MAC 0329

15/06/2021

AB=00

EF \ CD	00	01	11	10
00	m0	m4	m12	m8
01	m1	m5	m13	m9
11	m3	m7	m15	m11
10	m2	m6	m14	m10

AB=10

EF \ CD	00	01	11	10
00	m32	m36	m44	m40
01	m33	m37	m45	m41
11	m35	m39	m47	m43
10	m34	m38	m46	m42

AB=01

EF \ CD	00	01	11	10
00	m16	m20	m28	m24
01	m17	m21	m29	m25
11	m19	m23	m31	m27
10	m18	m22	m30	m26

AB=11

EF \ CD	00	01	11	10
00	m48	m52	m60	m56
01	m49	m53	m61	m57
11	m51	m55	m63	m59
10	m50	m54	m62	m58

← mapa de Karnaugh (6 variáveis)

$$f(a,b,c,d) = \sum m(0,4,5,6,7,8,9,10,11,14,15)$$

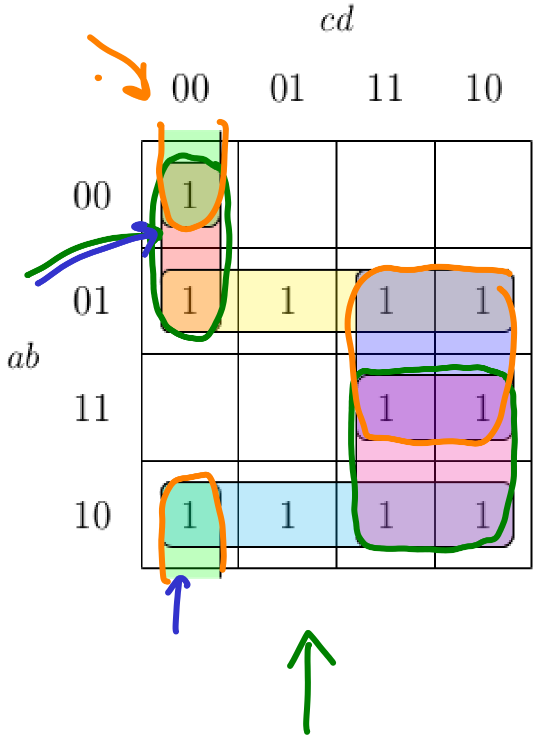
0000 0100 0101 0110 0111 1000 1001 1010 1011 1110 1111

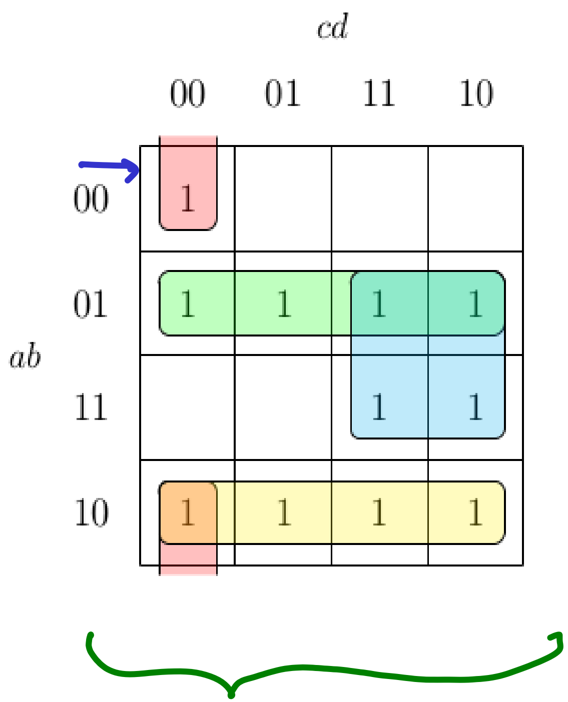
ab \ cd	00	01	11	10
00	1			
01	1	1	1	1
11			1	1
10	1	1	1	1

