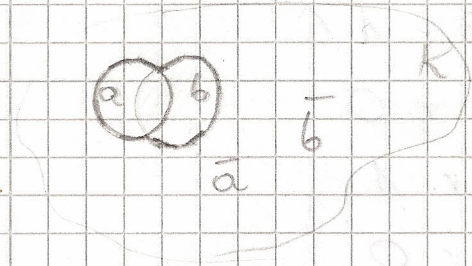
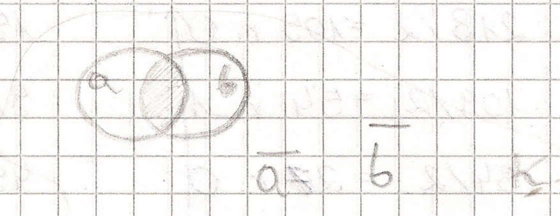
PRACA DOMOWA 1 (PUL)

Zilustrować na zbiorach

9.) $\overline{a+b} = \overline{a} \cdot \overline{b}$ 10.) $\overline{a \cdot b} = \overline{a} + \overline{b}$





Udowodnić:

13.) $a + ab = a$

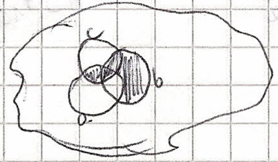
$a + ab \overset{4.}{=} a(i + b) \overset{8+}{=} a \cdot i \overset{4.}{=} a$

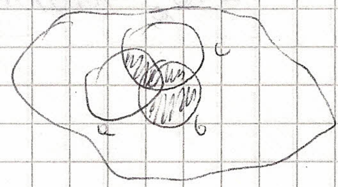
14.) $a(a+b) = a$

$a(a+b) = a \cdot a + ab \overset{6.}{=} a + ab \overset{13+}{=} a$

Pokazać na zbiorach:

15.) $(a+b)(\overline{a}+c) = ac + \overline{a}b$





Przekształcić iloczyn sum na sumę iloczynów:

$(A+B+\overline{C})(A+B+D)(A+B+E)(A+\overline{D}+E)(\overline{A}+C) =$

$(AA+AB+AD+AB+BB+BD+A\overline{C}+B\overline{C}+\overline{C}D)(AA+A\overline{D}+AE+AB+B\overline{D}+BE+AE+\overline{D}E+EE)$

$\cdot(\overline{A}+C) = (A+AB+AD+B+BD+A\overline{C}+B\overline{C}+\overline{C}D)(A+A\overline{D}+AB+B\overline{D}+BE+AE+\overline{D}E+E)(\overline{A}+C)$

$= (A+B+\overline{C}D)(A+E+B\overline{D})(\overline{A}+C) = (A+BE+B\overline{D}+\overline{C}DE+B\overline{C}D\overline{D})(\overline{A}+C)$

$= (A+BE+B\overline{D}+\overline{C}DE)(\overline{A}+C) = A\overline{A}+AC+\overline{A}BE+BCE+\overline{A}B\overline{D}+BC\overline{D}+\overline{A}\overline{C}DE+C\overline{C}DE =$

$= AC+\overline{A}BE+BCE+\overline{A}B\overline{D}+BC\overline{D}+\overline{A}\overline{C}DE$

Obliczyć maksymalne klasy zgodne dwoma sposobami, mając dane pary zgodne:

(1,2) (1,5) (1,6) (2,4) (2,5) (3,6) (4,5) (4,6)

2	✓				
3	X	X			
4	X	✓	X		
5	✓	✓	X	✓	
6	✓	X	✓	✓	X
	1	2	3	4	5

(1,2)
(1,5)
(1,6)
(2,4)
(2,5)
(3,6)
(4,5)
(4,6)

MKZ
(1,2,5)
(2,4,5)
(1,6)
(3,6)
(4,6)

$(1+3)(1+4)(2+3)(2+6)(3+4)(3+5)(5+6) = (1+34)(2+36)(3+45)(5+6) =$

$= (12+136+234+346)(35+36+45+\cancel{456}) = 1235+\cancel{1236}+1245+\cancel{1356}+136+\cancel{13456}+2345+\cancel{2346}$

$+\cancel{2345}+\cancel{3456}+346+\cancel{3486} = 1235+1245+136+2345+346$

Dopełnienia: $(4,6),(3,6),(2,4,5),(1,6),(1,2,5)$ MKZ

Przekształcić do systemu dwójkowego:

$218/2 = 109$ r. 0	$197/2 = 98$ r. 1
$109/2 = 54$ r. 1	$98/2 = 49$ r. 0
$54/2 = 27$ r. 0	$49/2 = 24$ r. 1
$27/2 = 13$ r. 1	$24/2 = 12$ r. 0
$13/2 = 6$ r. 1	$12/2 = 6$ r. 0
$6/2 = 3$ r. 0	$6/2 = 3$ r. 0
$3/2 = 1$ r. 1	$3/2 = 1$ r. 1
$1/2 = 0$ r. 1	$1/2 = 0$ r. 1

$218_{10} = 11011010_2$ $\qquad$ $197_{10} = 11000101_2$

PRACA DOMOWA:

b)

ab \ cd	00	01	11	10
00	–	1	0	–
01	1	–	0	–
11	0	0	1	0
10	1	–	0	1

$$y=\overset{0-1-}{(a+\bar c)}\cdot\overset{-101}{(\bar b+c+\bar d)}\cdot\overset{10-1}{(\bar a+b+\bar d)}\cdot\overset{11-0}{(\bar a+\bar b+d)}$$

$$=(\bar a+(b+\bar d)(\bar b+d))\cdot(a+\bar c)(\bar b+c+\bar d)$$

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

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

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

$$=\cancel{\bar a\bar b\bar c}+ab+ac+a\bar d+\bar b\bar c+\bar c\bar d$$

c) $y=\prod(3,5,7,8,9,12,13,18,20,22,24,28\,(1,2,10,14,15,16,17,21,30,31))$

ab \ cde	000	001	011	010	110	100	101	111
00	1	–	0	–	1	1	0	0
01	0	0	1	–	–	0	0	–
11	0	1	1	1	–	0	1	–
10	–	–	1	0	0	0	–	1

$$y=\overset{-000-}{\bar b\bar c\bar d}+\overset{1-0-1}{a\bar c e}+\overset{-101-}{b\bar c d}+\overset{001-0}{\bar a\bar b c\bar e}+\overset{1-1-1}{ace}$$

ab \ cde	000	001	011	010	110	100	101	111
00	1	–	0	–	1	1	0	0
01	0	0	1	–	–	0	0	–
11	0	1	1	1	–	0	1	–
10	–	–	1	0	0	0	–	1

$$y=\overset{10-10}{(\bar a+b+\bar d+e)}\cdot\overset{1010-}{(\bar a+b+\bar c+d)}\cdot\overset{-1---}{\bar b}\cdot\overset{0-1-1}{(a+\bar c+\bar e)}$$
$$\cdot\overset{-11-0}{(\bar b+\bar c+e)}\cdot\overset{0-001}{(a+c+d+\bar e)}\cdot\overset{0001-}{(a+b+c+\bar d)}$$

$$=(\bar a+(b+\bar d+e)(b+\bar c+d))\cdot(a+(\bar c+\bar e)(c+d+\bar e)(b+c+\bar d)$$

$$\cdot(\bar b+\bar c+e)\cdot\bar b=(\bar a+bb+b\bar c+\cancel{bd}+\cancel{b\bar d}+\bar c\bar d+d\bar d+\cancel{be}+\bar c e+de)$$

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

$$=(\bar a+b+\bar c\bar d+\bar c e+de)(a+b\bar c d+c\bar c d+\bar c d\bar d+b\bar e+c\bar e+\bar d e)\cdot\bar b=(a\bar a+\cancel{\bar a b\bar c\bar d}+\cancel{\bar a b\bar e}+\bar a c\bar e+\bar a de$$

$$+ab+b\bar c d+b\bar e+\cancel{bc\bar e}+b\bar d e+a\bar c\bar d+b\bar c d\bar d+b\bar c\bar d e+c\bar c\bar d e+\bar c\bar d e+ade+b\bar c d\bar d e+bd\bar e\bar e+cde\bar e+d\bar d e\bar e)\cdot\bar b$$

$$=\bar a\bar b c\bar e+\bar a\bar b de+ab\bar b+b\bar b\bar c d+b\bar b\bar e+b\bar b\bar d e+a\bar b\bar c\bar d+\bar b\bar c\bar d e+a\bar b de=\bar a\bar b c\bar e+\bar a\bar b de+a\bar b\bar c\bar d+\bar b\bar c\bar d e+a\bar b de$$

EKSPANSJA:

II)

$$F=\begin{array}{c}\left[\begin{array}{ccccc}1&0&0&-&0\\0&1&0&0&0\\0&1&0&1&0\\1&1&1&1&0\\0&1&1&0&1\\1&1&0&1&1\end{array}\right]\end{array}\begin{array}{c}k_1\\k_2\\k_3\\k_4\\k_5\\k_6\end{array}\qquad R=\begin{bmatrix}0&1&1&0&0\\0&0&0&1&0\\0&0&1&1&0\\1&0&0&0&1\\1&1&1&-&1\end{bmatrix}$$

$$B(k_1,R)=\begin{array}{c}1\;0\;0\;-\;0\\\left[\begin{array}{ccccc}1&1&1&0&0\\1&0&0&0&0\\1&0&1&0&0\\0&0&0&0&1\\0&1&1&0&1\end{array}\right]\end{array}\begin{array}{l}\\\cancel{1,2,3}\\1\\1,3\\5\\\cancel{2,3,5}\end{array}\qquad B(k_2,R)=\begin{array}{c}0\;1\;0\;0\;0\\\left[\begin{array}{ccccc}0&0&1&0&0\\0&1&0&1&0\\0&1&1&1&0\\1&1&0&0&1\\1&0&1&0&1\end{array}\right]\end{array}\begin{array}{l}\\3\\2,4\\\cancel{2,3,4}\\1,2,5\\\cancel{1,3,5}\end{array}$$

$$B(k_3,R)=\begin{array}{c}0\;1\;0\;1\;0\\\left[\begin{array}{ccccc}0&0&1&1&0\\0&1&0&0&0\\0&1&1&0&0\\1&1&0&1&1\\1&0&1&0&1\end{array}\right]\end{array}\begin{array}{l}\\3,4\\2\\2,3\\\cancel{1,2,4,5}\\1,3,5\end{array}\qquad B(k_4,R)=\begin{array}{c}1\;1\;1\;1\;0\\\left[\begin{array}{ccccc}1&0&0&1&0\\1&1&1&0&0\\1&1&0&0&0\\0&1&1&1&1\\0&0&0&0&1\end{array}\right]\end{array}\begin{array}{l}\\1,4\\\cancel{1,2,3}\\1,2\\\cancel{2,3,4,5}\\5\end{array}$$

15

$3\cdot(2+4)(1+25)=$
$3(2+14+45)=23+[illegible]+345$

$2(3+4)(1+3+5)=2(3+41+45)$
$=23+124+245$

$5(1+2)(1+4)=5(1+24)=15+245$

$$B(k_5,R)=\begin{array}{c}\begin{matrix}0&1&1&0&1\end{matrix}\\ \begin{bmatrix}0&0&0&0&1\\0&1&1&1&1\\0&1&0&1&1\\1&1&1&0&0\\1&0&0&0&0\end{bmatrix}\end{array}\begin{matrix}5\\ \cancel{2,3,4,5}\\ \cancel{3,4,5}\\ \cancel{1,2,3}\\ 1\end{matrix}\qquad B(k_0,R)=\begin{array}{c}\begin{matrix}1&1&0&1&1\end{matrix}\\ \begin{bmatrix}1&0&1&1&1\\1&1&0&0&1\\1&1&1&0&1\\0&1&0&1&0\\0&0&1&0&0\end{bmatrix}\end{array}\begin{matrix}\cancel{1,3,4,5}\\ 1,2,5\\ \cancel{1,2,3,5}\\ 2,4\\ 3\end{matrix}$$

15

$3(2+4)(1+2+3)=3(2+14+45)$
$=23+134+345$

III)

$$F=\begin{bmatrix}0&1&1&0&1&0\\1&1&0&1&0&0\\0&0&1&1&0&1\\0&1&0&1&1&1\\1&1&0&0&1&1\\0&0&1&1&1&1\end{bmatrix}\begin{matrix}k_1\\k_2\\k_3\\k_4\\k_5\\k_6\end{matrix}\qquad R=\begin{bmatrix}0&0&0&1&1&1\\1&1&1&0&0&1\\1&1&0&1&0&1\\0&0&0&0&1&0\\0&0&1&0&1&0\end{bmatrix}$$

$$B(k_1,R)=\begin{array}{c}\begin{matrix}0&1&1&0&1&0\end{matrix}\\ \begin{bmatrix}0&1&1&1&0&1\\1&0&0&0&1&1\\1&0&1&1&1&1\\0&1&1&0&0&0\\0&1&0&0&0&0\end{bmatrix}\end{array}\begin{matrix}\cancel{2,3,4,6}\\ 1,5,6\\ \cancel{1,3,4,6}\\ \cancel{2,3}\\ 2\end{matrix}\quad B(k_2,R)=\begin{array}{c}\begin{matrix}1&1&0&1&0&0\end{matrix}\\ \begin{bmatrix}1&1&0&0&1&1\\0&0&1&1&0&1\\0&0&0&0&0&1\\1&1&0&1&1&0\\1&1&1&1&1&0\end{bmatrix}\end{array}\begin{matrix}\cancel{1,2,5,6}\\ \cancel{3,4,6}\\ 6\\ 1,2,4,5\\ \cancel{1,2,3,4,5}\end{matrix}$$

