Dionatas Santos Brito

Lei de morgan $\Rightarrow (ab)' = a' + b'$

Identidade $\Rightarrow 1 \cdot a = a$

complemento $\Rightarrow (a+a') = 1 \;/\; (a \cdot a') = 0$

Distributivo $\Rightarrow a \cdot (b+c) = ab + ac$

Indepotencia $\Rightarrow a + a = a \;/\; a \cdot a = a$

Associativo $\Rightarrow (ab)c = a(bc)$

1 – $E(x,y,z) = y + x'(xz + yz')'$

$E = y + x'(xz + yz')'$

$= y + x'[(x'+z') \cdot (y'+z)]$ -> Lei de Morgan

$= y + x'[x'y' + x'z + y'z' + \underline{z'z}]$ -> Distributivo / complemento

$= y + x'x'y' + x'x'z + x'y'z'$ -> Distributiva

$= y + x'y' + x'z + x'y'z'$ -> Indepotencia

$= 1 \cdot y \cdot 1 + x'y' \cdot 1 + x'z \cdot 1 + x'y'z'$ — Identidade

$= (x+x')y(z+z') + x'y'(z+z') + x'z(y+y') + x'y'z'$ — Associativa

$= (xy + x'y)(z+z') + x'y'z + x'y'z' + x'yz + x'y'z + x'y'z'$ — Indepotencia

$= xyz + xyz' + \underline{x'yz} + x'yz' + \underline{x'y'z} + \underline{x'y'z'} + \underline{x'yz} + \underline{x'y'z} + \underline{x'y'z'}$

$= xyz + xyz' + x'yz + x'yz' + x'y'z + x'y'z'$

$$\Sigma m(\underset{6}{\overset{111}{xyz}}, \underset{7}{\overset{110}{xyz'}}, \underset{3}{\overset{011}{x'yz}}, \underset{2}{\overset{010}{x'yz'}}, \underset{1}{\overset{001}{x'y'z}}, \underset{0}{\overset{000}{x'y'z'}}) = \boxed{\Sigma m(0,1,2,3,6,7)}$$

$\boxed{\Pi M(4,5)}$ } <- conhecendo Σm, é possivel determinar ΠM

2 - $\Sigma m(0, 2, 5, 9, 15)$

$\Sigma d(1, 8, 10, 13)$

mapa K

x_3x_2 \ x_1x_0	00	01	11	10
00	1	X		1
01		1		
11		X	1	
10	X	1		X

0 0 0 0 → 0
0 0 0 1 → 1
0 0 1 0 → 2
0 0 1 1 → 3
0 1 0 0 → 4
0 1 0 1 → 5
0 1 1 0 → 6
0 1 1 1 → 7
1 0 0 0 → 8
1 0 0 1 → 9
1 0 1 0 → 10
1 0 1 1 → 11
1 1 0 0 → 12
1 1 0 1 → 13
1 1 1 0 → 14
1 1 1 1 → 15

① - $x_3 = 0$ ou 1
$x_2 = 0$
$x_1 = 0$ ou 1
$x_0 = 0$
} $x_3' x_0'$

② - $x_3 = 1$
$x_2 = 1$
$x_1 = 0$ ou 1
$x_0 = 1$
} $x_3 x_2 x_0$

$$\boxed{f(x_3, x_2, x_1, x_0) = x_3 x_2 x_0 + x_3' x_0' + x_1' x_0}$$

③ - $x_3 = 0$ ou 1
$x_2 = 0$ ou 1
$x_1 = 0$
$x_0 = 1$
} $x_1' x_0$

2 _ Quine McCluskey

$\sum m(0, 2, 5, 9, 15)$ — 0000, 0010, 0101, 1001, 1111

$\sum d(1, 8, 10, 13)$ — 0001, 1000, 1010, 1101

TERMOS	x_3	x_2	x_1	x_0	
0	0	0	0	0	V
1	0	0	0	1	V
2	0	0	1	0	V
8	1	0	0	0	V
5	0	1	0	1	V
9	1	0	0	1	V
10	1	0	1	0	V
13	1	1	0	1	V
15	1	1	1	1	V

