

Mayo 94

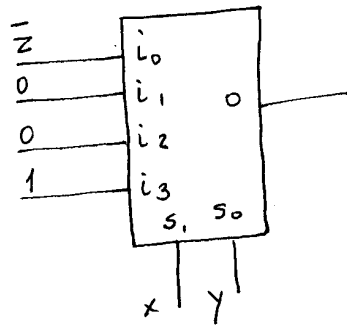
Sintetizar con MUX  $f(x,y,z) = (x + \bar{y})(\bar{x} + y)\bar{z} + xyz$

$$f(x,y,z) = (x + \bar{y})(\bar{x} + y)\bar{z} + xyz$$

$$f = (x + \bar{y})(\bar{x}\bar{z} + y\bar{z}) + xyz = \frac{x\bar{x}\bar{z}}{0} + x y \bar{z} + \bar{x} \bar{y} \bar{z} + \frac{y \bar{y} \bar{z}}{0} + xyz$$

$$f = xy\bar{z} + \bar{x}\bar{y}\bar{z} + xyz = xy(z + \bar{z}) + \bar{x}\bar{y}\bar{z} = xy + \bar{x}\bar{y}\bar{z}$$

selección  $xy \Rightarrow f = \frac{\bar{x}\bar{y}}{0}(\bar{z}) + \frac{xy}{1}(z) + \frac{\bar{x}\bar{y}}{1}(0) + \frac{x\bar{y}}{2}(0)$



Junio 95 (1ª Semanal)

Sintetizar con MUX 4 canales

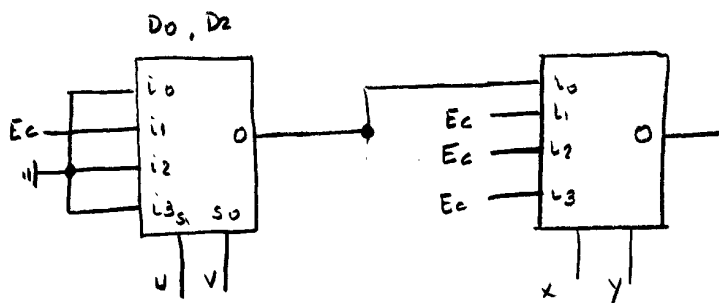
$$f_1(x, y, z, u, v) = x\bar{y}(u+\bar{v}) + y + \bar{u}v$$

→ Segundo nivel →  $xy$

$$f_1 = \underline{\underline{x\bar{y}(u+\bar{v})}} + xy + \underline{\underline{\bar{x}y}} + \underline{\underline{\bar{x}\bar{y}\bar{u}v}} + \underline{\underline{\bar{x}y\bar{u}v}} + \underline{\underline{x\bar{y}\bar{u}v}} + \underline{\underline{xy\bar{u}v}}$$

$$f_1 = \frac{\bar{x}\bar{y}(\bar{u}v)}{D_0} + \frac{\bar{x}y(1+\bar{u}v)}{D_1} + \underbrace{x\bar{y}(u+\bar{v}+\bar{u}v)}_{(u+\bar{u})(\bar{v}+u)} + \frac{xy(1+\bar{u}v)}{D_3}$$

