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Roll No: 20P-0149
Assignment: DLD LAB Assignment
Section: 2C2

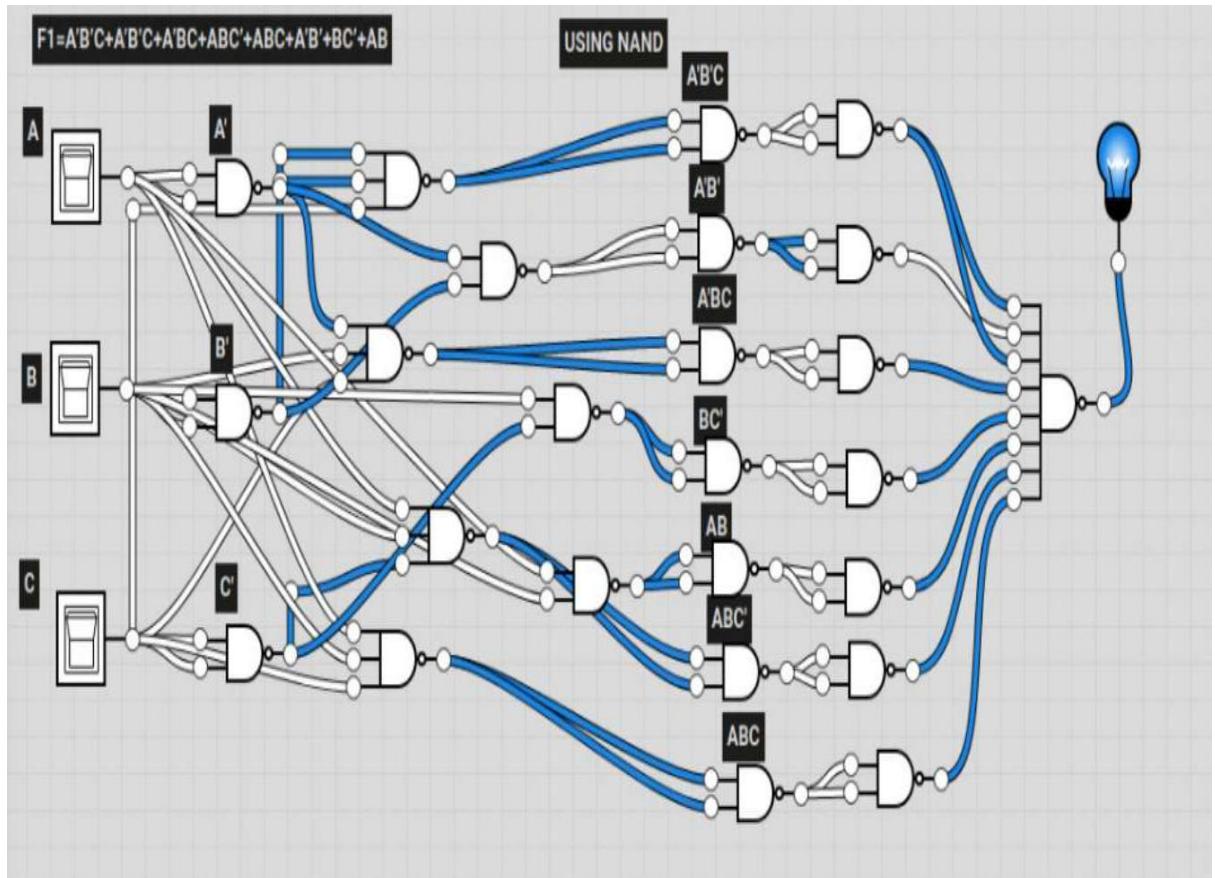
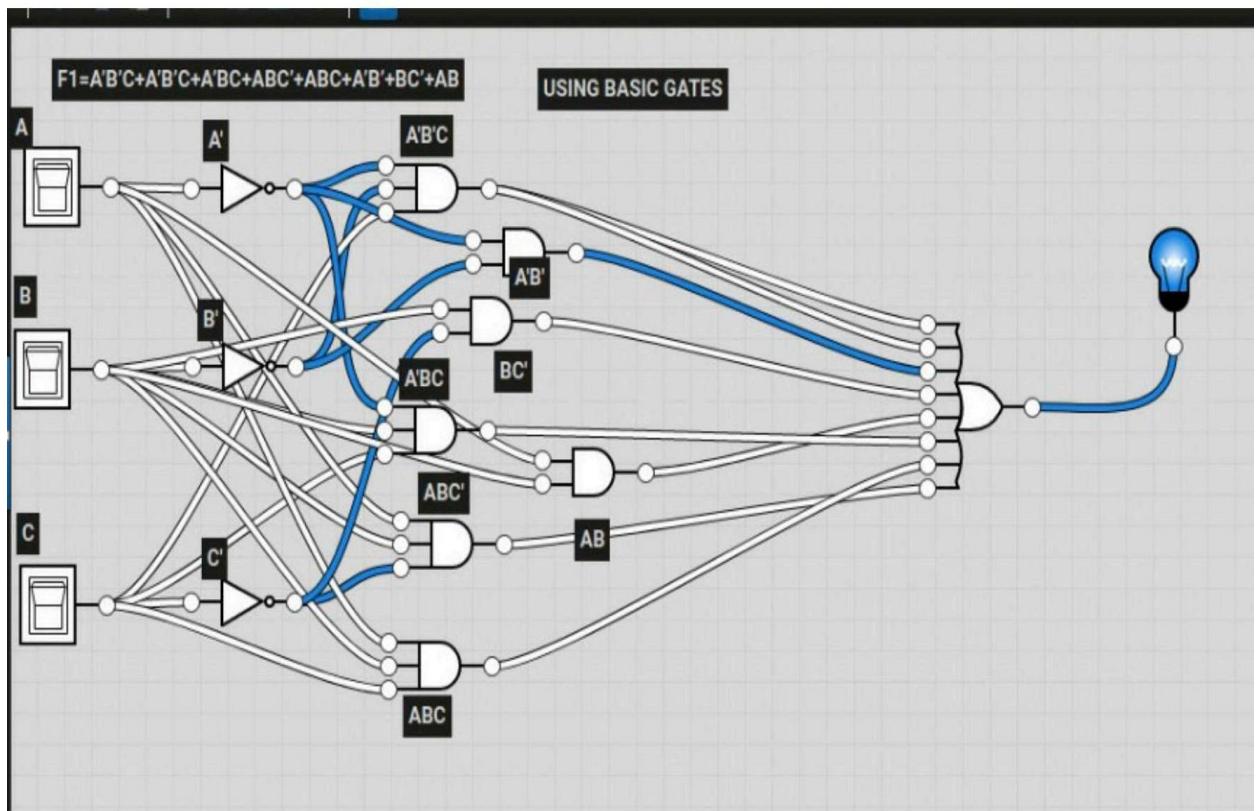
Truth table of f_1

