

Porte Universali

Architettura degli Elaboratori e Laboratorio

14 Marzo 2013

Proprietá dell'algebra di Boole

Identità: $A + 0 = A$

Nullò: $A + 1 = 1$

Idempotente: $A + A = A$

Inverso: $A + \bar{A} = 1$

Commutativa: $A + B = B + A$

Associativa: $A + (B + C) = (A + B) + C$

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

DeMorgan: $\overline{A + B} = \bar{A} \cdot \bar{B}$

$$A \cdot 1 = A$$

$$A \cdot 0 = 0$$

$$A \cdot A = A$$

$$A \cdot \bar{A} = 0$$

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

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

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

$$\overline{A \cdot B} = \bar{A} + \bar{B}$$

Porte Logiche

NOT

A	O
0	1
1	0



AND

A	B	O
0	0	0
0	1	0
1	0	0
1	1	1



NAND

A	B	O
0	0	1
0	1	1
1	0	1
1	1	0



OR

A	B	O
0	0	0
0	1	1
1	0	1
1	1	1



NOR

A	B	O
0	0	1
0	1	0
1	0	0
1	1	0



XOR

A	B	O
0	0	0
0	1	1
1	0	1
1	1	0

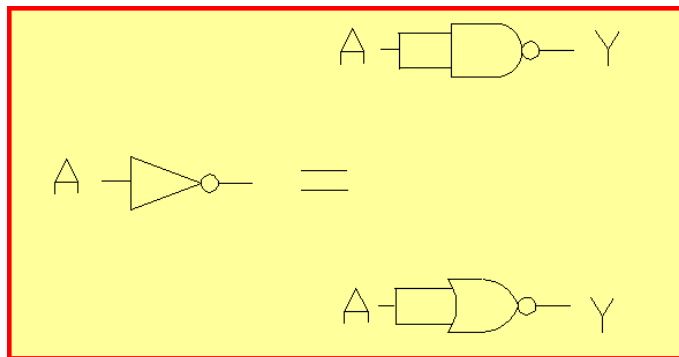


Porte Logiche Universali NAND e NOR

Tutti i circuiti digitali possono essere espressi utilizzando solo porte NAND o NOR dato che tutte le porte logiche fondamentali sono esprimibili in funzione di queste due.

NOT

A	O
0	1
1	0

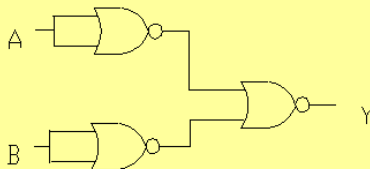
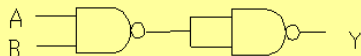
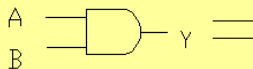


$$\bar{A} = \overline{A \cdot A} = \overline{A + A}$$

Porte Logiche Universali NAND e NOR

AND

A	B	O
0	0	0
0	1	0
1	0	0
1	1	1

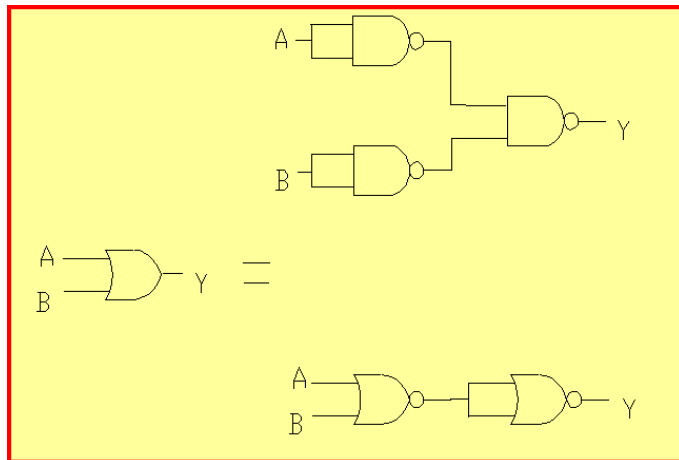


$$A \cdot B = \overline{\overline{A \cdot B}} = \overline{\overline{A} + \overline{B}}$$

Porte Logiche Universali NAND e NOR

OR

A	B	O
0	0	0
0	1	1
1	0	1
1	1	1

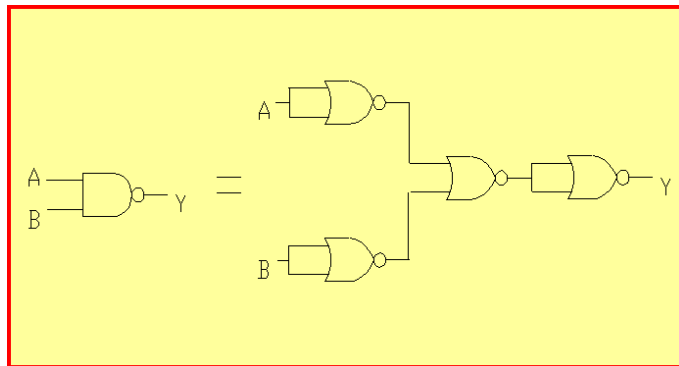


$$A + B = \overline{\overline{A} \cdot \overline{B}} = \overline{\overline{A + B}}$$

Porte Logiche Universali NAND e NOR

NAND

A	B	O
0	0	1
0	1	1
1	0	1
1	1	0

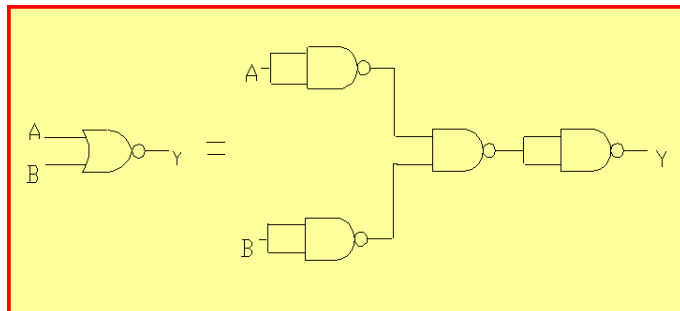


$$\overline{A \cdot B} = \overline{\overline{A} + \overline{B}}$$

Porte Logiche Universali NAND e NOR

NOR

A	B	O
0	0	0
0	1	1
1	0	1
1	1	1



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