

110'' : 16 RT.  
 "1"  
 M.

$\Sigma N +$

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

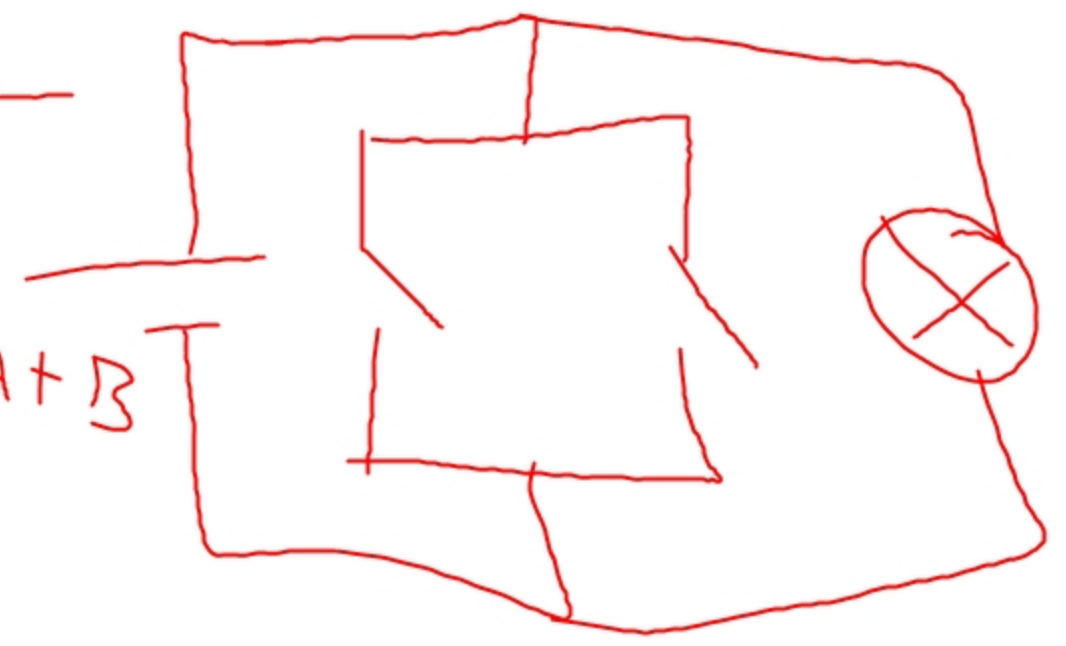
$Y = A \cdot B$   
 opens



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



$Y = A + B$



EXOR

B	A	$Y = A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

com 2.

