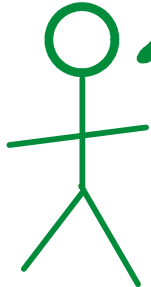


Álgebra de Boole



George Boole
Matemático inglês

Verdadeiro = 1
(com corrente)
Falso = 0
(sem corrente)
} Sistema Binário!

$\cup \leftrightarrow +$

+	0	1
0	0	1
1	1	1

$\cap \leftrightarrow \cdot$

$\cdot$	0	1
0	0	0
1	0	1

Associatividade

Comutatividade

Distributividade

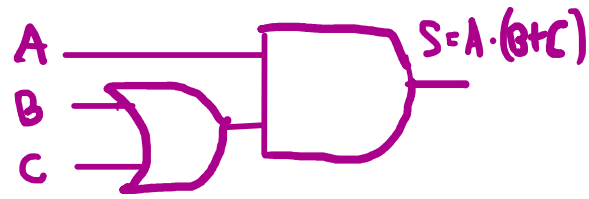
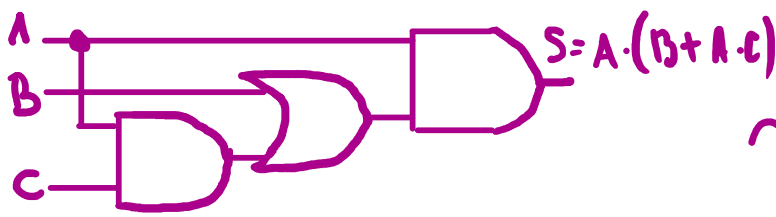
Idempotência

($X+X=X$; $X \cdot X=X$)

Com essa aritmética meio maluca, dá para simplificar várias coisas!

$$\text{Ex.: } A \cdot (B + A \cdot C) = A \cdot B + A \cdot A \cdot C \\ = A \cdot B + A \cdot C = A \cdot (B + C)$$

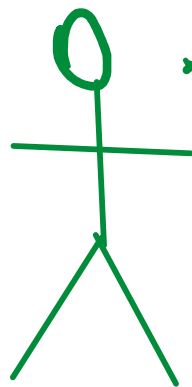
$$= A \cdot B + A \cdot C = A \cdot (B + C)$$



Leis de de Morgan.

Simplificação.

★ Leis de de Morgan



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

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

Cusquitos de Morgan,
Matemáticos inglês

A	B	$\overline{A}$	$\overline{B}$	$A + B$	$\overline{A + B}$	$\overline{A} \cdot \overline{B}$	$A \cdot B$	$\overline{A \cdot B}$	$\overline{A} + \overline{B}$
0	0	1	1	0	1	1	0	1	1

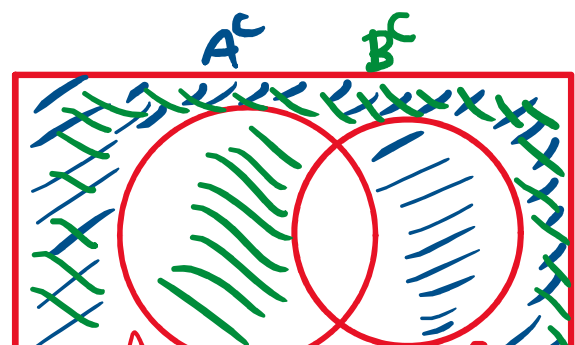
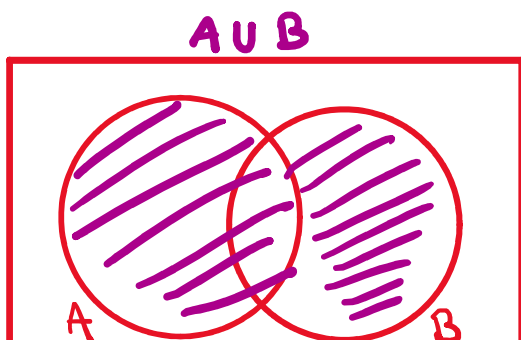
0	0	1	1	0	1	1	0	1	1
0	1	1	0	1	0	0	0	1	1
1	0	0	1	1	0	0	0	1	1
1	1	0	0	1	0	0	1	0	0

