Final

LAB-SHEET 20/10/2024

Exp no: 1

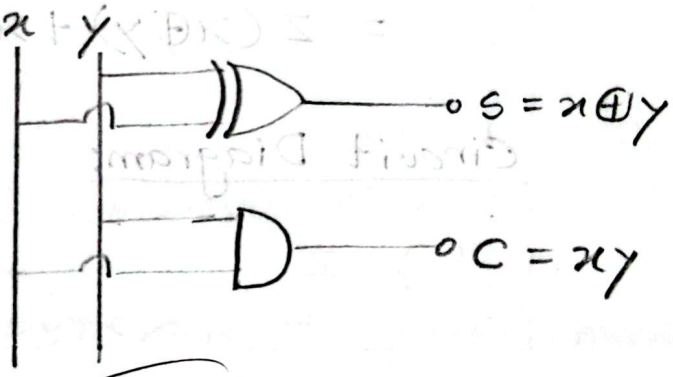
Exp name: Implementing Full-Adder by using Half-Adder and basic logic gates.

Half-Adder: (Truth Table)

x	y	s	c
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

$S = xy' + x'y = x \oplus y$

$C = xy$



circuit digram

Full-Adder: (Truth Table)

x	y	z	s	c
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

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

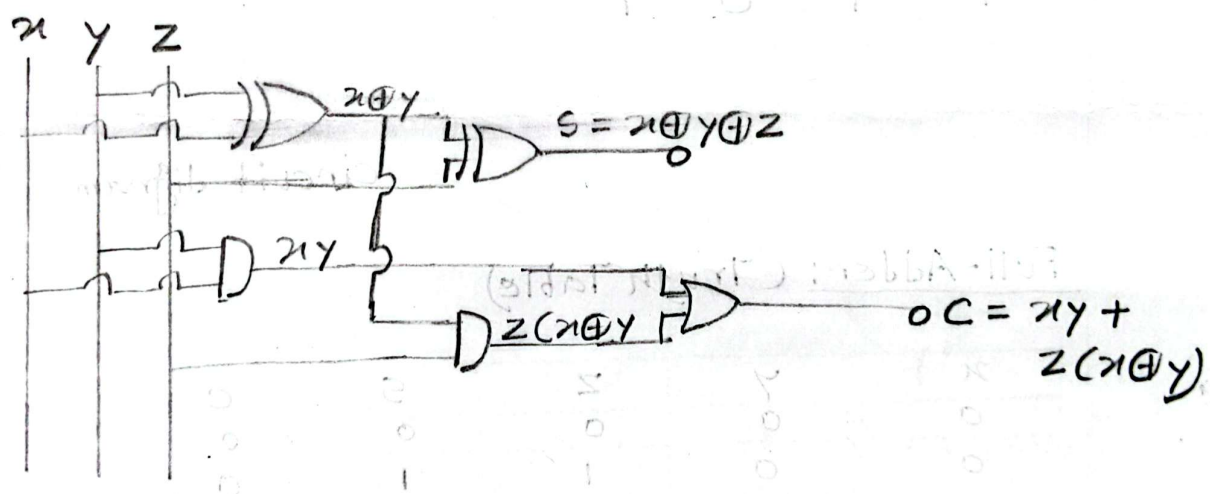
$C = x'yz + xy'z + xyz' + xyz$

Implementation of Full-Adder by using Half-Adder

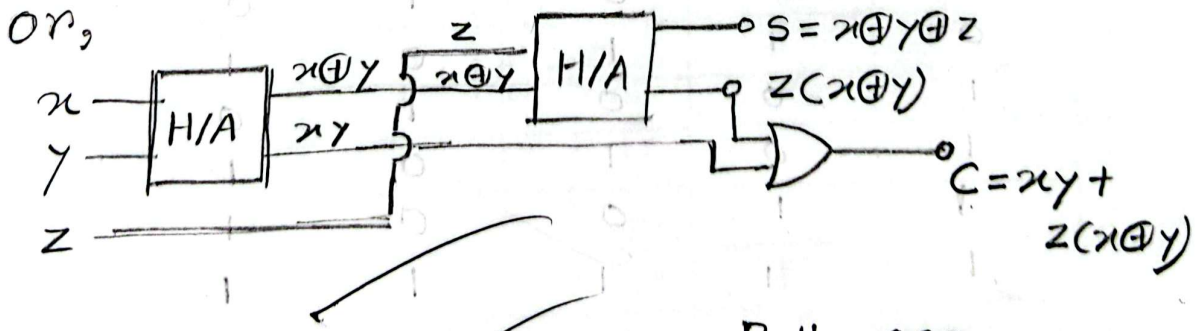
$$S = x'y'z + x'yz' + xy'z' + xyz$$
$$= z'(x'y + xy') + z(xy + x'y')$$
$$= z'(x \oplus y) + z(x \oplus y)'$$
$$= x \oplus y \oplus z$$

