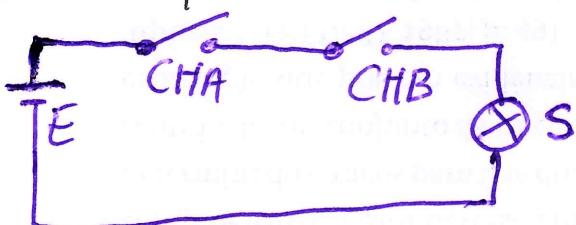


CAPÍTULO - 02

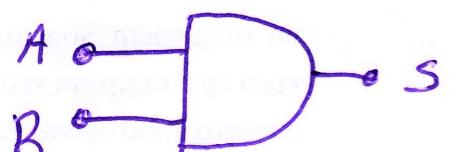
ELEMENTOS DE ELETROÔNICA DIGITAL FUNÇÕES E PORTAS LÓGICAS

→ SISTEMA MATEMÁTICO DE ANÁLISE LÓGICA
 - ALGEBRA DE BOOLE
 - GEORGE BOOLE (1815-1864)
 (AN INVESTIGATION OF THE LAWS
 OF THOUGHT)

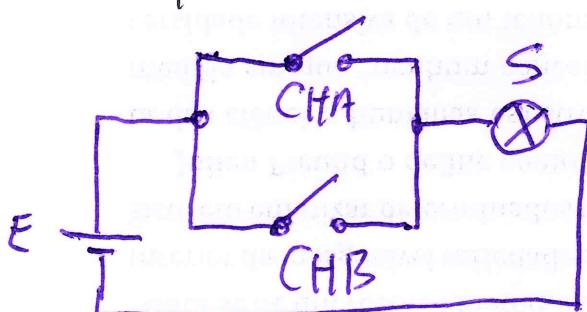
→ FUNÇÃO E (AND)



A	B	S
0	0	0
0	1	0
1	0	0
1	1	1



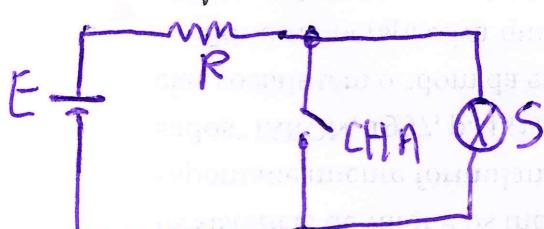
→ FUNÇÃO OU (OR)



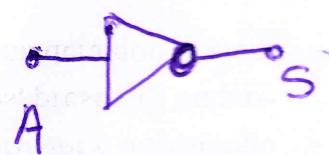
A	B	S
0	0	0
0	1	1
1	0	1
1	1	1



→ FUNÇÃO NÃO (NOT)



