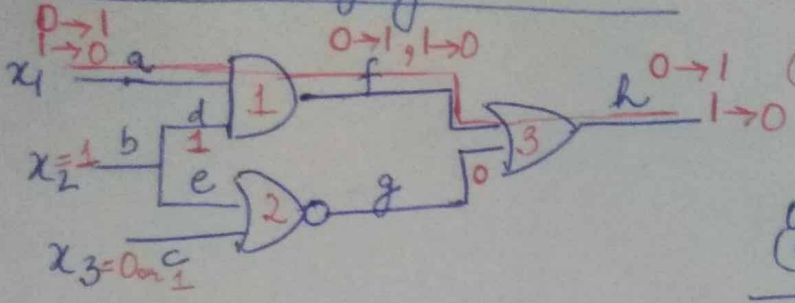
Path sensitizing method:



(Path afh is sensitized)

a	f	h	x_1	x_2	x_3
0→1 (a_1)	0→1 (f_1)	0→1 (h_1)	0	1	0 or 1 (2 or 3)

① Select a path from primary I/P to primary O/P such that it assigns value of 1 (s-a-0) & 0 (s-a-1) fault to sensitize the path.

② Along chosen path, assign '0' to each I/P of OR & NOR gates and value of '1' to each I/P of AND / NAND gate except the lines of path.

Path: afh ⇒ x_1 depends on s-a-0 or s-a-1 fault
- ↳ $x_2 = 1$
- ↳ $x_3 = 0$ or 1.

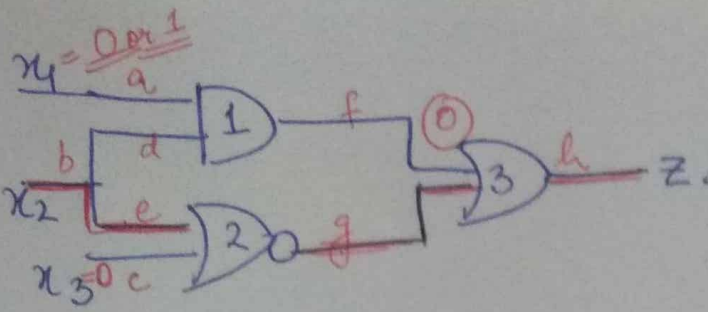
when $x_1 = 1$ ⇒ O/P = 1 (correct / fault-less ckt)
If O/P = 0 (ckt has fault of a_0)

when $x_1 = 0$ ⇒ O/P = 0 (correct / fault-less ckt)
If O/P = 1 (ckt has fault of a_1)

⇒ Test $x_1 x_2 x_3$ = 110, 111 (a_0, f_0, h_0)
010, 011 (a_1, f_1, h_1)

Test 6 or 7 (a_0, f_0, h_0)
Test 2 or 3 (a_1, f_1, h_1)

Path No.	Path	I/P values to sensitize path	Assigned value of I/P variable of path	Test	Faults detected
1	afh	$x_2 = 1$, $x_3 = 0$ or 1	$x_1 = 1$	6 or 7	a_0, f_0, h_0
			$x_1 = 0$	2 or 3	a_1, f_1, h_1
2	bdfh	$x_1 = 1$, $x_3 = 0$ or 1	$x_2 = 1$	6 or 7	b_0, d_0, f_0, h_0
		$x_1 = 1$, $x_3 = 1$	$x_2 = 0$	5	b_1, d_1, f_1 h_1
3	begh	$x_1 = 0$, $x_3 = 0$	$x_2 = 1$	2	b_0, e_0, f_1, h_1
		$x_1 = 0$ or 1, $x_3 = 0$	$x_2 = 0$	0 or 4	b_1, e_1, f_0, h_0
4	cgh	$x_1 = 0$ or 1, $x_2 = 0$	$x_3 = 1$	1 or 5	c_0, g_1, h_1
		$x_1 = 0$ or 1, $x_2 = 0$	$x_3 = 0$	0 or 4	c_1, g_0, h_0



$z = x_1x_2 + \bar{x}_2\bar{x}_3$

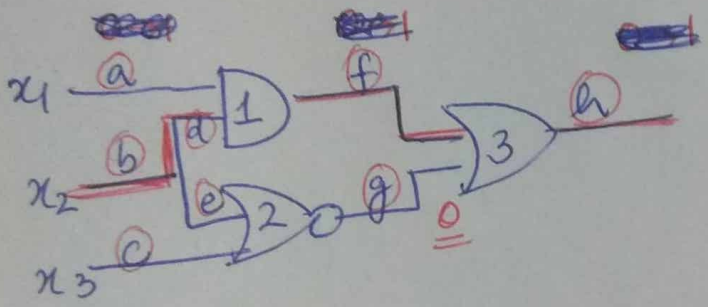
$= x_1x_2 + (\overline{x_2 + x_3})$

Path begh

x_1	x_2	x_3	
1 or 0	0 (s-a-1)	0	$\Rightarrow b_1, e_1, g_0, h_0$ (0 or 4)
0	1 (s-a-0)	0	$\Rightarrow b_0, e_0, g_1, h_1$ (2)

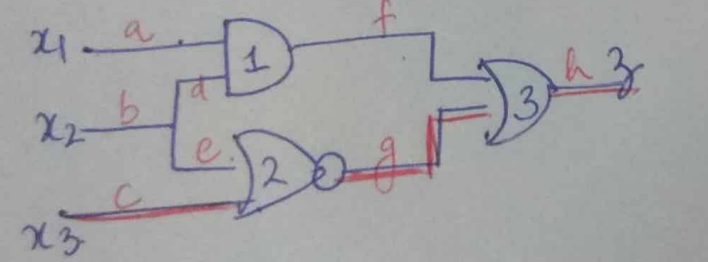
b	e	g	h
0→1	0→1	1→0	1→0
1→0	1→0	0→1	0→1
b_1	e_1	g_0	h_0
b_0	e_0	g_1	h_1

(Path is sensitized)



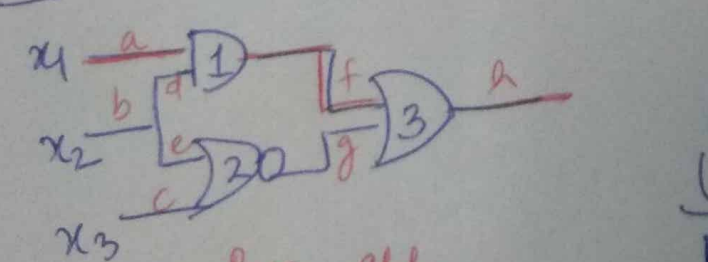
Path bdfh.

b	d	f	h	g	x_1	x_2	x_3	
0→1	0→1	0→1	0→1					
(b_1)	(d_1)	(f_1)	(g_1)		1	0	1	(5)
1→0	1→0	1→0	1→0		1	1	0	(6)
(b_0)	(d_0)	(f_0)	(g_0)		1	1	1	(7)



Path cgh

c	g	h	x_1	x_2	x_3	
0→1	1→0	1→0	0	0	0	(0)
(c_1)	(g_0)	(h_0)	1	0	0	(4)
1→0	0→1	0→1	0	0	1	(1)
(c_0)	(g_1)	(h_1)				
			1	0	1	(5)



Path afh

a	f	h	x_1	x_2	x_3	
0→1	0→1	0→1	0	1	0	(2)
(a_1)	(f_1)	(h_1)	0	1	1	(3)
1→0	1→0	1→0	1	1	0	(6)
(a_0)	(f_0)	(h_0)	1	1	1	(7)