$21+25+26$ $\qquad$ $16+26+46+56$

$$B(k_3,R)=\begin{array}{c}\begin{matrix}0&0&1&1&0&1\end{matrix}\\ \begin{bmatrix}0&0&1&0&1&0\\1&1&0&1&0&0\\1&1&1&0&0&0\\0&0&1&1&1&1\\0&0&0&1&1&1\end{bmatrix}\end{array}\begin{matrix}3,5\\ 1,2,4\\ 1,2,3\\ \cancel{3,4,5,6}\\ 4,5,6\end{matrix}\quad B(k_4,R)=\begin{array}{c}\begin{matrix}0&1&0&1&1&1\end{matrix}\\ \begin{bmatrix}0&1&0&0&0&0\\1&0&1&1&1&0\\1&0&0&0&1&0\\0&1&0&1&0&1\\0&1&1&1&0&1\end{bmatrix}\end{array}\begin{matrix}2\\ \cancel{1,3,4,5}\\ 1,5\\ \cancel{2,4,6}\\ \cancel{2,3,4,6}\end{matrix}$$

$12+25$

$$B(k_5,R)=\begin{array}{c}\begin{matrix}1&1&0&0&1&1\end{matrix}\\ \begin{bmatrix}1&1&0&1&0&0\\0&0&1&0&1&0\\0&0&0&1&1&0\\1&1&0&0&0&1\\1&1&1&0&0&1\end{bmatrix}\end{array}\begin{matrix}1,2,4\\ 3,5\\ 4,5\\ 1,2,6\\ \cancel{1,2,3,6}\end{matrix}$$

$$B(k_6,R)=\begin{array}{c}\begin{matrix}0&0&1&1&1&1\end{matrix}\\ \begin{bmatrix}0&0&1&0&0&0\\1&1&0&1&1&0\\1&1&1&0&1&0\\0&0&1&1&0&1\\0&0&0&1&0&1\end{bmatrix}\end{array}\begin{matrix}2\\ \cancel{1,2,4,5}\\ \cancel{1,2,3,5}\\ \cancel{3,4,6}\\ 4,6\end{matrix}$$

$24+26$

PUL - PRACA DOMOWA 3:

II

$$F = \begin{array}{c} \left[\begin{array}{ccccc} 1 & 0 & 0 & - & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 1 & 0 & 1 \\ 1 & 1 & 0 & 1 & 1 \end{array}\right] \end{array} \begin{array}{c} k_1 \\ k_2 \\ k_3 \\ k_4 \\ k_5 \\ k_6 \end{array} \qquad R = \left[\begin{array}{ccccc} 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & - & 1 \end{array}\right]$$

$$B(k_1,R) = \begin{array}{c} 1\ 0\ 0\ -\ 0 \\ \left[\begin{array}{ccccc} 1 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 & 1 \end{array}\right] \end{array} \begin{array}{l} \\ \cancel{1,2,3} \\ 1 \\ \cancel{1,3} \\ 5 \\ \cancel{2,3,5} \end{array} \qquad B(k_2,R) = \begin{array}{c} 0\ 1\ 0\ 0\ 0 \\ \left[\begin{array}{ccccc} 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 \end{array}\right] \end{array} \begin{array}{l} \\ 3 \\ 2,4 \\ \cancel{2,3,4} \\ 1,2,5 \\ \cancel{1,3,5} \end{array}$$

$1 \cdot 5 = a\bar{e}$

$3 \cdot (2+4)(1+2+5) = 3(2+14+45) = 23+134+345 =$
$= b\bar{c} + \bar{a}\bar{c}\bar{d} + \bar{c}d\bar{e}$

$$B(k_3,R) = \begin{array}{c} 0\ 1\ 0\ 1\ 0 \\ \left[\begin{array}{ccccc} 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 1 \\ 1 & 0 & 1 & 0 & 1 \end{array}\right] \end{array} \begin{array}{l} \\ 3,4 \\ 2 \\ \cancel{2,3} \\ \cancel{1,2,4,5} \\ 1,3,5 \end{array} \qquad B(k_4,R) = \begin{array}{c} 1\ 1\ 1\ 1\ 0 \\ \left[\begin{array}{ccccc} 1 & 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 1 \end{array}\right] \end{array} \begin{array}{l} \\ 1,4 \\ \cancel{1,2,3} \\ 1,2 \\ \cancel{2,3,4,5} \\ 5 \end{array}$$