A	S
0	1
1	0

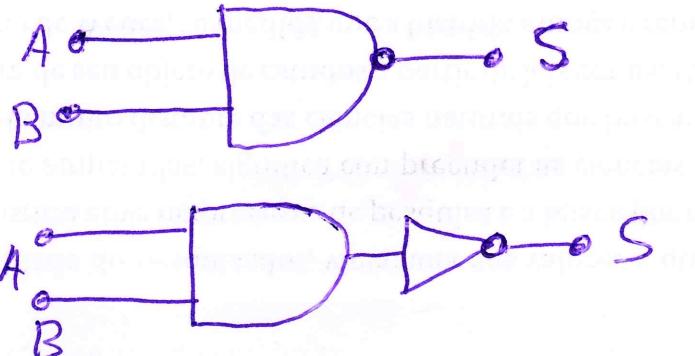


→ FUNÇÃO NÃO É, NE ou NAND

②

A	B	S
0	0	1
0	1	1
1	0	1
1	1	0

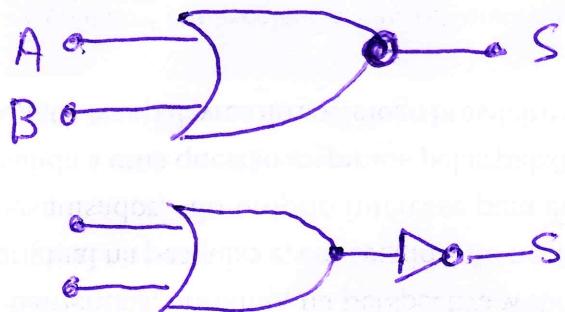
$$S = (\overline{A \cdot B})$$



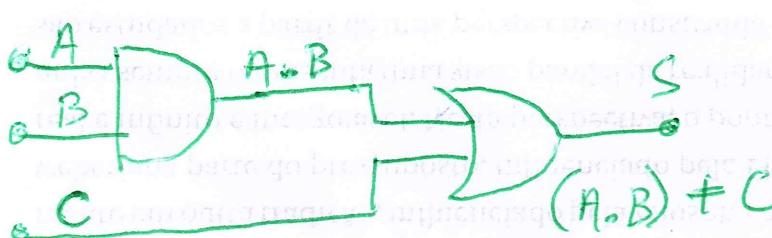
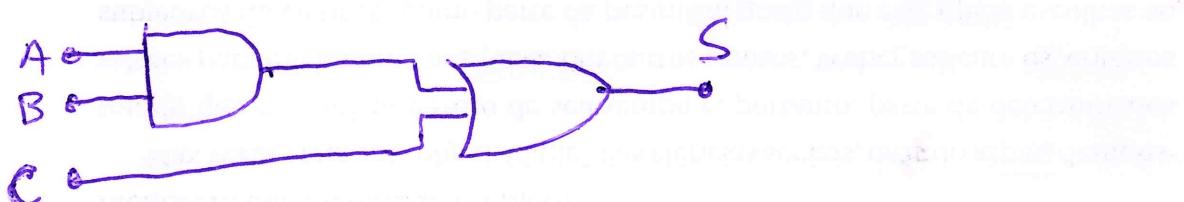
→ FUNÇÃO NÃO OU, NOV ou NOR

