AKADEMIA ETI 2012

PLAN WYKŁADU

- SYSTEMY LICZBOWE;
- ALGEBRA BOOLA;
- BRAMKI LOGICZNE;
- TABLICE KARNAUGH;
- UKŁADY LOGICZNE;

SYSTEM DZIESIĘTNY

- WYKORZYSTYWANE SYMBOLE:
  0, 1, 2, 3, 4, 5, 6, 7, 8, 9;

- $4532 = 2*10^0 + 3*10^1 + 5*10^2 + 4*10^3$
- $498 = 8*10^0 + 9*10^1 + 4*10^2$
- $12 = 2*10^0 + 1*10^1$

SYSTEM BINARNY

- WYKORZYSTYWANE SYMBOLE:
  0, 1;

- $10010 = 0*2^0 + 1*2^1 + 0*2^2 + 0*2^3 + 1*2^4$
- $1011 = 1*2^0 + 1*2^1 + 0*2^2 + 1*2^3$
- $101 = 1*2^0 + 0*2^1 + 1*2^2$

KONWERSJA LICZB

123	1
61	1
30	0
15	1
7	1
3	1
1	1
0	

129	1
64	0
32	0
16	0
8	0
4	0
2	0
1	1
0	

KOD GRAYA

DECIMAL	BINARY	GRAY
0	000	000
1	001	001
2	010	011
3	011	010
4	100	110
5	101	111
6	110	101
7	111	100

ALGEBRA BOOLA [1]

$$x + 0 = x$$

$$x + 1 = 1$$

$$x + x = x$$

$$x + \bar{x} = 1$$

$$x + x * y = x * (1 + y) = x * 1 = x$$

$$x + \bar{x} * y = (x + \bar{x})(x + y) = x + y$$

$$\overline{(x + y)} = \bar{x} * \bar{y}$$

$$\overline{(x + y + z)} = \bar{x} * \bar{y} * \bar{z}$$

ALGEBRA BOOLA [1]