TERMOS	X_3	X_2	X_1	X_0	
(0,1)	0	0	0	–	V
(0,2)	0	0	–	0	V
(0,8)	–	0	0	0	V
(1,5)	0	–	0	1	V
(1,9)	–	0	0	1	V
(2,10)	–	0	1	0	V
(8,9)	1	0	0	–	V
(8,10)	1	0	–	0	V
(5,13)	–	1	0	1	V
(9,13)	1	–	0	1	V
(13,15)	1	1	–	1	P_0

Termos	X_3	X_2	X_1	X_0	
(0,1)(8,9)	–	0	0	–	P_1
(0,2)(8,10)	–	0	–	0	P_2
(0,8)(1,9)	–	0	0	–	repetido
(0,8)(2,10)	–	0	–	0	repetido
(1,5)(9,13)	–	–	0	1	P_3
(1,9)(5,13)	–	–	0	1	repetido

13,15 → P_0
(0,1)(8,9) → P_1
(0,2)(8,10) → P_2
(1,5)(5,13) → P_3

	0	2	5	9	15
P_0					X
P_1	X			X	
P_2	X	X			
P_3			X	X	

→ P_2

	5	9	15
P_0			X
P_1		X	
P_2			
P_3	X	X	

} P_3, P_0

$$F(x_3, x_2, x_1, x_0) = P_0 + P_2 + P_3$$

$$= x_3 x_2 x_0 + x_2' x_0' + x_1' x_0$$

3 _

Deslocador 3 bits -> 3 mux

↳ 4 funções -> mux 4x1

(3) Circular direita -> $X_0 X_2 X_1$ [ROTD]

(2) Circular esquerda -> $X_1 X_0 X_2$ [ROTL]

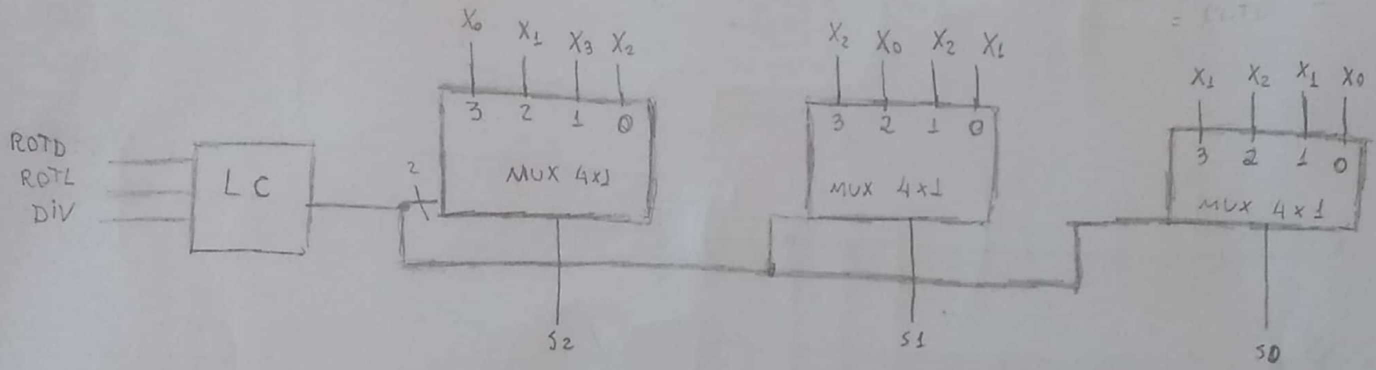
(1) Divisão por dois -> $X_3 X_2 X_1$ [DIV]