$$D_0 = \bar{u}v \quad D_1 = D_2 = 1 \quad D_3 = 1$$

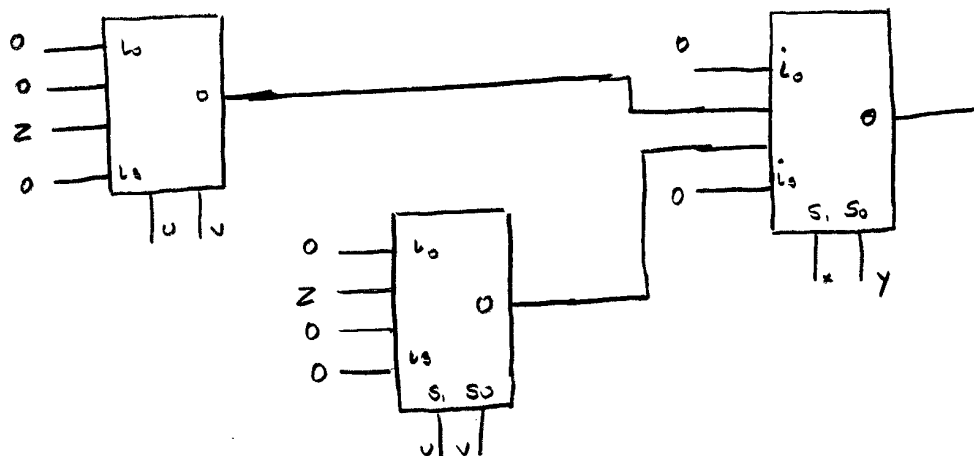


$$f_2(x, y, z, u, v) = \bar{x}y z u \bar{v} + x\bar{y} z \bar{u} v$$

- 2º nivel  $xy$

$$f_2 = \bar{x}y \frac{(z u \bar{v})}{D_0} + x\bar{y} \frac{(z \bar{u} v)}{D_1} + \bar{x}\bar{y}(0) + x\bar{y}(0)$$

- 1º nivel  $uv \Rightarrow \bar{u}\bar{v} \cdot z$   
 $uv \Rightarrow \bar{u}v \cdot z$



Junio 95

ALU

		$S_2$	$S_1$	$S_0$	$M$
$F_1 = A + B$	$\Rightarrow$	0	0	1	0
$F_2 = A + \bar{B}$	$\Rightarrow$	0	1	0	0
$F_3 = (A + B) \text{ plus } A\bar{B}$	$\Rightarrow$	1	0	1	0
$F_4 = A \oplus B$	$\Rightarrow$	1	1	0	1

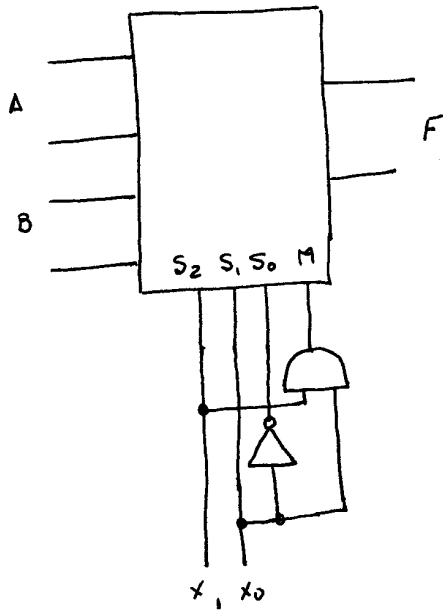
$f_1$	$f_0$	$S_2$	$S_1$	$S_0$	$M$
0	0	0	0	1	0
0	1	0	1	0	0
1	0	1	0	1	0
1	1	1	1	0	1

$S_2 = f_1$

$S_1 = f_0$

$S_0 = \bar{f}_0$

$M = f_1 f_2$



Septiembre 96 / Mayo 99

Describir los circuitos multiplexores: estructura interna, función y razón de su utilidad

Junio 94 (2ª semana)