$$x*0=0$$

$$x*1=x$$

$$x*x=x$$

$$x*\bar{x}=0$$

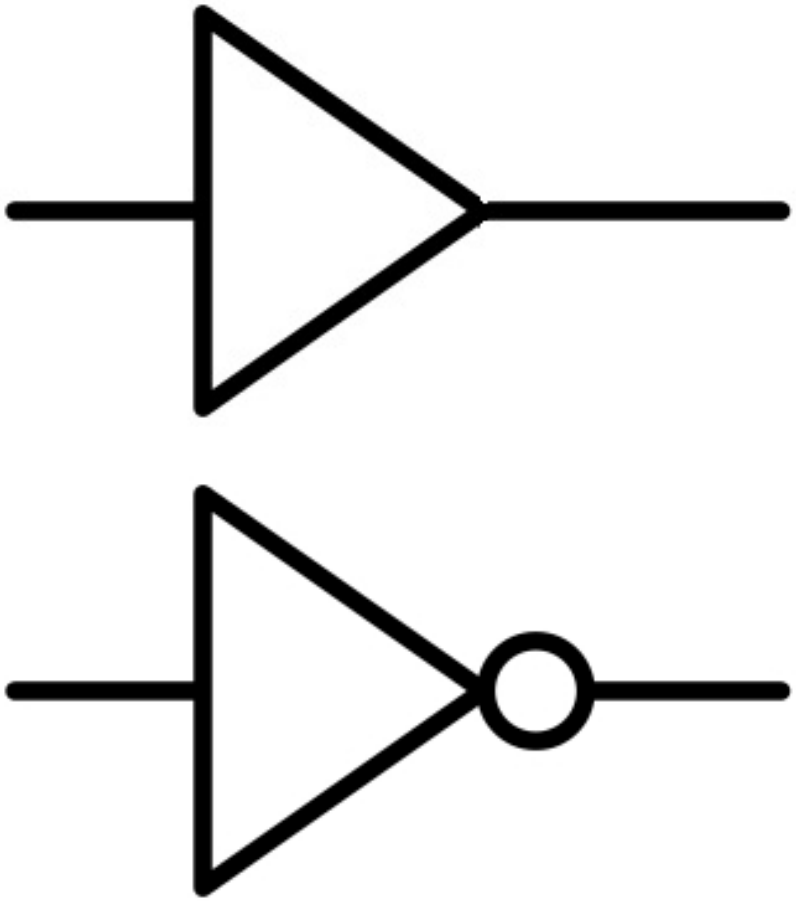
$$x*(x+y)=x+x*y=x$$

$$x*(\bar{x}+y)=x*y$$

$$\overline{(x*y)}=\bar{x}+\bar{y}$$

$$\overline{(x*y*z)}=\bar{x}+\bar{y}+\bar{z}$$

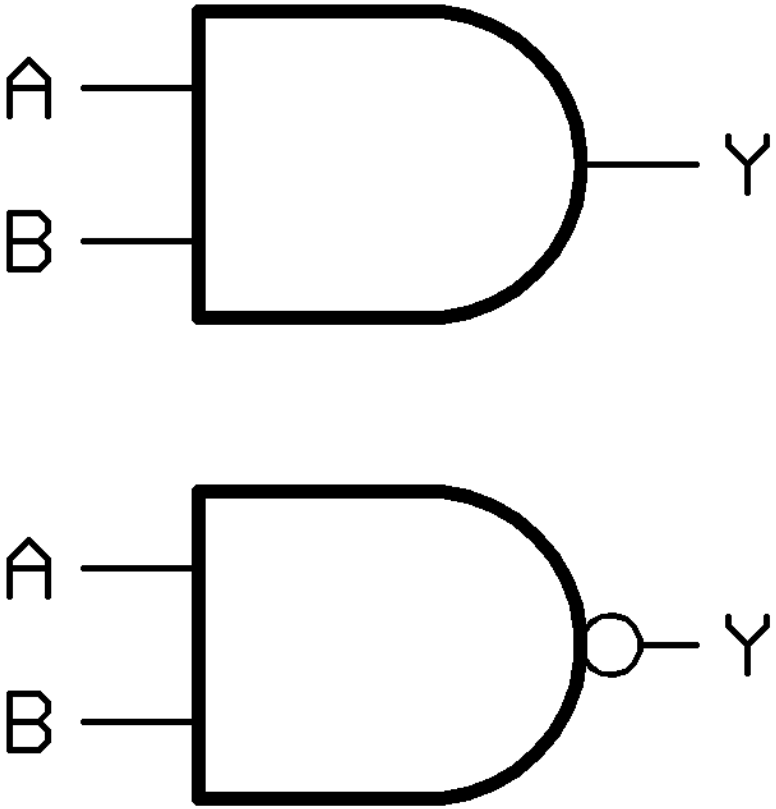
BUFOR, INWERTER [2]



A	Y
0	0
1	1

A	Y
0	1
1	0

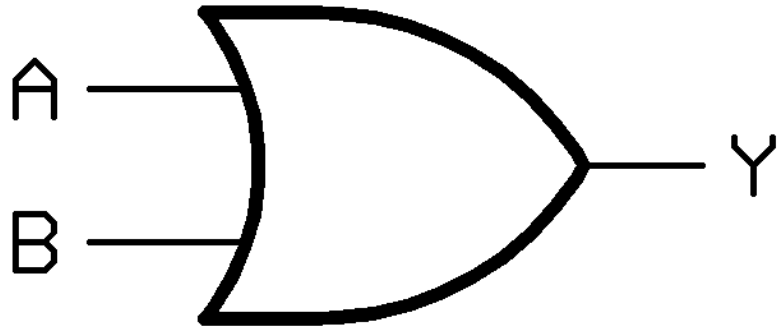
AND, NAND [2]



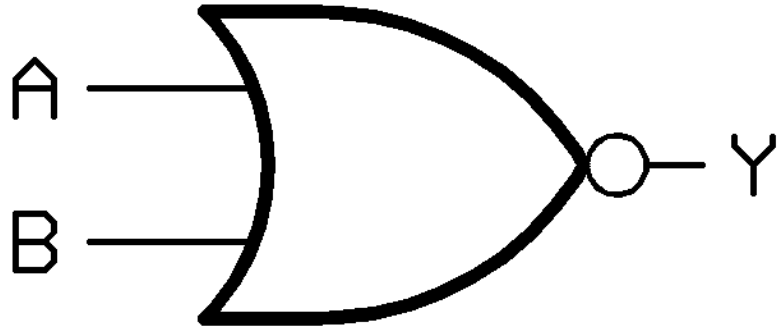
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

OR, NOR [2]

