Arhitectura calculatoarelor si sisteme de operare Rezolvari exercitii Seminar 2

Vitel Silviu-Constantin

Sumar realizare diagrama + minimizare:

- se vor completa cu 1 in diagrama doar locatiile ale caror etichete codifica intrarile pentru care functia este 1
- se vor cauta blocuri de valori de 1, de forma dreptungiulara, cu 2^k elemente, cat mai mari si cat mai putine
 - fiecare celula dintr-un bloc de 2^k elemente trebuie sa aiba k vecini
- fiecarui bloc ii va corespunde un termen conjunctie in care apar doar variabilele a caror eticheta este constanta pentru toate celulele blocului
 - negate daca au eticheta 0
 - fara negatie daca au eticheta 1
- termenii obtinuti se leaga prin disjunctie

Minimizati utilizand diagrame Karnaugh functiile date prin Σ – notatie:

- a) $\Sigma(0,2,7,8,15) + \Sigma^*(10,11,14)$
- b) $\Sigma(4,5,10,11,13,15) + \Sigma^*(2,7)$
- c) $\Sigma(0,1,2,3,5,8,15) + \Sigma^*(7)$
- d) $\Sigma(0,1,2,4,5,7,11,15) + \Sigma^*(8,9)$
- e) $\Sigma(0,2,4,5,6,8,10,13,15) + \Sigma^*(7,11)$
- f) $\Sigma(0,2,3,4,6,7,8,10,11,12,13,14,15) + \Sigma^*(1,9)$
- g) $\Sigma(8, 12, 21, 23, 24, 28) + \Sigma^*(2, 6, 9, 10, 14, 18, 22, 25, 26, 30)$

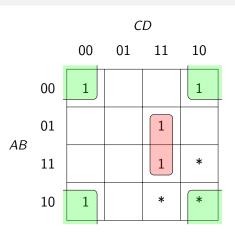
Minimizarile pot fi verificate aici:

http://www.32x8.com/index.html

 $\Sigma(0,2,7,8,15)+\Sigma^*(10,11,14)$ - maximul valorilor din paranteza e 15 (se scrie pe minim 4 biti) \to 4 variabile booleene

		CD					
		00	01	11	10		
АВ	00	1			1		
	01			1			
	11			1	*		
	10	1		*	*		

$$\begin{aligned} 0_{(10)} &= 0000_{(2)} \\ 2_{(10)} &= 0010_{(2)} \\ 7_{(10)} &= 0111_{(2)} \\ 8_{(10)} &= 1000_{(2)} \\ 10_{(10)} &= 1010_{(2)} \\ 11_{(10)} &= 1011_{(2)} \\ 14_{(10)} &= 1110_{(2)} \\ 15_{(10)} &= 1111_{(2)} \end{aligned}$$



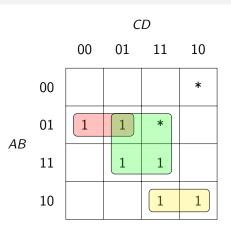
$$B \cdot C \cdot D + \overline{B} \cdot \overline{D}$$



 $\Sigma(4,5,10,11,13,15)+\Sigma^*(2,7)$ - maximul valorilor din paranteza e 15 (se scrie pe minim 4 biti) \to 4 variabile booleene

		CD				
		00	01	11	10	
AB	00				*	
	01	1	1	*		
	11		1	1		
	10			1	1	

$$\begin{aligned} 2_{(10)} &= 0010_{(2)} \\ 4_{(10)} &= 0100_{(2)} \\ 5_{(10)} &= 0101_{(2)} \\ 7_{(10)} &= 0111_{(2)} \\ 10_{(10)} &= 1010_{(2)} \\ 11_{(10)} &= 1011_{(2)} \\ 13_{(10)} &= 1101_{(2)} \\ 15_{(10)} &= 1111_{(2)} \end{aligned}$$



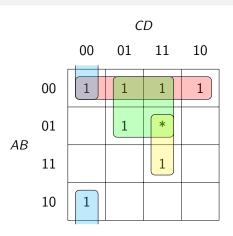
$$\overline{A} \cdot B \cdot \overline{C} + B \cdot D + A \cdot \overline{B} \cdot C$$



 $\Sigma(0,1,2,3,5,8,15)+\Sigma^*(7)$ - maximul valorilor din paranteza e 15 (se scrie pe minim 4 biti) \to 4 variabile booleene

		CD					
		00	01	11	10		
AB	00	1	1	1	1		
	01		1	*			
	11			1			
	10	1					

$0_{(10)} = 0000_{(2)}$
$1_{(10)} = 0001_{(2)}$
$2_{(10)} = 0010_{(2)}$
$3_{(10)} = 0011_{(2)}$
$5_{(10)} = 0101_{(2)}$
$7_{(10)} = 0111_{(2)}$
$8_{(10)} = 1000_{(2)}$
$15_{(10)} = 1111_{(2)}$



