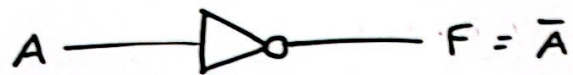


## Portas Lógicas

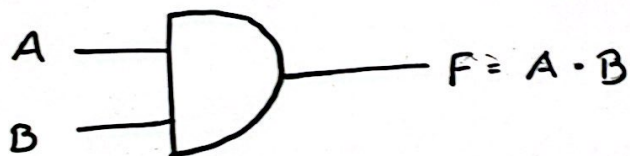
- Not (negação)



// Tabela da verdade //

A	F
0	1
1	0

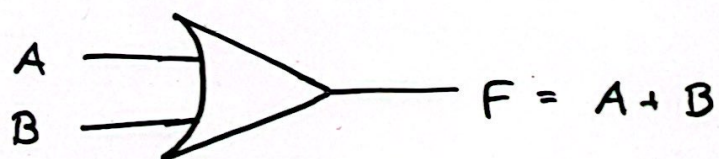
- AND ("Multiplicação")



// Tabela da verdade //

A	B	F
0	0	0
0	1	0
1	0	0
1	1	1

- OR ("soma")

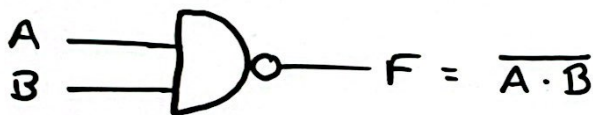


## "Tabela da verdade"

A	B	F
0	0	0
0	1	1
1	0	1
1	1	1

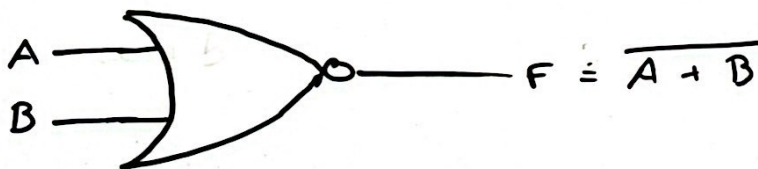
---

- NAND ("Not - And")



---

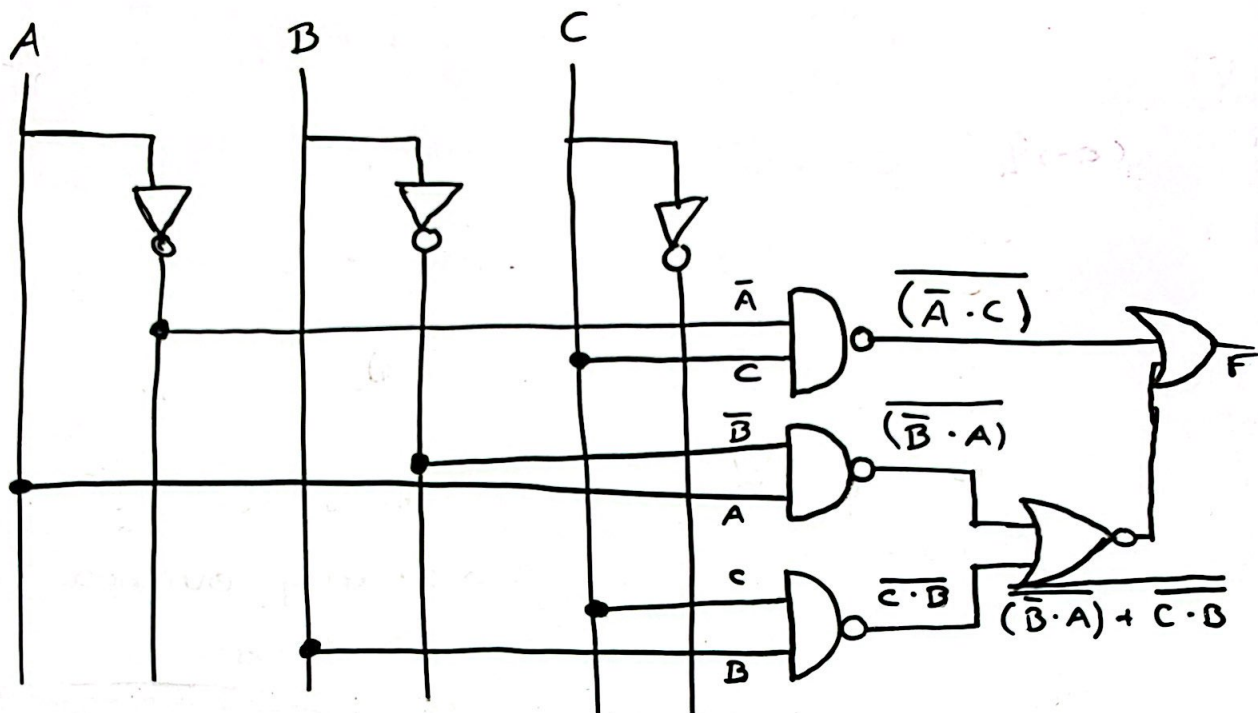
- NOR ("Not - OR")



Nota:

A porta lógica NAND e a NOR apenas são utilizados na teoria.

