

## HW #2

(3.4) f.)  $F(w, x, y, z) = \sum(8, 10, 12, 13, 14)$

wx \ yz	00	01	11	10
00	0	1	2	3
01	4	5	7	6
11	12	13	15	14
10	8	9	11	10

$$F(w, x, y, z) = w z' + w x y'$$

h.)  $F(w, x, y, z) = \sum(2, 3, 6, 7, 8, 9, 12, 13)$

wx \ yz	00	01	11	10
00	0	1	3	2
01	4	5	7	6
11	12	13	15	14
10	8	9	11	10

$$F(w, x, y, z) = w y' + w' y' \\ = w \oplus y'$$

(3.7) b.)  $AD' + B'C'D + BCD' + BC'D$

AB \ CD	00	01	11	10
00	0	1	3	2
01	4	5	7	6
11	12	13	15	14
10	8	9	11	10

$$\Rightarrow AC' + C'D + BCD'$$

d.)  $wxy + \cancel{wxz} + wx'z + w'x$

wx \ yz	00	01	11	10
00	1	2	4	3
01	5	6	8	7
11	13	14	16	15
10	9	11	12	10

$$\Rightarrow w'x + wz + xy$$

3.13 c.)  $(A' + B + D')(A' + B' + C')(A' + B' + C)(B' + C + D')$

$\Rightarrow AB'D + ABC + ABC' + BC'D$

AB \ CD	00	01	11	10
00	0	0	0	0
01	0	1	0	0
11	1	1	1	0
10	0	1	1	0

$\Rightarrow BC'D + AB + AD$

$\Rightarrow B'D' + A'B'D + A'CD + A'BD'$

$\Rightarrow (B+D)(A+B+D')(A+C'+D)(A+B'+D)$

POS

SOP

x110      110x      1x11

d.)  $BCD' + ABC' + ACD$

AB \ CD	00	01	11	10
00	0	0	0	0
01	0	0	0	1
11	1	1	1	1
10	0	0	1	0

$\Rightarrow AB + ACD + BCD'$

$\Rightarrow B'D' + A'C' + A'D + AB'C'$

$\Rightarrow (B+D)(A+C)(A+D')(A'+B+C)$

SOP

POS

3.15 a.)  $F(x, y, z) = \sum(0, 1, 4, 5, 6), d(x, y, z) = \sum(2, 3, 7)$

x \ yz	00	01	11	10
0	1	1	X	X
1	1	1	X	1

$= 1$

b.)  $F(A, B, C, D) = \sum(0, 6, 8, 13, 14), d(A, B, C, D) = \sum(2, 4, 10)$

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

$= B'D' + ABC'D + CD'$



4.1 a)  $T_1 = B'C$ ,  $T_2 = A'B$ ,  $T_3 = A + B'C$ ,  $T_4 = BD' + B'D$

$\Rightarrow F_1 = T_3 + T_4 = A + B'C + BD' + B'D$   $B \oplus D$

$\Rightarrow F_2 = T_2 + D' = A'B + D'$

b.)

A	B	C	D	$T_1$	$T_2$	$T_3$	$T_4$	$F_1$	$F_2$
0	0	0	0	0	0	0	0	0	1
0	0	0	1	0	0	0	1	1	0
0	0	1	0	1	0	1	0	1	1
0	0	1	1	1	0	1	1	1	0
0	1	0	0	0	1	0	1	1	1
0	1	0	1	0	1	0	0	0	1
0	1	1	0	0	1	0	1	1	1
0	1	1	1	0	1	0	0	0	1
1	0	0	0	0	0	1	0	1	0
1	0	0	1	0	0	1	1	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	1	1	0	1	1	1	0
1	1	0	0	0	0	1	1	1	0
1	1	0	1	0	0	1	0	1	0
1	1	1	0	0	0	1	1	1	0
1	1	1	1	0	0	1	0	1	0

c)  $F_1$ :

AB \ CD	00	01	11	10
00	0	1	1	1
01	1	1	1	1
11	1	1	1	1
10	1	1	1	1

$F_2$ :

