

9.3.5.2. Simplificati nemăcarate
 funcții booleene de 4 variabile date prin submulțime
 de 1, utilizând metoda lui Quine.

$f(1,1,0,1)=1$
 $f(0,1,0,1)=1$
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 $f(0,0,1,1)=1$

$S_f = \{(1,1,0,1), (1,0,1,1), (0,1,0,1), (1,0,0,1), (0,0,1,1), (0,1,0,0), (0,0,1,0), (0,0,0,0)\}$

Grup	x_1	x_2	x_3	x_4	
I	1	1	0	1	m13 ✓
	1	0	1	1	m11 ✓
II	0	1	0	1	m5 ✓
	1	0	0	1	m9 ✓
	0	0	1	1	m3 ✓
III	0	1	0	0	m4 ✓
	0	0	1	0	m2 ✓
IV	0	0	0	0	m0 ✓
factorizare simplă					
$V = I + II$	-	1	0	1	m13 ✓ m5 = max1 = $x_2 \bar{x}_3 x_4$
	1	-	0	1	m11 ✓ m9 = max2 = $x_1 \bar{x}_3 x_4$
	1	0	-	1	m11 ✓ m9 = max3 = $x_1 \bar{x}_2 x_4$
	-	0	1	1	m11 ✓ m3 = max4 = $x_2 x_3 \bar{x}_4$
$VI = II + III$	0	1	0	-	m5 ✓ m4 = max5 = $\bar{x}_1 x_2 \bar{x}_3$
	0	0	1	-	m3 ✓ m2 = max6 = $\bar{x}_1 \bar{x}_2 x_3$
$VII = III + IV$	0	-	0	0	m4 ✓ m0 = max7 = $\bar{x}_1 \bar{x}_3 \bar{x}_4$
	0	0	-	0	m2 ✓ m0 = max8 = $\bar{x}_1 \bar{x}_2 \bar{x}_4$
factorizare dublă					

$$M(f) = \{\max 1, \dots, \max 8\}$$

$$C(f) = \emptyset$$

$$CAZUL 3$$

$$f_1'(x_1, x_2, x_3, x_4) =$$

$$h_1(x_1, x_2, x_3, x_4) = \max 1 \vee \max 3 \vee \max 6 \vee \max 7$$

$$f_2'(x_1, x_2, x_3, x_4) =$$

$$= x_2 \bar{x}_3 x_4 \vee x_1 \bar{x}_2 x_4 \vee \bar{x}_1 \bar{x}_2 x_3 \vee \bar{x}_1 \bar{x}_3 \bar{x}_4$$

$$= h_2(x_1, x_2, x_3, x_4) = \max 2 \vee \max 4 \vee \max 5 \vee \max 8$$

$$= x_1 \bar{x}_3 x_4 \vee \bar{x}_2 x_3 x_4 \vee \bar{x}_1 x_2 \bar{x}_3 \vee \bar{x}_1 \bar{x}_2 \bar{x}_4$$

	$\max 1$	$\max 2$	$\max 3$	$\max 4$	$\max 5$	$\max 6$	$\max 7$	$\max 8$
$\max 11$			*	*				
$\max 13$	*	*						
$\max 7$				*		*		
$\max 5$	*				*			
$\max 9$		*	*					
$\max 4$					*		*	
$\max 2$						*		*
$\max 0$							*	*

9.3.6.2) Given

$$f(0,0,0) = f(0,0,1) = f(1,1,1) = 0$$

$$S_d = \{(1,1,0), (1,0,1), (0,1,1), (1,0,0), (0,1,0)\}$$

Given

	x_1	x_2	x_3	
I	0	1	1	$m_3 \checkmark$
	1	0	1	$m_5 \checkmark$
	1	1	0	$m_6 \checkmark$
II	0	1	0	$m_2 \checkmark$
	1	0	0	$m_4 \checkmark$
Full Form SOP	0	1	-	$m_3 \checkmark, m_2 = \overline{x_1}x_2 = m_{01}$
	1	0	-	$m_5 \checkmark, m_4 = x_1\overline{x_2} = m_{10}$
	-	1	0	$m_1 \checkmark, m_2 = x_2\overline{x_1} = m_{01}$
	1	-	0	$m_6 \checkmark, m_4 = x_1\overline{x_2} = m_{10}$

III = I + II

$$M(d) = \{m_{01}, m_{10}, m_{01}, m_{10}\}$$

	m_1	m_2	m_3	m_4
m_3	\oplus			
m_5		\oplus		
m_6			*	*
m_2	*		*	
m_4		*		*

$$C(d) = \{m_{01}, m_{10}\}$$

$$M(d) \neq C(d) \Rightarrow C \in I$$

$$C(d) \neq \emptyset$$

$$f(x_1, x_2, x_3) = m_{01} \vee m_{10}$$

$$f_1(x_1, x_2, x_3) = m_3$$

$$f_2(x_1, x_2, x_3) = m_4$$

$$\begin{aligned} f^s(x_1, x_2, x_3) &= f_1(x_1, x_2, x_3) \vee f_2(x_1, x_2, x_3) = \\ &= m_3 \vee m_4 \vee m_{01} \\ &= x_1x_2 \vee x_1\overline{x_2} \vee \overline{x_1}x_2 \end{aligned}$$

$$\begin{aligned} f^s(x_1, x_2, x_3) &= f_1(x_1, x_2, x_3) \vee f_2(x_1, x_2, x_3) = \\ &= m_3 \vee m_4 \vee m_{01} \\ &= \overline{x_1}x_2 \vee x_1\overline{x_2} \vee x_1x_2 \end{aligned}$$