$2 \cdot (3+4)(1+3+5) = 2(3+14+45) =$

$23+124+245 = b\bar{c} + \bar{a}bd + bd\bar{e}$

$5(1+4)(1+2) = 5(1+24) = 15+245 = a\bar{e} + bd\bar{e}$

$$B(k_5,R) = \begin{array}{c} 0\ 1\ 1\ 0\ 1 \\ \left[\begin{array}{ccccc} 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \end{array}\right] \end{array} \begin{array}{l} \\ 5 \\ \cancel{2,3,4,5} \\ \cancel{2,4,5} \\ \cancel{1,2,3} \\ 1 \end{array} \qquad B(k_6,R) = \begin{array}{c} 1\ 1\ 0\ 1\ 1 \\ \left[\begin{array}{ccccc} 1 & 0 & 1 & 1 & 1 \\ 1 & 1 & 0 & 0 & 1 \\ 1 & 1 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 \end{array}\right] \end{array} \begin{array}{l} \\ \cancel{1,3,4,5} \\ 1,2,5 \\ \cancel{1,2,3,5} \\ 2,4 \\ 3 \end{array}$$

$1 \cdot 5 = \bar{a}e$

$3(2+4)(1+2+5) = 3(2+14+45) = 23+134+345 =$
$= b\bar{c} + a\bar{c}d + \bar{c}de$

k_1 1 - - - 0 I_1

k_2 - 1 0 - - I_2

0 - 0 0 - I_3

- - 0 0 0 I_4

k_3 - 1 0 - -

0 1 - 1 - I_5

- 1 - 1 0 I_6

k_4 1 - - - 0

- 1 - 1 0

k_5 0 - - - 1 I_7

k_6 - 1 0 - -

1 - 0 1 - I_8

- - 0 1 1 I_9

	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	
k_1	1	0	0	0	0	0	0	0	0	1
k_2	0	1	1	1	0	0	0	0	0	2,3,4
k_3	0	1	0	0	1	1	0	0	0	2,5,6
k_4	1	0	0	0	0	1	0	0	0	~~1,6~~
k_5	0	0	0	0	0	0	1	0	0	7
k_6	0	1	0	0	0	0	0	1	1	2,8,9

$1 \cdot (2+3+4)(2+5+6) \cdot 7 \cdot (2+8+9) = 17(2+(3+4)(5+6)(8+9))$

$= 17(2+(35+36+45+46)(8+9)) = 17(2+358+359+368+369$
$+458+459+468+469)$

$= 127 + 13578 + 13579 + 13678 + 13679 + 14578 + 14579 + 14678 + 14679$

Rozwiązanie: $y = I_1 + I_2 + I_7$

lub $y = I_1 + I_3 + I_5 + I_7 + I_8$

lub $y = I_1 + I_3 + I_5 + I_7 + I_9$

lub $y = I_1 + I_3 + I_6 + I_7 + I_8$

lub $y = I_1 + I_3 + I_6 + I_7 + I_9$

lub $y = I_1 + I_4 + I_5 + I_7 + I_8$

lub $y = I_1 + I_4 + I_5 + I_7 + I_9$

lub $y = I_1 + I_4 + I_6 + I_7 + I_8$

lub $y = I_1 + I_4 + I_6 + I_7 + I_9$

III

$$F = \begin{bmatrix} 0&1&1&0&1&0 \\ 1&1&0&1&0&0 \\ 0&0&1&1&0&1 \\ 0&1&0&1&1&1 \\ 1&1&0&0&1&1 \\ 0&0&1&1&1&1 \end{bmatrix}\begin{matrix} u_1 \\ u_2 \\ u_3 \\ u_4 \\ u_5 \\ u_6 \end{matrix} \qquad R = \begin{bmatrix} 0&0&0&1&1&1 \\ 1&1&1&0&0&1 \\ 1&1&0&1&0&1 \\ 0&0&0&0&1&0 \\ 0&0&1&0&1&0 \end{bmatrix}$$

