



## **ASSIGNMENT 2**

**COC2070**

**NAME: MOHD. ZAID ALI**

**FACULTY NUMBER: 19COB103**

**COURSE : B. TECH**

**ENROLL. NUMBER : GL3125**

Assignment 2

$$F_1(w, n, y, z) = xy + \bar{w}z.$$

Converting  $F_1$  into Canonical SOP form,

$$F_1(w, n, y, z) = \bar{n}\bar{y}(z + \bar{z})(w + \bar{w}) + \bar{w}(n + \bar{n})(y + \bar{y})(z)$$

$$\begin{aligned} F_1(w, n, y, z) &= \bar{n}\bar{y}(z + \bar{z})(w + \bar{w}) + \bar{w}(n + \bar{n})(y + \bar{y})(z) \\ &= wxyz + wny\bar{z} + \bar{w}x\bar{y}z + \bar{w}x\bar{y}\bar{z} + \bar{w}ny^2 \\ &\quad + \bar{w}ny\bar{z} + \bar{w}\bar{n}\bar{y}z \end{aligned}$$

$$F_1(w, n, y, z) = \underline{\Sigma(1, 3, 4, 5, 7, 12, 13)}$$

8	1	0	1	0	0
1	0	1	0	0	0
0	0	0	1	1	0
0	0	1	1	1	0
0	1	1	0	0	0

$$F_2(w, n, y, z) = \bar{x}\bar{y}z + x\bar{y}z + x\bar{z}$$

$$\begin{aligned} &\Rightarrow \bar{x}\bar{y}z(w + \bar{w}) + x\bar{y}z(w + \bar{w}) + x\bar{z}(w + \bar{w})(y + \bar{y}) \\ &= w\bar{y}z + \bar{w}\bar{y}z + w\bar{y}z + \bar{w}x\bar{y}z + (wx\bar{z} + \bar{w}x\bar{z})(y + \bar{y}) \\ &= w\bar{y}z + \bar{w}\bar{y}z + \bar{w}x\bar{y}z + w\bar{y}z + wxy\bar{z} + wxy\bar{z} \\ &\quad + \bar{w}ny\bar{z} + \bar{w}ny\bar{z} \end{aligned}$$

$$F_2(w, n, y, z) = \underline{\Sigma(1, 4, 5, 6, 9, 13, 12, 14)}$$

A.w
110 - 10

$$F_3(w, n, y, z) = w\bar{y}\bar{z} + \bar{w}nz + ny\bar{z}$$

$$\begin{aligned} &\Rightarrow w(n + \bar{n})\bar{y}\bar{z} + \bar{w}n(y + \bar{y})z + ny\bar{z}(w + \bar{w}) \\ &= w\bar{y}\bar{z} + \bar{w}\bar{y}\bar{z} + \bar{w}nyz + \bar{w}ny\bar{z} + wny\bar{z} + \bar{w}nyz \end{aligned}$$

