ED-7 Projeto de Circuitos

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1)

Entradas:

A, B, C

Presença de carro = 1

Ausência = 0

Saídas:

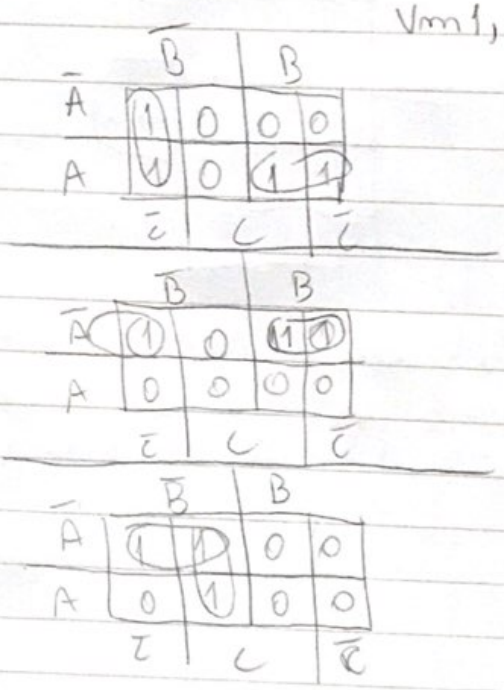
Sinal Verde p/ ruas A, B, C

V1, V2, V3

Sinal Vermelho p/ ruas A, B, C

Vm1, Vm2, Vm3

A	B	C	S_A	S_B	S_C
0	0	0	1	1	1
0	0	1	0	0	1
0	1	0	0	1	0
0	1	1	0	1	0
1	0	0	1	0	0
1	0	1	0	0	1
1	1	0	1	0	0
1	1	1	1	0	0



$S_A = \bar{B}\bar{C} + AB$

$S_C = \bar{A}\cdot\bar{C} + \bar{A}B = \bar{A}(\bar{C} + B)$

$S_B = \bar{A}\bar{B} + \bar{B}C = \bar{B}(\bar{A} + C)$

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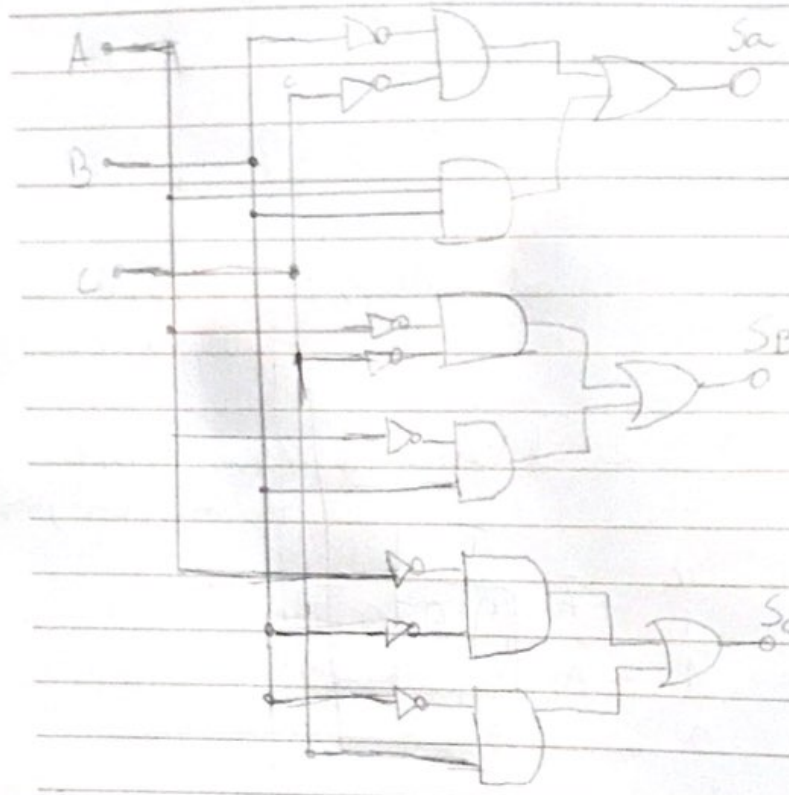


S_A:
0 = Vermelha Vm1
1 = Verde V1

S_B:
0 = Vermelha Vm2
1 = Verde V2

S_C
0 = Vermelha Vm3
1 = Verde V3.

b) Entradas (M, F1, F2, F3)
M = 1 elevador se movendo M = 0 Parado
F1, F2 e F3 = ALTO quando o elevador estiver posicionado na andar