$$Y = A \oplus B$$



EXNOR


$$Y = \overline{A \oplus B}$$

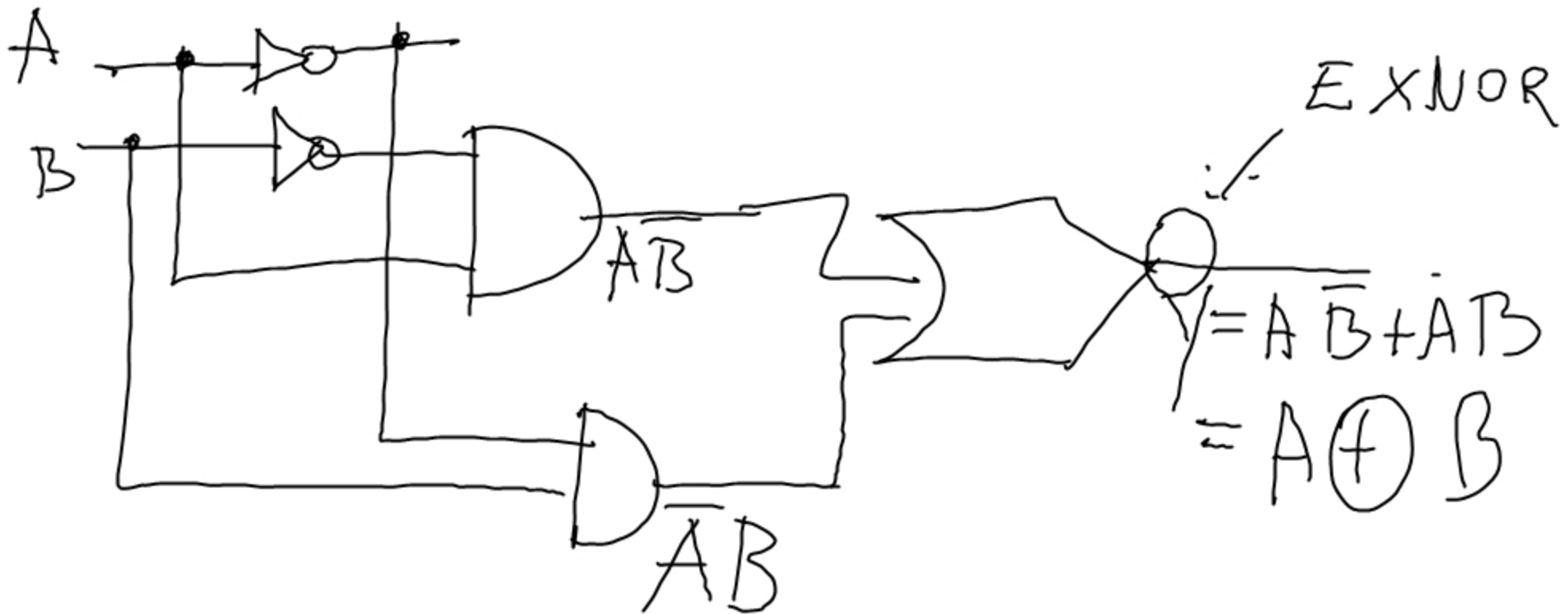


B	A	$Y = \overline{A \oplus B}$
0	0	1
0	1	0
1	0	0
1	1	1

$$Y = A \oplus B = A\bar{B} + \bar{A}B$$


B	A	$\bar{A}$	$\bar{B}$	$A\bar{B}$	$\bar{A}B$	$A\bar{B} + \bar{A}B$	$Y = A \oplus B$
0	0	1	1	0	0	0	0
0	1	0	1	1	0	1	1
1	0	0	0	0	1	1	1
1	1	0	0	0	0	0	0