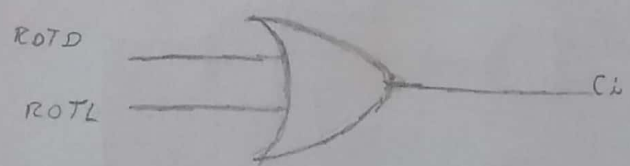
(0) Não deslocar -> $X_2 X_1 X_0$

ROTD	ROTL	DIV	Ci	Co
1	X	X	1	1
0	1	X	1	0
0	0	1	0	1
0	0	0	0	0

↳ $C_o = ROTD + ROTD'.ROTL'.DIV$

↳ $C_i = ROTD + ROTD'.ROTL$





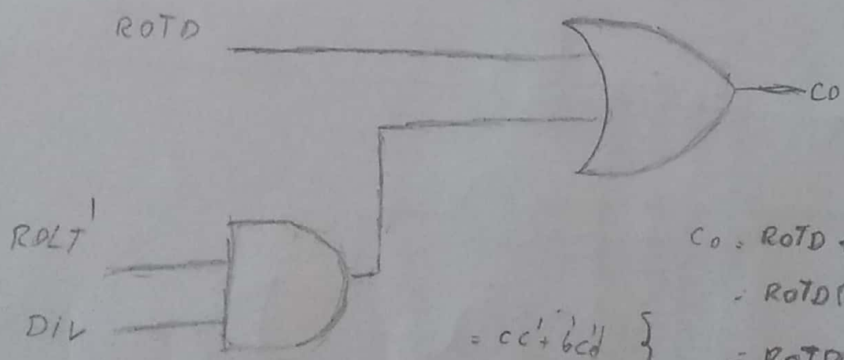
$C_i = ROTD + ROTD'.ROTL$

$= ROTD.(ROTD+ROTD') + ROTD'.ROTL$

$= ROTD.\underline{ROTD'} + \underline{ROTD'}.ROTL$

$\left.\begin{array}{l} = aa' + ba' \\ = a + b \end{array}\right\}$

$\underline{C_i = ROTD + ROTL}$



Simplificando o circuito, não muda a ordem de prioridade

