BIRZEIT UNIVERSITY

Digital Systems (ENCS234)
Summer Semester 2017

Homework for Chapter 3 Due to: **Monday, July 31, 2017**

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3.2 Simplify the following Boolean functions, using three-variable maps:

(c) $F(x,y,z) = \sum(2,3,4,5)$

(f) $F(x,y,z) = \sum(3,4,5,6,7)$

3.6 Simplify the following Boolean expressions, using four-variable maps:

(c) $A'B'C'D + AB'D + A'BC' + ABCD + AB'C$

(d) $A'B'C'D' + BC'D + A'C'D + A'BCD + ACD'$

3.11 Convert the following Boolean function from a sum-of-products form to a simplified product-of-sums form.

$F(x,y,z) = \sum(0,1,2,5,8,10,13)$

3.15 Simplify the following Boolean function F, together with the don't-care conditions d, and then express the simplified function in **sum-of-products** form:

(b) * $F(A,B,C,D) = \sum(0,6,8,13,14)$

$d(A,B,C,D) = \sum(2,4,10)$

3.16 Simplify the following functions, and implement them with two-level NAND gate circuits:

(a) $F(A,B,C,D) = AC'D' + A'C + ABC + AB'C + A'C'D'$

(c) $F(A,B,C) = (A' + C' + D')(A' + C')(C' + D')$

3.24 Implement the following Boolean function F , using the two-level forms of logic (a) NAND-AND and (d) NOR-OR:

$F(A,B,C,D) = \sum(0,4,8,9,10,11,12,14)$

3.x Using the Quine-McClusky method, obtain the minimal sum of the products expression for the function

$F(A,B,C,D) = \sum(1,3,4,5,9,10,11) + d(6,8)$.