$$C = x'yz + xy'z + xyz' + xyz$$
$$= z(x'y + xy') + xy(z + z')$$
$$= z(x \oplus y) + xy$$

Circuit Diagram:



Or,



Rolls: 089
115
116
118
306
250

20/10/2024

Exp no. 3

Lab sheet

03/11/2024

Experiment Name: Implementation of half adder circuit using 2 to 4 line decoder with enable input.

Half adder: (Truth Table)

x	y	s	c
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

$s = \bar{x}y + x\bar{y}$ (1,2) → minterm

$c = xy$ (3) → minterm.

2 to 4 line decoder:

E	$I_1 I_0$	Y_3	Y_2	Y_1	Y_0
0	XX	0	0	0	0
1	00	0	0	0	1
1	01	0	0	1	0
1	10	0	1	0	0
1	11	1	0	0	0

$Y_0 = I_1 \cdot I_0$

$y_1 = I_1' I_0$

$y_2 = I_1 I_0'$

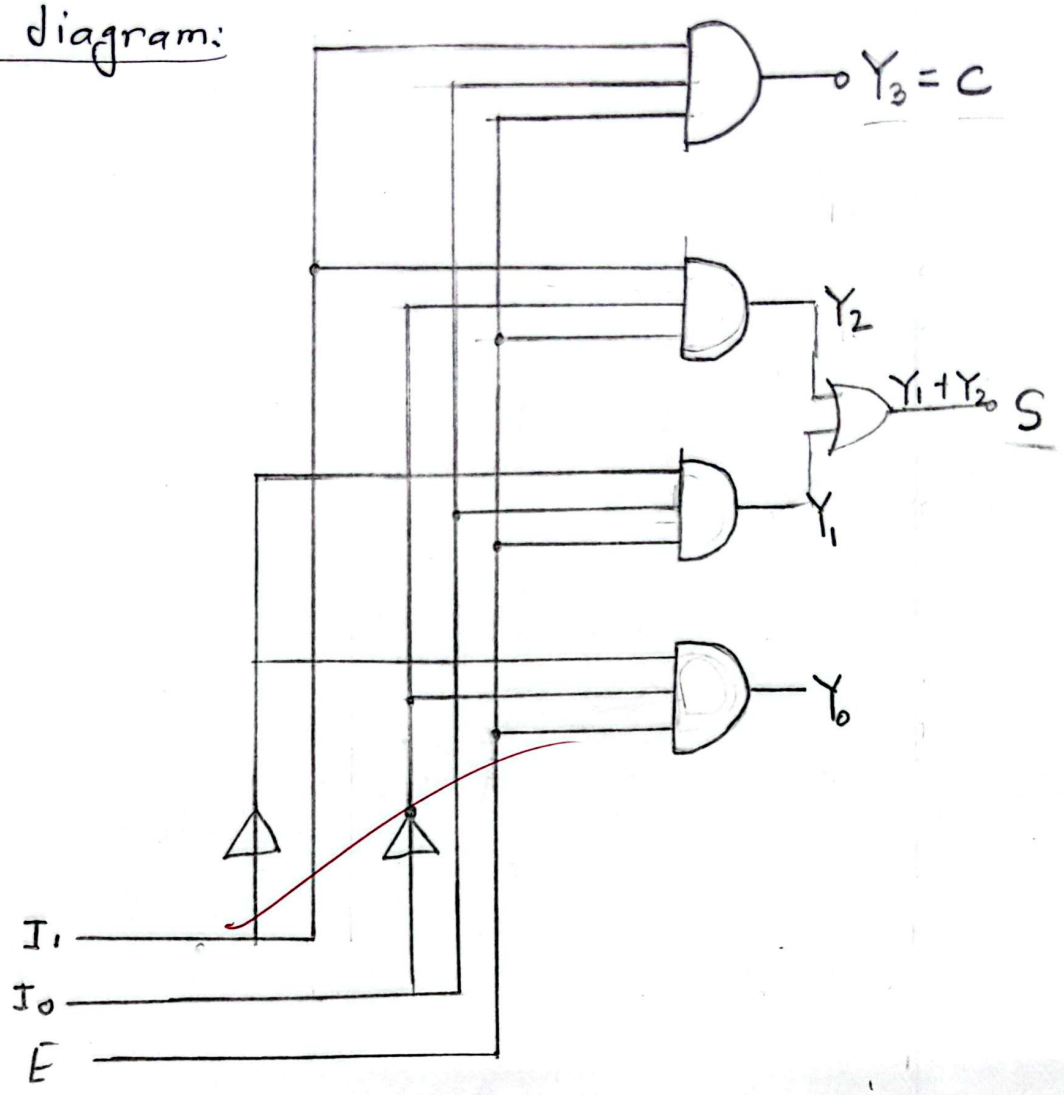
$y_3 = I_1 I_0$

} E is always 1

$\therefore S = y_1 + y_2$

$C = [illegible]$

Circuit diagram:



ID: 306, 118, 250, 089

3/11/2024

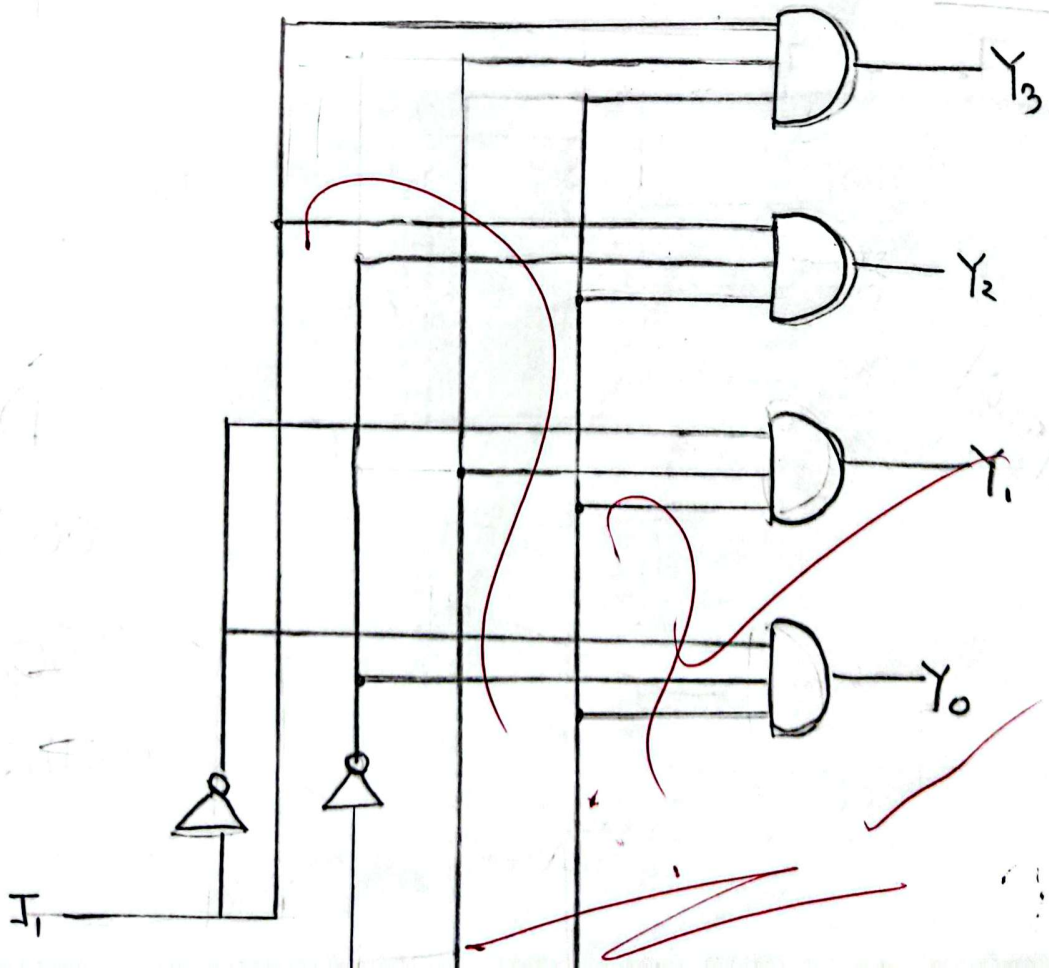
Experiment No:4

Experiment name: Design a 3 to 8 line decoder by using 2 to 4 line decoder.

E	I_1 I_0	Y_3 Y_2 Y_1 Y_0