A	B	S
0	0	1
0	1	0
1	0	0
1	1	0

$$S = (\overline{A + B})$$

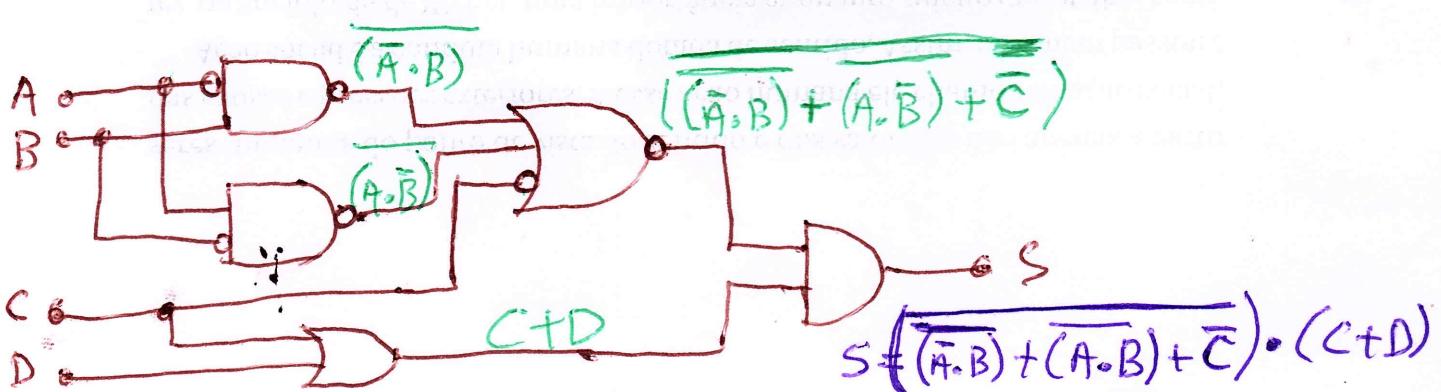
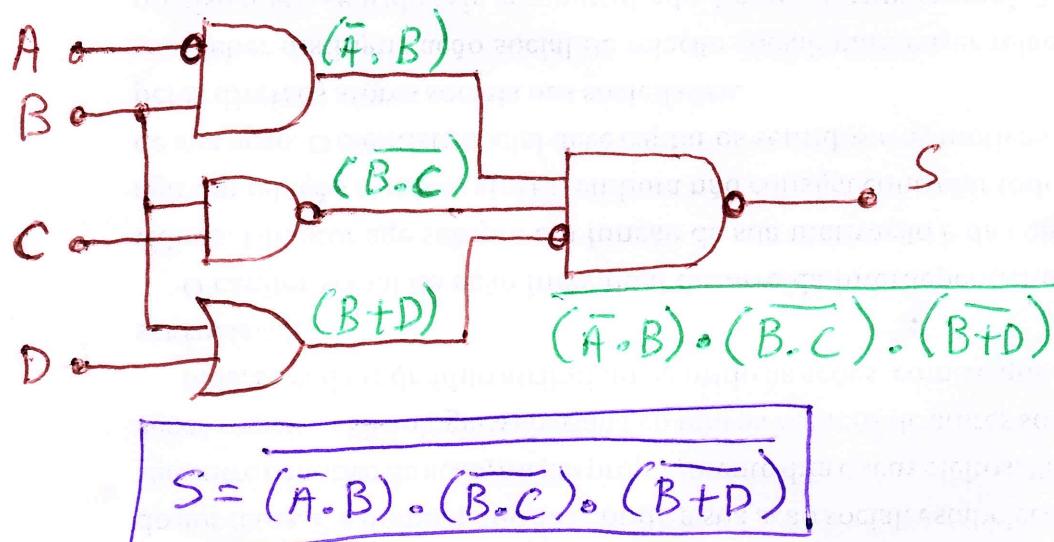
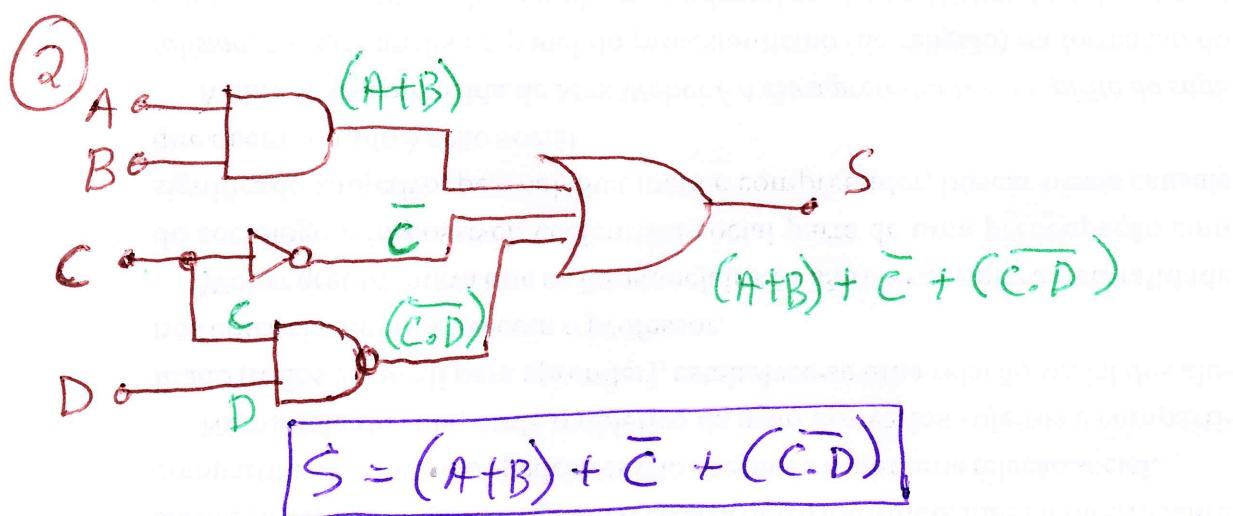
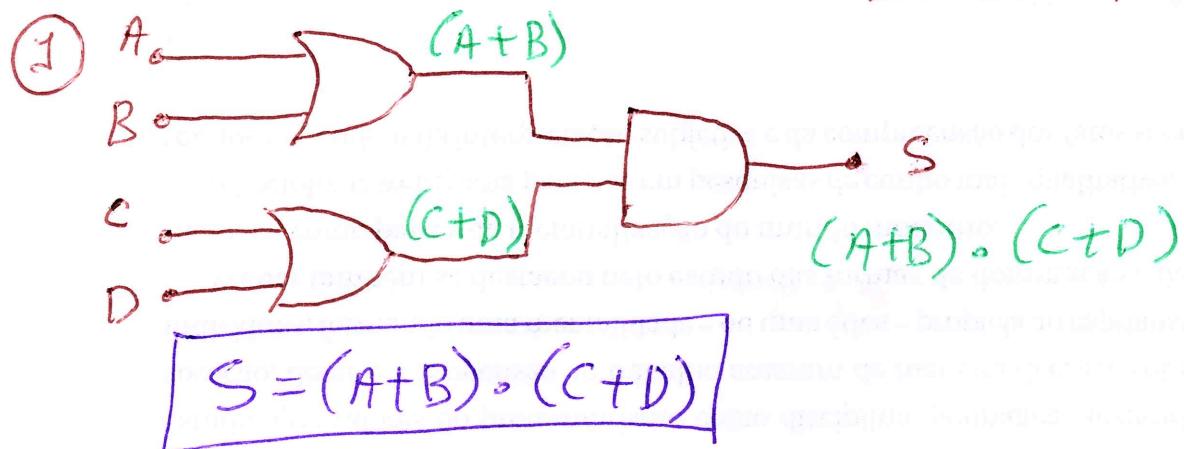