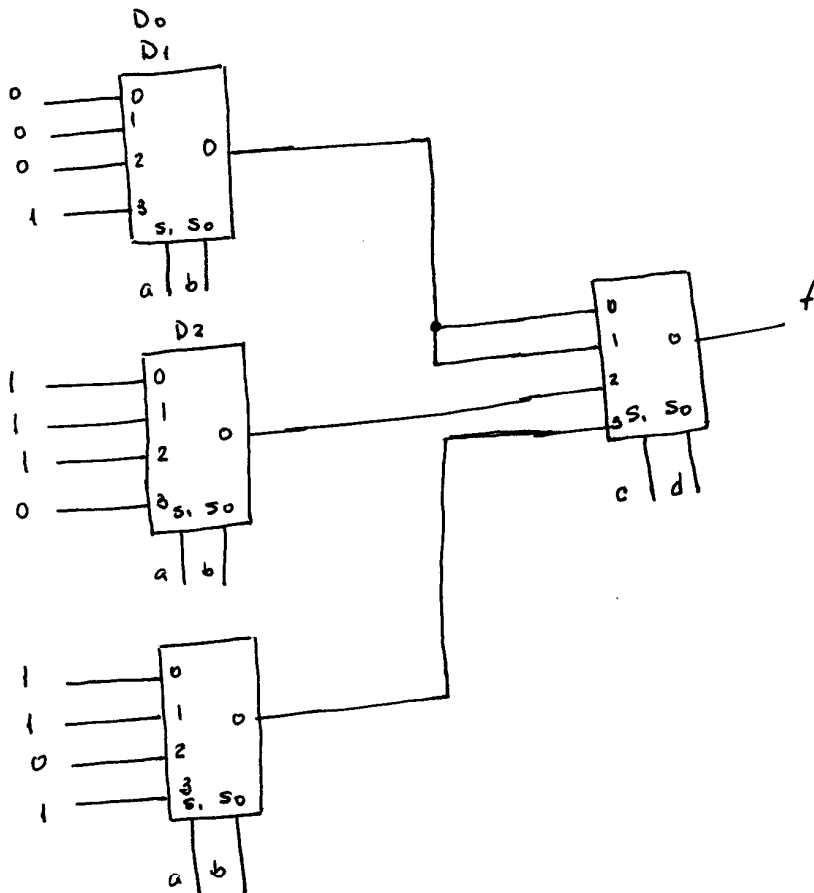
$$f(a,b,c,d) = \underline{\underline{\bar{a}\bar{b}c\bar{d}}} + \underline{\underline{\bar{a}b\bar{c}d}} + \underline{\underline{\bar{a}bcd}} + \underline{\underline{\bar{a}b\bar{c}d}} + \underline{\underline{a\bar{b}cd}} + \underline{\underline{ab\bar{c}d}} + \underline{\underline{abc\bar{d}}} + \underline{\underline{abcd}}$$

MUX 4 a 1  $\Rightarrow$  2 patillas selección  $\Rightarrow$  2 niveles

Nivel 2  $\Rightarrow$  c d

$$f = \underbrace{\bar{c}\bar{d}}_{D_0} (\underbrace{ab}_{D_1}) + \underbrace{\bar{c}d}_{D_1} (\underbrace{ab}_{D_1}) + \underbrace{cd}_{D_2} (\underbrace{\bar{a}\bar{b} + \bar{a}b + a\bar{b}}_{D_3}) + \underbrace{cd}_{D_3} (\underbrace{\bar{a}\bar{b} + \bar{a}b + ab}_{D_3})$$

$$D_2 = \bar{a}\bar{b} + \bar{a}b + a\bar{b} \qquad D_3 = \bar{a}\bar{b} + \bar{a}b + ab \qquad D_0 = ab = D_1$$



Junio 98

$$f = \prod M(0, 3, 4, 5, 6, 7, 11, 13, 14, 15)$$

Sintetizar con multiplexores.

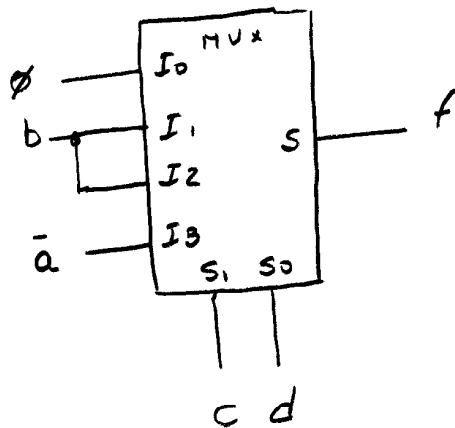
$$\bar{f} = \prod M(1, 2, 8, 9, 10, 12) = f = \overline{\prod M(1, 2, 8, 9, 10, 12)} = \sum m(14, 13, 7, 6, 5, 3)$$

$$f = \frac{\bar{a}\bar{b}cd}{3} + \frac{\bar{a}b\bar{c}d}{5} + \frac{\bar{a}bc\bar{d}}{6} + \frac{\bar{a}bcd}{7} + \frac{ab\bar{c}d}{13} + \frac{abcd}{14}$$