0	X X	0 0 0 0
1	0 0	0 0 0 1
1	0 1	0 0 1 0
1	1 0	0 1 0 0
1	1 1	1 0 0 0

→ 2 to 4 line decoder

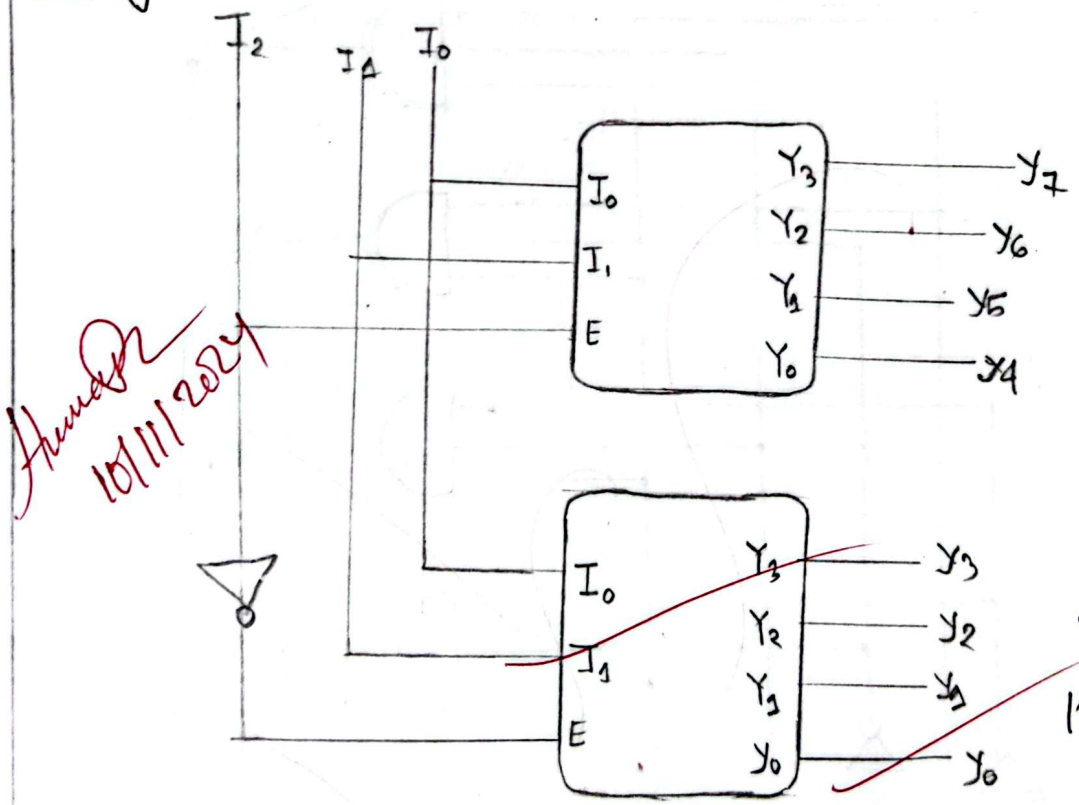
Circuit Diagram:



3 to 8 line decoder:

I_2 I_1 I_0	Y_7	Y_6	Y_5	Y_4	Y_3	Y_2	Y_1	Y_0
0 0 0	0	0	0	0	0	0	0	1
0 0 1	0	0	0	0	0	0	1	0
0 1 0	0	0	0	0	0	1	0	0
0 1 1	0	0	0	0	1	0	0	0
1 0 0	0	0	0	1	0	0	0	0
1 0 1	0	0	1	0	0	0	0	0
1 1 0	0	1	0	0	0	0	0	0
1 1 1	1	0	0	0	0	0	0	0

Diagram:



10/11/2024

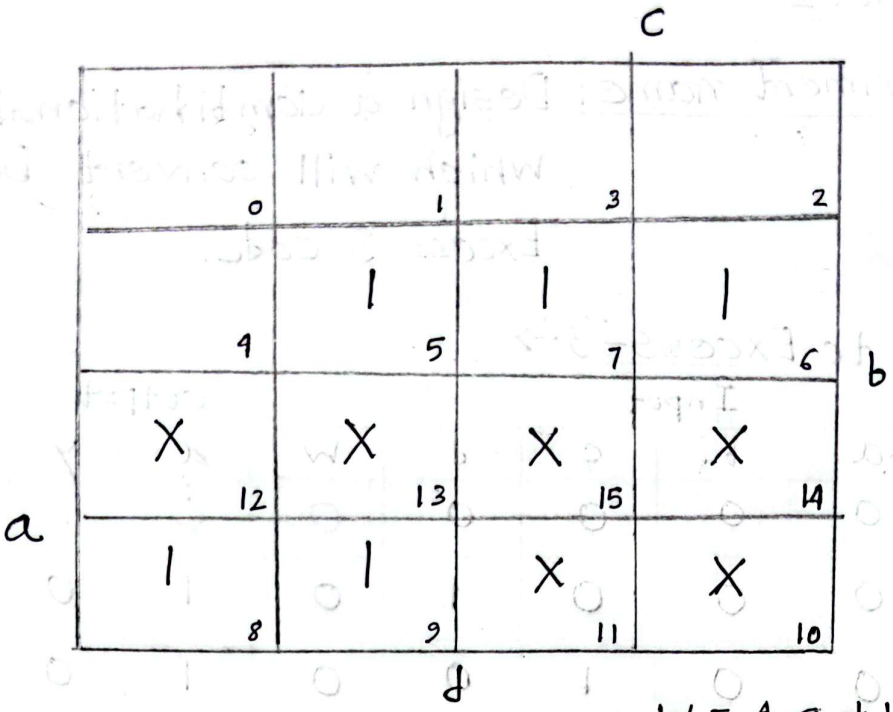
ID
306, 118,
250, 201,
175, 116,

Exp no: 2

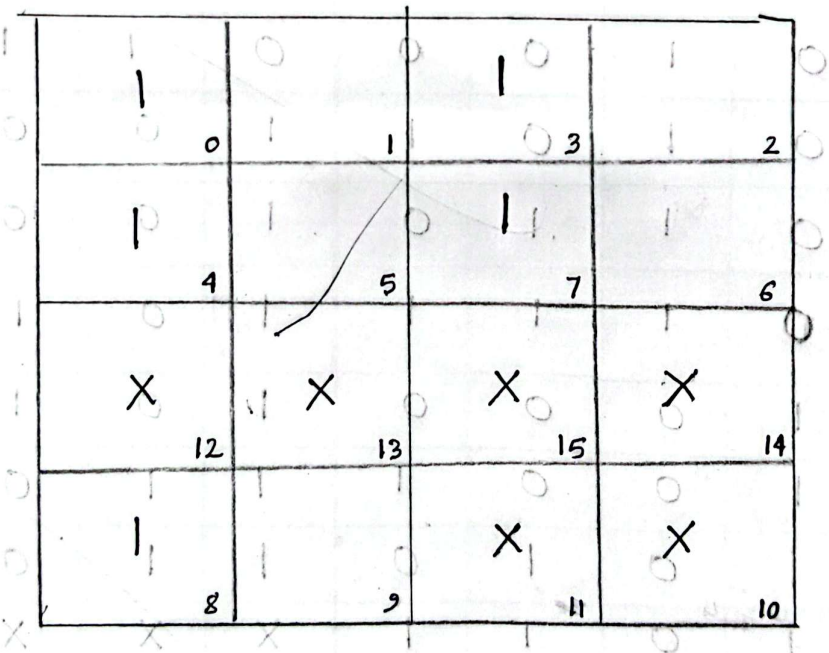
Experiment name: Design a combinational circuit which will convert BCD code to Excess 3 code.