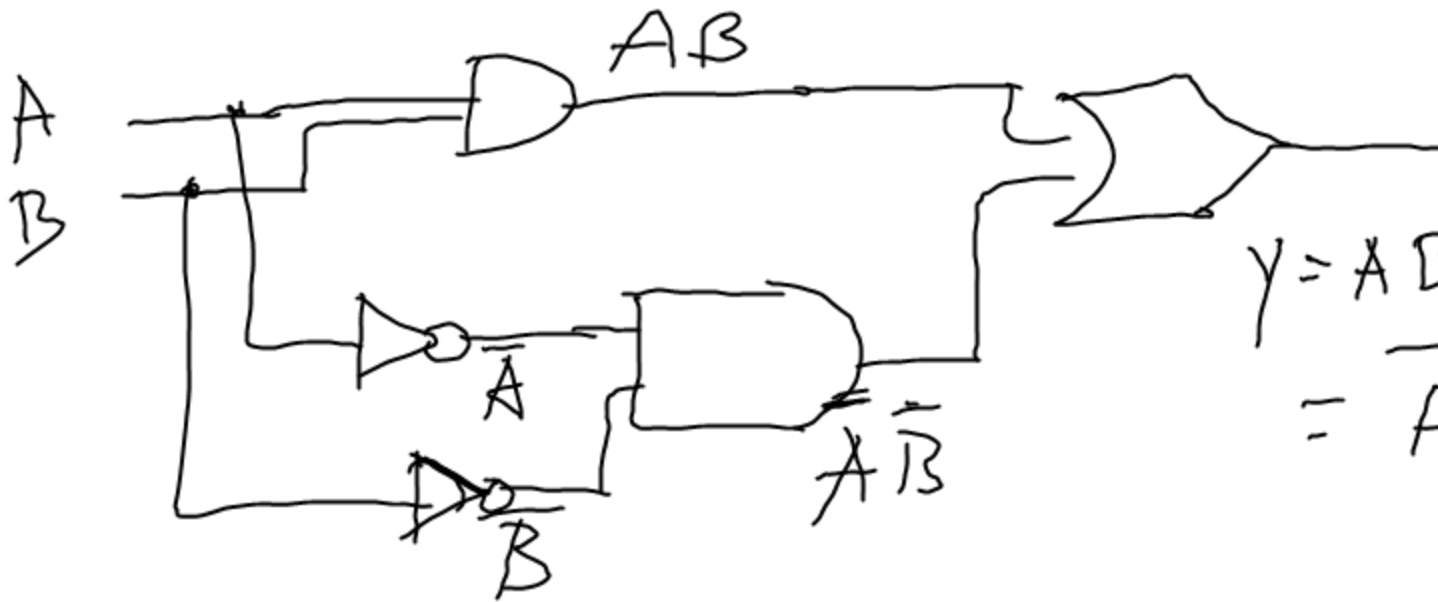
EXNOR = 1

$$Y = \overline{A \oplus B} = A \cdot B + \overline{A} \cdot \overline{B} = \overline{A \cdot B + \overline{A} \cdot \overline{B}}$$

B	A	A · B	$\overline{A}$	$\overline{B}$	$\overline{A} \cdot \overline{B}$	$A \cdot B + \overline{A} \cdot \overline{B}$	$Y = \overline{A \oplus B}$
0	0	0	1	1	1	1	1
0	1	0	1	0	0	0	0
1	0	0	0	1	0	0	0
1	1	1	0	0	0	1	1

Handwritten annotations: An arrow points from the expression  $\overline{A \oplus B}$  in the equation above to the  $\overline{A \cdot B + \overline{A} \cdot \overline{B}}$  column in the truth table. Another arrow points from the  $\overline{A \cdot B + \overline{A} \cdot \overline{B}}$  column to the  $Y = \overline{A \oplus B}$  column, with a double underline below the arrow.

$$y = AB + \bar{A} \cdot \bar{B}$$



$$y = AB + \bar{A} \cdot \bar{B} = \overline{A \oplus B}$$

# ALGEBRA DI BOOLI

- "0" e "1"
- Tre operatori: NOT, AND e OR
- PRINCIPIO di DUALITÀ

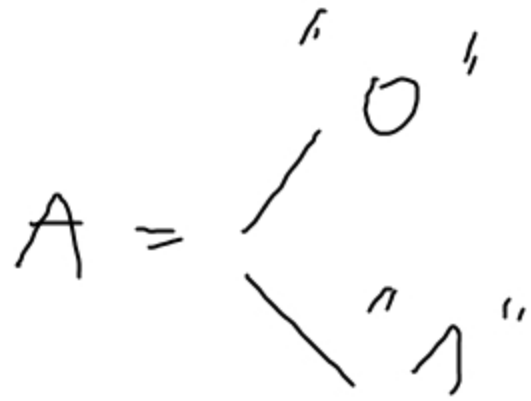
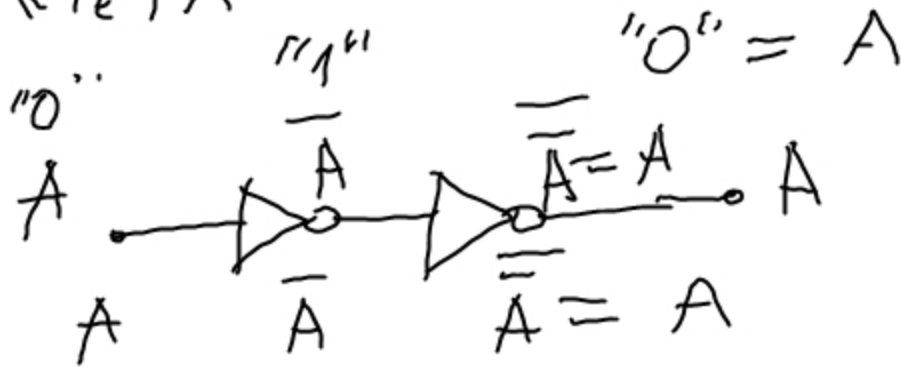
## PRINCIPIO DI DUALITÀ