1 Saída: Abrir para o 1 quando a porta for abrir.

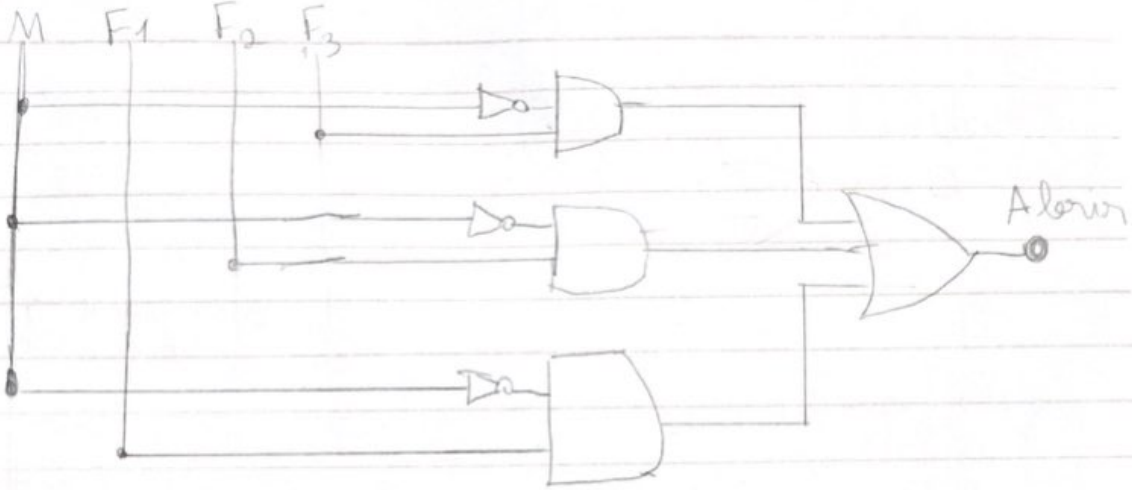
M	F1	F2	F3	Abrir
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	X
0	1	0	0	1
0	1	0	1	X
0	1	1	0	X
0	1	1	1	X

	$\bar{F}_2$		F_2		
$\bar{M}$	0	1	X	1	$\bar{F}_1$
	1	X	X	X	
M	0	0	0	0	F_1
	0	0	0	0	$\bar{F}_1$
	F_3	F_3		$\bar{F}_3$	

X = 1

$S = \bar{M}(F_1 + F_2 + F_3)$ //

M = 1 foi ignorado, pois a porta não irá abrir com o elevador em movimento



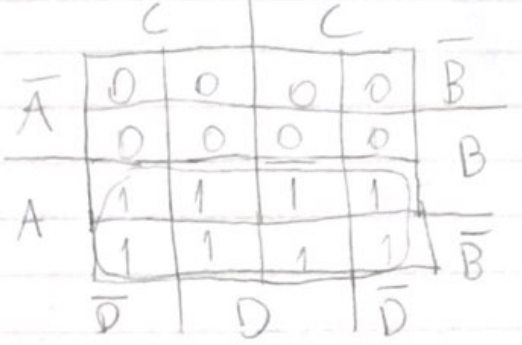
2)

Decimal	Excesso 3	Gray
0	0011	0000
1	0100	0001
2	0101	0011
3	0110	0010
4	0111	0110
5	1000	0111
6	1001	0101
7	1010	0100
8	1011	1100
9	1100	1101
10		1111
11		1110
12		1010
13		1011
14		1001
15		1000

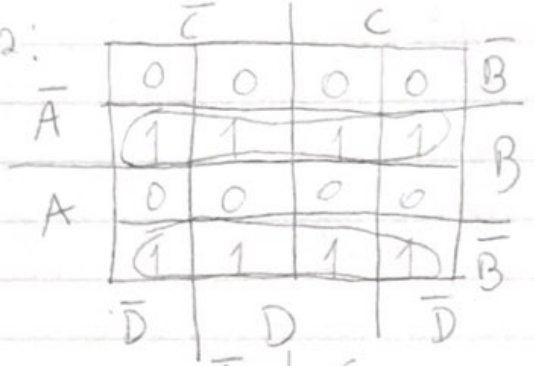
/ 7

	Excesso de 3				Gray			
	A	B	C	D	S1	S2	S3	S4
0	0	0	1	1	0	0	0	0
1	0	1	0	0	0	0	0	1
2	0	1	0	1	0	0	1	1
3	0	1	1	0	0	0	1	0
4	0	1	1	1	0	1	1	0
5	1	0	0	0	0	1	1	1
6	1	0	0	1	0	1	0	1
7	1	0	1	0	0	1	0	0
8	1	0	1	1	1	1	0	0
9	1	1	0	0	1	1	0	1
10					1	1	1	1
11					1	1	1	0
12					1	0	1	0
13					1	0	1	1
14					1	0	0	1
15					1	0	0	0

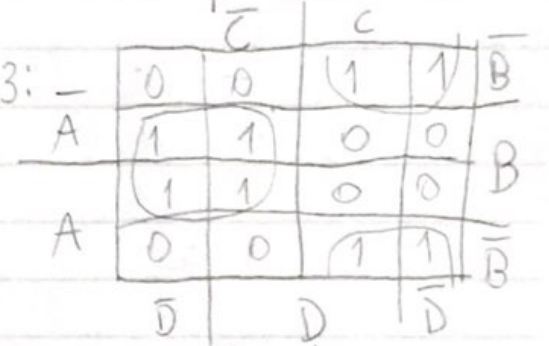
S1:



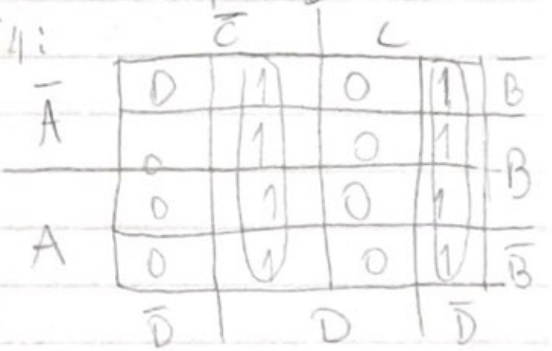
S2:



S3:



S4:



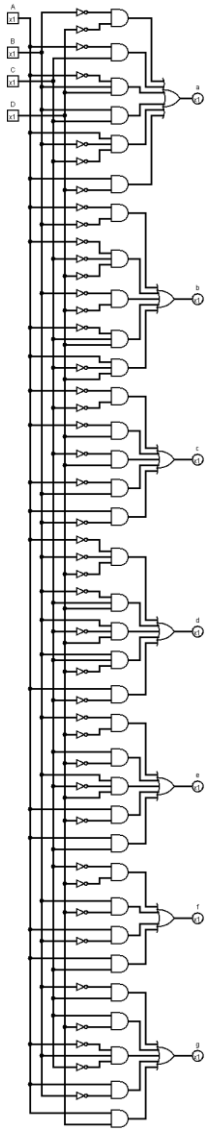
$S1 = A$

$S2 = \bar{A}B + A\bar{B} = A \oplus B$

$S3 = B\bar{C} + \bar{B}C = B \oplus C$

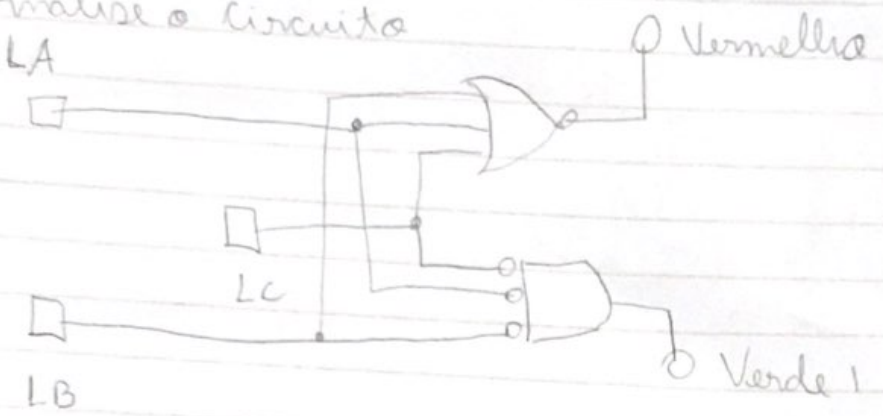
$S4 = \bar{C}D + C\bar{D} = C \oplus D$

b) Circuito decodificador de binário de 4 bits (0000 a 1111) para display de 7 segmentos. Neste caso, o circuito será grande, utilize o simulador Logisim!



A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	1	1	1	1	1	1	0
0	0	0	1	0	1	1	0	0	0	0
0	0	1	0	1	1	0	1	1	0	1
0	0	1	1	1	1	1	1	0	0	1
0	1	0	0	0	1	1	0	0	1	1
0	1	0	1	1	0	1	1	1	0	1
0	1	1	0	1	0	1	1	1	1	1
0	1	1	1	1	1	1	0	0	0	0
1	0	0	0	1	1	1	1	1	1	1
1	0	0	1	1	1	1	1	0	1	1
1	0	1	0	1	1	1	0	1	1	1
1	0	1	1	0	0	1	1	1	1	1
1	1	0	0	1	0	0	1	1	1	0
1	1	0	1	0	1	1	1	1	0	1
1	1	1	0	1	0	0	1	1	1	1
1	1	1	1	1	0	0	0	1	1	1

3) Analise o circuito



Entradas: LA, LB, LC ⇒ 1 para estendidos
0 para retraídos.

Vermelho = $\overline{LA + LB + LC}$

Verde = $\overline{LA} \cdot \overline{LB} \cdot \overline{LC}$

Saídas: Vermelho
Verde.

LA	LB	Lc	Vermelho	Verde
0	0	0	1	1
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	0	0
1	1	1	0	0

Quando LA, LB e Lc estiverem em 0, ou seja, retraídos, a luz vermelha e a luz verde estarão acesas, e em todos os outros casos, apagados.