2º Nivel cd  $\Rightarrow$

$$f = \bar{c}\bar{d}(0) + \bar{c}d(\underbrace{\bar{a}b + ab}_b) + c\bar{d}(\underbrace{\bar{a}b + ab}_{b(a+\bar{a})}) + cd(\underbrace{\bar{a}\bar{b} + \bar{a}b}_{\bar{a}(b+\bar{b})})$$

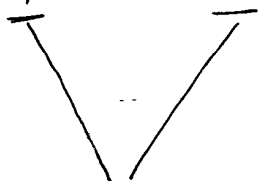
$$f = \bar{c}\bar{d}(0) + \bar{c}d(b) + c\bar{d}(b) + cd(\bar{a})$$



Mayo 98

$$f(x, y, z) = (x + y + \bar{z}) + (x + \bar{y} + \bar{z}) + \bar{x}\bar{y}z + \bar{x}y\bar{z} + xyz$$

$$f = x + y + \bar{z} + x + \bar{y} + \bar{z} + \bar{x}\bar{y}z + \bar{x}y\bar{z} + xyz$$



$$y + \bar{y} = 1 \Rightarrow 1 + (\bar{x}) = 1$$

Mayo 2000

$$f = \Sigma (1, 2, 3, 4, 7) \rightarrow$$

Variables  $\begin{cases} x \\ y \\ z \end{cases}$

$$f = \bar{x}\bar{y}z + \bar{x}y\bar{z} + \bar{x}yz + x\bar{y}\bar{z} + xyz$$

	$\bar{z}$		$z$	
$\bar{y}$	$\bar{x}$	$x$	$\bar{x}$	$x$
$\bar{y}$		1		1
$y$	1		1	1

$$f = yz + \bar{x}y + \bar{x}z + x\bar{y}\bar{z}$$

↓

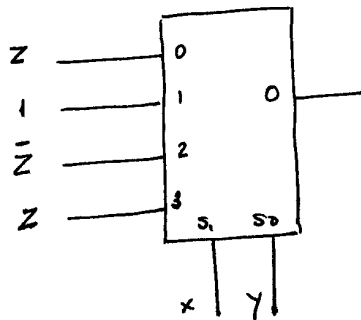
No hay mayores simplificaciones

↓

Dejamos la original.

Multiplexoras de 4 canales  $\Rightarrow$  2 selecciones  $\Rightarrow$   $x, y$

$$f = \bar{x}\bar{y}(z) + \bar{x}y(\underbrace{z+\bar{z}}_1) + x\bar{y}(\bar{z}) + xy(z)$$



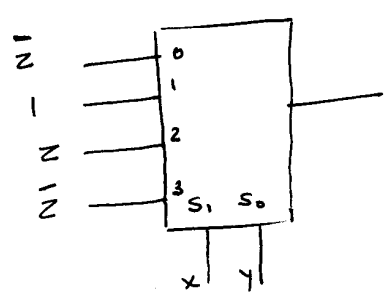
Junio 2000

$f = \bar{z} (0, 2, 3, 5, 6) \rightarrow 3 \text{ variables } \begin{cases} x \\ y \\ z \end{cases}$

$$f = \bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z} + \bar{x}yz + x\bar{y}z + xy\bar{z}$$