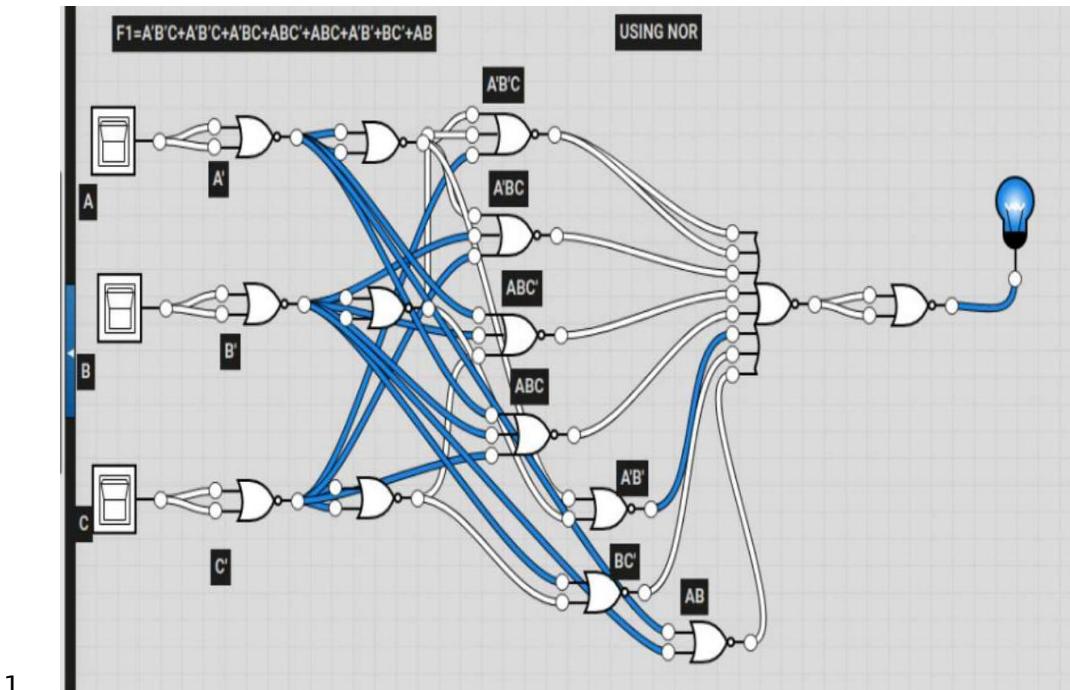
$$f_1 = A'B'C + A'B'C' + A'BC + ABC' + ABC + A'B^2$$
$$+ BC + AB$$

A	B	C	f_1
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

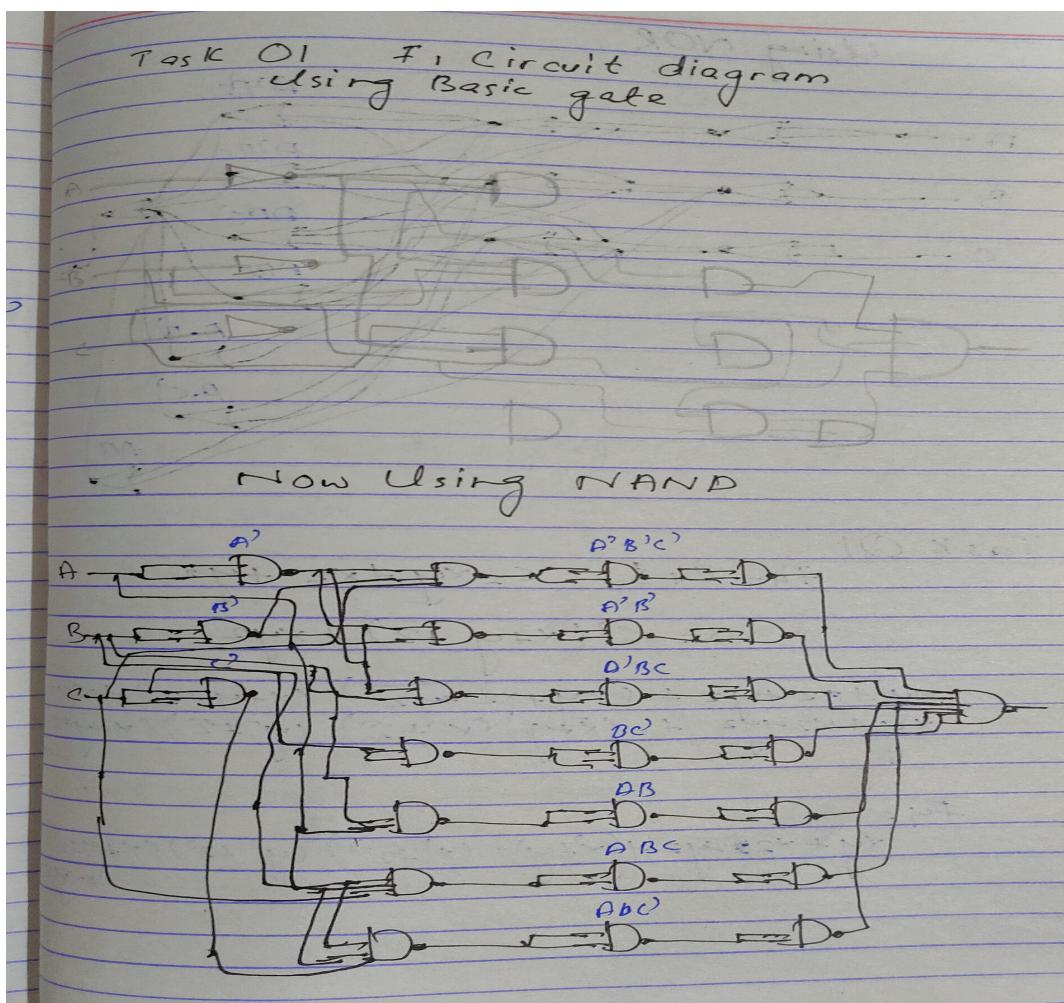
IC Used in making Logical circuit by basic gate

IC Name	IC Number
=> AND	7408
=> OR	7432
=> NOT	7404
=> NAND	7400
=> NOR	7402

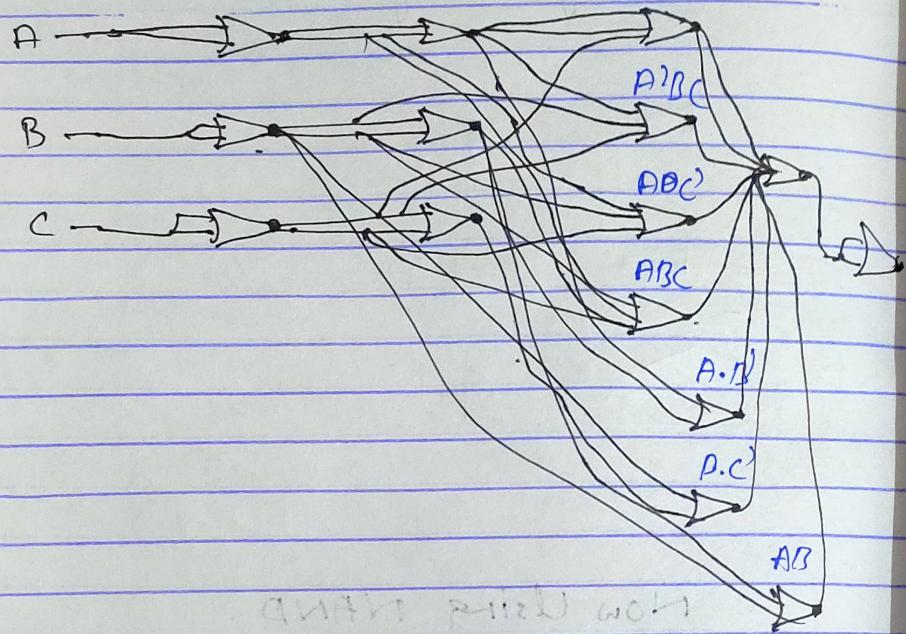




1.