BCD to Excess-3 →

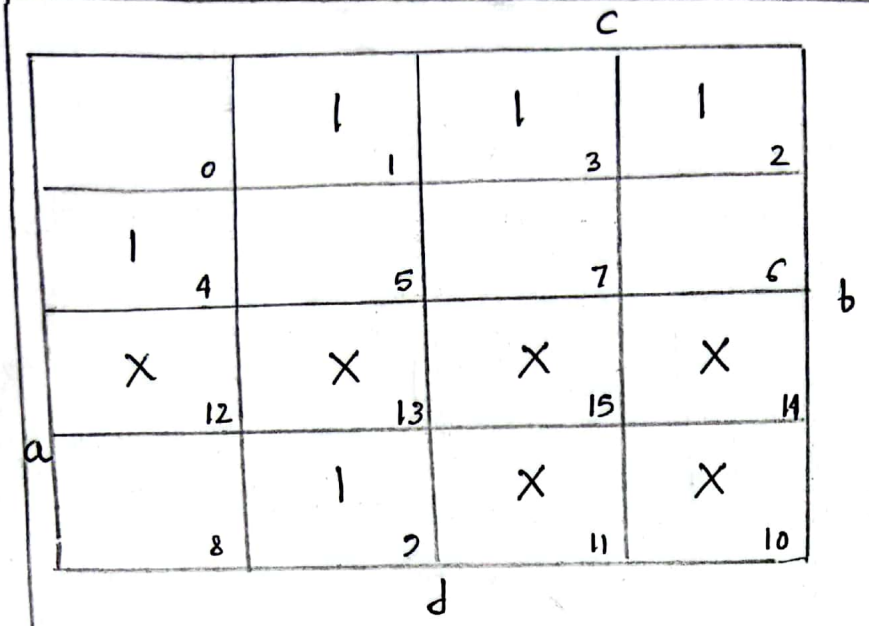
Input				output			
a	b	c	d	w	x	y	z
0	0	0	0	0	0	1	1
0	0	0	1	0	1	0	0
0	0	1	0	0	1	0	1
0	0	1	1	0	1	1	0
0	1	0	0	0	1	1	1
0	1	0	1	1	0	0	0
0	1	1	0	1	0	0	1
0	1	1	1	1	0	1	0
1	0	0	0	1	0	1	1
1	0	0	1	1	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	X	X	X	X
1	1	0	0	X	X	X	X
1	1	0	1	X	X	X	X
1	1	1	0	X	X	X	X
1	1	1	1	X	X	X	X



