i.e. $\Pi M()$).
- (c) Give the truth table form for the function.