Exámenes Gestión Algebra Boole

Sep 2002 B.9

Es falso con respecto a una XOR que la salida $= \emptyset$ cuando el nº entradas con valor $= 1$ es impar.

XOR

a	b	S
0	0	0
0	1	1
1	0	1
1	1	0

Sep 2002 B.11

simplificar $F = \overline{ab + ac} + \bar{a}\bar{b}c$

$F = \overline{ab} \cdot \overline{ac} + \bar{a}\bar{b}c = [(\bar{a} + \bar{b}) \cdot (\bar{a} + \bar{c})] + \bar{a}\bar{b}c = \bar{a}\bar{a} + \bar{a}\bar{c} + \bar{a}\bar{b} + \bar{b}\bar{c} + \bar{a}\bar{b}c =$

$= \bar{a}(1 + \bar{c} + \bar{b} + \bar{b}c) + \bar{b}\bar{c} = \bar{a} + \bar{b}\bar{c} \Rightarrow \underline{\underline{a}}$

Sep 2002 B.12

$f(a,b,c,d) = m_0 + m_3 + m_7 + m_9 + m_{12} + m_{15}$

$\overline{f(a,b,c,d)} = m_1 + m_2 + m_5 + m_6 + m_8 + m_{10} + m_{11} + m_{13} + m_{14} + m_4$

$f(a,b,c,d) = \overline{m_1 + m_2 + m_4 + m_5 + m_6 + m_8 + m_{10} + m_{11} + m_{13} + m_{14}}$

$f(a,b,c,d) = \overline{m_1} \cdot \overline{m_2} \cdot \overline{m_4} \cdot \overline{m_5} \cdot \overline{m_6} \cdot \overline{m_8} \cdot \overline{m_{10}} \cdot \overline{m_{11}} \cdot \overline{m_{13}} \cdot \overline{m_{14}}$

$f(a,b,c,d) = M_{14} \cdot M_{13} \cdot M_{11} \cdot M_{10} \cdot M_9 \cdot M_7 \cdot M_5 \cdot M_4 \cdot M_2 \cdot M_1 \Rightarrow \underline{\underline{c}}$

Feb 2002 - 2°S - B.15

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

$f(a,b,c) = M5 \Rightarrow \overline{f(a,b,c)} = M0 \cdot M1 \cdot M2 \cdot M3 \cdot M4 \cdot M6 \cdot M7$

$f(a,b,c) = \overline{M0 \cdot M1 \cdot M2 \cdot M3 \cdot M4 \cdot M6 \cdot M7}$

$f(a,b,c) = \overline{M0} + \overline{M1} + \overline{M2} + \overline{M3} + \overline{M4} + \overline{M6} + \overline{M7}$

$f(a,b,c) = m7 + m6 + m5 + m_4 + m_3 + m_1 + m0$

$f(a,b,c) = \Sigma(0,1,3,4,5,6,7) \Rightarrow \underline{\underline{a}}$

Feb 2002 - 1°S - C.11

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

$f(a,b,c,d) = (\bar{a} \cdot b) + \bar{b} + c + (c \cdot \bar{d}) = \bar{a}b + \bar{b} + c + c\bar{d} = \bar{a}b + \bar{b} + c\underbrace{(1+\bar{d})}_{1} =$

$= (\bar{a} + \bar{b})\underbrace{(b+\bar{b})}_{1} + c = c + \bar{a} + \bar{b} \Rightarrow \underline{\underline{d}}$

Feb 2002 - 1°S C.13

$f(a,b,c,d) = M1 \cdot M2 \cdot M5 \cdot M9 \cdot M12 \cdot M13 \longrightarrow$ minterms

$\overline{f(a,b,c,d)} = M0 \cdot M3 \cdot M4 \cdot M6 \cdot M7 \cdot M8 \cdot M10 \cdot M11 \cdot M14 \cdot M15$

