

2ap - 0750

Waqar Ahmed

$$\Rightarrow F_1 = AB + A'B'C' + A'BC + AB'C'$$

Truth Table

A	B	C	F
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

3 - Not-gate \Rightarrow 74081 - And-gate 1- input \Rightarrow 74043 - And Gate - 3-input \Rightarrow 7411

:

1 - OR Gate = 4 input = 74072

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2) $F_2 = A'B'C'D + AB'C'D + A'B'C'D + ABC'D$

Truth Table

A	B	C	D	F
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

3 - Not IC = 7408

~~6 - 7408~~

6 - And gate - 4-input = 74HFC21

1 - OR gate 6. input =

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3) $F_3 = C + S$ where $C = xy + y\Sigma$ and
 $S = C'(n+y) + ny\Sigma$

Sol:-

$$F_3 = xy + y\Sigma + C'(n+y) + ny\Sigma$$

$$\Rightarrow F_3 = xy + y\Sigma + C'x + C'y + ny\Sigma$$

$$\Rightarrow F_3 = xy + y\Sigma + (ny' + y'\Sigma')\pi + (ny' + y'\Sigma')y
+ ny\Sigma$$

$$\Rightarrow F_3 = xy + y\Sigma + n \cdot ny' + ny'\Sigma' + x'y'y
+ y \cdot y'\Sigma + ny\Sigma$$

$$\Rightarrow F_3 = xy + y\Sigma + 0 + n \cdot y'\Sigma' + 0 + 0 + ny\Sigma$$

$$F_3 = xy + y\Sigma + n \cdot y'\Sigma' + xy\Sigma$$

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Truth Table

$$F_3 = xy + yz + x \cdot y'z' + xyz$$

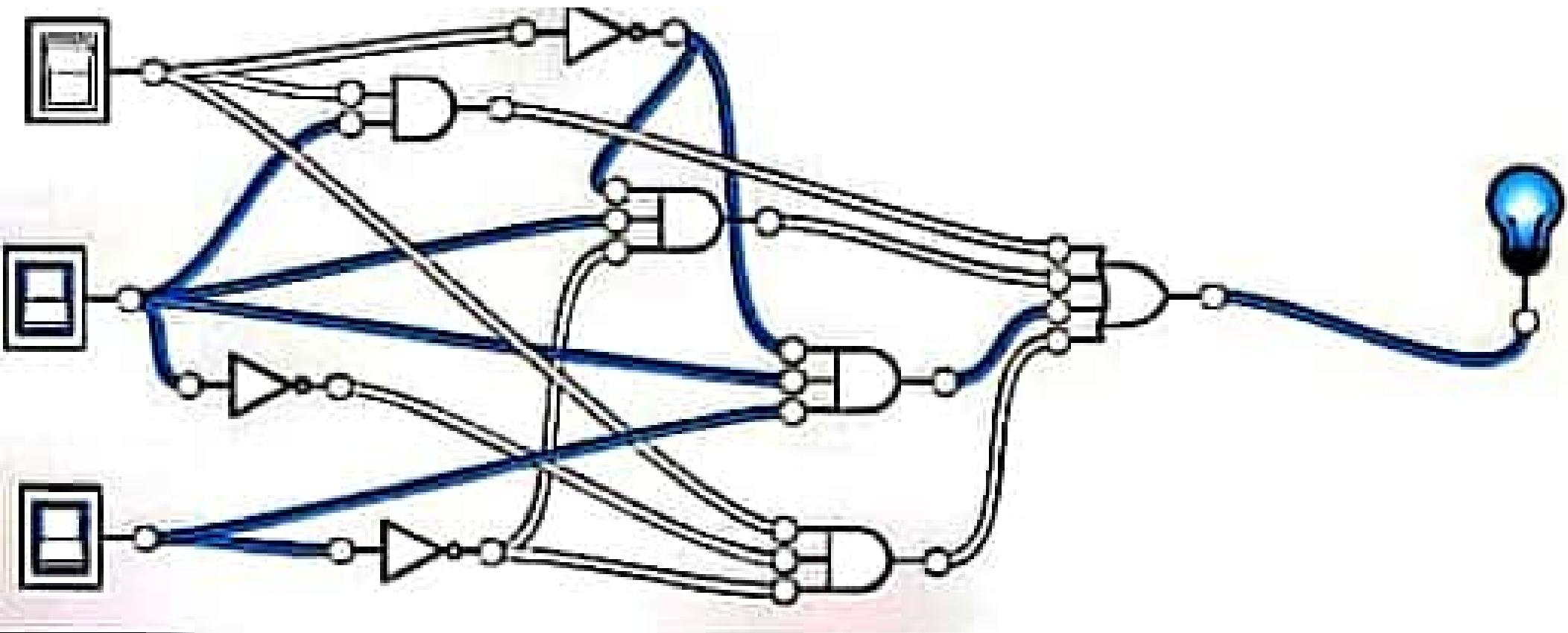
x	y	z	F
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