$$B(u_1,R) = \begin{array}{c} \begin{matrix} 0&1&1&0&1&0 \end{matrix} \\ \begin{bmatrix} 0&1&1&1&0&1 \\ 1&0&0&0&1&1 \\ 1&0&1&1&1&1 \\ 0&1&1&0&0&0 \\ 0&1&0&0&0&0 \end{bmatrix} \end{array} \begin{matrix} \cancel{2,3,4,6} \\ 1,4,6 \\ \cancel{1,3,4,5,6} \\ \cancel{2,3} \\ 2 \end{matrix} \qquad B(u_2,R) = \begin{array}{c} \begin{matrix} 1&1&0&1&0&0 \end{matrix} \\ \begin{bmatrix} 1&1&0&0&1&1 \\ 0&0&1&1&0&1 \\ 0&0&0&0&0&1 \\ 1&1&0&1&1&0 \\ 1&1&1&1&1&0 \end{bmatrix} \end{array} \begin{matrix} \cancel{1,2,5,6} \\ \cancel{3,4,6} \\ 6 \\ 1,2,4,5 \\ \cancel{1,2,3,4,5} \end{matrix}$$

$2 \cdot (1+4+6) = 12 + 24 + 26$

$6\,(1+2+4+5) = 16 + 26 + 46 + 56$

$$B(u_3,R) = \begin{array}{c} \begin{matrix} 0&0&1&1&0&1 \end{matrix} \\ \begin{bmatrix} 0&0&1&0&1&0 \\ 1&1&0&1&0&0 \\ 1&1&1&0&0&0 \\ 0&0&1&1&1&1 \\ 0&0&0&1&1&1 \end{bmatrix} \end{array} \begin{matrix} 3,5 \\ 1,2,4 \\ 1,2,3 \\ \cancel{3,4,5,6} \\ 4,5,6 \end{matrix} \qquad B(u_4,R) = \begin{array}{c} \begin{matrix} 0&1&0&1&1&1 \end{matrix} \\ \begin{bmatrix} 0&1&0&0&0&0 \\ 1&0&1&1&1&0 \\ 1&0&0&0&1&0 \\ 0&1&0&1&0&1 \\ 0&1&1&1&0&1 \end{bmatrix} \end{array} \begin{matrix} 2 \\ \cancel{1,3,4,5} \\ 1,5 \\ \cancel{2,4,6} \\ \cancel{2,3,4,6} \end{matrix}$$

$(3+5)(1+2+4)(1+2+3)(4+5+6) =$

$(1+2+34)(5+34+36) = 15 + \cancel{134} + 136$

$+ 25 + \cancel{234} + 236 + \cancel{345} + 34 + \cancel{346} =$

$15 + 25 + 34 + 136 + 236$

$2 \cdot (1+5) = 12 + 25$

$$B(u_6,R) = \begin{array}{c} \begin{matrix} 0&0&1&1&1&1 \end{matrix} \\ \begin{bmatrix} 0&0&1&0&0&0 \\ 1&1&0&1&1&0 \\ 1&1&1&0&1&0 \\ 0&0&1&1&0&1 \\ 0&0&0&1&0&1 \end{bmatrix} \end{array} \begin{matrix} 3 \\ 1,2,4,5 \\ \cancel{1,2,3,5} \\ \cancel{3,4,6} \\ 4,6 \end{matrix}$$

$$B(u_5,R) = \begin{array}{c} \begin{matrix} 1&1&0&0&1&1 \end{matrix} \\ \begin{bmatrix} 1&1&0&1&0&0 \\ 0&0&1&0&1&0 \\ 0&0&0&1&1&0 \\ 1&1&0&0&0&1 \\ 1&1&1&0&0&1 \end{bmatrix} \end{array} \begin{matrix} 1,2,4 \\ 3,5 \\ 4,5 \\ 1,2,6 \\ \cancel{1,2,3,6} \end{matrix}$$

$3 \cdot (4+6)(1+2+4+5) = 3\,(4 + 16 + 26 + 56) = 34 + 136 + 236 + 356$

$(1+2+4)(3+5)(4+5)(1+2+6) = (5+34)(1+2+46) = 15 + 25 + 456 + 134 + 234 + 346$

k_1 0 1 - - - - I_1
- 1 - 0 - - I_2
- 1 - - - 0 I_3

k_2 1 - - - - 0 I_4
- 1 - - - 0
- - - 1 - 0 I_5
- - - - 0 0 I_6

k_3 0 - - - 0 - I_7
0 - - 0 - I_8
- - 1 1 - - I_9
0 - 1 - - 1 I_{10}
- 0 1 - - 1 I_{11}

k_4 0 1 - - - -
0 1 - - 1 - I_{12}

k_5 1 - - - 1 - I_{13}
- 1 - - 1 - I_{14}
- - - 0 1 1 I_{15}
1 - 0 0 - - I_{16}
- 1 0 0 - - I_{17}
- - 0 - 1 1 I_{18}

k_6 - - 1 1 - -
0 - 1 - - 1
- 0 1 - - 1
- - 1 - 1 1 I_{19}

	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}	I_{11}	I_{12}	I_{13}	I_{14}	I_{15}	I_{16}
k_1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
k_2	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
k_3	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0
k_4	1	0	0	0	0	0	0	0	0 0	0 0	0 0	1 0	0 0	0	0	0
k_5	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
k_6	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0