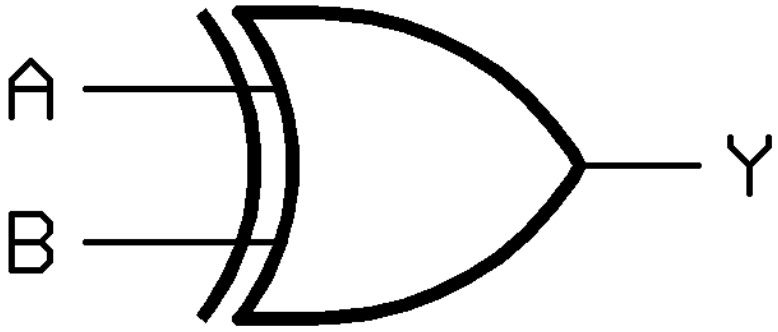


A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

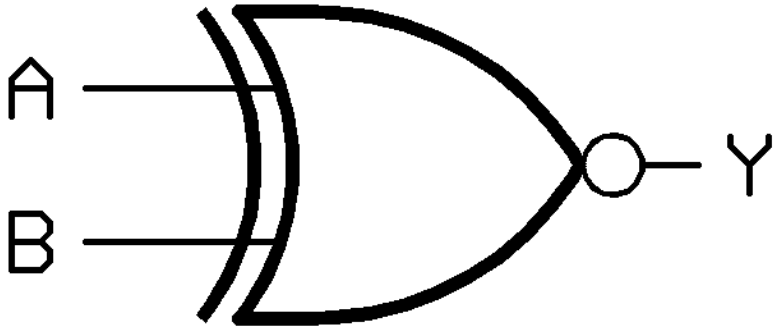


A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

XOR, XNOR [2]