Using NOR



Task 01

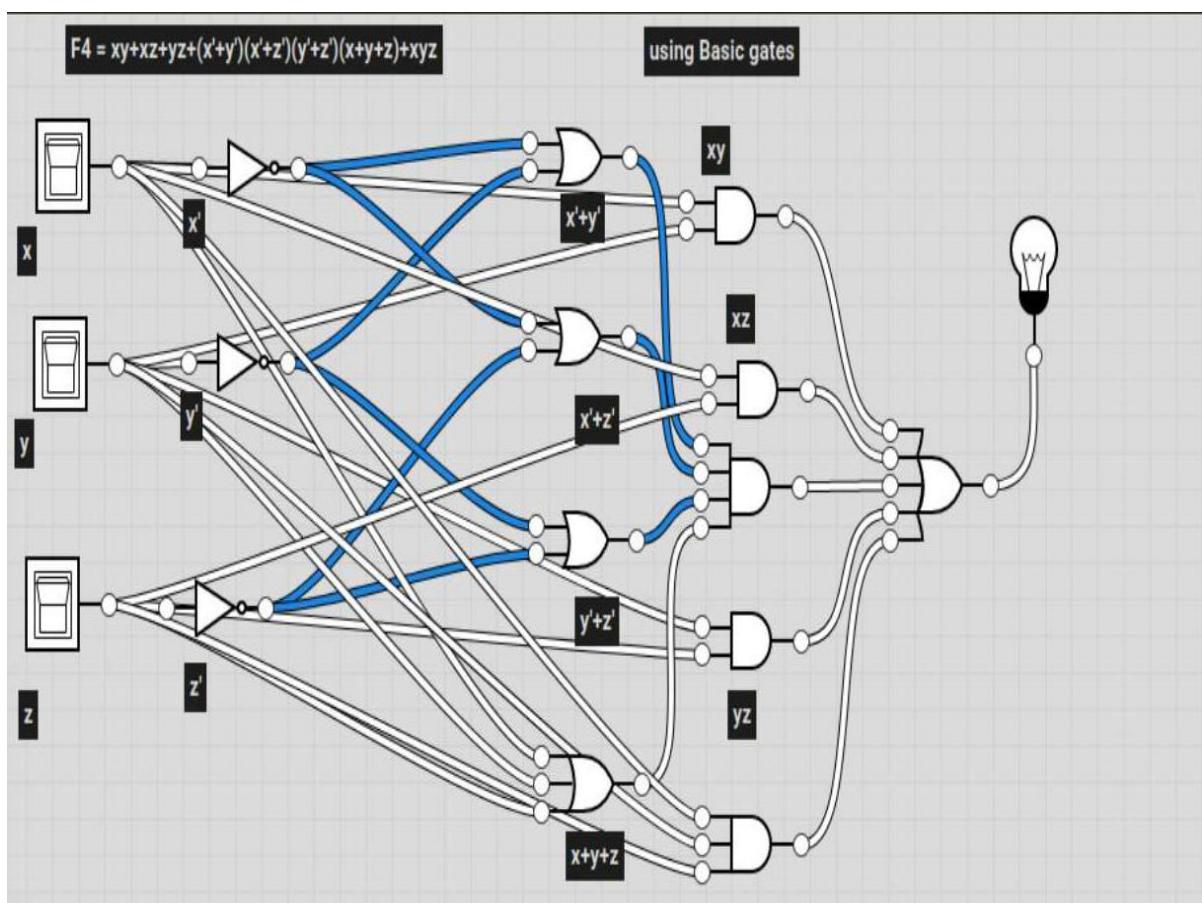
$$F_4 = C + S \quad C = xy + xz + yz$$

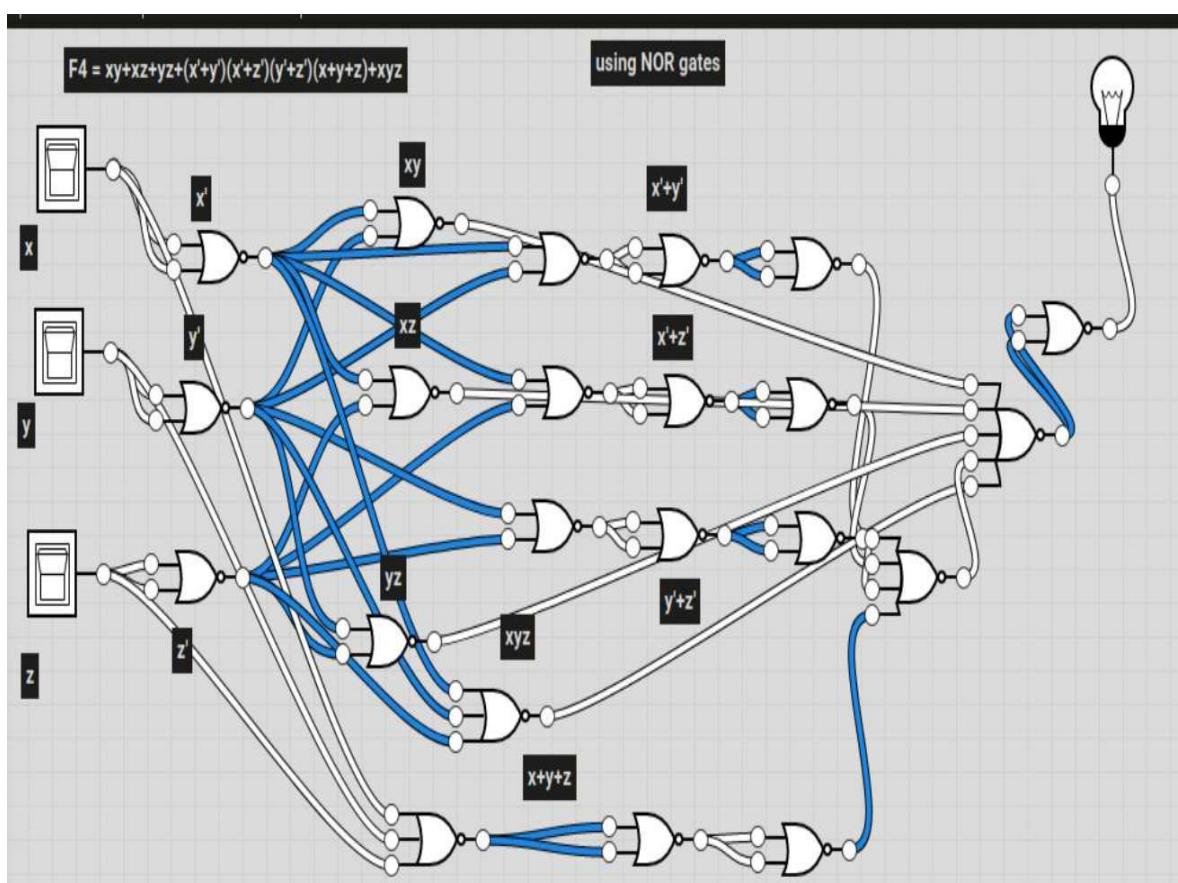
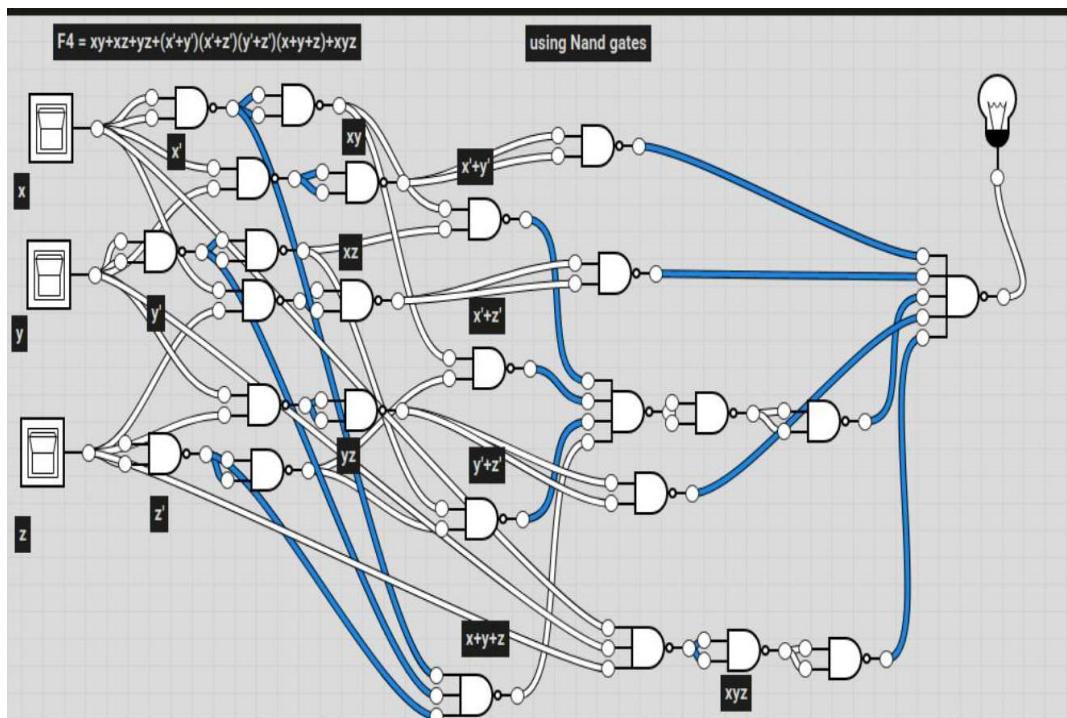
$$S = C'(x+y+z) + xyz$$