$f(a,b,c,d) = \overline{M_0} + \overline{M_3} + \overline{M_4} + \overline{M_6} + \overline{M7} + \overline{M8} + \overline{M10} + \overline{M11} + \overline{M14} + \overline{M15}$

$f(a,b,c,d) = m_{15} + m_{12} + m_{11} + m_9 + m_8 + m_7 + m_5 + m_4 + m_1 + m_0$

$\Downarrow$

$\underline{\underline{d}}$

Sep 2001 - B.12

$$F=(ab+\underbrace{a\cancel{c}\bar{c}}_{\substack{c\cdot\bar{c}=0\\ \emptyset\cdot a=0}}+\bar{a}b+\underbrace{ab\cancel{c}\bar{b}}_{\substack{b\cdot\bar{b}=0\\ 0\cdot x=0}}+a\bar{b})\,(\underbrace{\underbrace{a\bar{c}+\bar{a}\bar{c}}_{\bar{c}(\underbrace{a+\bar{a}}_{1})}+c}_{\underbrace{\bar{c}+c}_{1}})$$

$$F=\ ab+\bar{a}b+a\bar{b}=b\,(\underbrace{a+\bar{a}}_{1})+a\bar{b}=\ b+a\bar{b}=\underbrace{(a+b)(\underbrace{b+\bar{b}}_{1})}_{a+b}\Rightarrow \underline{\underline{a}}$$

a) $a+\bar{a}b=\underbrace{(a+\bar{a})}_{1}(a+b)=a+b$

Sep 2001 - B.20

$f(a,b,c)=\bar{a}\bar{b}c+\bar{a}b\bar{c}+abc \rightarrow$ 2ª forma canónica $\Downarrow$ maxterm

$f(a,b,c)=m_1+m_2+m_7$

$\overline{f(a,b,c)}=m_0+m_3+m_4+m_5+m_6$

$f(a,b,c)=\overline{m_0}\cdot\overline{m_3}\cdot\overline{m_4}\cdot\overline{m_5}\cdot\overline{m_6}=M_7\cdot M_4\cdot M_3\cdot M_2\cdot M_1$

$\Downarrow$

$\underline{\underline{b}}$

Feb 2001 - 2ªS D.10

Es falso que la NAND de un "1" solo si todas entradas son simultaneamente 1. Si todas entradas 1 $\rightarrow$ salida $=\emptyset$

$\Downarrow$

$\underline{\underline{d}}$

Feb 2001 – 2ª S - D12

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

$$= \left(\overline{\overline{a+b}} + \bar{c}\right) a \cdot (b+\bar{d}) \cdot (c+d) =$$

$$= (a+b+\bar{c}) \cdot a \cdot (b+\bar{d}) \cdot (c+d) \Rightarrow \underline{\underline{c}}$$

Feb 2001 - 1ª S - B.19

$$f(a,b,c,d) = m_0 + m_5 + m_8 + m_{15} \qquad \text{para} \quad a=b=c=d=1$$

$$f(a,b,c,d) = \underbrace{\bar{a}\bar{b}\bar{c}\bar{d}}_{0} + \underbrace{\bar{a}b\bar{c}d}_{0} + \underbrace{a\bar{b}\bar{c}\bar{d}}_{0} + \underbrace{abcd}_{1} = \underset{c}{\underset{\Downarrow}{1}}$$

Feb 2001 - 1ª S. B.20

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

$$= a + \underbrace{(b+\bar{b})}_{1}(b+\bar{c}) = a+b+\bar{c} = M6$$

$$f(a,b,c) = M6 \Rightarrow \overline{f(a,b,c)} = M_0 \cdot M1 \cdot M2 \cdot M3 \cdot M4 \cdot M5 \cdot M7$$

$$f(a,b,c) = \overline{M_0} + \overline{M_1} + \overline{M2} + \overline{M3} + \overline{M4} + \overline{M5} + \overline{M7}$$

$$f(a,b,c) = m_7 + m_6 + m_5 + m_4 + m_3 + m_2 + m_0$$

$$f(a,b,c) = \Sigma(0,2,3,4,5,6,7) \Rightarrow \underline{\underline{a}}$$

Sep 2000 - C.9

Respecto a las formas canónicas existen dos formas canónicas, la 1ª es suma de producto de todas las variables y la 2ª es un producto de sumas de todas las variable ⇒ <u>d</u>