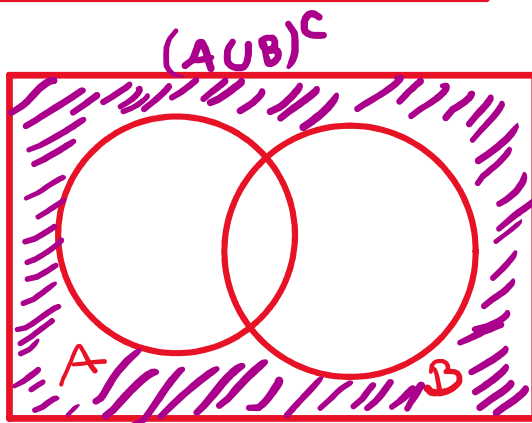
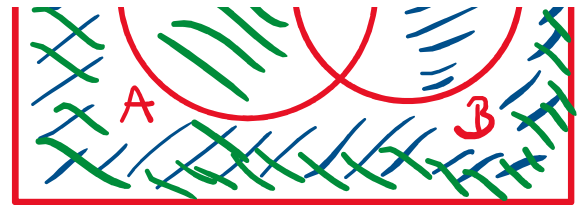
↑ comprovaçāo com tab. verdade

Também existe uma prova puramente algébrica (rigorosa). Interessados, pesquisar.

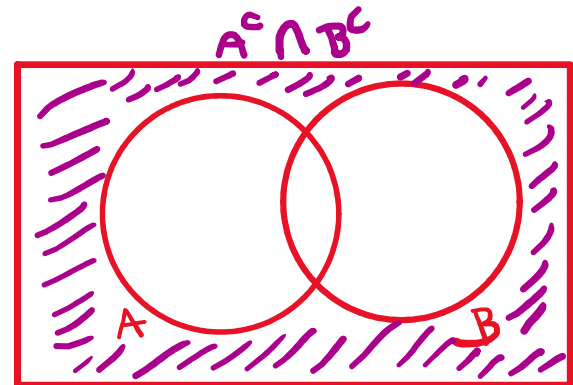
Lei de De Morgan:

$$\star (A \cup B)^c = A^c \cap B^c$$





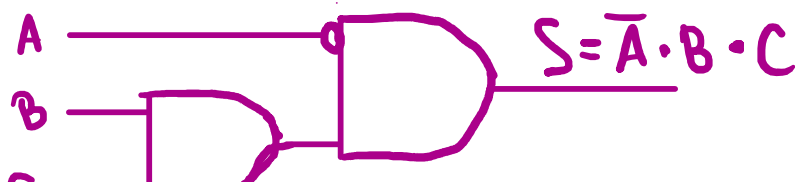
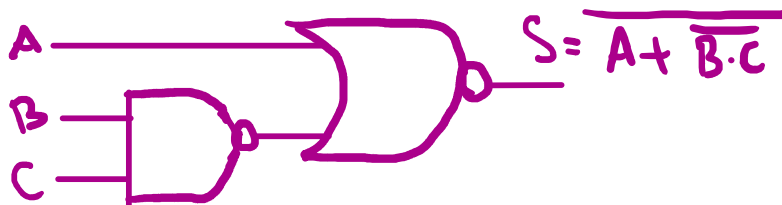
=



$$\star (A \cap B)^c = A^c \cup B^c$$

(Faça os diagramas!)

$$\begin{aligned} \text{Ex.: } \overline{A + \overline{B \cdot C}} &= \overline{A} \cdot \overline{\overline{B \cdot C}} \\ &= \overline{A} \cdot B \cdot C \end{aligned}$$





↑
menos operações
menos inversões