$$\begin{aligned} & xy + xz + yz + (xy + xz + yz)'(x+y+z) + xyz \\ & xy + xz + yz + (x'y)(x+z)(y+z)(x+y+z) \end{aligned}$$

$$\begin{aligned} F_4 = & xy + xz + yz + (x'y)(x+z)(y+z)(x+y+z) \\ & + xyz \end{aligned}$$

x	y	z	F ₄
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

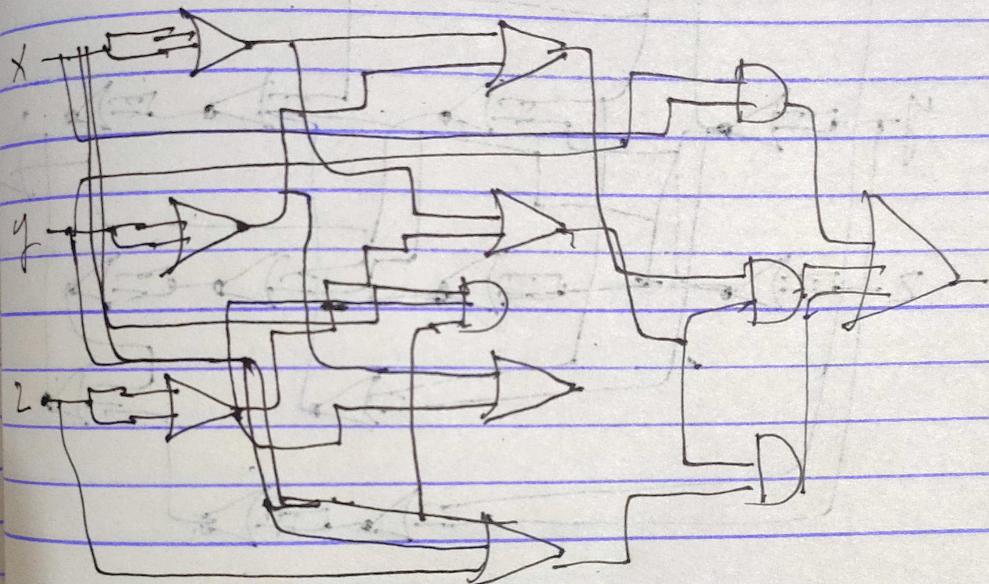




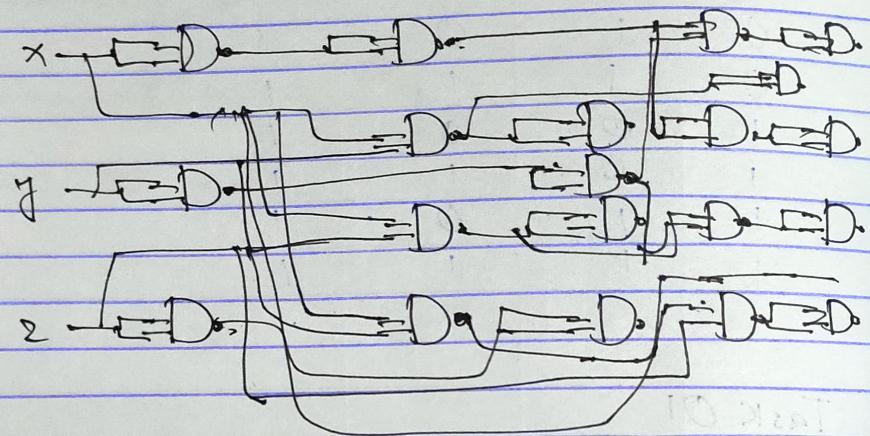
Task 01

b) $F_4 = xy + xz + yz + (x' + y')(x' + z)(x + y + z) \{ x + y + z \} \neq xyz$

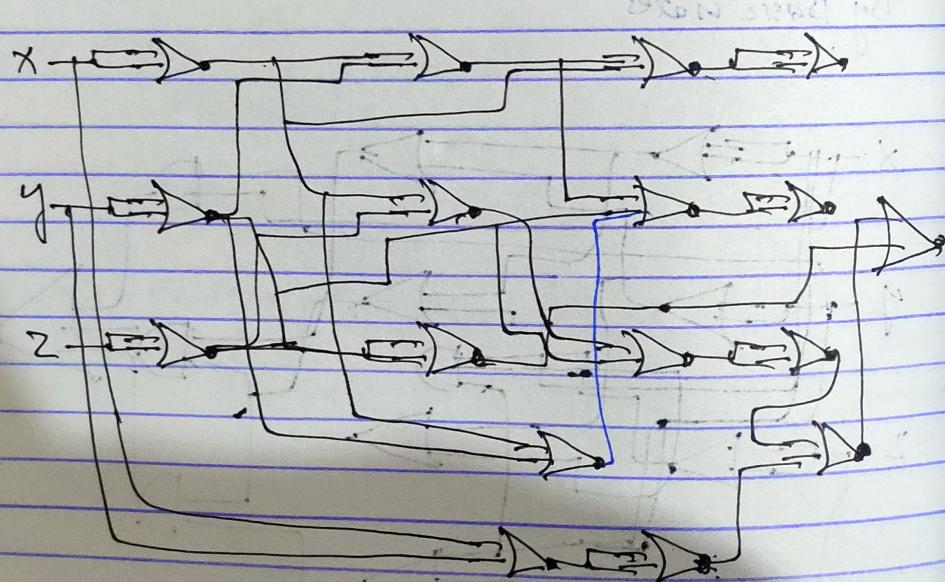
By Basic Gates



Now By using Nor



Now Using NOR



$$F_3 = AB + A'B'D + A'B + AB'C'D$$

A	B	C	D	F
---	---	---	---	---

0	0	0	0	0
---	---	---	---	---

0	0	0	1	1
---	---	---	---	---

0	0	0	0	0
---	---	---	---	---

0	0	1	1	1
---	---	---	---	---

0	1	0	0	1
---	---	---	---	---

0	1	0	1	1
---	---	---	---	---

0	1	1	0	1
---	---	---	---	---

0	1	1	1	1
---	---	---	---	---

1	0	0	0	0
---	---	---	---	---

1	0	0	1	1
---	---	---	---	---

1	0	1	0	0
---	---	---	---	---

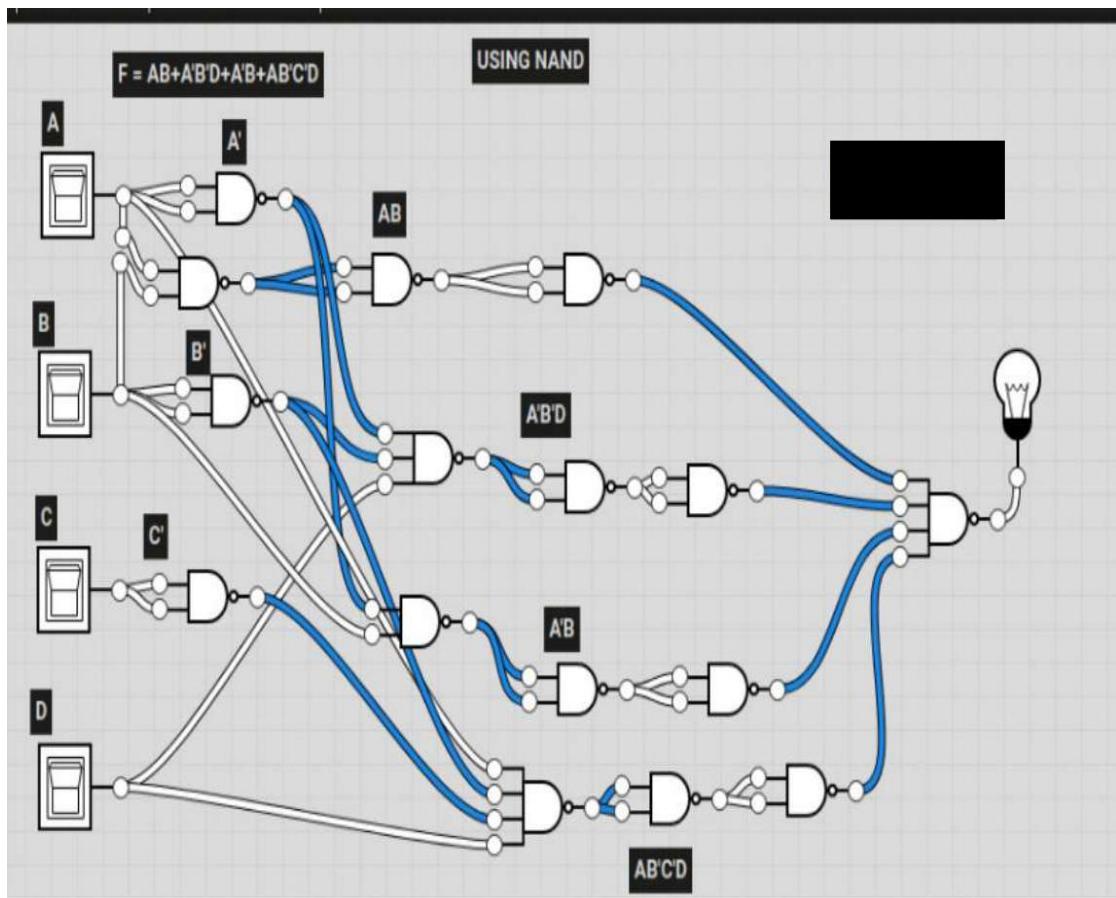
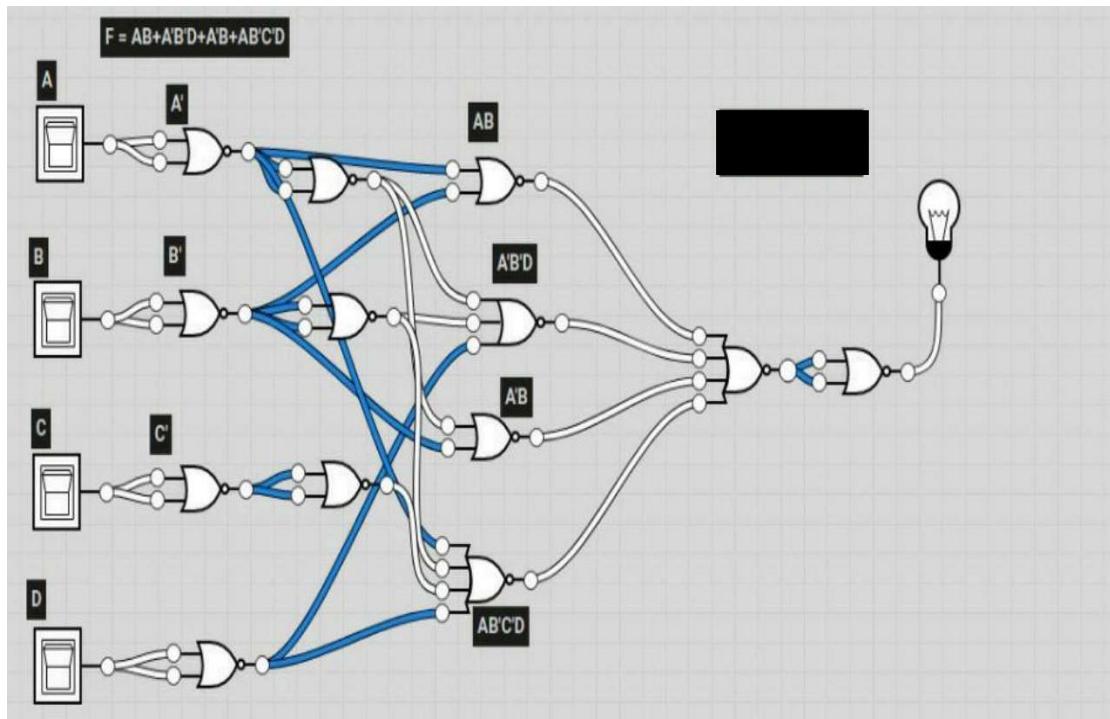
1	0	1	1	0
---	---	---	---	---