Sep 2000 - C.12

$F = \bar{a}b + c$ → forma canónica

$F = \bar{a}b(c+\bar{c}) + c = \bar{a}bc + \bar{a}b\bar{c} + c(a+\bar{a}) =$

$= \bar{a}bc + \bar{a}b\bar{c} + ac + \bar{a}c = \underbrace{\bar{a}bc}_{m_3} + \underbrace{\bar{a}b\bar{c}}_{m_2} + \underbrace{a\bar{b}c}_{m_5} + \underbrace{abc}_{m_7} + \underbrace{\bar{a}bc}_{m_3} + \underbrace{\bar{a}\bar{b}c}_{m_1}$

$F = m_1 + m_2 + m_3 + m_5 + m_7 = \bar{a}\bar{b}c + \bar{a}b\bar{c} + \bar{a}bc + a\bar{b}c + abc$

⇓

<u>b</u>

Sep 2000 - C.13

$f(a,b,c,d) = m_0 + m_5 + m_8 + m_{15}$ → $a = b = c = d = 1$

$f(a,b,c,d) = \underbrace{\bar{a}\bar{b}\bar{c}\bar{d}}_{0} + \underbrace{\bar{a}b\bar{c}d}_{0} + \underbrace{a\bar{b}\bar{c}\bar{d}}_{0} + \underbrace{abcd}_{1} = 1$

⇓

<u>c</u>

Feb 2000 - 2ªS - D.11

$f(a,b,c,d) = m_0 + m_3 + m_7 + m_9 + m_{12} + m_{15}$

$\overline{f(a,b,c,d)} = m_1 + m_2 + m_4 + m_5 + m_6 + m_8 + m_{10} + m_{11} + m_{13} + m_{14}$

$f(a,b,c,d) = \overline{m_1} \cdot \overline{m_2} \cdot \overline{m_4} \cdot \overline{m_5} \cdot \overline{m_6} \cdot \overline{m_8} \cdot \overline{m_{10}} \cdot \overline{m_{11}} \cdot \overline{m_{13}} \cdot \overline{m_{14}}$

$f(a,b,c,d) = M_{14} \cdot M_{13} \cdot M_{11} \cdot M_{10} \cdot M_9 \cdot M_7 \cdot M_5 \cdot M_4 \cdot M_2 \cdot M_1$

⇓

debiera ser la <u>a</u> si tuviese M_4

Feb 2000-2ªS- D.15

$$F = \overline{\overline{\overline{a+b}\cdot c} + \bar a + (\bar b d) + (bd)} = \overline{\overline{a+b}\cdot c} \cdot a \cdot \overline{\bar b d} \cdot \overline{bd} =$$

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

$$= (\underbrace{aa+ab+a\bar c}_{a(\underbrace{1+b+\bar c}_{1})\ =\ a})(b+\bar d)(\bar b+\bar d) = (ab+a\bar d)(\bar b+\bar d) =$$

$$= \cancel{ab\bar b} + ab\bar d + a\bar b\bar d + a\bar d\bar d = a\bar d(1+b+\bar b) = a\bar d$$

a) $a + (b\,\cancel{d\bar d}\,\bar b) = a$

?

