

Logic Circuits and Digital Systems

Assignment #3

Due date: Sunday 21/12/90

Please submit questions 4.2, and 4.5 (Part A and B) from your reference book and the following problems for this homework.

1 - Simplify the following Boolean functions using Karnaugh map:

(a) $F(A, B, C, D) = \sum m(4, 6, 7, 15)$

(b) $F(w, x, y, z) = \sum m(2, 3, 12, 13, 14, 15)$

(c) $F(A, B, C, D) = \sum m(3, 7, 11, 13, 14, 15)$

2 - Simplify the following Boolean functions using Karnaugh map:

(a) $F(A, B, C, D, E) = \sum m(0, 1, 4, 5, 16, 17, 21, 25, 29)$

(b) $F(A, B, C, D, E) = \sum m(0, 2, 3, 4, 5, 6, 7, 11, 15, 16, 18, 19, 23, 27, 31)$

(c) $F = A'B'CE' + A'B'C'D' + B'D'E' + B'CD' + CDE' + BDE'$

3 - Simplify the following functions and implement them with only "NOR" gates. Use minimum number of gates.

(a) $F = wx' + y'z' + w'yz'$

(b) $F(w, x, y, z) = \sum m(5, 6, 9, 10)$

4 – Implement the functions of problem 3 with only "NAND" gates. Use minimum number of gates.

5 - Derive the logic equation and circuit diagram for a circuit with three inputs A , B , and C . The output is to be high only when exactly one of the three inputs is high. Use only NAND gates in the design.