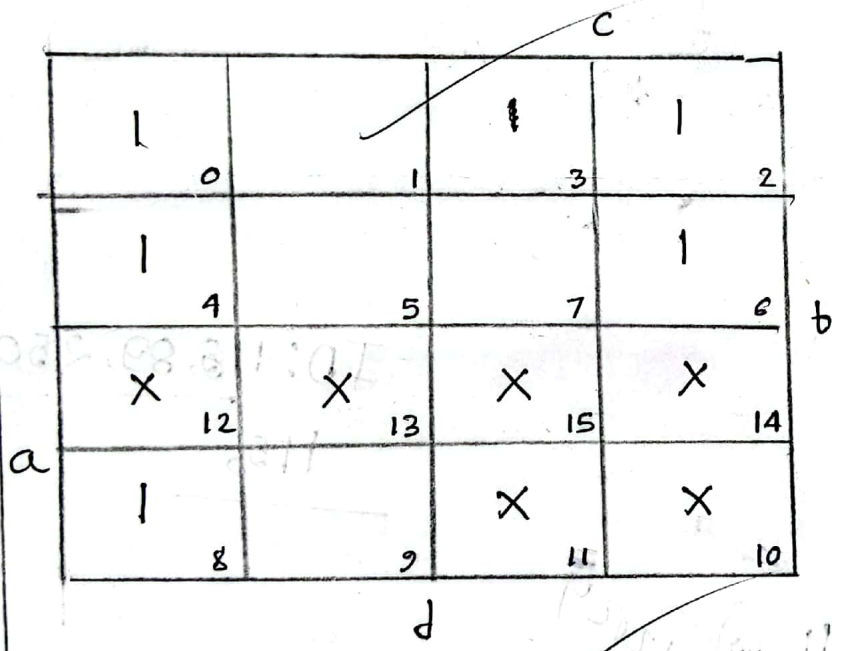
$W = a + bC + bd$



$Y = C'd' + Cd$



$x = b'c + b'd + bc'd'$



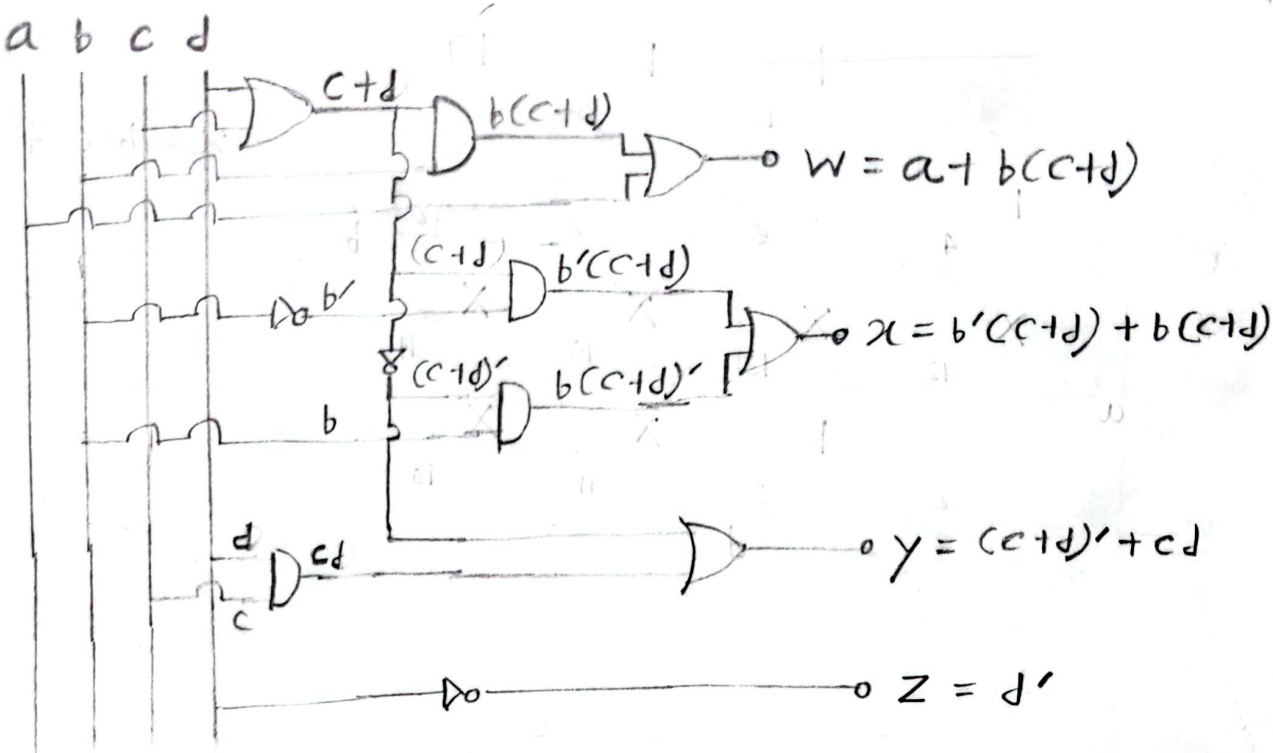
$z = d'$

$\therefore w = \cancel{A+}\ a + b(c+d)$

$x = b'(c+d) + b(c+d)'$

$y = (c+d)' + cd$

$z = d'$



ID: 118, 89, 250, 306, 115,

27/10/2024