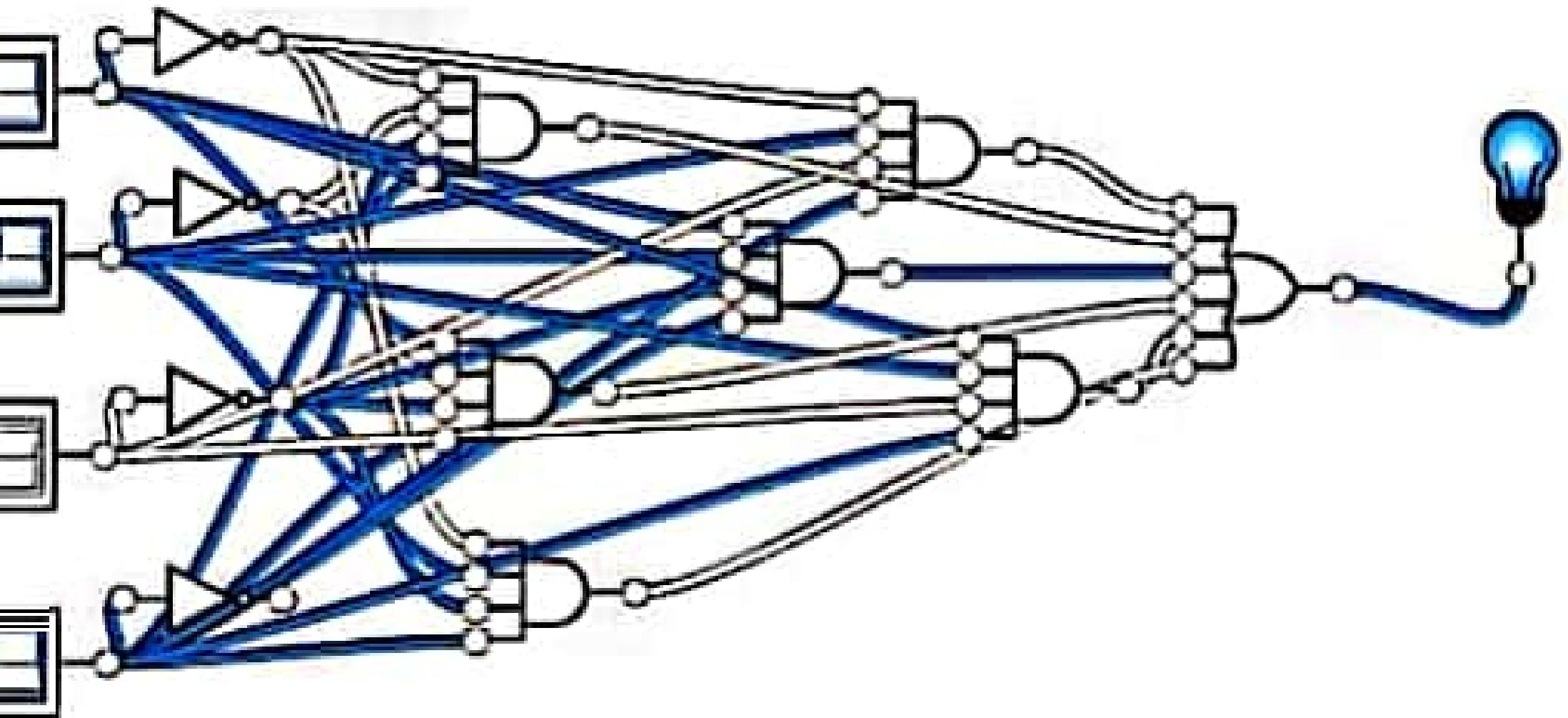
2-And-gate - 2-input = 7404

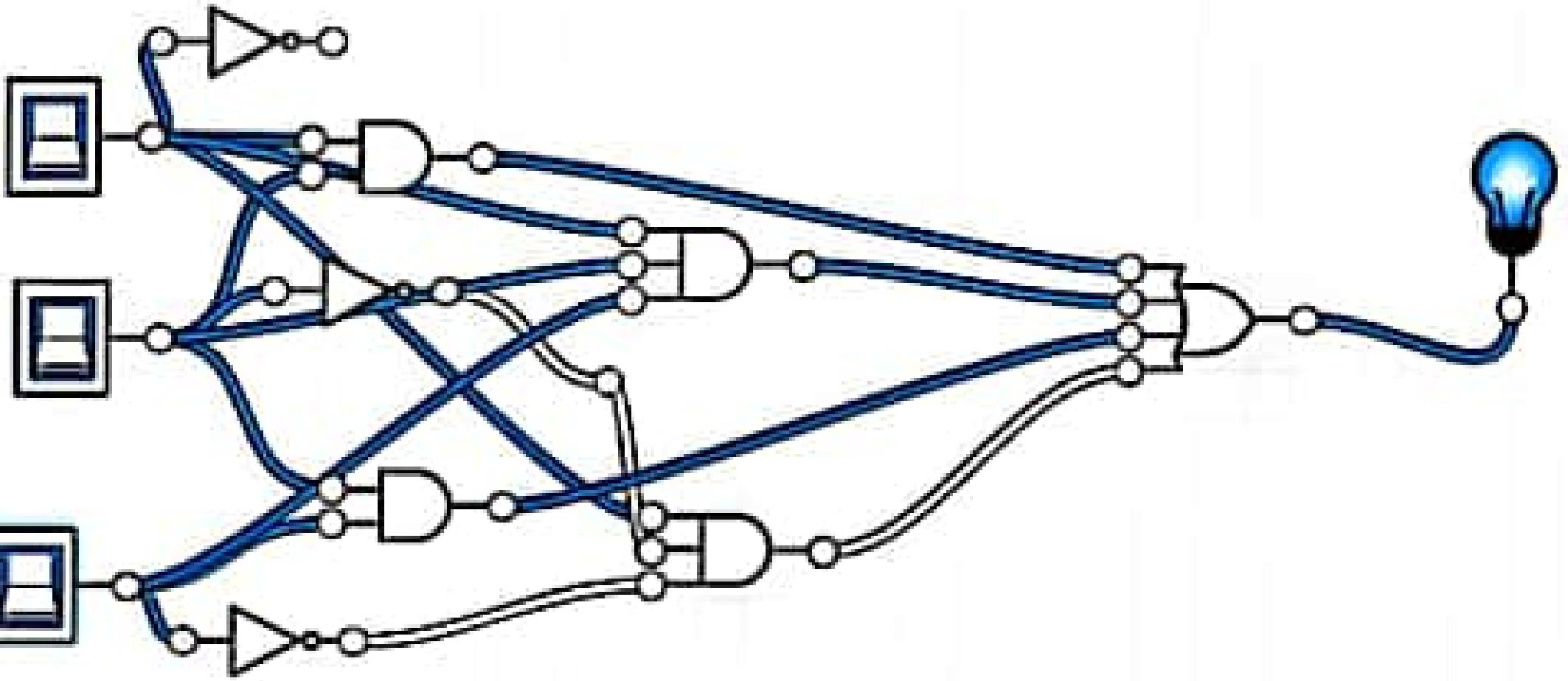