MUX 4 canales  $\Rightarrow$  2 selección  $\rightarrow x, y$

$$f_1 = \bar{x}\bar{y}(\bar{z}) + \bar{x}y(\bar{z} + z) + x\bar{y}(z) + xy(\bar{z})$$



Septiembre 2000(2)

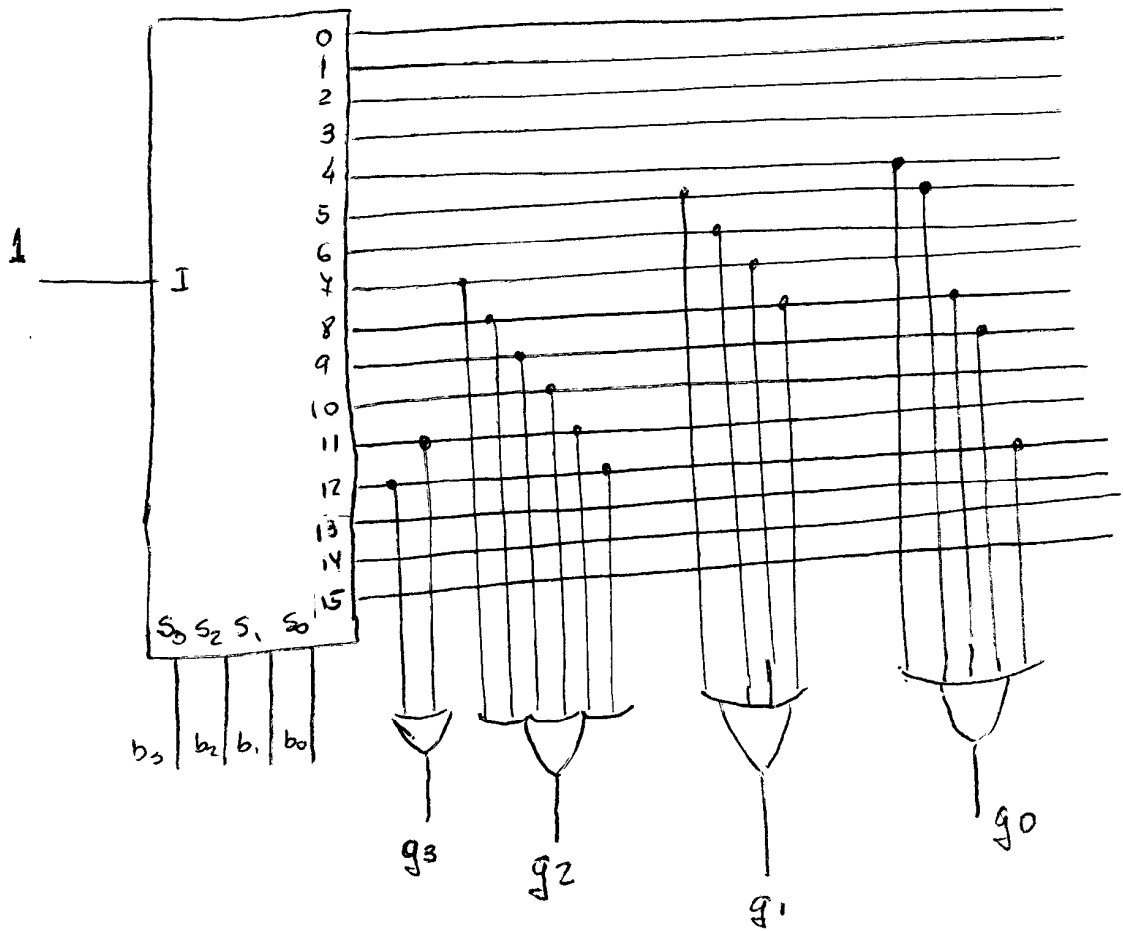
Decimal	BCD dec 3	Gray	Decimal de BCD dec 3
0	0 0 1 1	0 0 0 0	3
1	0 1 0 0	0 0 0 1	4
2	0 1 0 1	0 0 1 1	5
3	0 1 1 0	0 0 1 0	6
4	0 1 1 1	0 1 1 0	7
5	1 0 0 0	0 1 1 1	8
6	1 0 0 1	0 1 0 1	9
7	1 0 1 0	0 1 0 0	10
8	1 0 1 1	1 1 0 0	11
9	1 1 0 0	1 1 0 1	12
	$b_3 \ b_2 \ b_1 \ b_0$	$g_3 \ g_2 \ g_1 \ g_0$	

