HW 2

1. a. $F(x,y) = (\bar{x}+\bar{y})(\bar{x}+y)$

$= \bar{x}\bar{x} + \bar{y}\bar{x} + \bar{x}y + \bar{y}y$

$= \bar{x} + \bar{y}\bar{x} + \bar{x}y + 1$

$1 + \bar{x}(1 + \bar{y} + y) = \boxed{1}$

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

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

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

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

$BC + \bar{B}C + AB\bar{C}$

$C(B+\bar{B}) + AB\bar{C} = \boxed{C + AB\bar{C}}$

2. a. $F(x,y,z) = x + yz$

$= x(1) + yz(1)$

$= x(y+y')(z+z') + (x+x')yz$

$= (xy + xy')(z+z') + xyz + x'yz$

$= xyz + xyz' + xy'z + xy'z' + xyz + x'yz$

$= \boxed{xyz + xy'z + xyz' + xy'z' + x'yz}$

b. $F(A,B,C) = C(B + AB)$

$= CB + ABC$

$CB(A+A') + ABC$

$= \boxed{ABC + A'BC}$

3. a. $F(A,B,C) = \Sigma m(2,4,6,7)$

A \ BC	00	01	11	10
0	0	0	0	1
1	1	0	1	1

$\boxed{AC' + AB + BC'}$

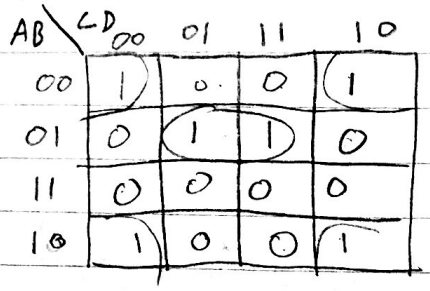
b. $F(A,B,C) = \Sigma m(0,1,3,5,7)$

A \ BC	00	01	11	10
0	1	1	1	0
1	0	1	1	0

$\boxed{A'B'C' + C}$

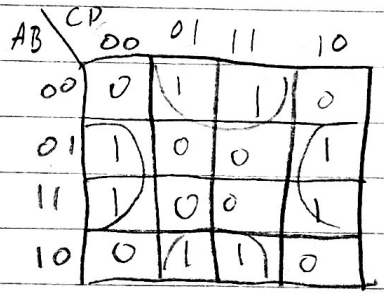
HW2

3c $F(ABCD) = \Sigma m(0, 2, 5, 7, 8, 10)$



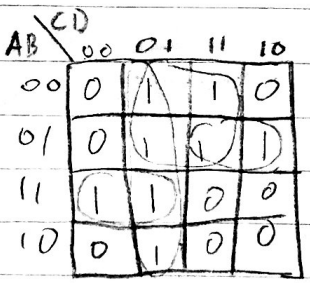
$A'BD + B'D'$

d. $F(A, B, C, D) = \Sigma m(1, 3, 4, 6, 9, 11, 12, 14)$



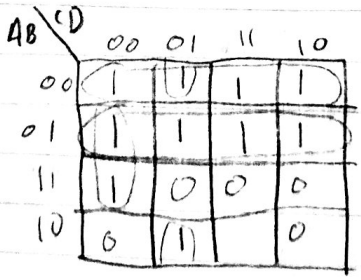
$BD' + B'D$

e.



$C'D + A'D + A'BC + ABC'$

f



$A'B' + A'B + BC'D' + B'C'D$

HW2

4a $F(A,B,C,D) = \overline{(A'B' + C'D'B')} + \overline{ACD}$

$\overline{(\overline{A'B'})(\overline{C'D'B'})} + \overline{ACD}$

$\overline{(A+B)(C+D+B)} + (A'+C'+D')$

$\overline{(\overline{(A+B)(CD+B)})}\,\overline{(A'+C'+D')}$

$\left(\overline{(\overline{A+B})}\,\overline{(C+D+B)}\right)\overline{(ACD)} = \left((A'B') + (C'D'B')\right) ACD =$