2- And-gate - 3-input = 7411

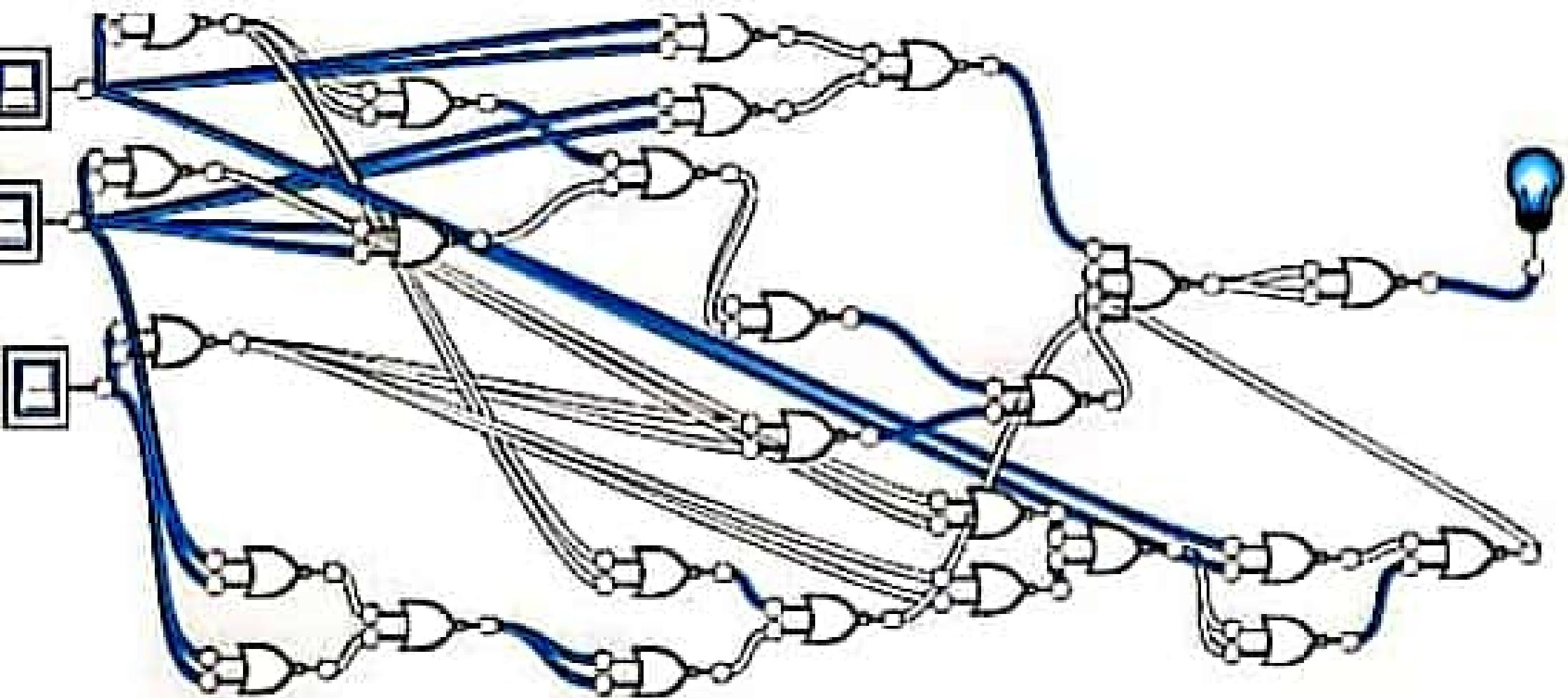
2- Not-gate = 7408