b) $a(bd + \bar d\bar b)$

c) $\emptyset$

d) $= a(bd+\bar d\bar b) + a + (d\,\cancel{b\bar d}\,\bar b) = a$

Feb 2000 - 1ªS - D.11

$$f(a,b,c,d) = M_1\cdot M_2\cdot M_5\cdot M_9\cdot M_{12}\cdot M_{13}\cdot M_{15}$$

$$\overline{f(a,b,c,d)} = M_0\cdot M_3\cdot M_4\cdot M_6\cdot M_7\cdot M_8\cdot M_{10}\cdot M_{11}\cdot M_{14}$$

$$f(a,b,c,d) = \overline{M_0}+\overline{M_3}+\overline{M_4}+\overline{M_6}+\overline{M_7}+\overline{M_8}+\overline{M_{10}}+\overline{M_{11}}+\overline{M_{14}}$$

$$f(a,b,c,d) = m_{15}+m_{12}+m_{11}+m_9+m_8+m_7+m_5+m_4+m_1 \Rightarrow \underline{b}$$

Feb 2000 - 1ªS - D.15

$$F = \overline{(\bar a+b)\bar c + a + b + c + \bar d}\cdot\overline{c\bar b} = \overline{\bar a\bar c + \underline{b\bar c} + a + \underline{b} + c + \bar d}\cdot\overline{c\bar b} =$$

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

$$= (a\bar c + ab + \cancel{c\bar c} + cb)\,\bar a\bar b\bar c\bar d = \cancel{a\bar c\bar a\bar b\bar c\bar d} + \cancel{ab\bar a\bar b\bar c\bar d} + \cancel{cb\bar a\bar b\bar c\bar d}$$

$F=0 \Rightarrow \underline{a}$

Sep. 2003. - R - 4

Respecto a las funciones lógicas en su forma canónica es cierto que: Se define como término canónico de una función lógica a todo producto o suma en el que aparecen todas las variables en su forma directa a o complementada a'

$\Downarrow$

$\boxed{d}$

Sep. 2003 R-5

Indicar el nº de cuadros adyacentes que tiene un cuadro de un mapa de karnaugh de 4 variables:

Cada cuadro de una tabla de karnaugh tiene tantos cuadros adyacentes como variables haya (Pg 172).

$\Downarrow$

4 variables $\Rightarrow$ Todo cuadro 4 adyacentes $\Rightarrow \boxed{d}$

Sep 2003. R-12

¿Cuál de las funciones S0, S1, S2 de la siguiente tabla de la verdad es equivalente a $F(x,y,z) = xy(z+z') + xy'z$

x	y	z	S_2	S_1	S_0
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	0	0	0
1	0	1	1	1	0
1	1	0	1	0	1
1	1	1	1	0	1

$S_2 = x\bar{y}z + xy\bar{z} + xyz =$

$S_2 = xy(z+\bar{z}) + x\bar{y}z$

$S_1 = x\bar{y}z$

$S_0 = xy\bar{z} + xyz = xy(z+\bar{z})$

$\Downarrow$

$S_2 \Rightarrow \boxed{c}$

Sep 2003 - R - 14

obtener la expresión en minterms de la función:

$f(A,B,C) = M_1 M_2 M_3 M_4 M_7$

$\overline{f(A,B,C)} = M_0 M_5 M_6 \Rightarrow f(A,B,C) = \overline{M_0 M_6 M_5} =$

$f(A,B,C) = \overline{M_0} + \overline{M_6} + \overline{M_5} = m_7 + m_1 + m_2 \Rightarrow \boxed{b}$

Sep 2003 - R - 19

simplificar $F = \sum m(0,1,2,3,8,9,10,11) = f(A,B,C,D)$

		$\bar{a}\,\bar{d}$	$\bar{a}\,d$	$a\,d$	$a\,\bar{d}$
$\bar{b}$	$\bar{c}$	0: 1	1: 1	9: 1	8: 1
$\bar{b}$	c	2: 1	3: 1	11: 1	10: 1
b	c	6	7	15	14
b	$\bar{c}$	4	5	13	12

$F = \bar{b} \Rightarrow \boxed{b}$

Sep 2003 - A. 2

Con respecto a los mapas de Karnaugh es "FALSO" que

No se debe de cumplir que los cuadros contiguos de un mapa de Karnaugh sean términos canónicos adyacentes

$\Downarrow$

$\boxed{c}$

!! Sep 2003 - A. 11 !!