## Extração de funções



$$F = (\overline{A} \cdot C) + [(\overline{A} \cdot \overline{B}) + (\overline{B} \cdot C)]$$

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

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

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

$$F = A + \overline{C} + \underbrace{A \cdot 0 \cdot C}_{= 0}$$

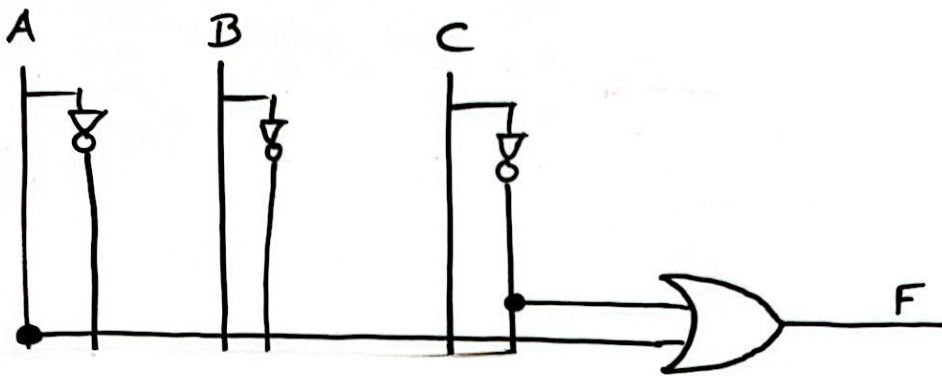
$$F = A + \overline{C}$$

== "Ver tabela disponibilizada na disciplina"





# Simplificação



Preenchimento de tabela de verdade:

$$F = A \cdot B + A \cdot C \quad | \quad F2 = A \cdot (B + C)$$

A	B	C	$A \cdot B$	$A \cdot C$	F	F2
0	0	0	0	0	0	0
0	0	1	0	0	0	0
0	1	0	0	0	0	0
0	1	1	0	0	0	0
1	0	0	0	0	0	0
1	0	1	0	1	1	1
1	1	0	1	0	1	1
1	1	1	1	1	1	1

Ex. 5...

c)  $F = X \cdot Z + Y \cdot Z + Z$

X	Y	Z	X · Z	Y · Z	F
0	0	0	0	0	0
0	0	1	0	0	1
0	1	0	0	0	0
0	1	1	0	1	1
1	0	0	0	0	0
1	0	1	1	0	1
1	1	0	0	0	0
1	1	1	1	1	1

$$\begin{aligned}
 & X \cdot Z + Y \cdot Z + Z \\
 \Leftrightarrow & Z \cdot (X + Y + 1) \\
 \Leftrightarrow & Z \cdot (X + Y + 1) \\
 \Leftrightarrow & Z \cdot 1 \\
 \Leftrightarrow & Z
 \end{aligned}$$

d)  $F = X \cdot (Y + Z) + X \cdot Y$

X	Y	Z	X · Y	X · (Y + Z)	F
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	0	0	0
1	0	1	0	1	1
1	1	0	1	1	1
1	1	1	1	1	1

$$\begin{aligned}
 & X \cdot (Y + Z) + X \cdot Y \\
 \Leftrightarrow & X \cdot Y + Z + X \cdot Y \\
 \Leftrightarrow & X \cdot (Y + Z + Y) \\
 \Leftrightarrow & X \cdot (Y + Z)
 \end{aligned}$$

Ex. 7...

c)

$X = \bar{A} \cdot C$	$Y = A \cdot \bar{B}$	$Z = \bar{A} \cdot C + A \cdot \bar{B} + B \cdot C$
$X' = B \cdot C$	$Y' = A \cdot \bar{B}$	$Z' = A \cdot \bar{B} + \bar{A} \cdot B$
$X'' = \bar{A} \cdot B$	$Y'' = A \cdot \bar{B} + B \cdot C$	

$$F = Z + Z' = \bar{A} \cdot C + A \cdot \bar{B} + B \cdot C + A \cdot \bar{B} + \bar{A} \cdot B$$



$$\Leftrightarrow F = \bar{A} \cdot C + \underline{A \cdot \bar{B}} + B \cdot C + \underline{A \cdot \bar{B}} + \bar{A} \cdot B$$

$$\Leftrightarrow F = \bar{A} \cdot C + A \cdot \bar{B} + B \cdot C + \bar{A} \cdot B$$

$$\Leftrightarrow F = C \cdot (\bar{A} + B) + A \cdot \bar{B} + \bar{A} \cdot B$$

Ex. 6...

$$d) X \cdot (\overline{X \cdot Y}) + X \cdot Y = X$$

$$\Leftrightarrow X \cdot \overline{X \cdot Y} + X \cdot Y = X$$

$$\Leftrightarrow X \cdot 1 = X$$

$$\Leftrightarrow X = X$$

$$e) (A + \bar{A} \cdot B) \cdot (A + \bar{B}) = A$$

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

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

$$\Leftrightarrow 1 \cdot A + B + \bar{B} = A$$

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

$$\Leftrightarrow A \cdot 1 = A$$

$$\Leftrightarrow A = A$$

$$p) \overline{\overline{A} \cdot (\overline{B} + C)} + B \cdot C = A + B$$

$$\Leftrightarrow \overline{\overline{A}} + \overline{(\overline{B} + C)} + B \cdot C = A + B$$

$$\Leftrightarrow A + (\overline{\overline{B} \cdot \overline{C}}) + B \cdot C = A + B$$

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

$$\Leftrightarrow A + B \cdot (\overline{C} + C) = A + B$$

$$\Leftrightarrow A + B \cdot 1 = A + B$$

$$\Leftrightarrow A + B = A + B$$

—————//—————//—————