

Assignment 4 IIT 1500 Relina Daler

$$T_1 = \bar{B}C, T_2 = \bar{A}B, T_3 = A + T_1 = A + \bar{B}C$$

$$T_4 = D \oplus T_2 = D \oplus (\bar{A}B) = \bar{A}B\bar{D} + D(\bar{A}B) = \bar{A}B\bar{D} + \bar{A}BD$$

$$F_1 = A + \bar{B}C + B\bar{D} + \bar{B}D \quad F_2 = T_2 + \bar{D} = \bar{A}B + \bar{D}$$

$$F = T_2 + \bar{D} = \bar{A}B + \bar{D}$$

$2^4 = 16$

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

BC	00	01	11	10
00		1	1	1
01	1			1
11	1	1	1	1
10	1			1

$$F_1 = A + B \cdot C + \overline{B} \cdot \overline{D} + \overline{B} \cdot D$$

BCD	000	001	011	100
000	1			1
001	1	1	1	1
011	1			1
100	1			1

$$F_2 = \overline{A} \cdot B + \overline{D}$$

AB	00	01	11	10
00		1	1	1
01	1			1
11	1	1	1	1
10	1	1	1	1

$$F_2 = \overline{B} \cdot \overline{D} + \overline{B} \cdot D + C \cdot \overline{D} + A$$

4.5

$2^3 = 8$

x y z	ABC
000	010
001	011
010	100
011	101
100	001
101	010
110	011
111	100

xy	00	01	11	10
0	1	1		
1	1	1	1	1

$$B = x y \overline{z} + \overline{x} \overline{y} + \overline{y} z$$

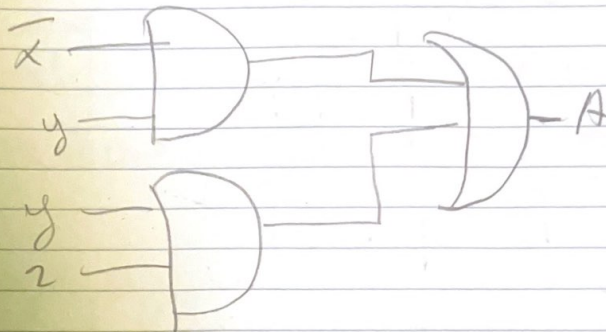


xy	00
0	1

xy	0
1	1

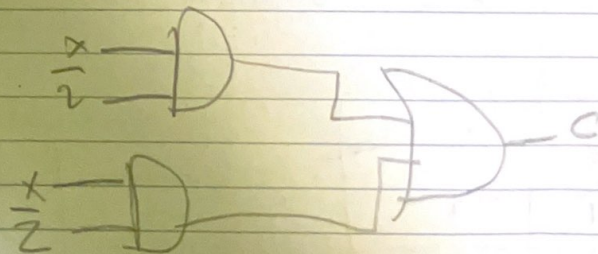
	$x/y/z$	00	01	11	10
0		0	0	1	1
1		0	1	1	0
		4	5	3	6

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



	$x/y/z$	00	01	11	10
0		0	1	1	0
1		1	0	0	1
		4	5	3	6

$$C = x\bar{z} + \bar{x}z$$



$$B\bar{D} + C\bar{D} + A$$

$$2^4 = 16$$



ABCD	a	b	c	d	e	f	g
0000	1	1	1	1	1	0	0
0001	0	1	1	0	0	0	0
0010	1	1	0	1	1	0	1
0011	1	1	1	1	0	0	1
0100	0	1	1	0	0	1	1
0101	1	0	1	1	0	1	1
0110	1	0	1	1	1	1	1
0111	1	1	1	0	0	0	0
1000	1	1	1	1	1	1	1
1001	1	1	1	0	1	1	1



$$a = B\bar{C}D + \bar{A}D + \bar{A}B + A\bar{B}\bar{C}$$



$$b = A\bar{B}\bar{C} + \bar{A}\bar{B} + \bar{A}\bar{C}\bar{D} + \bar{A}C\bar{D}$$

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

$$C = \bar{A}B + A\bar{D} + A\bar{B}C + B\bar{C}D$$

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

$$d = \bar{A}\bar{B}C\bar{D} + \bar{A}C\bar{D} + A\bar{B}C + A\bar{B}\bar{C}$$

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

$$E = \bar{B}C\bar{D} + A\bar{C}D$$

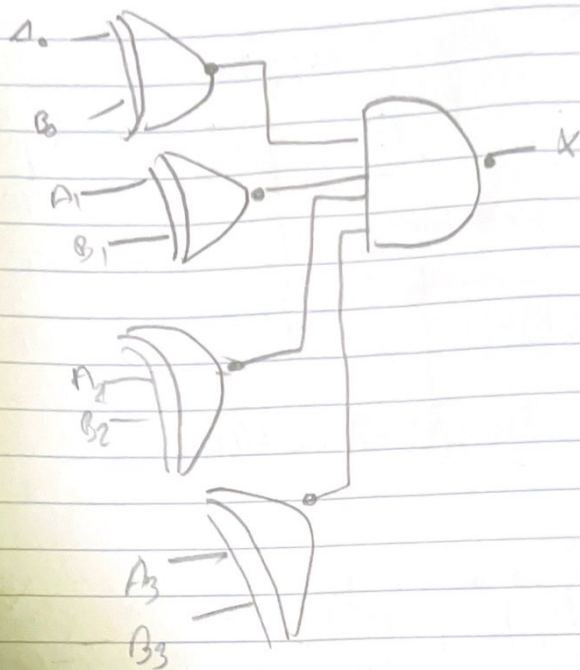
	CD			
	00	01	11	10
AB	00	1	1	1
	01	1	1	1
	11	1	1	1
	10	1	1	1

$$F = \bar{A}BC + \bar{A}B\bar{D} + \bar{A}BC + \bar{A}\bar{C}\bar{D}$$

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

$$G = \bar{A}C\bar{D} + \bar{A}B\bar{C} + A\bar{B}\bar{C}$$

4.24



$$X = (A_0 \oplus B_0) \cdot (A_1 \oplus B_1) \cdot (A_2 \oplus B_2) \cdot (A_3 \oplus B_3)$$

