Exámenes: Sistemas Algebra Boole

Sep 2002. D. 16

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

$= ab + a\bar{c} + \bar{a}\bar{b} + \bar{b}\bar{c} + \bar{b}c = \underbrace{ab\bar{c}}_{m6} + \underbrace{abc}_{m7} + \underbrace{a\bar{b}\bar{c}}_{m4} + \underbrace{ab\bar{c}}_{m6} +$

$+ \underbrace{\bar{a}\bar{b}\bar{c}}_{m0} + \underbrace{\bar{a}\bar{b}c}_{m1} + \underbrace{\bar{a}\bar{b}\bar{c}}_{m0} + \underbrace{a\bar{b}\bar{c}}_{m4} + \underbrace{\bar{a}\bar{b}c}_{m_1} + \underbrace{a\bar{b}c}_{m5} =$

$= \sum(0,1,4,5,6,7)$

$f(a,b,c) = m_0 + m_1 + m_4 + m_5 + m_6 + m_7$

$\overline{f(a,b,c)} = m_2 + m_3 \Rightarrow f(a,b,c) = \overline{m_2 + m_3} = \overline{m_2} \cdot \overline{m_3} =$

$f(a,b,c) = M5 \cdot M_4 \Rightarrow \underline{\underline{c}}$

Feb 2002 - 2ª S - B. 15

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

$f(a,b,c) = \overline{a(b + acb + acac + \bar{b})} = \overline{ab + acb + ac + a\bar{b}} =$

$f(a,b,c) = \underbrace{a(\underbrace{b+\bar{b}}_{1})}_{a} + acb + ac = \overline{a(1 + cb + c)} = \bar{a} \Rightarrow \underline{\underline{c}}$

Feb 2002 - 1º S - A. 12

$f(a,b) = \overline{\bar{a} + a\bar{b}}$ → 2ª Forma canónica

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

$f(a,b) = m3 \Rightarrow \overline{f(a,b)} = m_0 \cdot m_1 \cdot m_2$

$f(a,b) = \overline{m_0 \cdot m_1 \cdot m_2} = \overline{m_0} + \overline{m_1} + \overline{m_2} = M3 \cdot M2 \cdot M1 \Rightarrow \underline{\underline{a}}$

Sep 2001 - A 11

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

$$f(a,b,c) = \bar{a}bb + \bar{a}b\bar{c} + a\cancel{\bar{b}bc} + a\cancel{\bar{b}c\bar{c}} = \bar{a}b + \bar{a}b\bar{c} = \bar{a}b(1+\bar{c}) =$$

$$= \bar{a}b$$

$$f(a,b,c) = \bar{a}bc + \bar{a}b\bar{c} = m_3 + m_2 \Rightarrow a$$

Feb 2001 - 2ª S - E. 11

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

$$+ \bar{b}c$$

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

$$f(a,b,c) = \underset{m_6}{\underline{ab\bar{c}}} + \underset{m_7}{\underline{abc}} + \underset{m_4}{\underline{a\bar{b}\bar{c}}} + \underset{m_6}{\underline{ab\bar{c}}} + \underset{m_0}{\underline{\bar{a}\bar{b}\bar{c}}} + \underset{m_1}{\underline{\bar{a}\bar{b}c}} + \underset{m_0}{\underline{\bar{a}\bar{b}\bar{c}}} + \underset{m_4}{\underline{a\bar{b}\bar{c}}} + \underset{m_1}{\underline{\bar{a}\bar{b}c}} + \underset{m_5}{\underline{a\bar{b}c}}$$

$$f(a,b,c) = m_0 + m_1 + m_4 + m_6 + m_7 + m_5$$

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

$$\underline{M_4 \cdot M_5} \longrightarrow b$$

Feb 2001 - 1ª S - E. 14

$$f(a,b,c,d) = M_0 \cdot M_2 \cdot M_4 \cdot M_5 \cdot M_6 \cdot M_7 \cdot M_8 \cdot M_{10} \cdot M_{12} \cdot M_{13} \cdot M_{14} \cdot M_{15}$$

$$\overline{f(a,b,c,d)} = M_1 \cdot M_3 \cdot M_9 \cdot M_{11}$$

$$f(a,b,c,d) = \overline{M_1} \cdot \overline{M_3} \cdot \overline{M_9} \cdot \overline{M_{11}} = m_{14} \cdot m_{12} \cdot m_6 \cdot m_4$$