La función canónica equivalente a $f(a,b,c) = (a+\bar{b})(\bar{a}+b+\bar{c}) + \bar{b}c =$

$= \underbrace{a\cdot\bar{a}}_{0} + ab + a\bar{c} + \bar{a}\bar{b} + \underbrace{b\bar{b}}_{0} + \bar{b}\bar{c} + \bar{b}c \Rightarrow$ Shanon $\Rightarrow$

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

$f(a,b,c) = \underbrace{abc}_{7} + \underbrace{ab\bar{c}}_{6} + \underbrace{ab\bar{c}}_{6} + \underbrace{a\bar{b}\bar{c}}_{4} + \underbrace{\bar{a}\bar{b}\bar{c}}_{0} + \underbrace{\bar{a}\bar{b}\bar{c}}_{0} + \underbrace{a\bar{b}\bar{c}}_{4} + \underbrace{\bar{a}\bar{b}\bar{c}}_{0} + \underbrace{a\bar{b}c}_{5} + \underbrace{\bar{a}\bar{b}c}_{1}$

$f(a,b,c) = m_0 + m_1 + m_4 + m_5 + m_6 + m_7$ ---> E.ΔB.68

$f(a,b,c) = \Sigma m(0,1,4,5,6,7)$

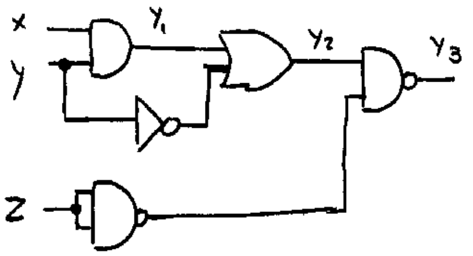
$\overline{f(a,b,c)} = \Sigma m(2,3) = m_2 + m_3 \Rightarrow f(a,b,c) = \overline{m_2 + m_3} = M_5 \cdot M_4$

$\Downarrow$

$\boxed{a}$

Sep 2003 - A.16

Indicar la función lógica asociada a:



$Y_1 = xy$

$Y_2 = xy + \bar{y}$

$Y_3 = \overline{(xy + \bar{y})\,\bar{z}}$

$Y_3 = \overline{(xy + \bar{y})} + z = \overline{(x + \bar{y})\underbrace{(y + \bar{y})}_{1}} + z = \overline{x + \bar{y}} + z =$

$Y_3 = \bar{x} y + z \longrightarrow \boxed{a}$

a) $F(x,y,z) = \overline{xy}\, y + z = (\bar{x} + \bar{y})\, y + z = \bar{x} y + \underbrace{y\bar{y}}_{0} + z = \bar{x} y + z$

Feb 2003 - D.1

Es FALSO respecto a la obtención de la función canónica que la expresión canónica de la función a partir de la tabla de la verdad se obtiene multiplicando los minterms en los que la función valga cero. $\Rightarrow \boxed{d}$

Feb 2003 - D.14

Expresar $f(A,B,C) = A + \bar{B}C$ en suma de minitérminos

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

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

$$f(a,b,c) = \underset{7}{\underline{abc}} + \underset{6}{\underline{ab\bar{c}}} + \underset{5}{\underline{a\bar{b}c}} + \underset{4}{\underline{a\bar{b}\bar{c}}} + \underset{5}{\underline{a\bar{b}c}} + \underset{1}{\underline{\bar{a}\bar{b}c}}$$

$$f(a,b,c) = m_1 + m_4 + m_5 + m_6 + m_7 \Rightarrow \boxed{a}$$

Feb 2003 - D.15

Simplificar $f(A,B,C,D) = \overline{(a\bar{b}+c)(ab+\bar{c}d)} + \overline{c+b}$

$$f = \overline{a\bar{b}+c} + \overline{ab+\bar{c}d} + \bar{c}\bar{b} = \left(\overline{a\bar{b}} \cdot \bar{c}\right) + \left(\overline{ab} \cdot \overline{\bar{c}d}\right) + \bar{c}\bar{b} =$$