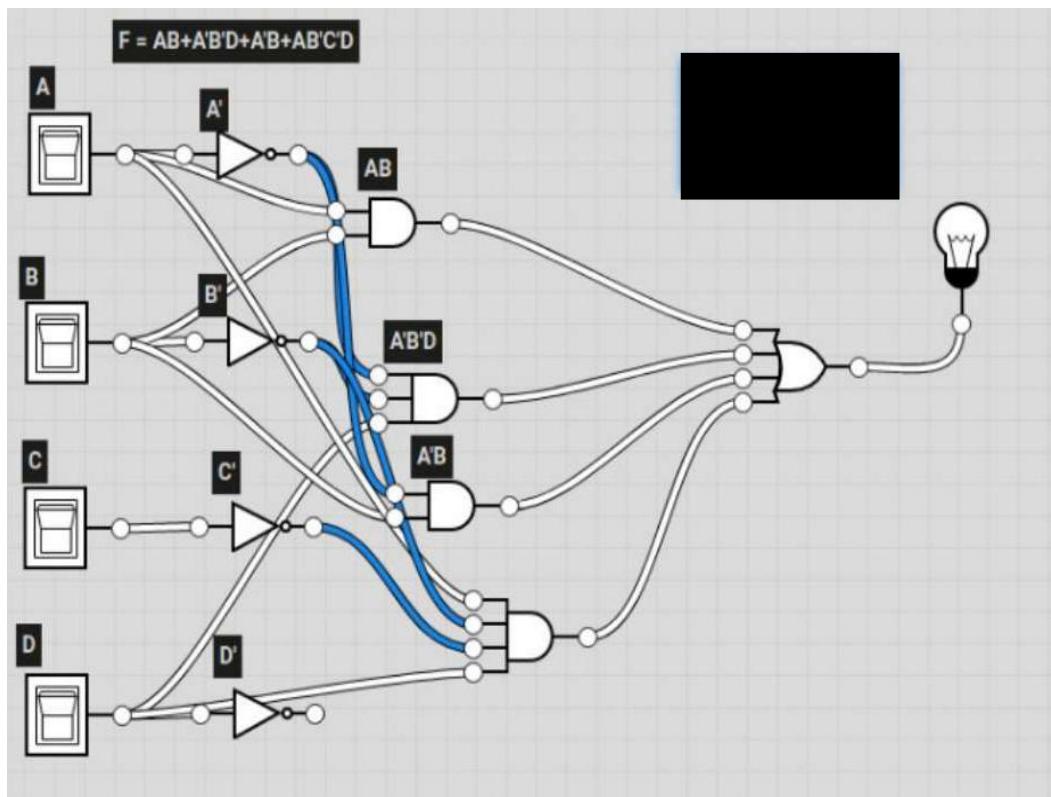
1	1	0	0	1
---	---	---	---	---

1	1	0	1	1
---	---	---	---	---

1	1	1	0	1
---	---	---	---	---

1	1	1	1	1
---	---	---	---	---

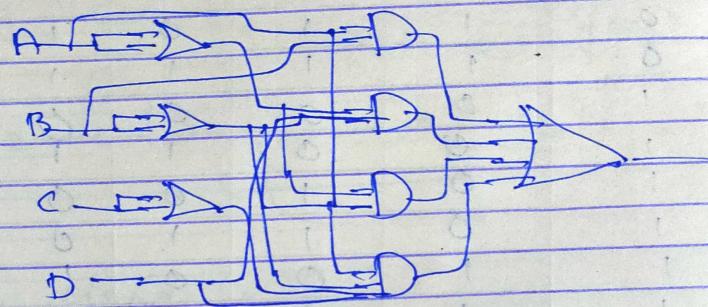




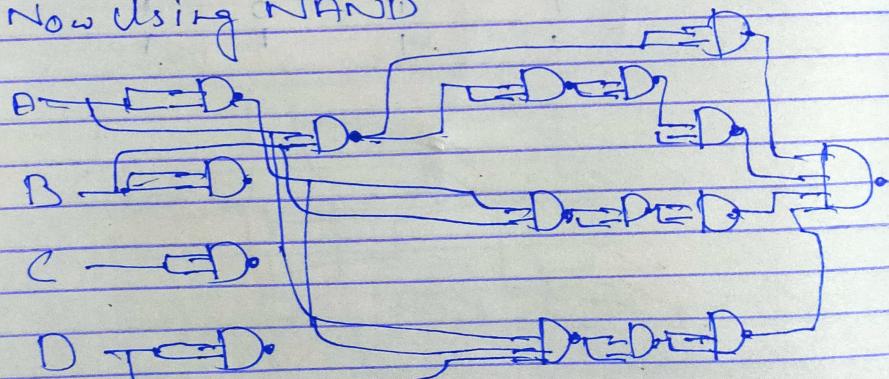
