Laborator Proiectare Logică 5

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Optimizarea funcțiilor logice

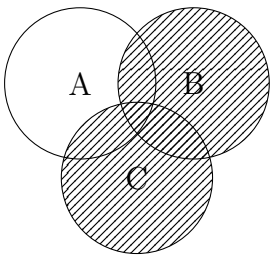
Optimizarea-reducerea numărului de operații

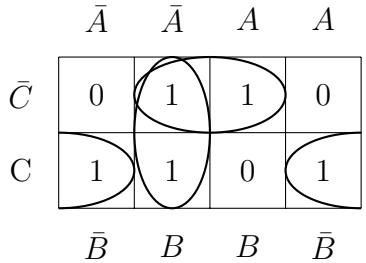
Website: lg.ccpr.ro

Exerciții

Exercițiul 1:
$y : 2^3 \to 2^1$; $y = \sum(1,2,3,5,6) = FCD_y$
$y = \Pi(0,4,7) = FCC_y$
$FCD_y = \bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC + A\bar{B}C + AB\bar{C}$
21 operații logice ↑
$FCC_y = (A+B+C)(\bar{A}+B+C)(\bar{A}+\bar{B}+\bar{C})$
12 operații logice ↑
Rezolvare: $FCD_y = \sum(2,3) = n(2,3) = A\bar{B} + AB$
$FCC_y = \Pi(0,1) = m(0,1) = (A+B)(A+\bar{B})$
$y = A\bar{B} + AB = A(\bar{B}+B) = A \times 1 = A$
$y = (A+B)(A+\bar{B}) = A^2 + A\bar{B} + BA + B\bar{B}$
$= A + A\bar{B} + AB + 0 = A(1+B+\bar{B}) = A$

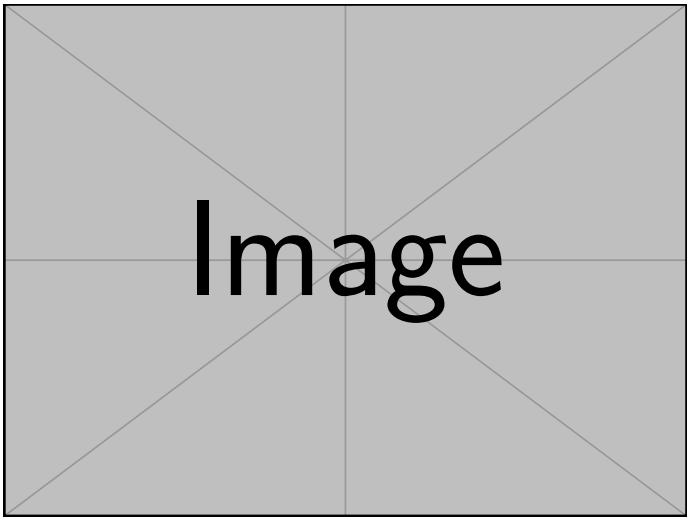
A	B	C	y
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0





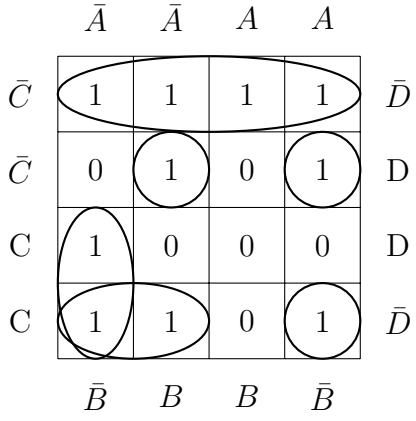
$\bar{A}(\bar{B}C + B\bar{C}) + A(\bar{B}C + B\bar{C}) + \bar{A}(BC)$
$= (\bar{A}+A)(\bar{B}C + B\bar{C}) + \bar{A}BC$
$= \bar{B}C + B\bar{C} + \bar{A}BC$
$= B \bigoplus C + \bar{A}BC$

Exercițiul 2:
Faceți schema pentru funția:
$y = B\bar{C} + \bar{A}B + C\bar{B}$



A	B	C	D	y
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

Exercițiul 3:
Simplificați funcția dată prin tabela de adevăr:
Rezolvare:
$y = \sum(0, 2, 3, 4, 5, 6, 8, 9, 10, 12)$
$= \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}C\bar{D} + \bar{A}\bar{B}CD + \bar{A}B\bar{C}\bar{D} +$
$+\bar{A}B\bar{C}D + A\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D + A\bar{B}C\bar{D} + AB\bar{C}\bar{D}$
$y = \Pi(1, 7, 11, 13, 14, 15)$
$= (A + B + C + \bar{D})(A + \bar{B} + \bar{C} + \bar{D})(\bar{A} + B + \bar{C} + \bar{D})$
$(\bar{A} + \bar{B} + C + \bar{D})(\bar{A} + \bar{B} + \bar{C} + D)(\bar{A} + \bar{B} + \bar{C} + \bar{D})$



$y = \bar{C}\bar{D} + \bar{A}B\bar{C}D + A\bar{B}\bar{C}D +$
$\bar{A}\bar{B}C + \bar{A}C\bar{D} + A\bar{B}C\bar{D}$