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

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

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

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

$= a\bar{b}c\bar{d} + a\bar{b}cd + a\bar{b}\bar{c}\bar{d} + a\bar{b}\bar{c}d + \bar{a}\bar{b}c + \bar{a}bc + a\bar{b}c + abc =$

$$= \underbrace{a\bar{b}c\bar{d}}_{m10} + \underbrace{a\bar{b}cd}_{m11} + \underbrace{a\bar{b}\bar{c}\bar{d}}_{m8} + \underbrace{a\bar{b}\bar{c}d}_{m9} + \underbrace{\bar{a}\bar{b}c\bar{d}}_{m2} + \underbrace{\bar{a}\bar{b}cd}_{m3} + \underbrace{\bar{a}bc\bar{d}}_{m6} + \underbrace{\bar{a}bcd}_{m7} +$$

$$+ \underbrace{a\bar{b}c\bar{d}}_{m10} + \underbrace{a\bar{b}cd}_{m11} + \underbrace{abc\bar{d}}_{m14} + \underbrace{abcd}_{m15} =$$

$f(a,b,c,d) = \Sigma(2,3,6,7,8,9,10,11,14,15)$

$\overline{f(a,b,c,d)} = \Sigma(0,1,4,5,12,13)$

$f(a,b,c,d) = \overline{m_0} \cdot \overline{m_1} \cdot \overline{m_4} \cdot \overline{m_5} \cdot \overline{m_{12}} \cdot \overline{m_{13}} = M_{15} \cdot M_{14} \cdot M_{11} \cdot M_{10} \cdot M_3 \cdot M_2$

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

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

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

Sep 2000. A.14

$f(a,b,c,d) = m_0 + m_1 + m_2 + m_3 + m_4 + m_5 + m_6$

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

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

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

Feb 2000. 2ª S - E.14

La posición de las m según anterior

		$\bar a\,\bar c$	$\bar a\,c$	$a\,c$	$a\,\bar c$
$\bar b$	$\bar d$	1	0	0	0
$\bar b$	d	1	0	0	X
b	d	X	1	0	0
b	$\bar d$	1	X	0	0

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

Feb 2000. 1ª S. A.14

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

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

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

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

Sep 2003. A. 14 (Viejo)

Hallar la 2^{a} forma canónica de $f(A,B) = \overline{A + A\bar{B}}$

$$f = \bar{a} \cdot \overline{a\bar{b}} = \bar{a} \cdot (\bar{a} + b) = \bar{a}\bar{a} + \bar{a}b = \underbrace{\bar{a}(1+b)}_{\text{Shanon}} = \bar{a}$$

$$f = \bar{a}\bar{b} + \bar{a}b = \Sigma m(0,1) = m_0 + m_1$$

$$\bar{f} = m_2 + m_3 \Rightarrow f = \overline{m_2 + m_3} = \overline{m_2} \cdot \overline{m_3} = M_1 \cdot M_0 \Downarrow \boxed{d}$$

Sep 2003. R. 12 (Viejo)

simplificar $f = \overline{(A + A\bar{B})(B + AC(B + AC) + \bar{B})}$

$$f = \overline{(a + a\bar{b})(b + ac(b + ac) + \bar{b})} = \overline{\underbrace{\underbrace{[a(1+\bar{b})]}_{a \cdot 1}}_{a} \underbrace{[b + abc + ac + \bar{b}]}_{1}}$$

$b + \bar{b} = 1 \Rightarrow 1 + \dots = 1$

$$f = \overline{(a \cdot 1)} = \bar{a} \Rightarrow \boxed{c}$$

Sep 2003. A. 9 (Nuevo)

¿Cuántas casillas adyacentes se considera que tiene una casilla de un mapa de Karnaugh para 4 variables?

Todas las casillas tienen 4 $\Rightarrow \boxed{a}$

Sep 2003. A. 11 (Nuevo)

Sacar la 2ª función canónica de $f = m_3 + m_5 + m_7$

$$f = m_3 + m_5 + m_7 \Rightarrow \bar f = m_0 + m_1 + m_2 + m_4 + m_6$$

$$f = \overline{m_0 + m_1 + m_2 + m_4 + m_6} = \overline{m_0} \cdot \overline{m_1} \cdot \overline{m_2} \cdot \overline{m_4} \cdot \overline{m_6} =$$

$$f = M_7 \cdot M_6 \cdot M_5 \cdot M_3 \cdot M_1 \Rightarrow \underline{b}$$

Sep 2003. A. 13 (Nuevo)