Task O2
Circuit Diagram

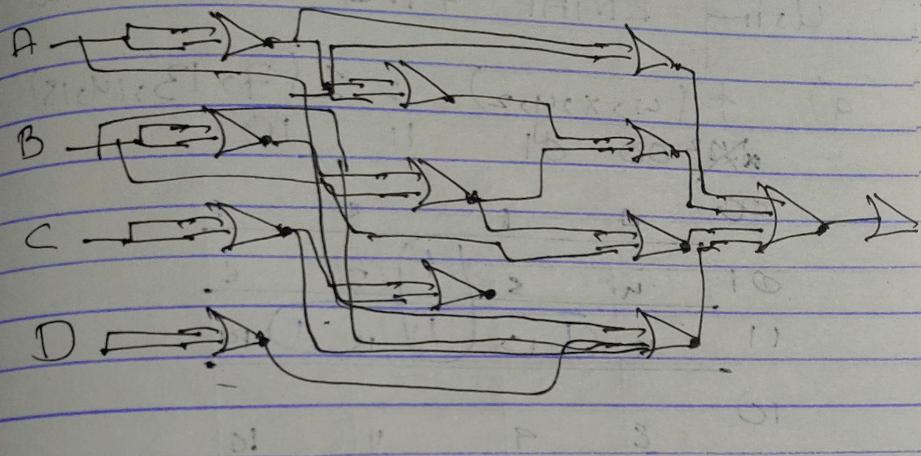
$$F_3 = AB + A'B'D + BB + AB'C'D$$

using Basic Gates



Now Using NAND





$$F_4 = C + S$$

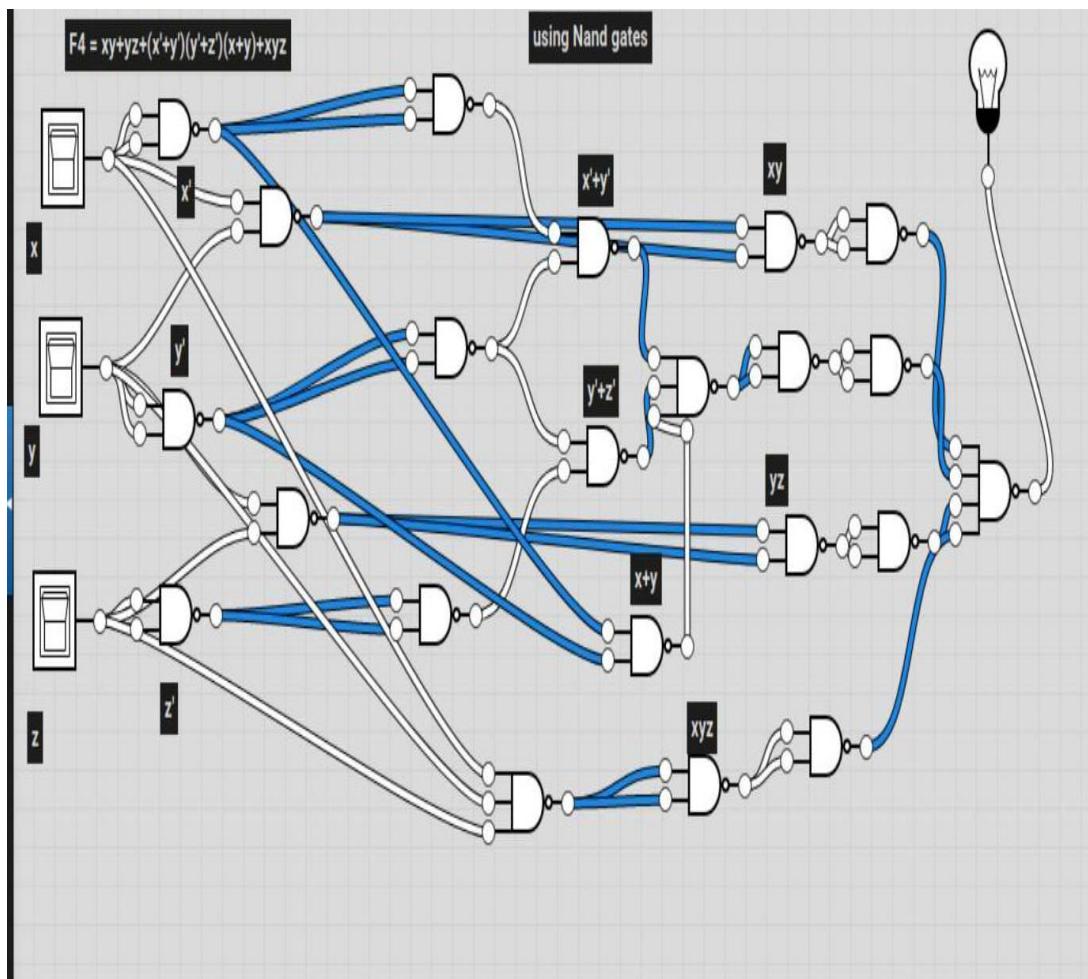
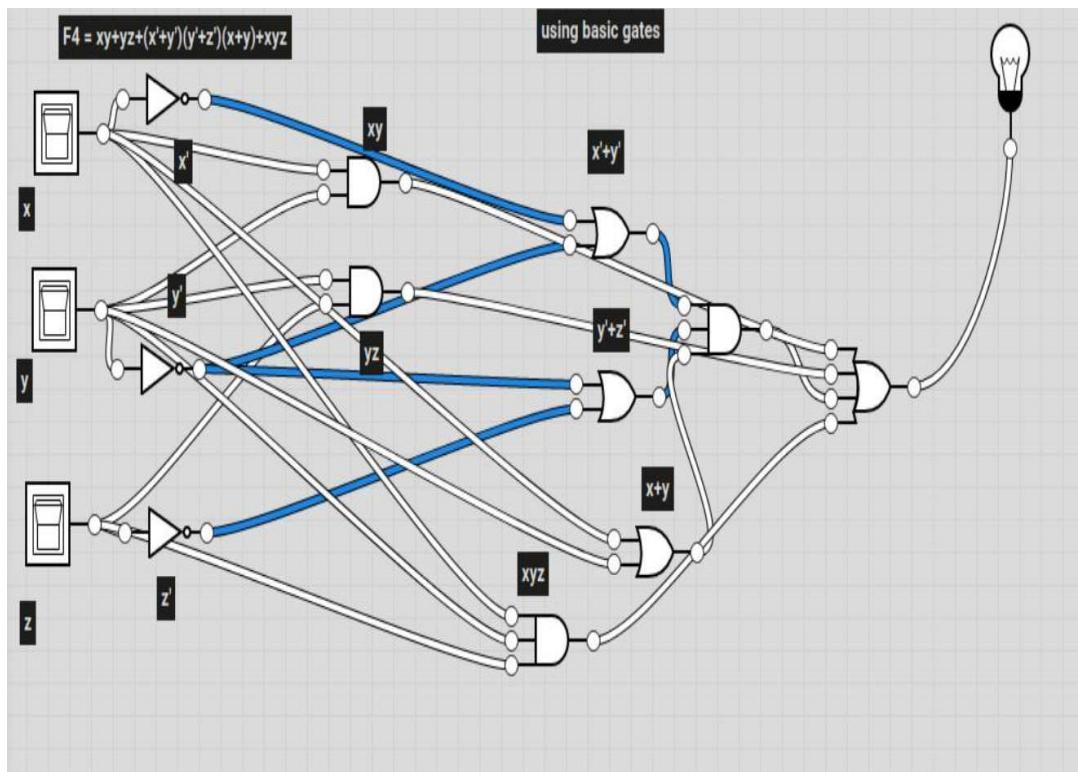
$$C = xy + yz$$