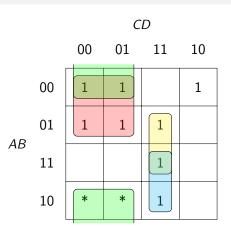
$$\overline{A} \cdot \overline{B} + \overline{A} \cdot D + B \cdot C \cdot D + \overline{B} \cdot \overline{C} \cdot \overline{D}$$



 $\Sigma(0,1,2,4,5,7,11,15) + \Sigma^*(8,9)$ - maximul valorilor din paranteza e 15 (se scrie pe minim 4 biti) \to 4 variabile booleene

		CD					
		00	01	11	10		
AB	00	1	1		1		
	01	1	1	1			
	11			1			
	10	*	*	1			

$0_{(10)} = 0000_{(2)}$)
$1_{(10)} = 0001_{(2)}$)
$2_{(10)} = 0010_{(2)}$)
$4_{(10)} = 0100_{(2)}$)
$5_{(10)} = 0101_{(2)}$)
$7_{(10)} = 0111_{(2)}$)
$8_{(10)} = 1000_{(2)}$)
$9_{(10)} = 1001_{(2)}$)
$11_{(10)} = 1011_{(2)}$)
$15_{(10)} = 1111_{(2)}$	Ē ▶



$$\overline{A} \cdot \overline{C} + \overline{B} \cdot \overline{C} + B \cdot C \cdot D + A \cdot C \cdot D$$

 $\Sigma(0,2,4,5,6,8,10,13,15)+\Sigma^*(7,11)$ - maximul valorilor din paranteza e 15 (se scrie pe minim 4 biti) \to 4 variabile booleene

		CD				
		00	01	11	10	
AB	00	1			1	
	01	1	1	*	1	
	11		1	1		
	10	1		*	1	

$$0_{(10)} = 0000_{(2)}$$

$$2_{(10)} = 0010_{(2)}$$

$$4_{(10)} = 0100_{(2)}$$

$$5_{(10)} = 0101_{(2)}$$

$$6_{(10)} = 0110_{(2)}$$

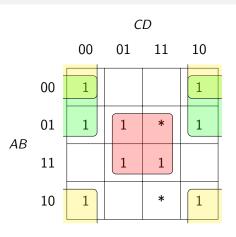
$$7_{(10)} = 0111_{(2)}$$

$$8_{(10)} = 1000_{(2)}$$

$$10_{(10)} = 1010_{(2)}$$

$$11_{(10)} = 1011_{(2)}$$

$$13_{(10)} = 1101_{(2)}$$



$$B \cdot D + \overline{A} \cdot \overline{D} + \overline{B} \cdot \overline{D}$$



 $\Sigma(0,2,3,4,6,7,8,10,11,12,13,14,15)+\Sigma^*(1,9)$ - maximul valorilor din paranteza e 15 (se scrie pe minim 4 biti) \to 4 variabile booleene

		CD					
		00	01	11	10		
AB	00	1	*	1	1		
	01	1		1	1		
	11	1	1		1		
	10	1*	1	1	1		

$$0_{(10)} = 0000_{(2)}$$

$$1_{(10)} = 0001_{(2)}$$

$$2_{(10)} = 0010_{(2)}$$

$$3_{(10)} = 0011_{(2)}$$

$$4_{(10)} = 0100_{(2)}$$

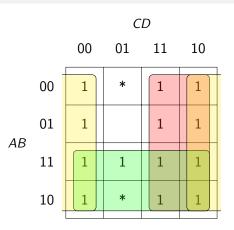
$$6_{(10)} = 0110_{(2)}$$

$$7_{(10)} = 0111_{(2)}$$

$$8_{(10)} = 1000_{(2)}$$

$$9_{(10)} = 1001_{(2)}$$

$$10_{(10)} = 1010_{(2)}$$



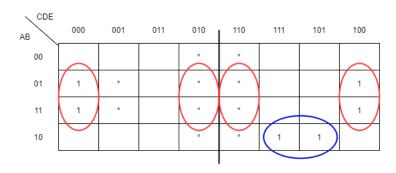
$$C + A + D$$



 $\Sigma(0,2,5,7,13,16,21,23,29)$ - maximul valorilor din paranteza e 29 (se scrie pe minim 5 biti) \to 5 variabile booleene

AB CDE	000	001	011	010	110	111	101	100
00				*	*			
01	1	*		*	*			1
11	1	*		*	*			1
10				ż	ź	1	1	

$$\overline{B} \cdot \overline{C} \cdot \overline{D} \cdot \overline{E} + \overline{A} \cdot \overline{B} \cdot \overline{C} \cdot \overline{E} + C \cdot \overline{D} \cdot E + \overline{B} \cdot C \cdot E$$



$$B \cdot \overline{E} + A \cdot \overline{B} \cdot C \cdot E$$