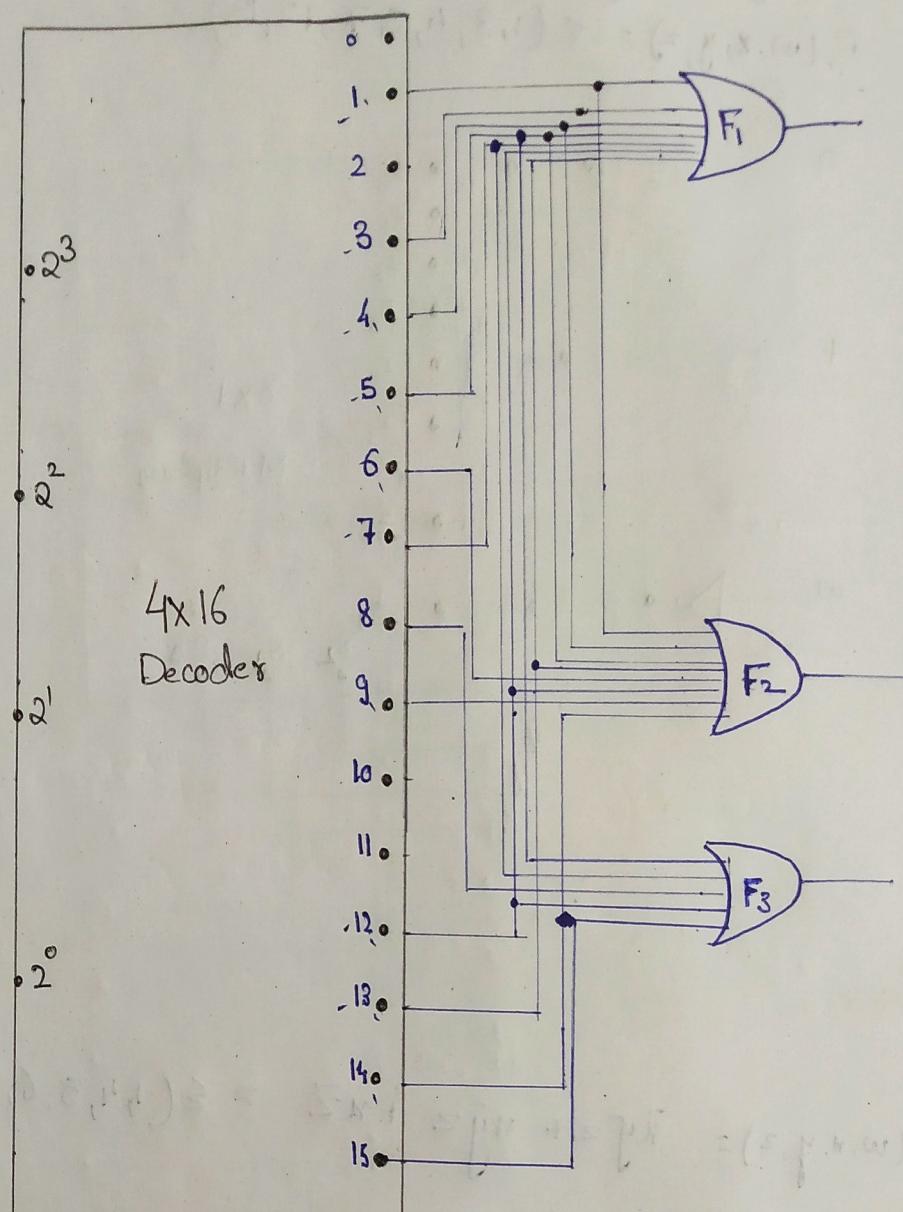
$$F_3(w, n, y, z) = \underline{\Sigma(5, 7, 8, 12, 15)}$$

w	x	y	z	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>
0	0	0	0	0	0	0
0	0	0	1	1	1	0
0	0	1	0	0	0	0
0	0	1	1	1	0	0
0	1	0	0	1	1	1
0	1	0	1	1	1	0
0	1	1	0	0	1	1
0	1	1	1	1	0	1
1	0	0	0	0	0	1
1	0	0	1	0	1	0
1	0	1	0	0	0	0
1	0	1	1	0	0	0
1	1	0	0	1	1	0
1	1	0	1	1	1	0
1	1	1	0	0	1	1
1	1	1	1	0	0	0

Using Decoder:

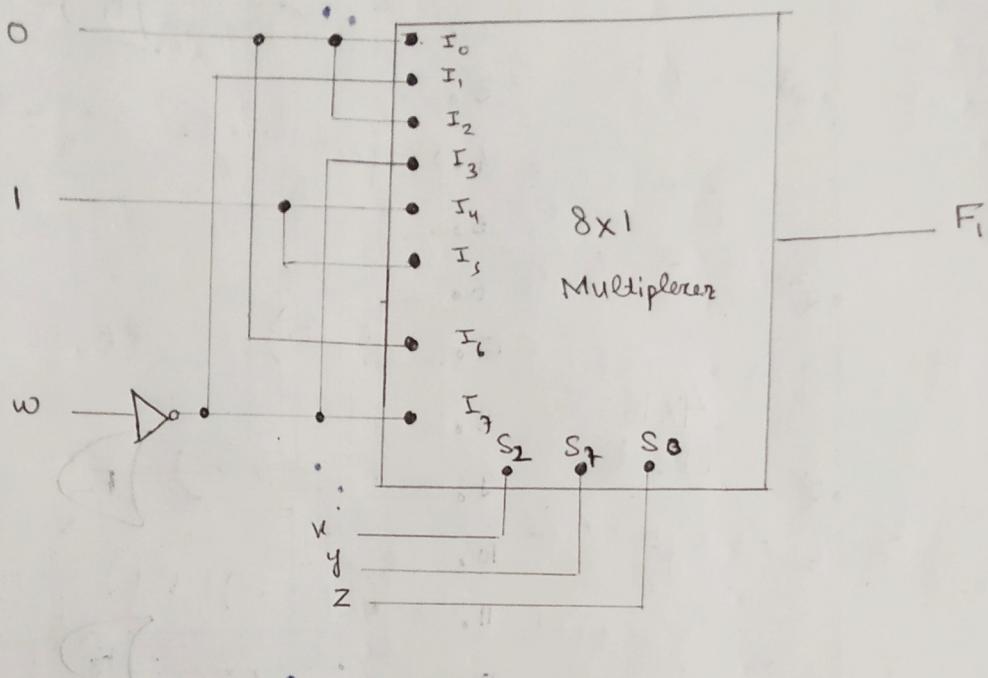
No of input var:  $\frac{4}{2} = 2^4 = 16$

$\therefore 4 \times 16$  decoders will be used.