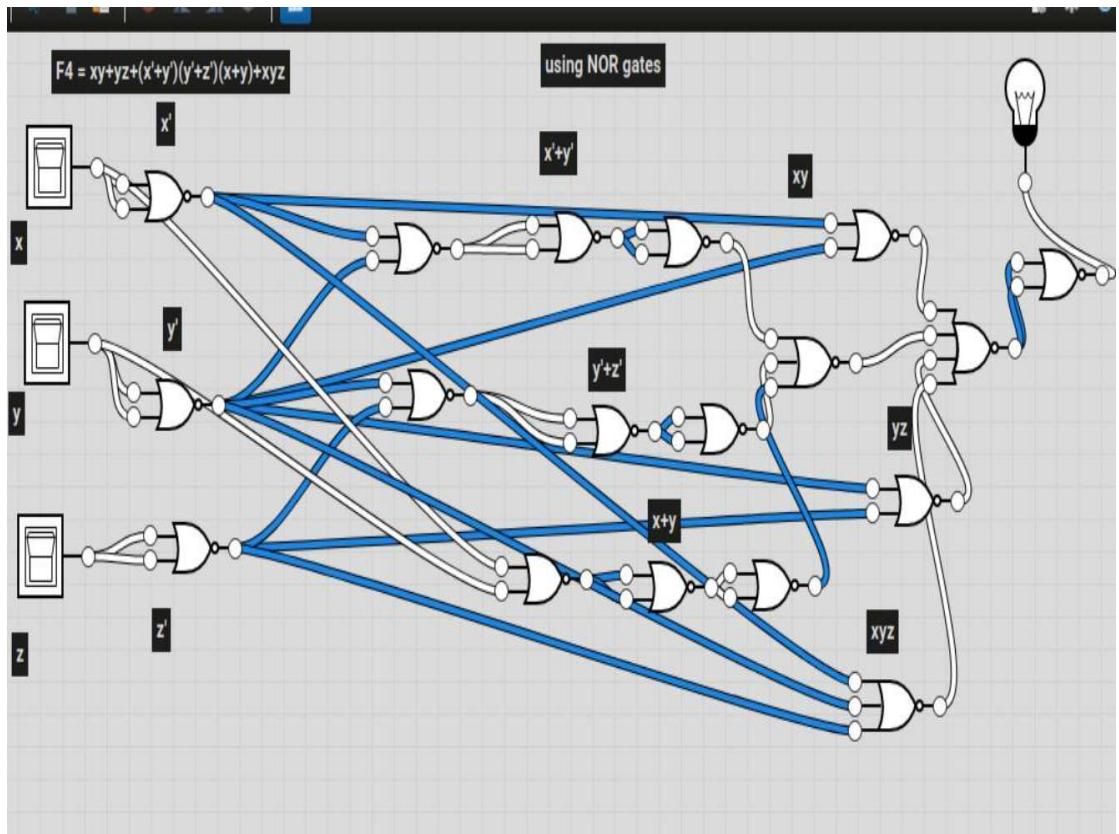
$$S = \overline{CD}(\overline{x}+y) + xyz$$

$$S = (\overline{x}y + \overline{y}z) + (\overline{x}y + \overline{y}z) + xyz = 1$$

$$xy + yz + (\overline{x}y + \overline{y}z) (yz + z) \overline{y}(x+y) + xyz$$

x	y	z	1	F ₄
0	0	0	0	0
0	0	1	1	0
0	1	0	0	1
0	1	1	1	1
1	0	0	0	1
1	0	1	1	1
1	1	0	1	1
1	1	1	1	1