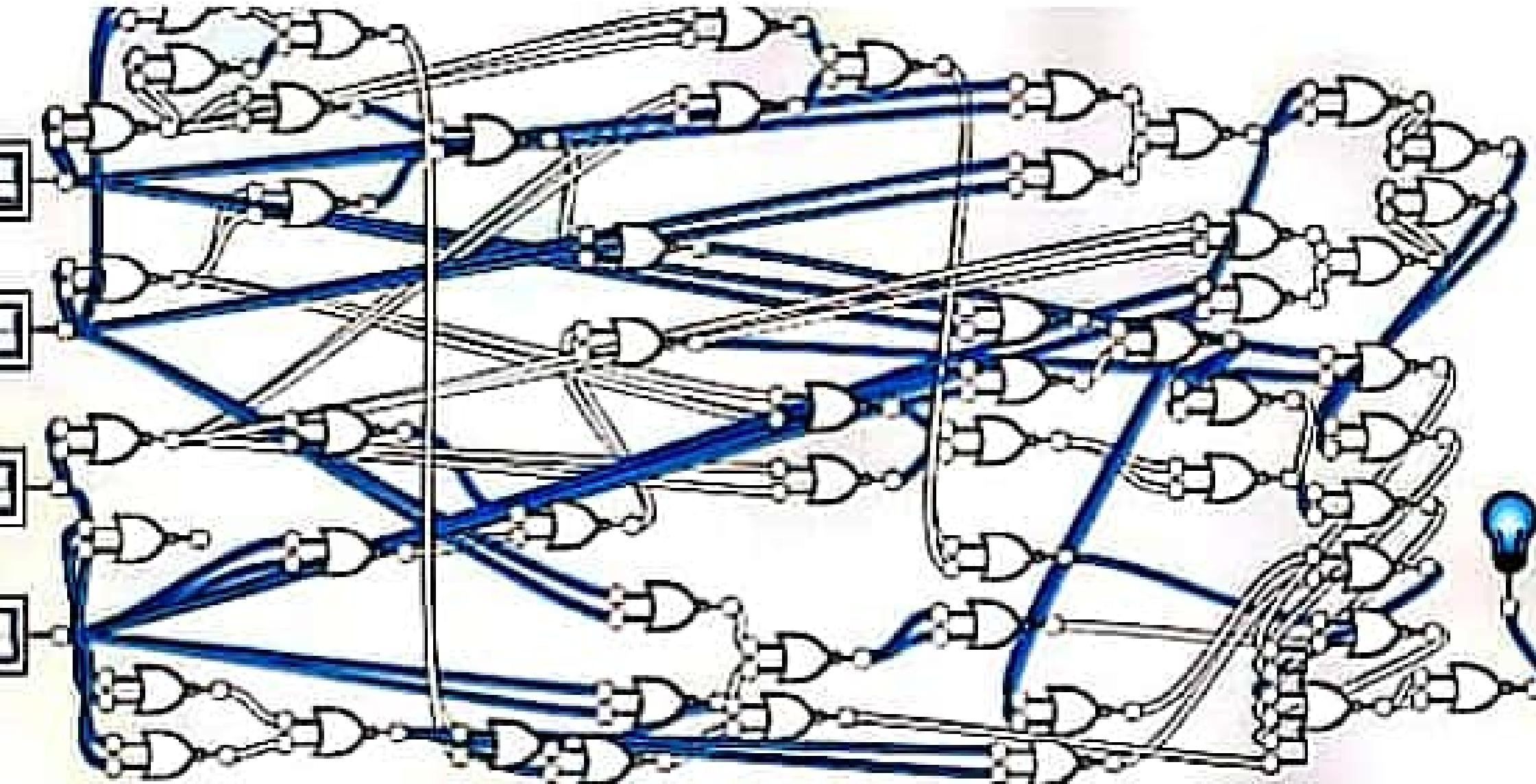
1- OR-gate 4-input = 7407

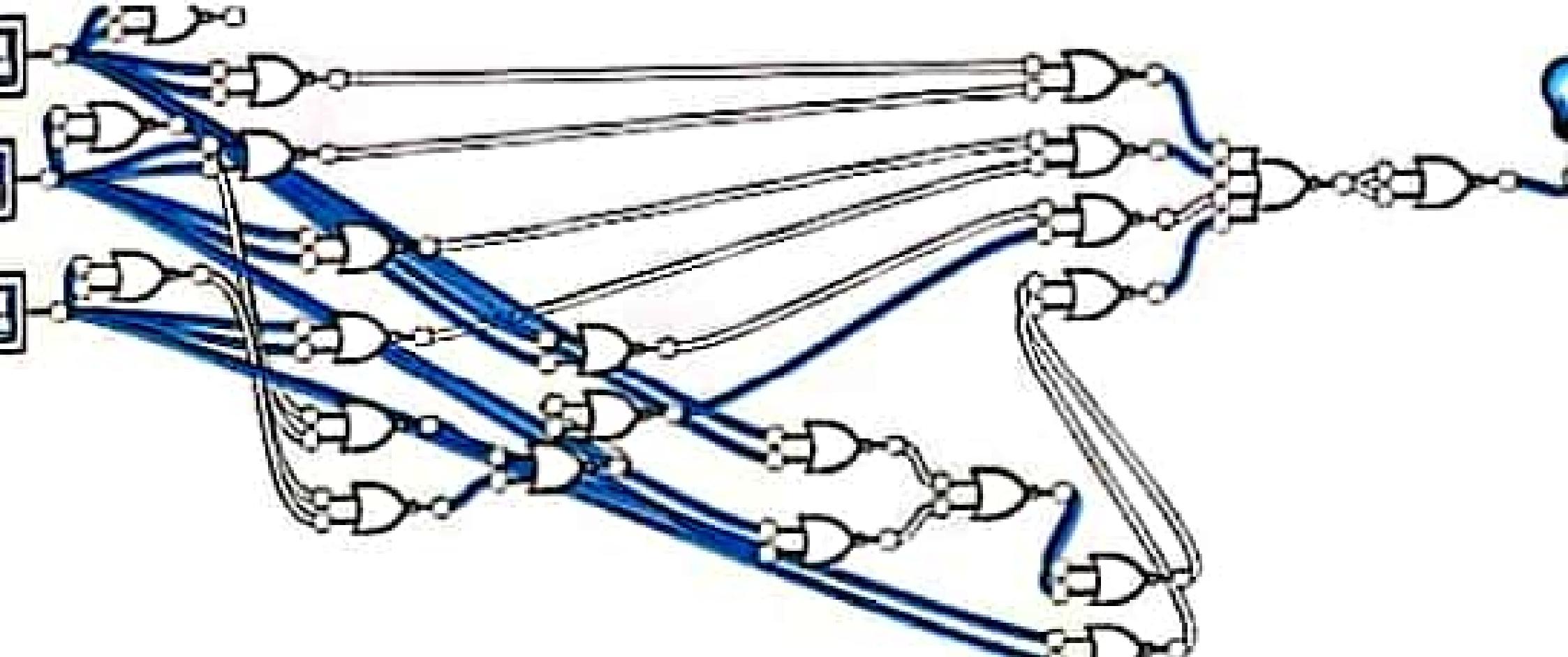












4) A Truth table was given for a function (F) in Table - 1 give three representation of this function.