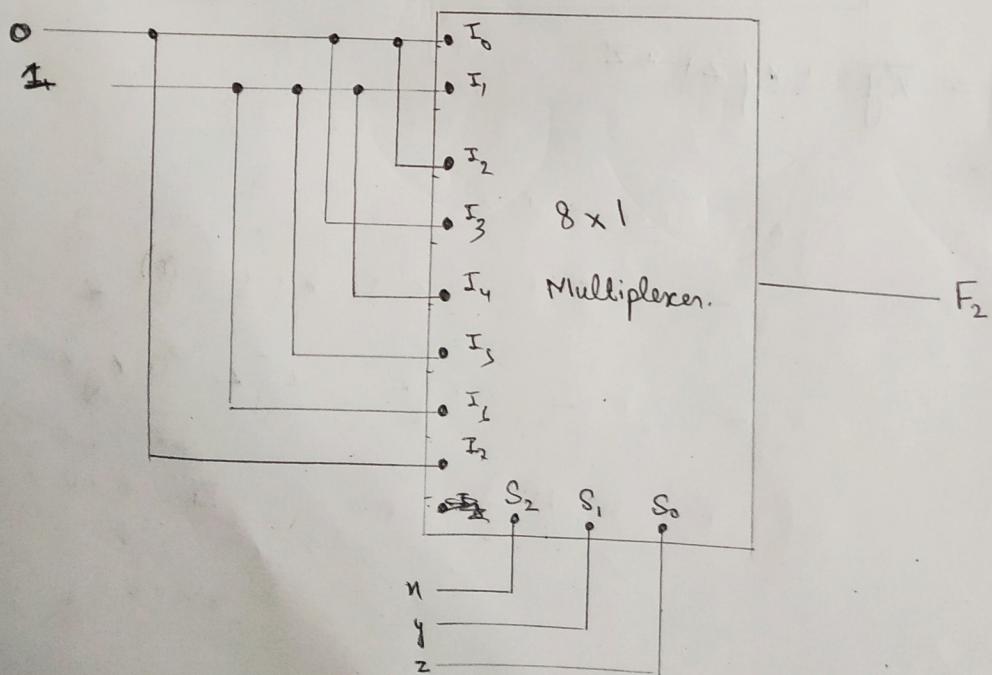


$$F_1(w, n, y, z) = \bar{x}\bar{y} + \bar{w}z$$

$$F_1(w, x, y, z) = \Sigma(1, 3, 4, 5, 7, 12, 13)$$

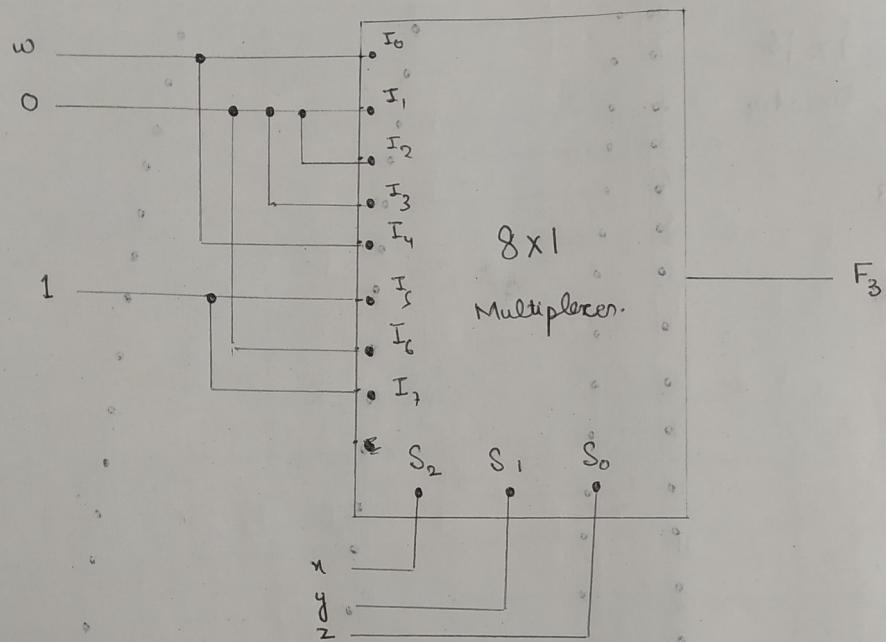


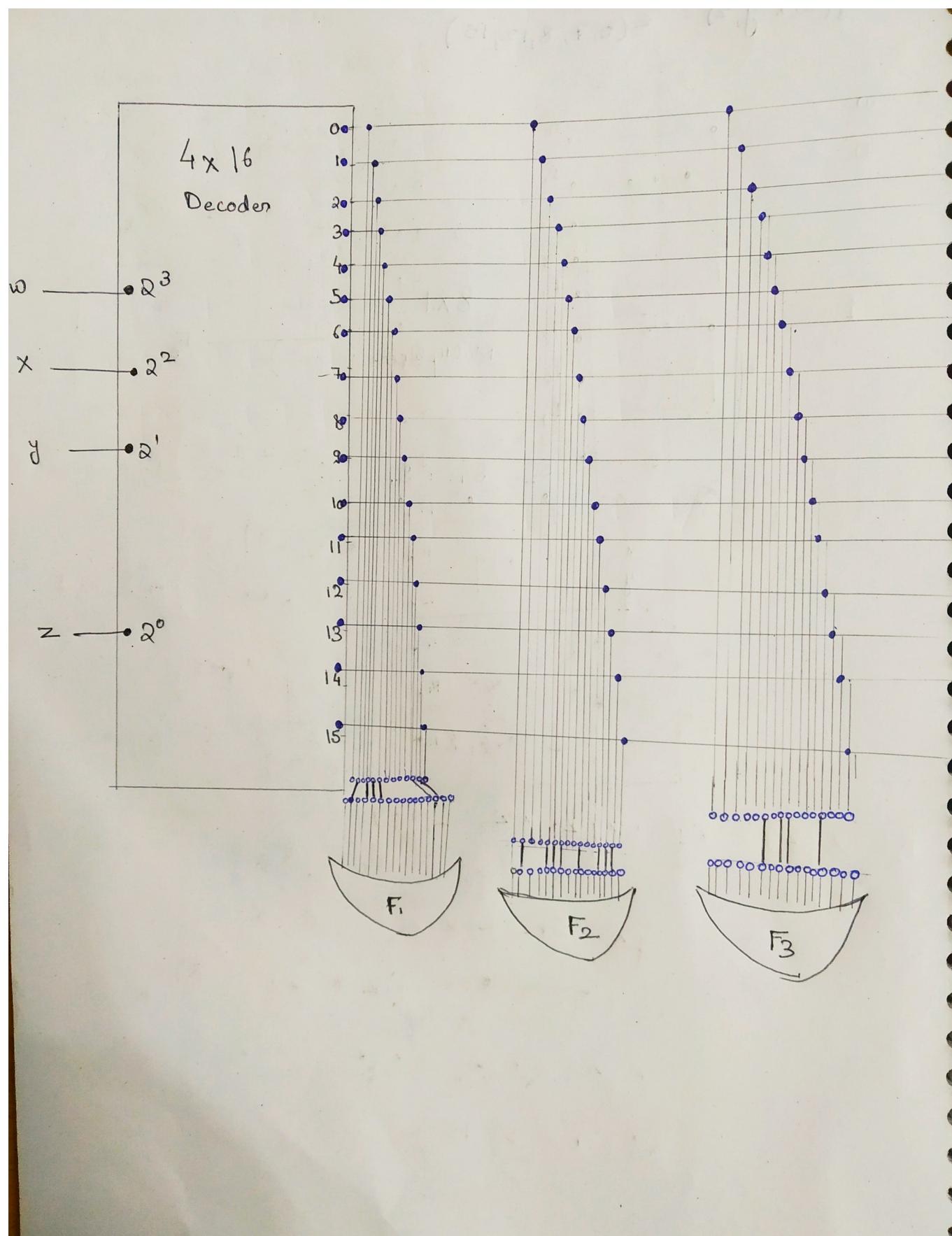
$$F_2(w, n, y, z) = \bar{x}yz + ny\bar{z} + n\bar{z} = \Sigma(1, 4, 5, 6, 9, 12, 13, 14)$$