$g_3 \Rightarrow 11, 12$

$g_2 \Rightarrow 7, 8, 9, 10, 11, 12$

$g_1 \Rightarrow 5, 6, 7, 8$

$g_0 \Rightarrow 4, 5, 8, 9, 12$





$$f_2 = (x y z u v) = x \bar{y} z \bar{u} \bar{v} + \bar{x} y \bar{z} u \bar{v} + x \bar{z} (u+v)$$

Mux de 4 canales

$$f_2 = x \bar{y} z (\bar{u} + \bar{v}) + \bar{x} y \bar{z} u \bar{v} + x \bar{z} u + x \bar{z} v$$

$$f_2 = x \bar{y} z \bar{u} + x \bar{y} z \bar{v} + \bar{x} y \bar{z} u \bar{v} + x \bar{z} u + x \bar{z} v$$

1er nivel xz ⇒

$$f_2 = xz (\underbrace{\bar{y} \bar{u} + \bar{v} \bar{y}}_A) + \bar{x} \bar{z} (\underbrace{u y \bar{v}}_B) + x \bar{z} (\underbrace{u+v}_C) + \bar{x} z (\emptyset)$$

2º nivel uy

$$A \rightarrow \bar{y} \bar{u} + \bar{v} \bar{y} \Rightarrow \bar{u} \bar{y} + u \bar{v} \bar{y} + \bar{u} \bar{v} \bar{y} \Rightarrow \bar{u} \bar{y} \underbrace{(1 + \bar{v})}_1 + u \bar{v} \bar{y} + \bar{u} \bar{v} \bar{y} + u \bar{v} \bar{y}$$

$$B \rightarrow u y \bar{v} = u y (\bar{v})$$

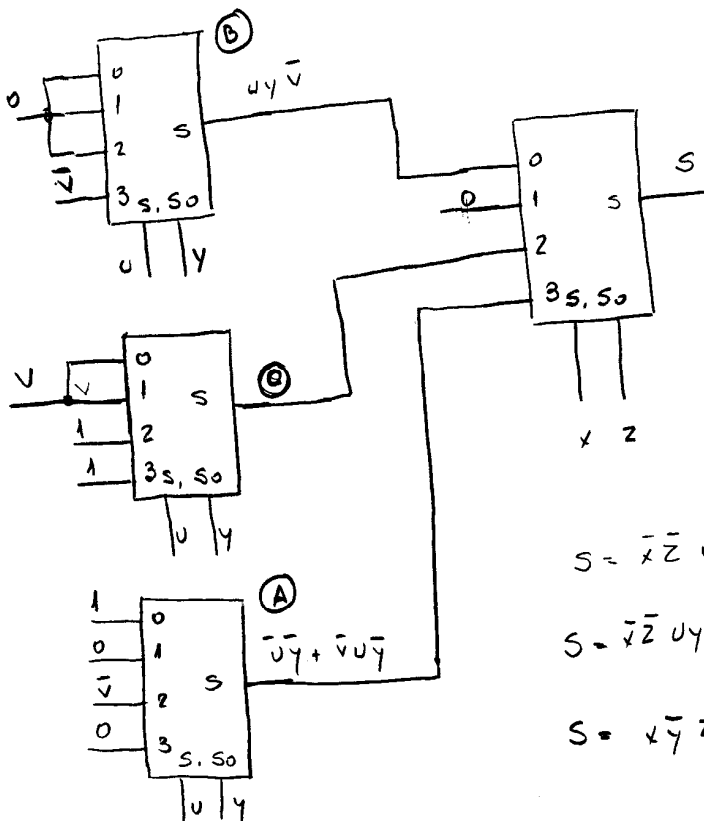
$$C \rightarrow u+v = u y + u \bar{y} + v u y + v \bar{u} \bar{y} + v u \bar{y} + v \bar{u} \bar{y} = u y + u \bar{y} + \bar{u} \bar{y} (v) + \bar{u} \bar{y} (v)$$