→ one in terms of maxterm list,
one symbolically using a product of appropriate i.e

$$F = \bar{\pi}(0, 3, 5) = (M_0 M_3 M_5) = (x + y + \Sigma) \cdot (x + y' + \Sigma) \cdot (x' + y + \Sigma)$$

S.No	X	Y	Z	F
0	0	0	0	0
1	0	0	1	1
2	0	1	0	0
3	0	1	1	0
4	1	0	0	0
5	1	0	1	1
6	1	1	0	0
7	1	1	1	1

1) $\bar{\pi}(0, 2, 3, 4, 6)$

2) $(M_0, M_2, M_3, M_4, M_6)$

3) $(x + y + \Sigma) \cdot (x + y' + \Sigma) \cdot (x' + y + \Sigma')$
 $\cdot (x' + y + \Sigma) \cdot (x' + y' + \Sigma)$

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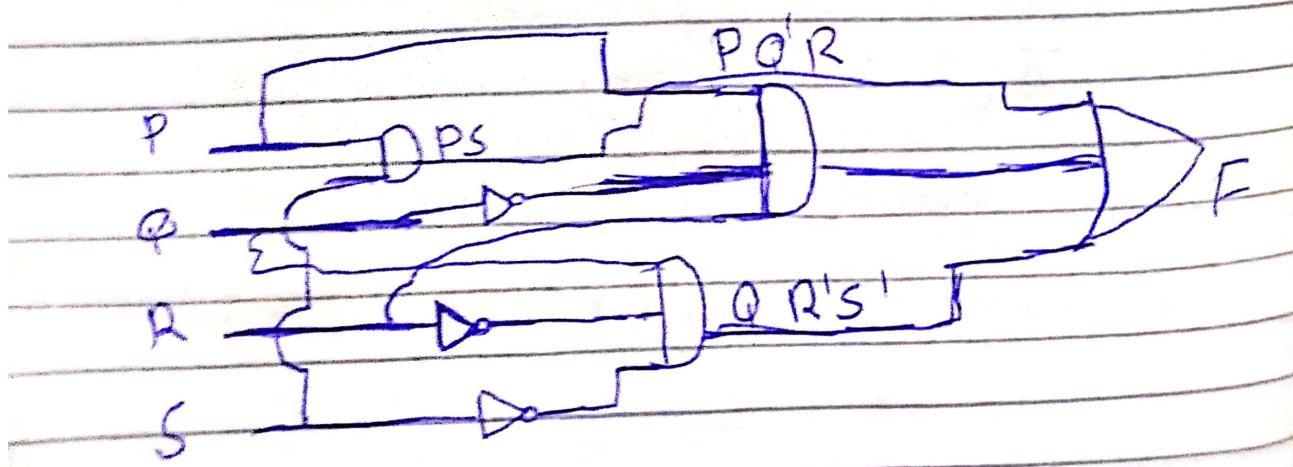
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5) Using K-maps, find minimal Boolean expression of the following SOP and POS representations and draw a gate circuit equivalent to simplified expression.

$$F = (P, Q, R, S) = \sum (2, 4, 6, 9, 10, 11, 12, 13, 15)$$

		RS	R'S'	R'S	RS	RS'
		00	01	11	10	10
PQ	00	0	1	.	3	12
	01	4	1	5	7	6
PQ 11	11	12	1	13	1	15
	10	8		9	1	11

$$F = QR'S' + PS + PQ'R$$



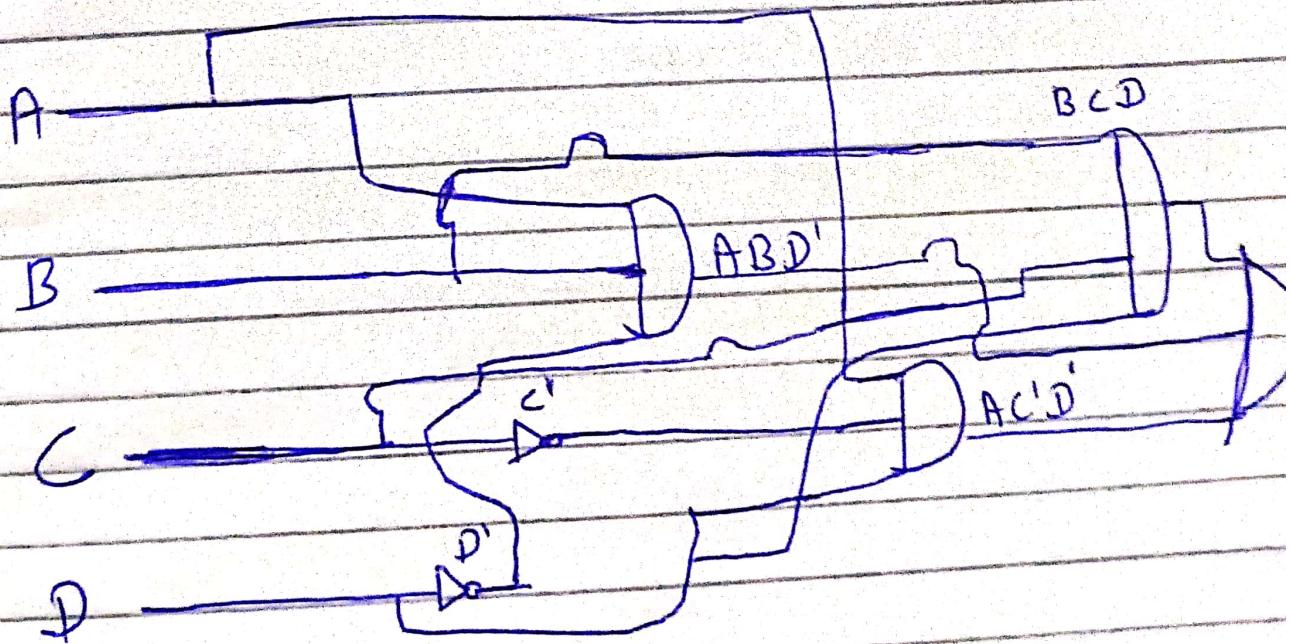
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3) $F_2(A, B, C, D) = \Sigma(7, 9, 12, 13, 14, 15)$