$C_o = ROTD + ROTD'.ROTL'.DIV$

$= ROTD(ROTD + ROTD') + ROTD'.ROTL'.DIV$

$= ROTD.\underline{ROTD'} + \underline{ROTD'}.ROTL'.DIV$

$\left.\begin{array}{l} = cc' + bc'd \\ = c + b'd \end{array}\right\}$

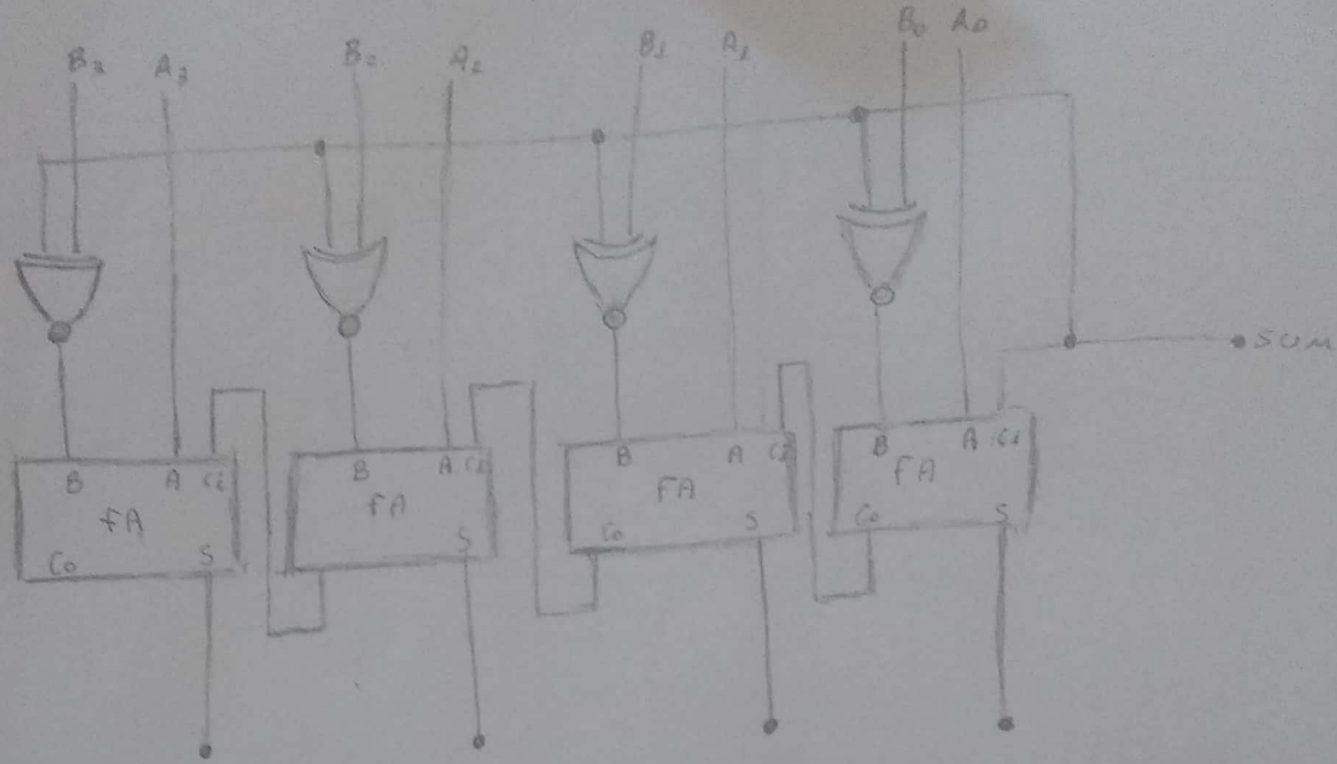
$\underline{C_o = ROTD + ROTL'.DIV}$

PRIORIDADE

	Ci	Co
CIRCULAR DIREITA ->	1	1
CIRCULAR ESQUERDA ->	1	0
DIVISÃO POR DOIS ->	0	1
NÃO DESLOCA ->	0	0

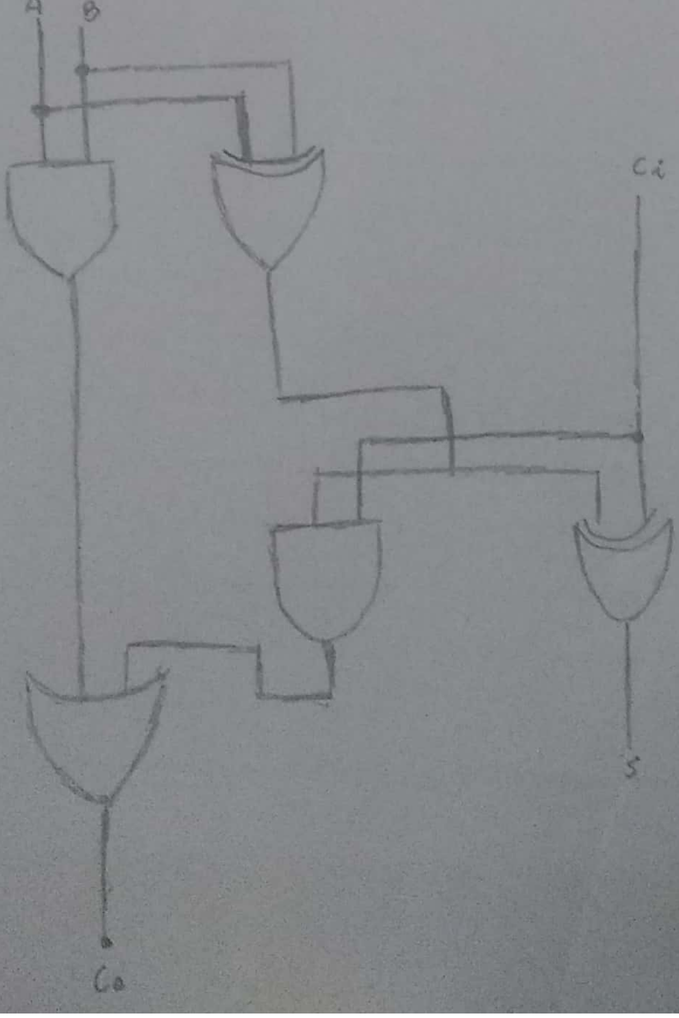
SOLUÇÃO SIMPLIFICADA

4.



{ SUM = 0 → subtrai
SUM = 1 → soma

FA → FULL Adder



somador completo