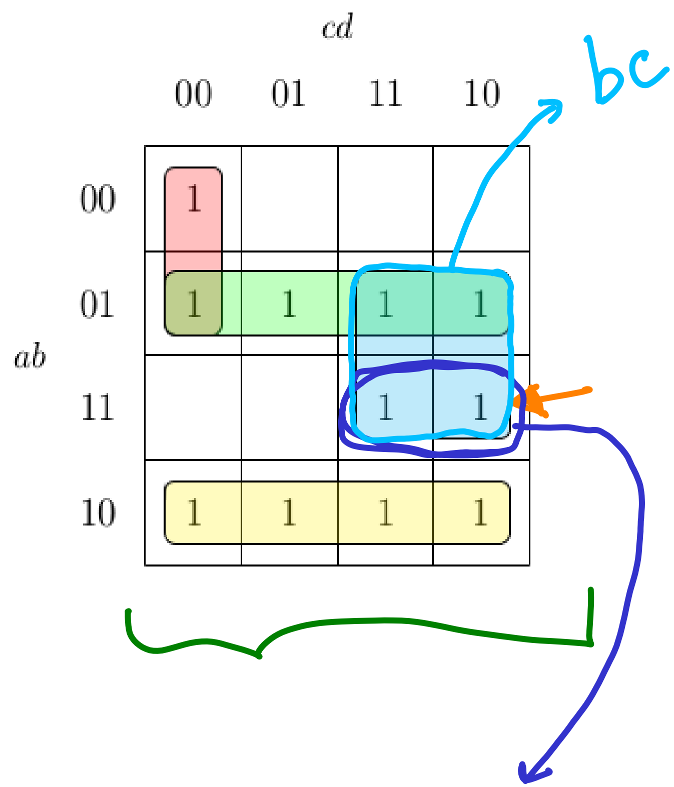
f

$$f(a,b,c,d) = \overline{a}\,b + a\,\overline{b} + \overline{a}\,\overline{c}\,\overline{d} + b\,c$$
$$f(a,b,c,d) = \overline{a}\,b + a\,\overline{b} + \overline{a}\,\overline{c}\,\overline{d} + a\,c$$

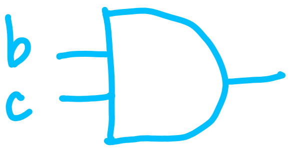
$$f(a,b,c,d) = \overline{a}\,b + a\,\overline{b} + \overline{b}\,\overline{c}\,\overline{d} + b\,c$$
$$f(a,b,c,d) = \overline{a}\,b + a\,\overline{b} + \overline{b}\,\overline{c}\,\overline{d} + a\,c$$

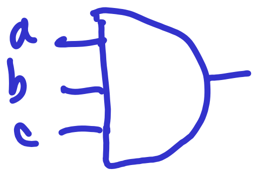






abc





Minimização POS

$$f(a,b,c) = \sum m(0,4,5,7)$$

$$\bar f(a,b,c) = \sum m(1,2,3,6)$$

001 010 011 110

$\bar a c$

$a \backslash bc$	00	01	11	10
0		1	1	1
1				1

$\bar f$

$$b\bar c \Longrightarrow \bar f(a,b,c) = \bar a c + b\bar c \qquad \bar{\bar f}$$

$$f = \bar{\bar f} \qquad f(a,b,c) = \overline{\bar a c + b\bar c}$$

$$= (\overline{\bar a c}) \cdot (\overline{b\bar c})$$

$$= (a + \bar c)(\bar b + c)$$

$a \backslash bc$	00	01	11	10
0		0	0	0
1				0

$a+\bar{c}$

$\bar{b}+c$

f

$$f(a,b,c) = (a+\bar{c})(\bar{b}+c)$$

Don't cares

$$f(a,b,c,d)=\sum \underline{m}\underbrace{(1,3,7,11,15)}+d\underbrace{(0,2,5)}$$

ab \ cd	00	01	11	10
00	X	1	1	X
01		X	1	
11			1	
10			1	

f

$\bar{a}d$

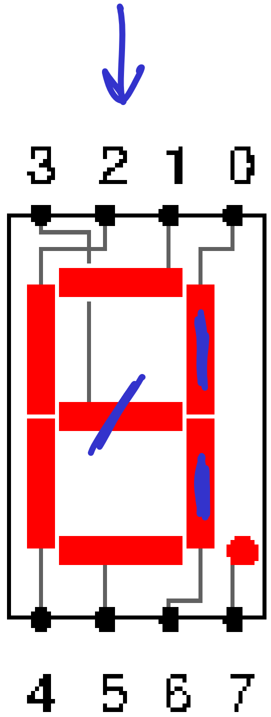
cd

$\bar{a}\bar{b}$

$$f(a,b,c,d)= cd+\bar{a}d$$

$$=cd+\bar{a}\bar{b}$$

BCD – Binary coded decimal (0 a 9)