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

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

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

$$+ \bar a \bar b d + \bar a b d + \bar a b d + abd$$

$$f = \bar a \bar b \bar c + a \bar b \bar c + \bar a \bar b \bar c + \bar a b \bar c + \bar a b \bar c + a b \bar c$$

$$f = \underset{1}{\underline{\bar a \bar b \bar c d}} + \underset{0}{\underline{\bar a \bar b \bar c \bar d}} + \underset{8}{\underline{a \bar b \bar c \bar d}} + \underset{9}{\underline{a \bar b \bar c d}} + \underset{1}{\underline{\bar a \bar b \bar c d}} + \underset{0}{\underline{\bar a \bar b \bar c \bar d}} + \underset{5}{\underline{\bar a b \bar c d}} + \underset{4}{\underline{\bar a b \bar c \bar d}} +$$

$$+ \underset{5}{\underline{\bar a b \bar c d}} + \underset{4}{\underline{\bar a b \bar c \bar d}} + \underset{12}{\underline{a b \bar c \bar d}} + \underset{13}{\underline{a b \bar c d}} + \underset{1}{\underline{\bar a \bar b \bar c d}} + \underset{3}{\underline{\bar a \bar b c d}} + \underset{5}{\underline{\bar a b \bar c d}} + \underset{7}{\underline{\bar a b c d}} +$$

$$+ \underset{5}{\underline{\bar a b \bar c d}} + \underset{7}{\underline{\bar a b c d}} + \underset{13}{\underline{a b \bar c d}} + \underset{15}{\underline{a b c d}} =$$

$$f = \Sigma m(0, 1, 3, 4, 5, 7, 8, 9, 12, 13, 15)$$

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

$$f = \bar c + \bar a d + bd = \bar c + d(\bar a + b)$$

$$\Downarrow$$

$$\boxed{e}$$

Sep. 2003. R. 11 (Nuevo)

segunda función canónica de $f = m_1 + m_4 + m_6 + m_7$

$$\bar{f} = m_0 + m_2 + m_3 + m_5 \Rightarrow f = \overline{m_0 + m_2 + m_3 + m_5}$$

$$f = \overline{m_0} \cdot \overline{m_2} \cdot \overline{m_3} \cdot \overline{m_5} = M_7 \cdot M_5 \cdot M_4 \cdot M_2 \Rightarrow \boxed{a}$$

Sep 2003. R. 13 (Nuevo) Feb 2003. A. 16 (Nuevo)

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

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

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

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

$$f = \underbrace{\bar{a}\bar{b}\bar{c}\bar{d}}_{0} + \underbrace{\bar{a}b\bar{c}\bar{d}}_{4} + \underbrace{\bar{a}\bar{b}\bar{c}d}_{1} + \underbrace{a\bar{b}\bar{c}d}_{9} + \underbrace{\bar{a}\bar{b}\bar{c}d}_{1} + \underbrace{\bar{a}b\bar{c}d}_{5} + \underbrace{\bar{a}b\bar{c}d}_{5} + \underbrace{ab\bar{c}d}_{13}$$

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

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

$\Downarrow$

$\boxed{b}$

Feb 2008. A. 14 (Viejo)

Hallar la 2ª func. canónica de

$$f(A,B) = \overline{\bar{A} + A\bar{B}} = \overline{\bar{a} + a\bar{b}} = a \cdot \overline{a\bar{b}} = a \cdot (\bar{a} + b)$$

$$f = a \cdot \bar{a} + ab = ab \Rightarrow f = \Sigma m_3$$

$$\bar{f} = \Sigma m(0,1,2) \Rightarrow m_0 + m_1 + m_2$$

$$f = \overline{m_0 + m_1 + m_2} = \overline{m_0} \cdot \overline{m_1} \cdot \overline{m_2} = M_3 \cdot M_2 \cdot M_1 \Rightarrow \boxed{a}$$

Feb 2003. A. 11 (Nuevo)

La 2ª func. canónica de $f = m_1 + m_4 + m_6 + m_7$

$$\bar{f} = m_0 + m_2 + m_3 + m_5 \Rightarrow f = \overline{m_0 + m_2 + m_3 + m_5}$$

$$f = \overline{m_0} \cdot \overline{m_2} \cdot \overline{m_3} \cdot \overline{m_5} = M_7 \cdot M_5 \cdot M_4 \cdot M_2 \Rightarrow \boxed{a}$$