Using KMAP Find the minimal

a) $f(w, x, y, z) = \Sigma(7, 13, 14, 15)$

w\z	00	01	11	10
00	0	1	0	0
01	0	1	1	0
11	1	1	1	1
10	0	0	0	0

Following

$$f = w'yz + w'xz + wx'y$$

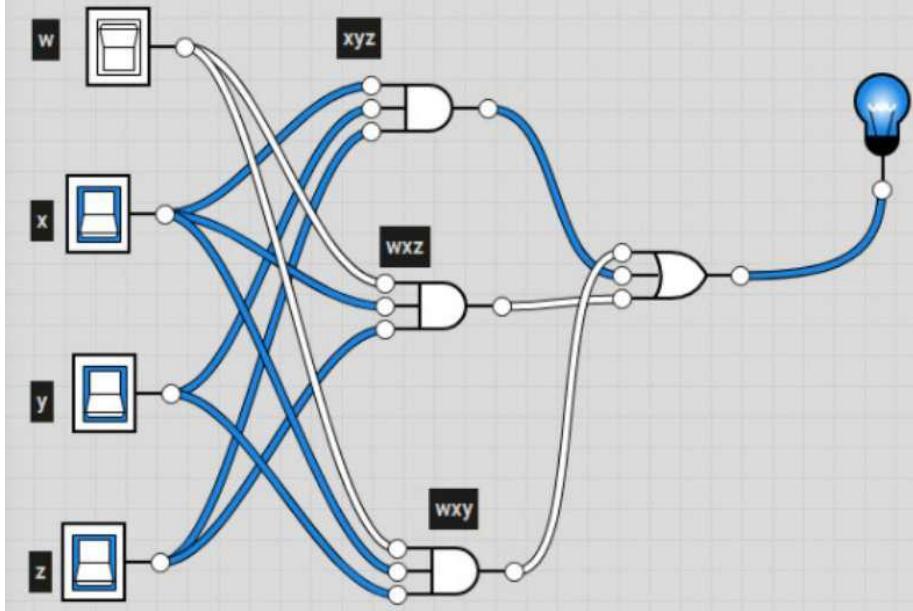
Boolean exp

b) $f(w, x, y, z) = \Pi(1, 4, 5, 6, 11, 12, 13, 14, 15)$

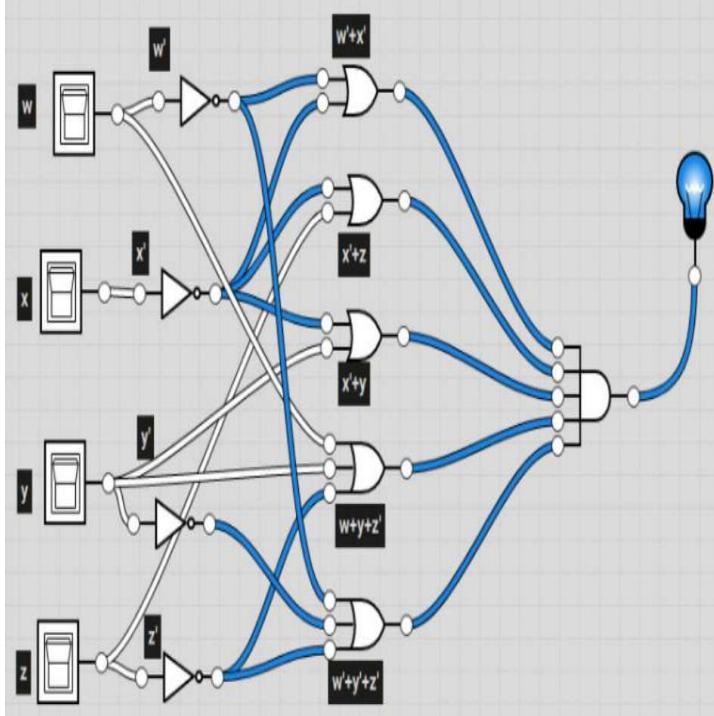
w\z	00	01	11	10
00	0	1	3	2
01	0	0	5	7
11	0	12	13	0
10	8	9	11	10

$$(w' + x')(x' + z)(x' + y)(w + y + z)(w + y + z')$$

a) $xyz + wxz + wxy$



b) $(w+x')(x'+z)(x'+y)(w+y+z')(w'+y'+z')$



c) $f(w, x, y, z) = \sum (1, 3, 4, 5, 7, 8, 9, 11, 15)$

$wx'y'z'$	00	01	11	10	2
00	0	1	1	1	3
01	1	1	1	1	7
11	12	13	1	13	6
10	18	19	1	11	14

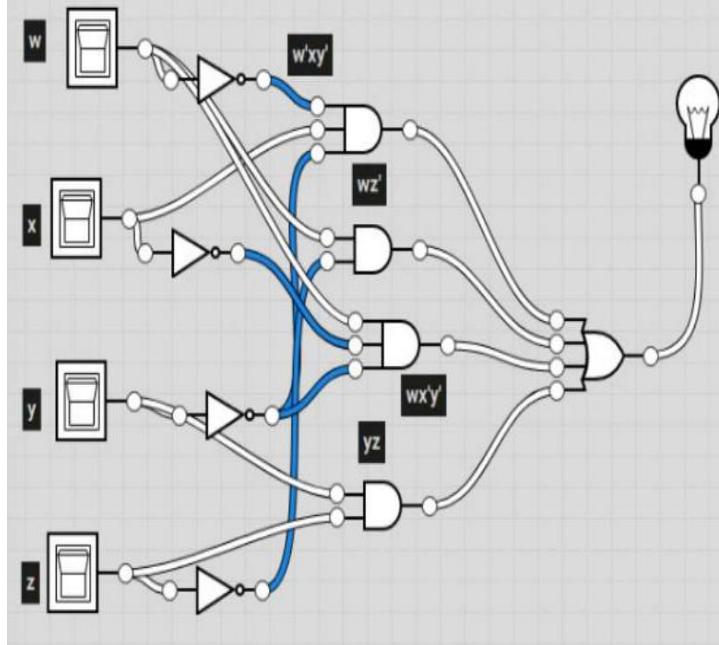
$$f(1, 3, 4, 5, 7, 8, 9, 11, 15) = w'y + w'z + yz + xy$$

d) $f(w, x, y, z) = \pi (0, 4, 3, 7, 8, 9, 13, 15)$

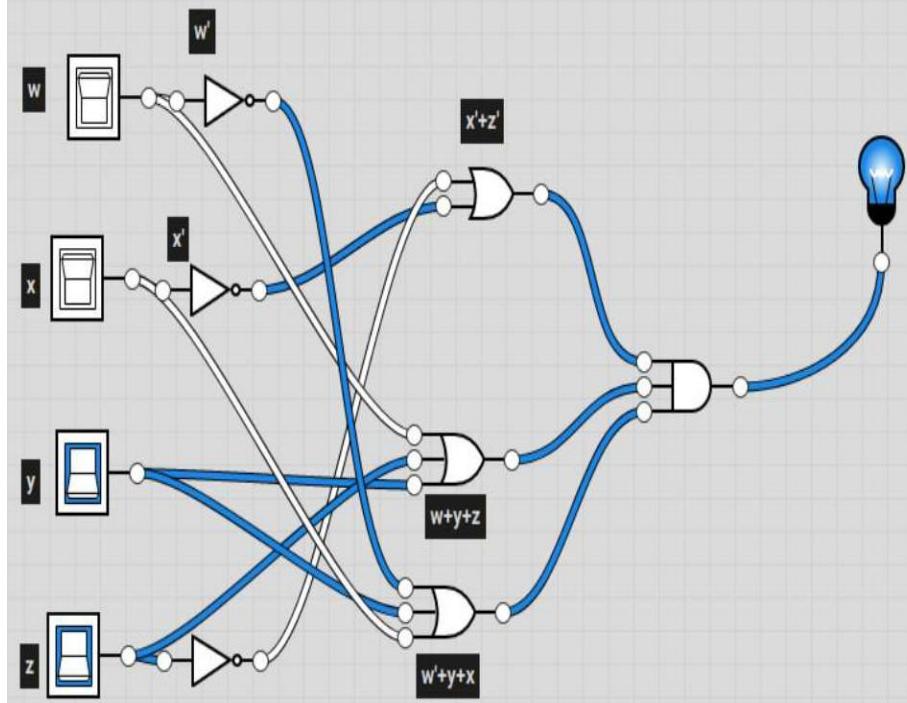
$wx'y'z'$	00	01	11	10
00	0	0	1	2
01	0	0	0	0
11	0	0	0	0
10	0	0	11	10

$$f(0, 4, 3, 7, 8, 9, 13, 15) = (w'x' + z')(w'xy + z)$$

$$c) w'xy' + w'z + yz + wx'y'$$



$$c) (x+z')(w+y+z)(w'+x+y)$$



QM =

A	B	C	D	Output
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

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

$$SOP = AC + BC'D'$$

