Participants:

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Task 1

$$f(x_1, x_2, x_3) = \overline{x_1}\,\overline{x_2}(x_3 + x_1) + x_3(x_1 x_2 + x_1 \overline{x_3}) + x_1 \overline{x_2 x_3} + x_1 x_3 (x_2 + x_2 \overline{x_3})$$

1. Truth Table:

x_1	x_2	x_3	g
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

DNF: $\overline{x_1}\,\overline{x_2} x_3 + x_1 \overline{x_2}\,\overline{x_3} + x_1 x_2 x_3$

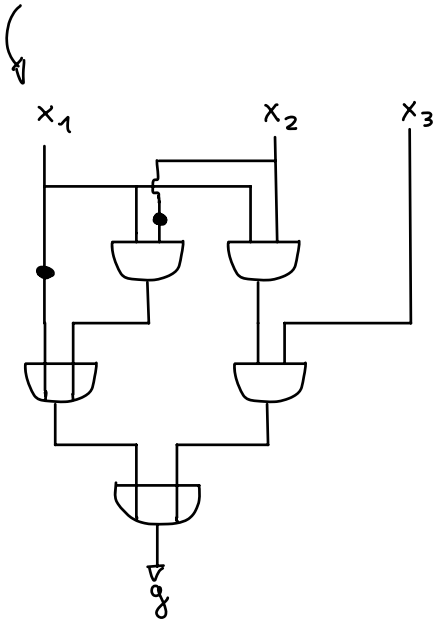
CNF: $(x_1 + x_2 + x_3) \cdot (x_1 + \overline{x_2} + x_3) \cdot (x_1 + \overline{x_2} + x_3) \cdot (\overline{x_1} + x_2 + \overline{x_3}) \cdot (\overline{x_1} + \overline{x_2} + x_3)$

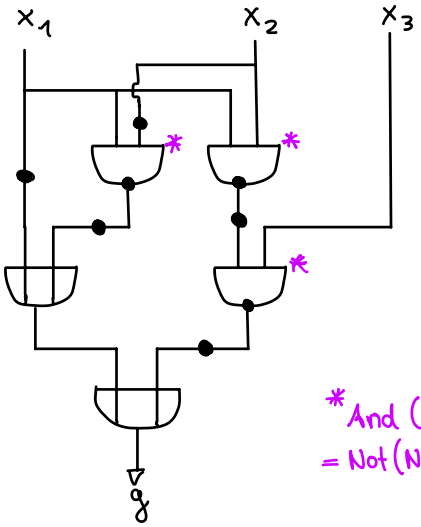
2. $\overline{x_1}\,\overline{x_2} x_3 + x_1 \overline{x_2}\,\overline{x_3} + x_1 x_2 x_3$

$= \overline{x_2}(\overline{x_1} x_3 + x_1 \overline{x_3}) + x_1 x_2 x_3$ (distributivity)

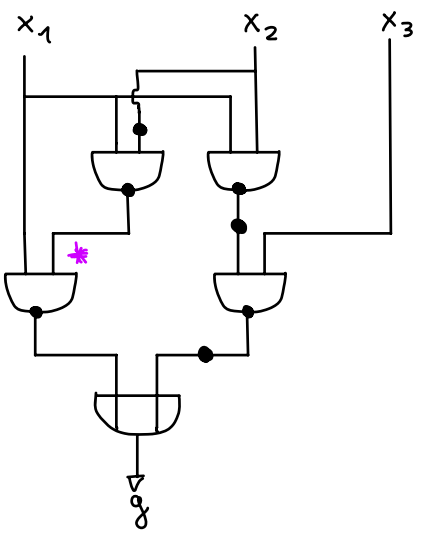
Task 2

$$g(x_1, x_2, x_3) = \overline{x_1} + x_1\overline{x_2} + x_1x_2x_3$$

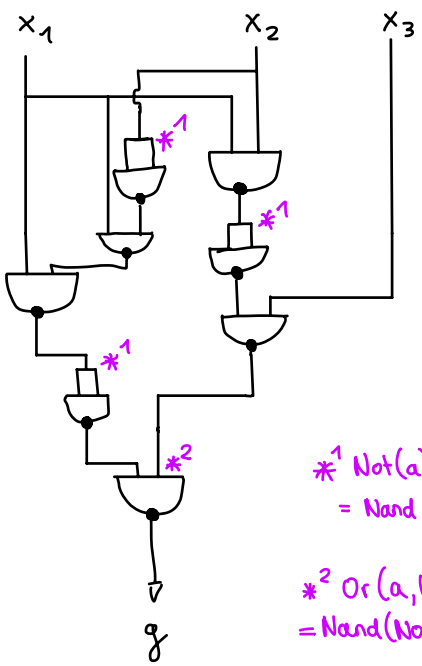




*And (a,b) = Not(Nand(a,b))



* Or (a,b) = Nand(Not(a), Not(b))



*1 Not(a) = Nand (a,a)

*2 Or (a,b) = Nand(Not(a), Not(b))