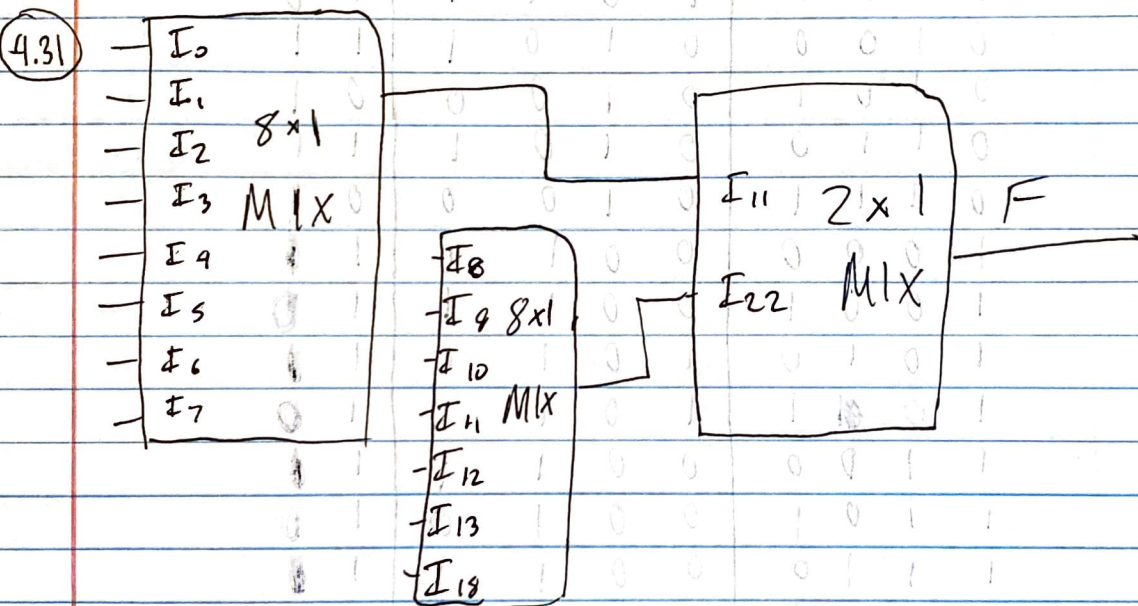
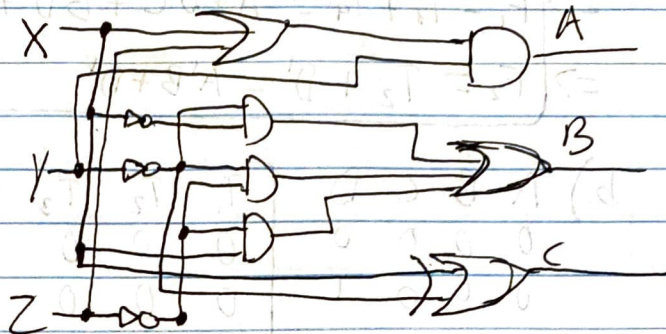
AB \ CD	00	01	11	10
00	1	0	0	1
01	1	1	1	1
11	1	0	0	1
10	1	0	0	1

$F_1 = A'B'D + A'BD' + CD' + A$

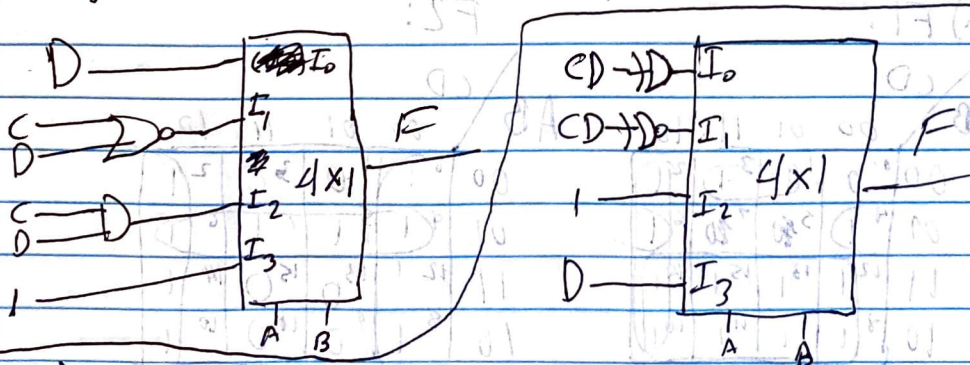
$F_2 = D' + A'B$

4.5)  $x \ y \ z \mid A \ B \ C \quad \begin{cases} A = y(z+x'), B = y'x' + z'y' + z'x, C = x'z + xz' \end{cases}$

0	0	0	0	0	0
0	0	1	0	1	1
0	1	0	1	0	0
0	1	1	1	0	1
1	0	0	0	0	1
1	0	1	0	1	0
1	1	0	0	1	1
1	1	1	1	0	0



4.35) a.)  $F_1(A, B, C, D) = \sum(1, 3, 9, 11, 12, 13, 14, 15) = AB + A'B'D + A'BC'D' + AB'CD$



b.)  $F_2(A, B, C, D) = \sum(1, 2, 5, 7, 8, 10, 11, 13, 15)$   
 $= AB' + ABD + A'B(C \oplus D)' + A'B'(C \oplus D)$