$$F_3(w, x, y, z) = w\bar{y}\bar{z} + \bar{w}xz + \bar{w}y\bar{z}$$

$$F_3(w, x, y, z) = \Sigma(5, 7, 8, 12, 15)$$





F<sub>1</sub>

wx\y <sup>2</sup>	00	01	11	10
00		1	1	
01	1	1	1	
11	1	1		
10				

$$F_1(w, x, y, z) = xy' + \bar{w}z$$

wx\y <sup>2</sup>	00	01	11	10
00	0			0
01				0
11			0	0
10	0	0	0	0

$$F'_1(w, x, y, z) = w'x' + y^2 + \bar{x}\bar{z} + wz$$

F<sub>2</sub>

wx\y <sup>2</sup>	00	01	11	10
00		1		
01	1	1		1
11	1	1		
10				

$$F_2(w, x, y, z) = \bar{y}^2 + \bar{x}\bar{z}$$

wx\y <sup>2</sup>	00	01	11	10
00	0		0	0
01			0	
11			0	
10	0	0	0	0

$$F'_2(w, x, y, z) = yz + \bar{x}\bar{z}$$

F<sub>3</sub>

wx\y <sup>2</sup>	00	01	11	10
00				
01		1	1	
11	1		1	
10	1			

$$F_3(w, x, y, z) = w\bar{y}\bar{z} + \bar{w}xz + wyz$$

wx\y <sup>2</sup>	00	01	11	10
00	0	0	0	0
01	0			0
10	0			0
11	0	0	0	0

$$F'_3(w, x, y, z) = \bar{w}\bar{x} + w\bar{y}z + w\bar{y}\bar{z} + y\bar{z} + w\bar{y}z$$

Product Term.	Inputs				Outputs		
	w	x	y	z	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>
$x\bar{y}$	-	1	0	-	1	-	-
$\bar{w}z$	0	-	-	1	1	-	-
$\bar{y}z$	-	-	0	1	-	1	-
$w\bar{z}$	-	1	-	0	-	1	-
$w\bar{y}\bar{z}$	1	-	0	0	-	-	1
$\bar{w}yz$	0	1	-	1	-	-	1
$xyz$	-	1	1	1	-	-	1
	1	0	1	0	T	T	T/C
	0	0	1	0			

$$\Sigma x + \Sigma \bar{B} = (\Sigma p, N) \oplus T$$

$$\Sigma N + \Sigma \bar{B} = (\Sigma p, N) \oplus T$$