⇒ EXPRESSES LÓGICAS OBTIDAS DE CIRCUITOS LÓGICOS



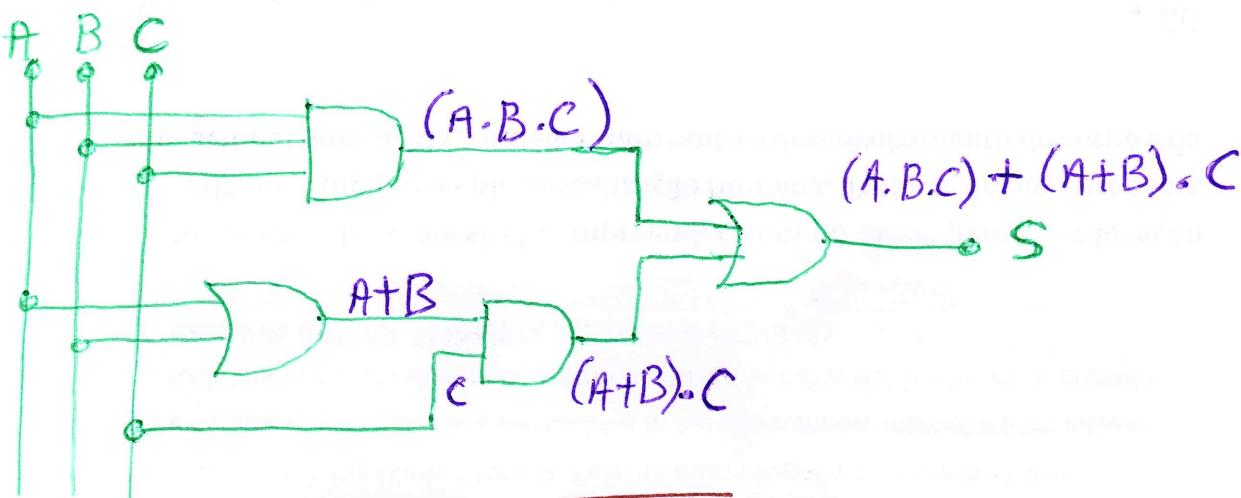
$$S = A \cdot B + C$$

(3)

