

CE2210, Sec. 3

Homework 3

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1. $F = AB + C$

ABC	F
000	0
001	1
010	0
011	1
100	0
101	1
110	1
111	1

CSOP: $F = (\bar{A}\bar{B}C) + (A\bar{B}\bar{C}) + (A\bar{B}C) + (AB\bar{C}) + (ABC)$

Minterm: $F = \Sigma m(1, 3, 5, 6, 7)$

2. $F = AB + BC$

ABC	F
000	0
001	0
010	0
011	1
100	0
101	0
110	1
111	1

CPOS: $F = (A+B+C) \cdot (A+B+\bar{C}) \cdot (A+\bar{B}+C) \cdot (\bar{A}+B+C) \cdot (\bar{A}+B+\bar{C})$

Maxterm: $F = \Sigma M(0, 1, 2, 4, 5)$

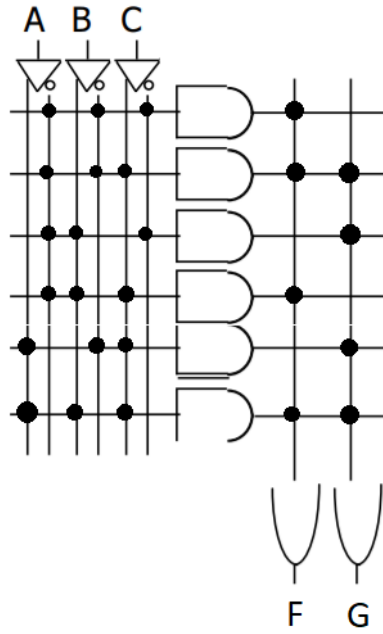
3. $F = AB + BC + AC$

$= AB(C + \bar{C}) + BC(A + \bar{A}) + AC(B + \bar{B})$ (Compliment)

$= (ABC + AB\bar{C}) + (ABC + \bar{A}BC) + (ABC + A\bar{B}C)$ (Distribute)

$= ABC + AB\bar{C} + \bar{A}BC + A\bar{B}C$ (Idempotence)

4. AND-OR PLA



5. OR-AND PLA

6. (a) $425_{10} = 0100\ 0010\ 0101_{BCD}$
 (b) $17_{10} = 0001\ 0111_{BCD}$
 (c) $2039_{10} = 0010\ 0000\ 0011\ 1001_{BCD}$

7. (a) C function.

		<i>CD</i>			
		00	01	11	10
<i>AB</i>	00	1	1	1	0
	01	1	1	1	1
	11	-	-	-	-
	10	1	1	-	-

MSOP: $F = B + \bar{C} + D$

MPOS: $F = B + \bar{C} + D$

(b) D function

		<i>CD</i>			
		00	01	11	10
<i>AB</i>	00	1	0	1	1
	01	0	1	0	1
	11	-	-	-	-
	10	1	0	-	-

MSOP: $F = \bar{B}\bar{D} + B\bar{C}D + \bar{B}C + C\bar{D}$

MPOS: $F = (\bar{B} + C + D) \cdot (B + C + \bar{D}) \cdot (\bar{B} + \bar{C} + \bar{D})$

8. (a) $f(x, y, z) = \Sigma m(0, 1, 2, 3, 4, 6, 7)$

		YZ			
		00	01	11	10
X	0	1	1	1	1
	1	1	0	1	1

MSOP: $F = \bar{X} + \bar{Z} + Y$

MPOS: $F = \bar{X} + \bar{Z} + Y$

- (b) $f(w, x, y, z) = \Sigma m(1, 3, 4, 6, 7, 9, 11, 13, 15)$

		YZ			
		00	01	11	10
WX	00	0	1	1	0
	01	1	0	1	1
	11	0	1	1	0
	10	0	1	1	0

MSOP: $F = \bar{W}X\bar{Z} + WZ + \bar{X}Z + YZ$

MPOS: $F = (\bar{W} + Y + Z) \cdot (X + Y + Z) \cdot (\bar{W} + \bar{Y} + Z) \cdot (X + \bar{y} + Z) \cdot (W + \bar{X} + Y + \bar{Z})$