I_{17}	I_{18}	I_{19}	
0	0	0	1, 2, 3
0	0	0	3, 4, 5, 6
0	0	0	7, 8, 9, 10, 11
0	0	0	1, 12
0	0	0	13, 14, 15, 16
0	0	1	9, 10, 11, 19

x_3x_4 \ x_5x_6	00	01	11	10
00	0	0	-	1
01	-	1	1	0
11	1	-	-	-
10	-	1	1	1

$\overline{x_4}\, x_5 + x_4 x_6 + x_3$

PRZYGOTOWANIE DO KOLOKWIUM:

24.11.2010
wykład PUL

Zadanie 1:

	x_1	x_2	x_3	x_4	x_5	x_6	x_7	F
1	0	1	1	0	1	0	0	1
2	1	1	1	0	0	1	1	1
3	1	0	0	1	0	1	0	1
4	1	1	0	1	1	0	0	0
5	1	0	1	0	0	1	1	1
6	0	1	1	1	0	0	0	1
7	1	0	0	0	0	1	0	0
8	1	1	0	0	1	0	1	1
9	1	1	0	1	1	1	0	1
10	1	0	0	0	0	0	1	0
11	0	1	1	0	1	1	0	1
12	0	1	1	0	0	1	0	1

$$P_4 = (\overset{0}{\overline{1,2,5,7,8,10,11,12}}; \overset{1}{\overline{3,4,6,9}})$$

$$P_6 = (\overset{0}{\overline{1,4,6,8,10}}; \overset{1}{\overline{2,3,5,7,9,11,12}})$$

$$P_4 \cdot P_6 = (\overset{00}{\overline{1,8,10}}; \overset{01}{\overline{2,5,7,11,12}}; \overset{10}{\overline{4,6}}; \overset{11}{\overline{3,9}})$$

$$P_F = (\overline{1,2,3,5,6,8,9,11,12}; \overline{4,7,10})$$

$$P_4 \cdot P_6 | P_F = (\overline{(1,8)(10)}, \overline{(2,5,11,12)(7)}, \overline{(4)(6)}, \overline{(3,9)})$$

1,10	~~$x_1 \cup x_2 \cup x_3 \cup x_5 \cup x_7$~~	
8,10	$x_2 \cup x_5$	$x_2 x_5$
2,7	~~$x_2 \cup x_3 \cup x_7$~~	
5,7	$x_3 \cup x_7$	$x_3 x_7$
7,11,[illegible]	~~$x_1 \cup x_2 \cup x_3 \cup x_5$~~	
7,12,[illegible]	$x_1 \cup x_2 \cup x_3$	$x_1 x_2 x_3$
4,6	$x_1 \cup x_3 \cup x_5$	$x_1 x_3 x_5$

$\Rightarrow$ WB

$$(x_2 + x_5)(x_1 + x_3 + x_5)(x_3 + x_7)(x_1 + x_2 + x_3) =$$

$$(x_1 + x_3 + x_2)(x_1 + x_3 + x_5)(x_2 + x_5)(x_3 + x_7) =$$

$$(x_1 + x_3 + x_2 x_5)(x_2 x_3 + x_5 x_7 + x_3 x_5 + x_2 x_7) = \cancel{x_1 x_2 x_3} + x_1 x_5 x_7 + x_2 x_3 + \cancel{x_3 x_5 x_7} + \cancel{x_2 x_3 x_5} + x_2 x_5 x_7 + \cancel{x_1 x_3 x_5} + x_1 x_2 x_7 + x_3 x_5 + \cancel{x_2 x_3 x_7} + \cancel{x_2 x_3 x_5} + \cancel{x_2 x_5 x_7}$$

$$= x_1 x_5 x_7 + x_2 x_3 + \cancel{x_3 x_5 x_7} + x_2 x_5 x_7 + x_1 x_2 x_7 + x_3 x_5$$

MINIMALNE ROZWIĄZANIA

$x_1 x_5 x_7$
$x_2 x_3$
$x_2 x_5 x_7$
$x_1 x_2 x_7$
$x_3 x_5$

$\} \; x_4, x_6$

O najmniejszej liczności:

x_2, x_3, x_4, x_6 ✓
x_3, x_4, x_5, x_6

$x_3x_4 \backslash x_5x_6$	00	01	11	10
00	0	1	–	1
01	–	1	1	0
11	1	–	–	–
10	–	1	1	1

$$f = x_3 + x_4 x_6 + \overline{x_4} x_5$$

Zadanie 2: Uproszczona metoda ekspansji.