4
1.23
12

4.22

4.22

4.22

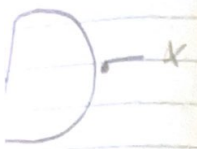
A	3
B	4
C	

4.22

F1

F2 =

F3



4.27

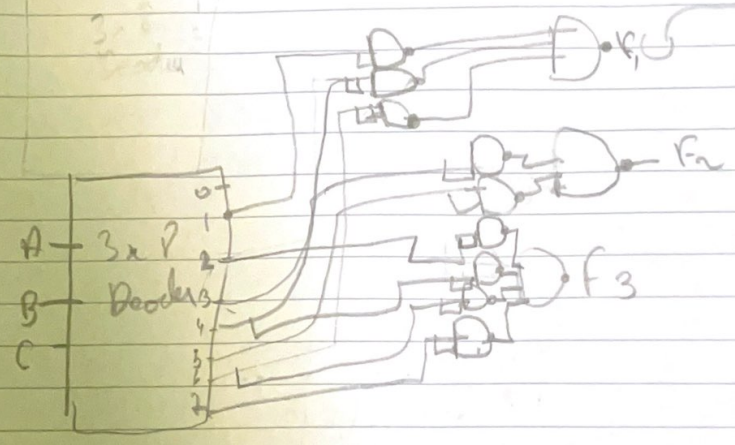
Implementation

$$F_1(A, B, C) = \sum(1, 2, 6)$$

$$F_2(A, B, C) = \sum(3, 5)$$

$$F_3(A, B, C) = \sum(2, 4, 6, 7)$$

4.28



OB3

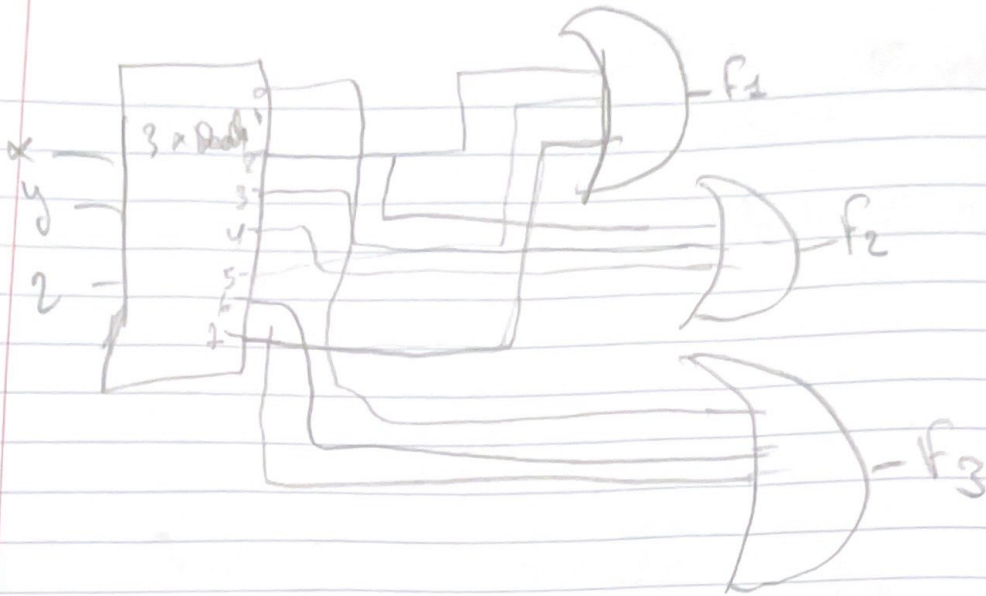
4.28

$$F_1 = \sum(2, 5, 7) = x(y + \bar{y})z + \bar{x}\bar{y}\bar{z} + x\bar{y}z + \bar{x}y\bar{z}$$

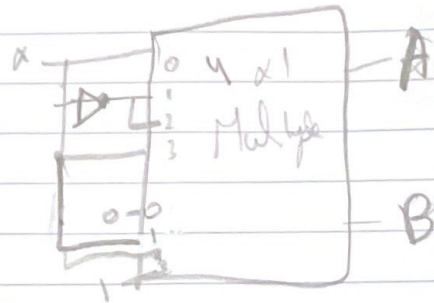
$$F_2 = \sum(2, 3, 4) = x\bar{y}\bar{z} + \bar{x}y = x\bar{y}\bar{z} + \bar{x}y\bar{z}$$

$$F_3 = \sum(0, 6, 7) = \bar{x}\bar{y}\bar{z} + x\bar{y}(z + \bar{z}) + \bar{x}y\bar{z} + x\bar{y}z + x\bar{y}\bar{z}$$

$$F_1 = \Sigma(2,3,7) \quad | \quad F_2 = \Sigma(2,3,4) \quad F_3 = \Sigma(4,6,7)$$



4. 3 3



$$A(x,y,z) = \Sigma(1,2,4,7)$$

$$C(x,y,z) = \Sigma(3,5,6,7)$$

	\bar{x}	x
\bar{y}	0 1 2 3	4 5 6 7
y	1 0 0 1	1 1 1 1

	\bar{x}	x
\bar{y}	0 1 2 3	4 5 6 7
y	0 0 0 1	0 1 1 1