$ACD(A'B') + ACD(C'D'B')$

$AA'B'CD + AB'CC'DD'$

$0 + 0 = \boxed{0}$

b. $F(A) = \overline{A'+A} = A'+A = \boxed{1}$

c. $F(x,y,z) = \overline{(x'+y'+z')}\,\overline{(xyz'+yz)}$

$(x'+y'+z') + (xyz'+yz)$

$x'+y'+z' + xyz' + yz =$

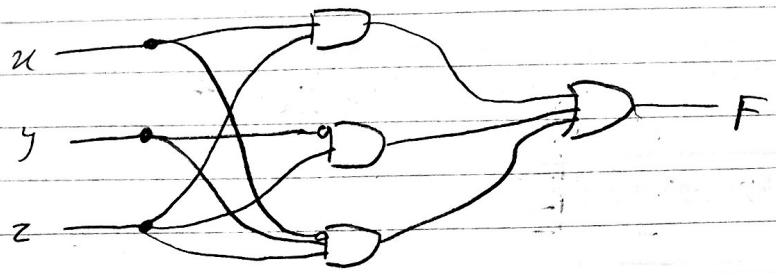
$x'+y'+z'+y(xz'+z) = \boxed{1}$

d. $F(x,y) = \overline{(x+y)}\,(\bar{x}+\bar{y})$

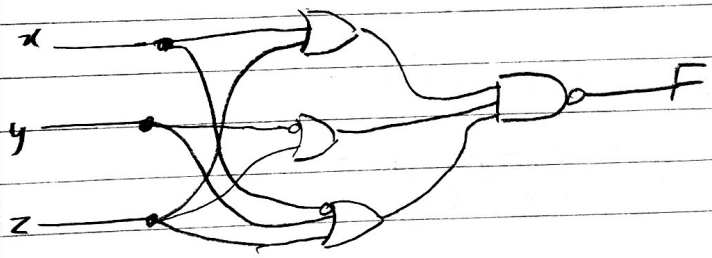
$= (x+y) + \overline{(\bar{x}+\bar{y})}$

$= (x+y) + xy = x+y+xy = \boxed{x+y}$

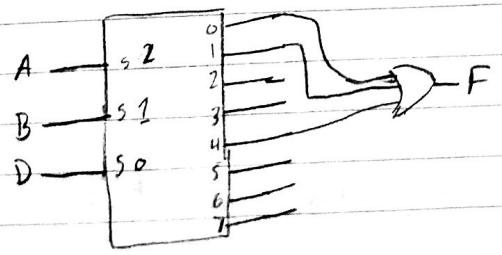
5. a. $F(x,y,z) = xz + \bar{y}z + \bar{x}yz$



b. $F(x,y,z) = \overline{(x+z)(\bar{y}+z)(\bar{x}+y+z)}$

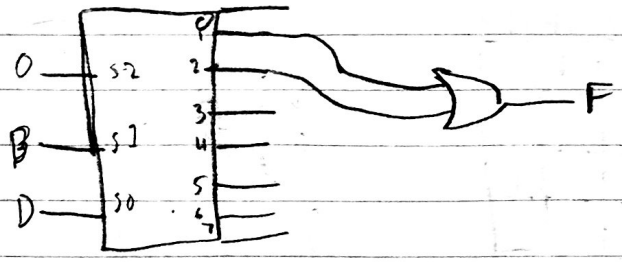


6. a. $A'BD + B'D'$; $F = \Sigma m(0,2,5,7,8,10)$



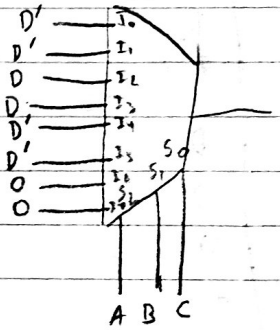
A	B	D	F
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

6. 3). $\Sigma m(1,3,4,6,9,11,12,14) = BD' + B'D$



7. 3c $F(a,b,c,d) = \Sigma m(0,2,5,7,8,10)$

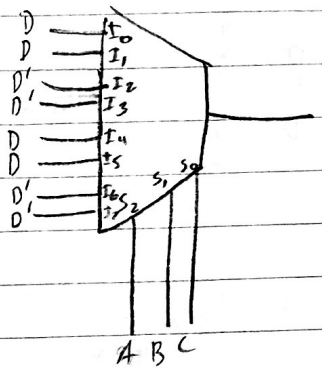
AB \ CD	00	01	11	10
00	1			1
01		1	1	
11				
10	1			1



S_2	S_1	S_0	F	
0	0	0	$D' = I_0$	$S_0 = C$
0	0	1	$D' = I_1$	$S_1 = B$
0	1	0	$D = I_2$	$S_2 = A$
0	1	1	$D = I_3$	
1	0	0	$D' = I_4$	
1	0	1	$D' = I_5$	
1	1	0	$0 = I_6$	
1	1	1	$0 = I_7$	

7. $F(a,b,c,d) = \Sigma m(1,3,4,6,9,11,12,14)$

AB \ CD	00	01	11	10
00		1	1	
01	1			1
11	1			1
10		1	1	



S_2	S_1	S_0	F
0	0	0	$D = I_0$
0	0	1	$D = I_1$
0	1	0	$D' = I_2$
0	1	1	$D' = I_3$
1	0	0	$D = I_4$
1	0	1	$D = I_5$
1	1	0	$D' = I_6$
1	1	1	$D' = I_7$

$S_0 = C$

$S_1 = B$

$S_2 = A$