		CD	C'D'	C'D	CD	CD'
		00	01	11	11	10
AB		00	1	3	2	
A'B'	00	0	1			
A'B	01	4	5	7	6	7
AB	11	12	13	15	14	1
AB'	10	8	9	11	10	

$$F_2 = AB'D' + A'C'D' + BCD$$



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$$3) F = (W, X, Y, Z) \cdot \bar{n}(0, 2, 3, 4, 8, 9, 10, 11)$$

Sol:

$\bar{W}X$	$\bar{X}\bar{Y}$	$\bar{X}Y$	$X\bar{Y}$	XY	$\bar{X}\bar{Z}$	$\bar{X}Z$	$X\bar{Z}$	XZ
$\bar{W}X'$	00	01	10	11	10	11	10	00
$\bar{W}X'$	00	01	10	11	10	11	10	00
$\bar{W}X$	12	13	15	14	11	10	01	00
$\bar{W}X'$	8	9	11	10	01	00	01	00

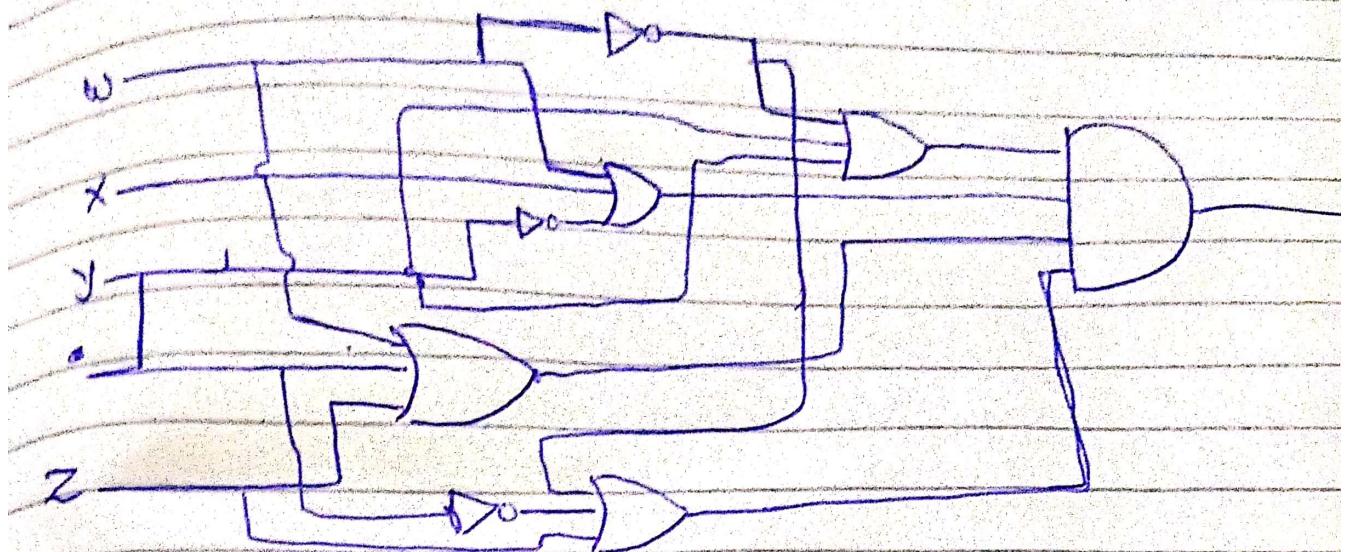
$$F = (\bar{W}X'Z') + (\bar{W}X'Y) + (W\bar{X}'Y) + (X\bar{Y}W)$$

in Mexterm.