A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

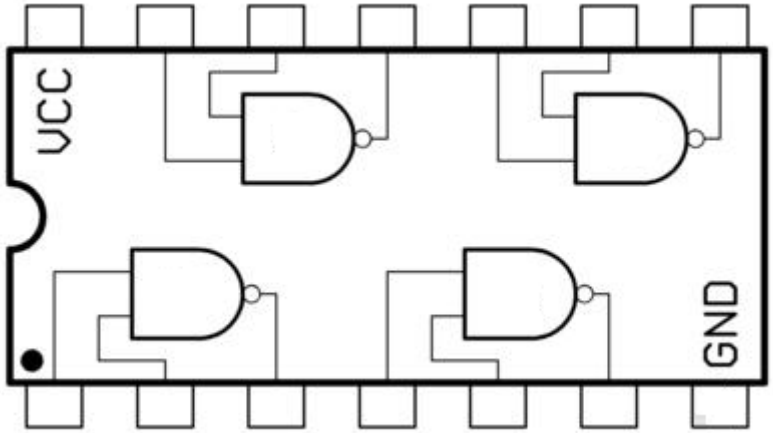


A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

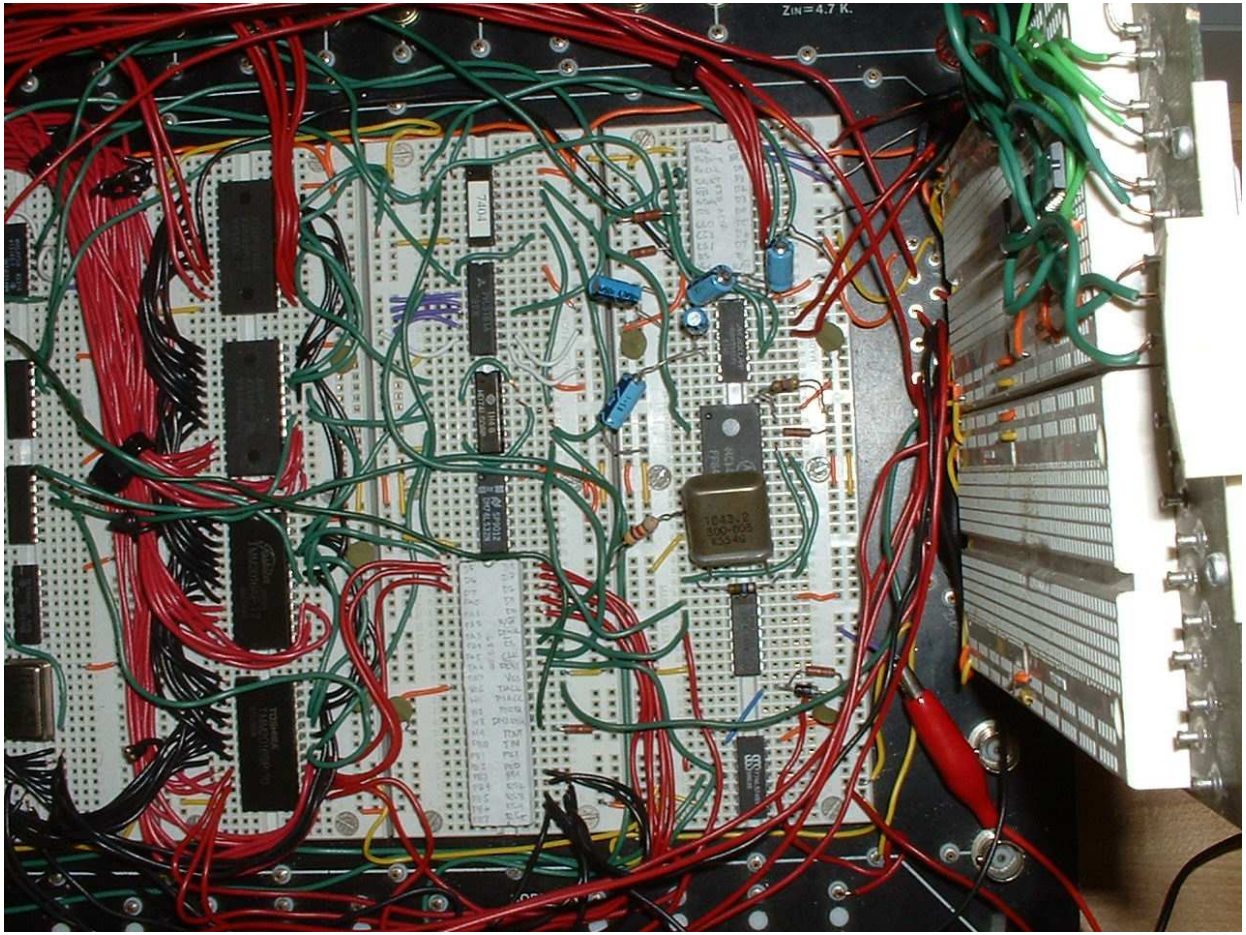
TABLICE KARNAUGH

- **Przykład:**
  „Zaprojektuj kombinacyjny układ sumatora dwóch 2-bitowych liczb binarnych.”

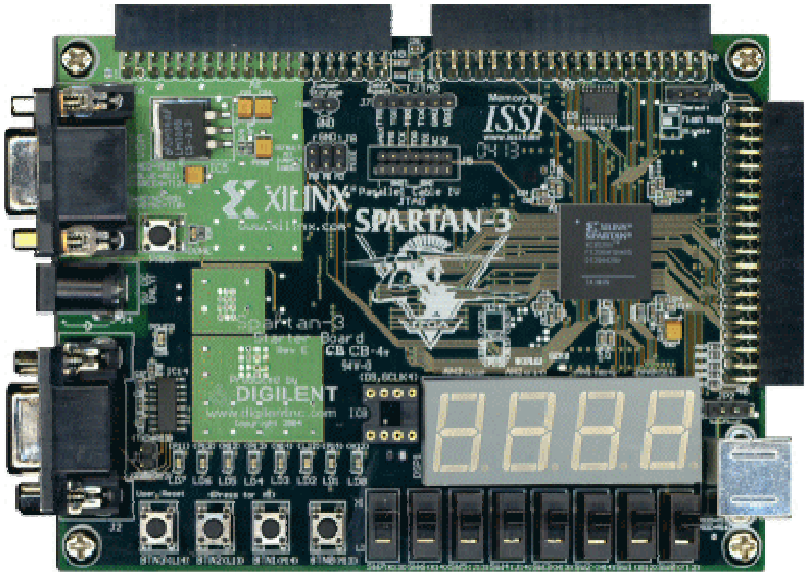
LOGIKA DYSKRETNA [3]



LOGIKA DYSKRETNA [4]



FPGA [5]



DZIĘKUJĘ ZA UWAGĘ

- [1] http://galaxy.uci.agh.edu.pl/~jamro/tul/bool.pdf
- [2] http://commons.wikimedia.org/
- [3] http://dlnmh9ip6v2uc.cloudfront.net/tutorialimages/LogicBlocksExp/7400n-detailed.png
- [4] http://en.wikipedia.org/
- [5] http://www.digilentinc.com/