$$f = \left[(\bar{a}+b)\bar{c}\right] + \left[(\bar{a}+\bar{b})(c+\bar{d})\right] + \bar{c}\bar{b} = \underline{\bar{a}\bar{c}} + \underline{b\bar{c}} + \underline{\bar{a}c} + \bar{a}\bar{d} +$$

$$+ \bar{b}c + \bar{b}\bar{d} + \bar{b}\bar{c}$$

$\Downarrow$

Shanon

$\Downarrow$

$$f = \bar{a}\bar{b}\bar{c} + \bar{a}b\bar{c} + \bar{a}b\bar{c} + ab\bar{c} + \bar{a}\bar{b}c + \bar{a}bc + \bar{a}\bar{d} + \bar{a}\bar{b}c + a\bar{b}c +$$

$$+ \bar{a}\bar{b}\bar{d} + a\bar{b}\bar{d} + \bar{a}\bar{b}\bar{c} + a\bar{b}\bar{c} =$$

$$f = \underset{0}{\underline{\bar{a}\bar{b}\bar{c}\bar{d}}} + \underset{1}{\underline{\bar{a}\bar{b}\bar{c}d}} + \underset{4}{\underline{\bar{a}b\bar{c}\bar{d}}} + \underset{5}{\underline{\bar{a}b\bar{c}d}} + \underset{4}{\underline{\bar{a}b\bar{c}\bar{d}}} + \underset{5}{\underline{\bar{a}b\bar{c}d}} + \underset{12}{\underline{ab\bar{c}\bar{d}}} + \underset{13}{\underline{ab\bar{c}d}} +$$

$$+ \underset{2}{\underline{\bar{a}\bar{b}c\bar{d}}} + \underset{3}{\underline{\bar{a}\bar{b}cd}} + \underset{6}{\underline{\bar{a}bc\bar{d}}} + \underset{7}{\underline{\bar{a}bcd}} + \underset{0}{\underline{\bar{a}\bar{b}\bar{c}\bar{d}}} + \underset{2}{\underline{\bar{a}\bar{b}c\bar{d}}} + \underset{4}{\underline{\bar{a}b\bar{c}\bar{d}}} +$$

$$+ \underset{6}{\underline{\bar{a}bc\bar{d}}} + \underset{2}{\underline{\bar{a}\bar{b}c\bar{d}}} + \underset{3}{\underline{\bar{a}\bar{b}cd}} + \underset{10}{\underline{a\bar{b}c\bar{d}}} + \underset{11}{\underline{a\bar{b}cd}} + \underset{0}{\underline{\bar{a}\bar{b}\bar{c}\bar{d}}} + \underset{1}{\underline{\bar{a}\bar{b}\bar{c}d}} +$$

$$+ \underset{8}{\underline{a\bar{b}\bar{c}\bar{d}}} + \underset{9}{\underline{a\bar{b}\bar{c}d}} + \underset{0}{\underline{\bar{a}\bar{b}\bar{c}\bar{d}}} + \underset{1}{\underline{\bar{a}\bar{b}\bar{c}d}} + \underset{8}{\underline{a\bar{b}\bar{c}\bar{d}}} + \underset{9}{\underline{a\bar{b}\bar{c}d}}$$

$$f = \sum m(0,1,2,3,4,5,6,7,8,9,10,11,12,13) \dashrightarrow \underline{E.AB.G.10}$$

$$\bar{f} = \Sigma\, m\,(14, 15) \Rightarrow f = \overline{m_{14} + m_{15}} =$$

$$f = \overline{abc\bar{d} + abcd} = \overline{abc(d + \bar{d})} = \overline{abc} = \bar{a} + \bar{b} + \bar{c}$$

$$\Downarrow$$

$$\boxed{C}$$