

CDA 3201 - Computer Logic Design
Homework Assignment 2 (Total: 100 Points)

Due to: Tuesday 06/17/2014
Turn in as hardcopy format in class
10 bonus points for typed homework

1. (20 points) (Quine-McCluskey method) Use the Quine-McCluskey method to find the minimum sum-of-product form of the following Boolean expression. Show your process of deriving the prime implicants. Include the implementation chart from which your minimum sum-of-product form is derived.

$$F(\bar{A}, B, C, D) = \sum m(1, 2, 3, 4, 9, 10, 11, 12) + \sum d(0, 13, 14, 15)$$

2. (20 points) (Hazards) Given the following specifications of Boolean function, implement them as hazard-free circuits:

(A) $F(A, B, C) = B\bar{C} + \bar{A}C$

(B) $F(A, B, C, D) = \sum m(0, 4, 5, 6, 9, 11, 13, 14) + \sum d(3, 8, 10)$

(C) $F(A, B, C) = (A + B)(\bar{B} + C)$

(D) $F(A, B, C, D) = \prod M(0, 1, 3, 5, 7, 8, 9, 13, 15)$

3. (10 points) (Boolean Simplification) Use Karnaugh maps (K-maps) to simplify the following functions in sum-of-products form. How many literals appear in your minimized solutions?

a. $f(W, X, Y, Z) = \prod M(0, 1, 4, 5, 12, 13)$

b. $f(A, B, C, D, E) = \sum m(0, 4, 18, 19, 22, 23, 25, 29)$

4. (10 points) (Boolean Simplification) Use Karnaugh maps (K-maps) to simplify the following functions in sum-of-products form taking advantage of the don't cares provided.

a. $f(A, B, C, D) = \sum m(0, 1, 4, 10, 11, 14) + \sum d(5, 15)$

b. $f(A, B, C, D, E, F) = \sum m(0, 1, 4, 5, 16, 17, 20, 21, 32, 33, 36, 37, 52, 53)$

5. (10 points) Exercise 3.2 from the book

6. (10 points) Exercise 3.9 from the book

7. (20 points) Exercise 3.17 from the book