	Entrada				Segmentos						
	x_3	x_2	x_1	x_0	f_0	f_1	f_2	f_3	f_4	f_5	f_6
0	0	0	0	0	1	1	1	0	1	1	1
1	0	0	0	1	1	0	0	0	0	0	1
2	0	0	1	0	1	1	0	1	1	1	0
3	0	0	1	1	1	1	0	1	0	1	1
4	0	1	0	0	1	0	1	1	0	0	1
5	0	1	0	1	0	1	1	1	0	1	1
6	0	1	1	0	0	1	1	1	1	1	1
7	0	1	1	1	1	1	0	0	0	0	1
8	1	0	0	0	1	1	1	1	1	1	1
9	1	0	0	1	1	1	1	1	0	1	1
	1	0	1	0	×	×	×	×	×	×	×
	1	0	1	1	×	×	×	×	×	×	×
	1	1	0	0	×	×	×	×	×	×	×
	1	1	0	1	×	×	×	×	×	×	×
	1	1	1	0	×	×	×	×	×	×	×
	1	1	1	1	×	×	×	×	×	×	×

Minimização de múltiplas funções

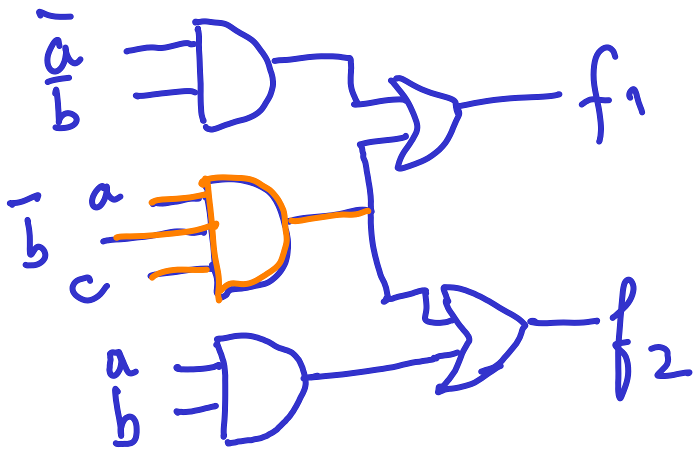
a b c	f_1	f_2
0 0 0	1	0
0 0 1	1	0
0 1 0	0	0
0 1 1	0	0
1 0 0	0	0
1 0 1	1	1
1 1 0	0	1
1 1 1	0	1

$$f_1(a,b,c) = \bar{a}\bar{b} + \bar{b}c = \bar{a}\bar{b} + a\bar{b}c$$

000
001 $\Rightarrow$ 00X

001 $\Rightarrow$ X01
101

$$f_2(a,b,c) = ab + ac = ab + a\bar{b}c$$



a	b	c	f_1	f_2
0	0	0	1	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	1
1	1	0	0	1
1	1	1	0	1