$$F = (W + X + Z) \cdot (W + X + Y) \cdot (W + X + Y) \\ + (Y + Z + W)$$

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$$y = F(w, x, y, z) = \bar{x}(4, 5, 6, 7, 10, 12, 13, 15)$$

w'z'	y'z'	y'z	xz	y'z
wx'z'	00	01	11	01
wx'z	4 1	5 1	7 1	6 1
wx z'	12 1	13 1	15 1	14
wx z	8	9	11	10 1

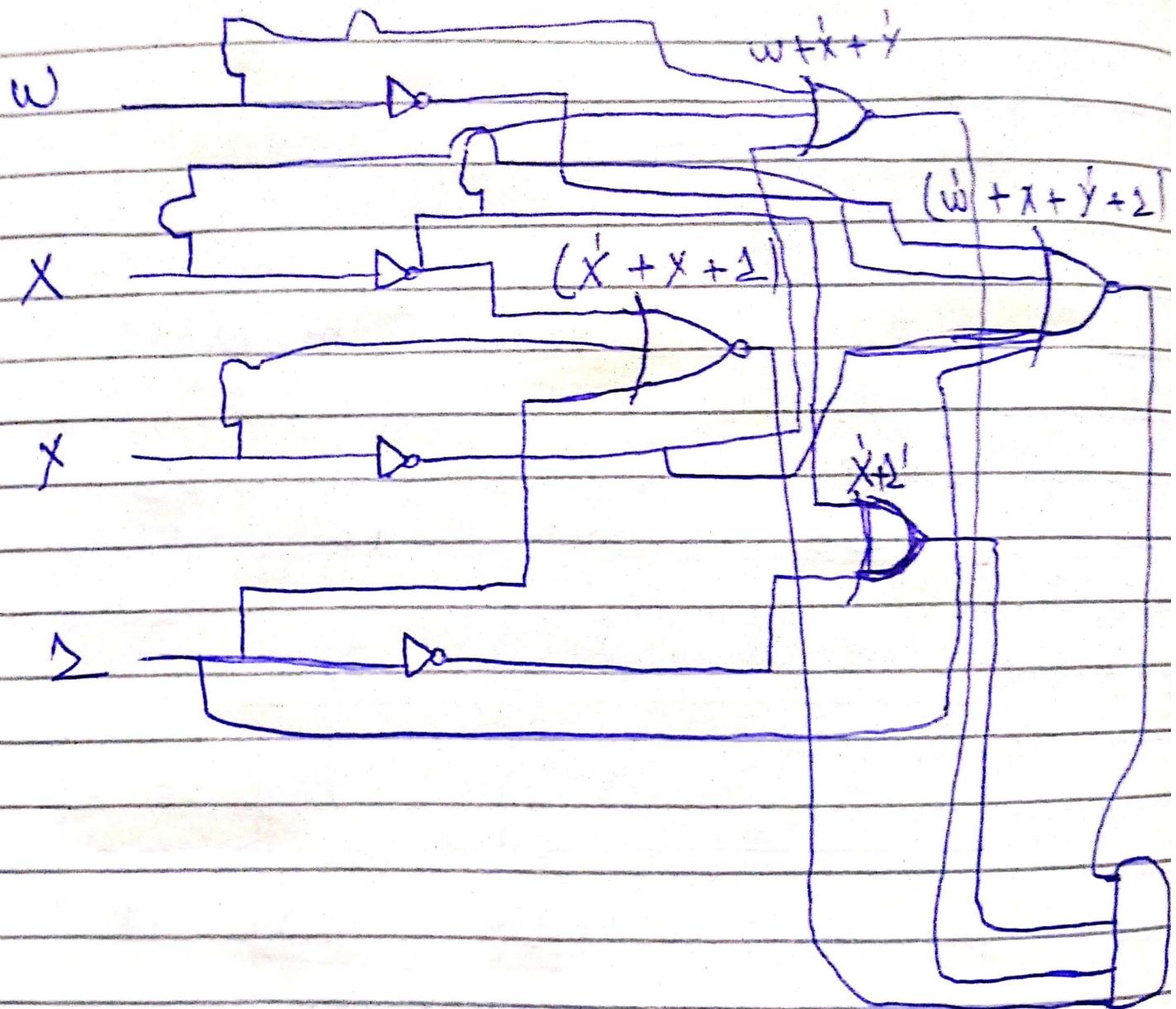
$$F = (x'y'z') + (xz) + (\bar{w}x'y) + (w'x'z')$$

in Max term:

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

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6)

Sol:-

		$C'D'$	$C'D$	CD	CD'
		00	01	11	10
AB	AB'	0	1	3	2
$A'B$	$A'B'$	4	5	7	6
AB	AB'	12	13	15	14
AB'	AB'	8	9	11	10

$$F = A'C'D + ABD + DAB' + AB'C$$