$$F = \begin{array}{c} \begin{bmatrix} \cancel{0\ 0\ 1\ 1} \\ 1\ 0\ 1\ 0 \\ \cancel{0\ 0\ 1\ 0} \\ 1\ 1\ 0\ 0 \end{bmatrix} \end{array} \begin{array}{l} k_1 \\ k_2 \\ k_3 \\ k_4 \end{array} \qquad R = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 \end{bmatrix}$$

$$B(k_1, R) = \begin{array}{cc} \begin{bmatrix} 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix} & \begin{array}{l} x_3 x_4 \\ \cancel{x_1 x_2} \checkmark \\ x_2 x_3 \\ x_1 \end{array} \\ \begin{array}{cccc} x_1 & x_2 & x_3 & x_4 \end{array} & \end{array}$$

$x_1 x_3$ - implikant to: $\bar{x}_1 x_3$ $\quad 0 - 1 -$

$$F' = \begin{array}{cc} \begin{bmatrix} 1010 \\ 1100 \end{bmatrix} & \begin{array}{l} k_2 \\ k_4 \end{array} \end{array}$$

$$\begin{array}{ccccc} & 1 & 0 & 1 & 0 \end{array}$$

$$B(k_2, R) = \begin{array}{cc} \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} & \begin{array}{l} x_1 x_3 \\ \cancel{x_2 x_4} \checkmark \\ \cancel{x_1 x_2 x_3 x_4} \checkmark \\ x_4 \end{array} \\ \begin{array}{cccc} x_1 & x_2 & x_3 & x_4 \end{array} & \end{array}$$

$x_1 x_4 \quad \vee \quad x_3 x_4$

$x_1 \overline{x_4} \qquad x_3 \overline{x_4}$

PRZYGOTOWANIE DO KOLOKWIUM

19.01.2011
wykład PUL

$P_3 \cdot P_5 = (\overline{1,5,10}\,;\ \overline{2}\,;\ \overline{3}\,;\ \overline{4,7}\,,\ \overline{6}\,,\ \overline{8}\,,\ \overline{9})$

$P_D = (\overline{1,2,3}\,;\ \overline{4,5,6}\,;\ \overline{7,8}\,;\ \overline{9,10}$

$P_{iloczyn}: (\overline{(1)(5)(10)}\,;\ \overline{2}\,;\ \overline{3}\,;\ \overline{(4)(7)}\,;\ \overline{6}\,;\ \overline{8}\,;\ \overline{9})$

1,5	~~a_1, a_2, a_6~~
1,10	a_2, a_4
5,10	a_1, a_4, a_6
4,7	a_1, a_2, a_6

$(2+4)(1+4+6)(1+2+6) = \cancel{(2+4)}\cancel{(1}+24+$

$(4+12+26)(1+2+6) = 14+24+46+12+\cancel{12}+\cancel{126}+\cancel{126}+26$

$+\cancel{26}$

Rozwiązania: a_1, a_3, a_4, a_5

a_2, a_3, a_4, a_5

a_3, a_4, a_5, a_6

a_1, a_2, a_3, a_5

a_2, a_3, a_5, a_6

ZADANIE: Uogólnianie reguł decyzyjnych

	x_1	x_2	x_3	x_4	x_5	
1	0	0	0	0	1	T
2	0	0	0	1	0	T
3	0	1	0	1	0	T
4	0	1	1	1	1	T
5	1	1	0	1	1	T
6	0	0	1	1	0	N
7	0	1	0	0	0	N
8	0	1	1	0	0	N
9	1	0	0	0	1	N
10	1	0	1	1	1	N

01	0	0	0	0	1
	0	0	1	1	0
	0	1	0	0	0
	0	1	1	0	0
	1	0	0	0	1
	1	0	1	1	1

$$\Rightarrow \begin{array}{c|l} \begin{bmatrix} 0 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 1 & 0 \end{bmatrix} & \begin{array}{l} 3,4,5 \\ 2,5 \\ \cancel{2,3,5} \\ 1 \\ \cancel{1,3,4} \end{array} \end{array}$$

Minimalne rozwiązanie: 1,5

$1(3+4+5)(2+5) = 1(5+23+24) = 15+123+124$

$(x_1, 0) \wedge (x_5, 1) \rightarrow$ TAK

0 – – – 1