Le proprietà e i Teoremi della somma

logica si possono ricavare da quelli del prodotto logico (e viceversa) scambiando il segno di AND ( $\cdot$ ) con quello di OR ( $+$ ) e gli "0" con gli "1"

# PROPRIETA'

NOT  
 $\overline{\overline{A}} = A$

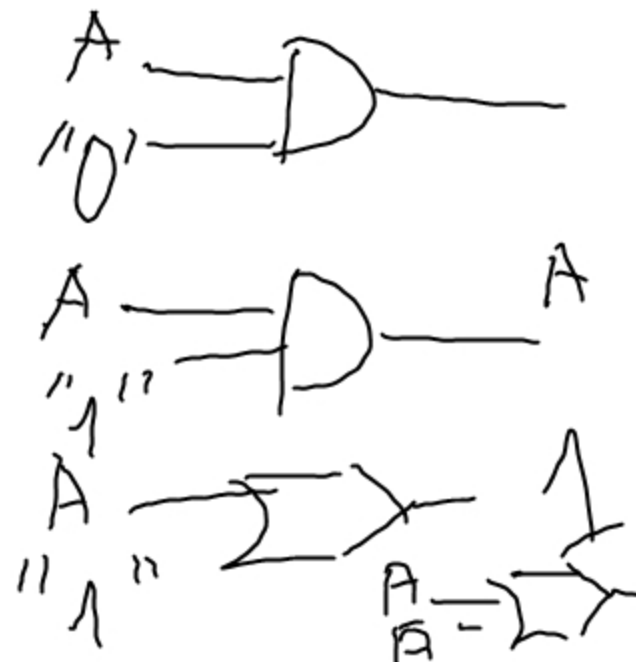


## AND

- $A \cdot 0 = 0$
- $A \cdot 1 = A$
- $A \cdot A = A$
- $A \cdot \overline{A} = 0$

## OR

- $A + 1 = 1$
- $A + 0 = A$
- $A + A = A$
- $A + \overline{A} = 1$





PROPRIETÀ COMMUTATIVA  
DIRETTA AND DUALE OR

$$A \cdot B = B \cdot A$$

$$A + B = B + A$$

ASSOCIATIVA DIRETTA

$$\begin{aligned} A \cdot B \cdot C &= \\ &= A (B \cdot C) = \\ &= (A \cdot B) \cdot C = \\ &= (A \cdot C) \cdot B \end{aligned}$$

DISTRIBUTIVA DIRETTA

$$A(B+C) = AB + AC$$

DUALE

$$\begin{aligned} A + B + C &= A + (B + C) \neq \\ &= (A + B) + C = \\ &= (A + C) + B \end{aligned}$$

DUALE

$$A + B \cdot C = (A + B) \cdot (A + C)$$

# TEOREMA IDEMPOTENZA

DIRRETTO

$$A \cdot A \cdot A \cdot A = A$$

DUALE

$$A + A + A + A = A$$

TEOREMA  
DIRRETTO

$$A + A \cdot B = A$$

DIM:

$$A + AB = A$$

$$A \left( \underbrace{1 + B}_{=1} \right) = A$$

$$A \cdot 1 = A \text{ c.v.d.}$$

ASSORBIMENTO

DUALE

$$A \cdot (A + B) = A$$

DIM:

$$A \cdot (A + B) = A$$

$$A + AB = A$$

$$A \left( \underbrace{1 + B}_{=1} \right) = A$$

$$A \cdot 1 = A \text{ c.v.d.}$$