a \ bc	00	01	11	10
0	1	1		
1		1		

f_1

a \ bc	00	01	11	10
0				
1		1	1	1

f_2

	1		

$f_1 \cdot f_2$

f_1

f_2

f_3

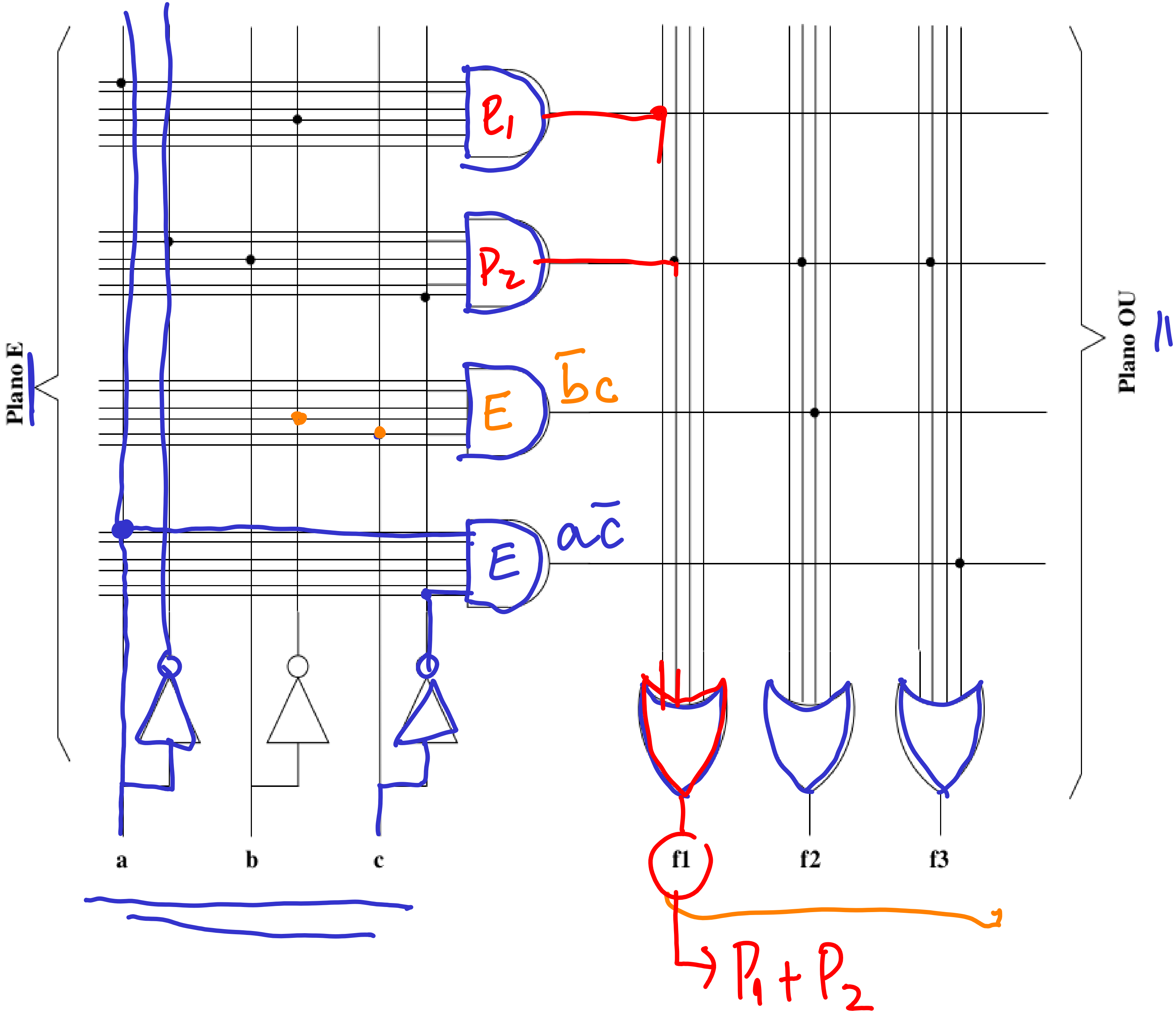
$f_1 f_2$

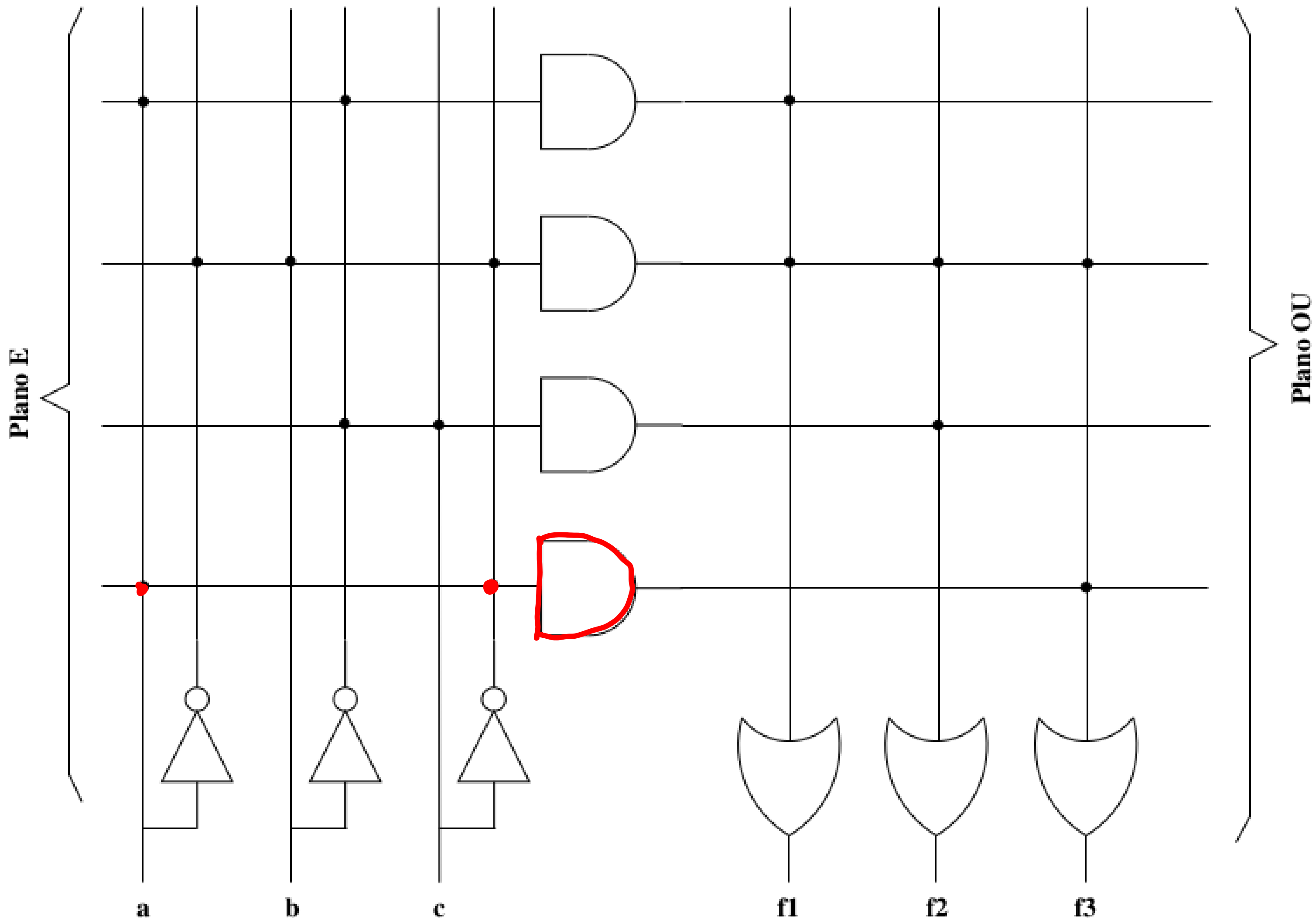
$f_1 f_3$

$f_2 f_3$

$f_1 f_2 f_3$

PLA - Programmable Logic Arrays




Plano E
Plano OU
a
b
c
f1
f2
f3

$$f(a,b,c) = \sum m(0,4,5,7)$$

000 100 101 111

000

100

101

111

$$f(a,b,c,d)=\sum m(0,4,5,6,7,8,9,10,11,14,15)$$

0000 0100 0101 0110 0111 1000 1001 1010 1011 1110 1111

0000	0X00
	X000
0100	$\boxed{010X}$
1000	01X0
0101	100X
0110	10X0
1001	01X1
1010	$\boxed{011X}$
0111	X110
1011	10X1
1110	101X
1111	

01XX

$\bar a b \bar c$

$+$

$\bar a b c$

$\Rightarrow \bar a b$

Algoritmo de Quine-McCluskey

(ver notas de aula)