$$M = u \bar{v} \bar{y} + v \bar{u} \bar{y} + u \bar{y} + u y$$

$$M = \underbrace{u \bar{v} \bar{y}} + \underbrace{v \bar{u} \bar{y}} + \underbrace{u \bar{y}} + \underbrace{u y}$$

$$+ \underbrace{\bar{v} u y}$$

$$M = \underline{v + u}$$



$$S = \bar{x} \bar{z} u y \bar{v} + x \bar{z} (v+u) + x z (\bar{u} \bar{y} + \bar{v} u \bar{y})$$

$$S = \bar{x} \bar{z} u y \bar{v} + x \bar{z} v + x \bar{z} u + \frac{x z \bar{u} \bar{y}}{1} + \frac{x z \bar{v} u \bar{y}}{1}$$

$$S = x \bar{y} z \underbrace{(\bar{u} + u \bar{v})}_{\bar{u} + \bar{v}} + \bar{x} y \bar{z} u \bar{v} + x \bar{z} (u+v)$$

Septiembre 2002

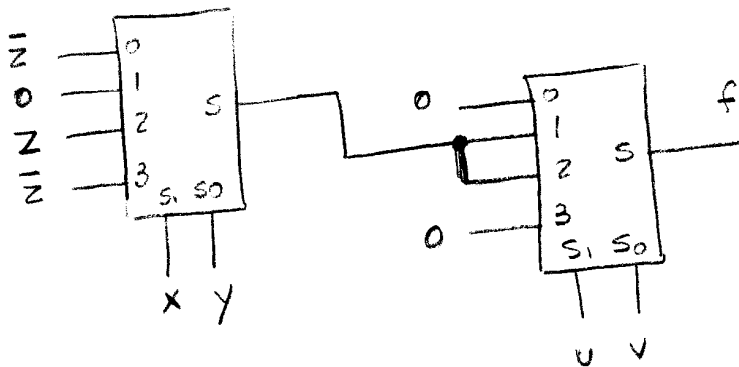
Sintetizar la función  $f$  con multiplexores de 4 entradas

$$f = (\bar{x}\bar{y}\bar{z} + x\bar{y}z + xy\bar{z})(u\bar{v} + \bar{u}v)$$

$$f = u\bar{v}(\bar{x}\bar{y}\bar{z} + x\bar{y}z + xy\bar{z}) + \bar{u}v(\bar{x}\bar{y}\bar{z} + x\bar{y}z + xy\bar{z}) + uv(0) + \bar{u}\bar{v}(0)$$

1er nivel  $\rightarrow uv$

$$\bar{x}\bar{y}\bar{z} + x\bar{y}z + xy\bar{z} \rightarrow xy \Rightarrow \bar{x}\bar{y}(\bar{z}) + x\bar{y}(z) + xy(\bar{z}) + \bar{x}y(0)$$



Junio 2003

Codificador con 4 niveles de prioridad. (Prioridades)

Pg 327 libro teoría

Septiembre 2003 - Reserva

Sintetizar con multiplexores  $f = \Sigma(1, 2, 3, 4, 7) \Rightarrow (a, b, c)$

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

$$\text{1er nivel} \rightarrow ab \Rightarrow f = \bar{a}\bar{b}(c) + \bar{a}\bar{b}(\bar{c}+c) + a\bar{b}(\bar{c}) + ab(c)$$