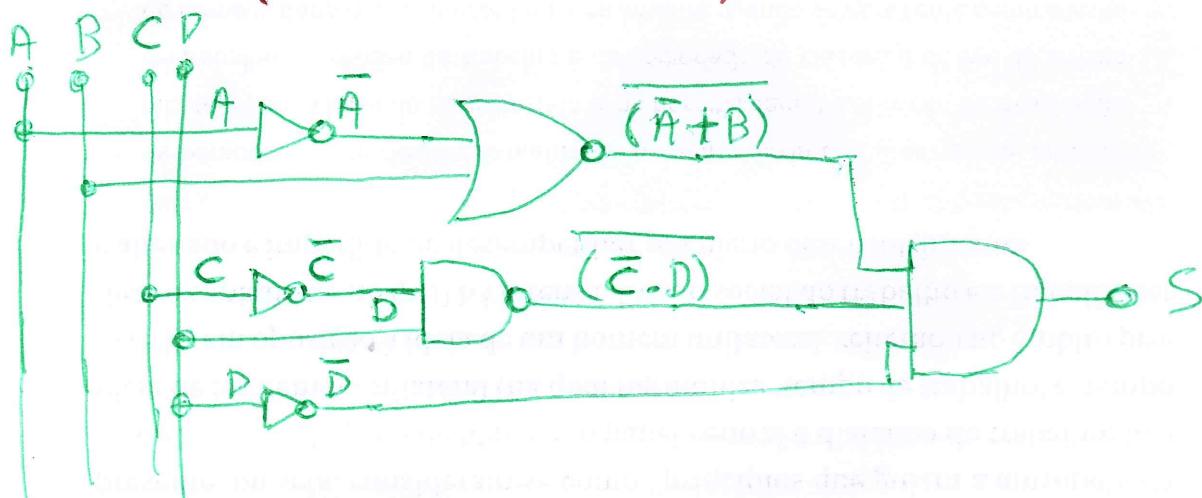
EXEMPLOS- ACHAR EXPRESSÃO
BOOLEANA

→ CIRCUITOS OBTIDOS DE EXPRESSESES BOOLEANAS ④

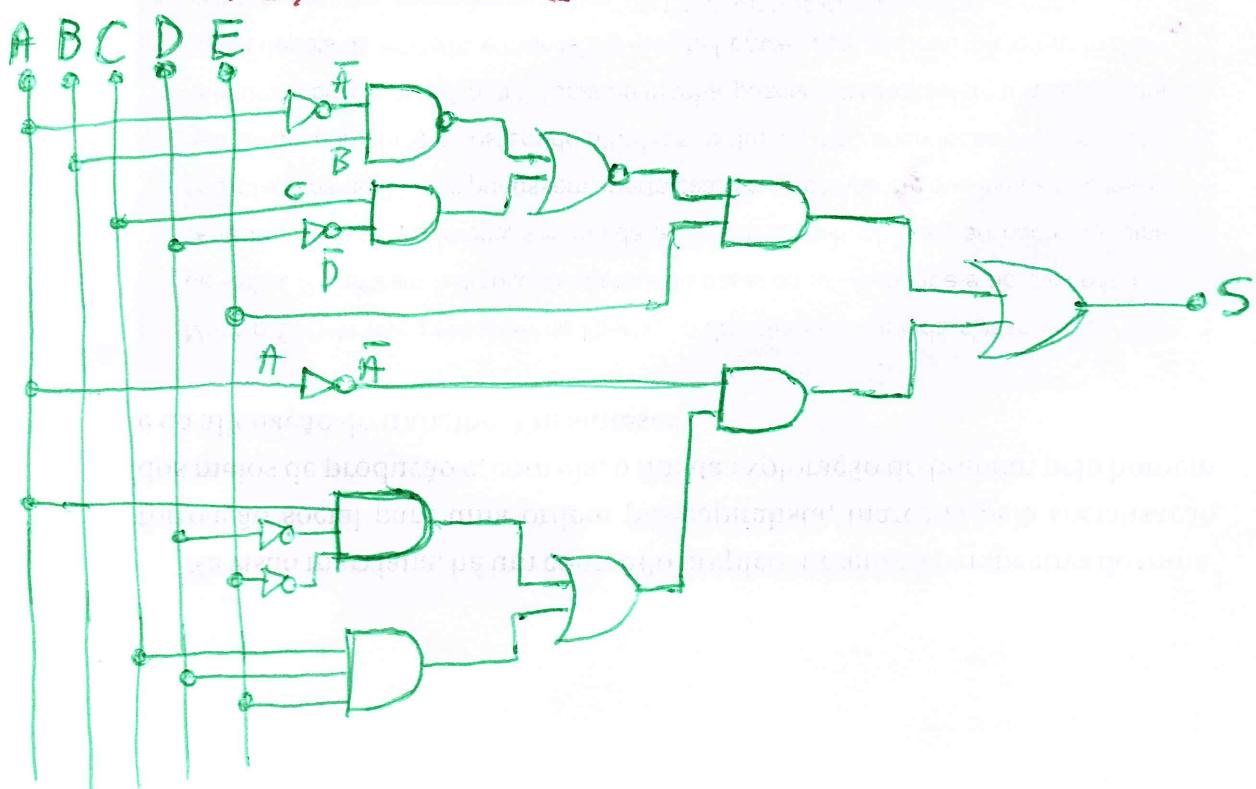
$$S = A \cdot B \cdot C + (A+B) \cdot C$$



$$S = (\overline{(\bar{A}+B)} + \overline{(\bar{C} \cdot D)}) \cdot \bar{D}$$



$$S = [\overline{(\bar{A} \cdot B)} + \overline{(C \cdot \bar{D})}] \cdot E + \bar{A} \cdot (A \cdot \bar{D} \cdot \bar{E} + C \cdot D \cdot E)$$



→ TABELAS DE VERDADE OBTIDAS DE
EXPRESSÕES BOOLEANAS

$$S = A \cdot \bar{B} \cdot C + A \cdot \bar{D} + \bar{A} \cdot B \cdot D$$

	8	4	2	1	\bar{A}	\bar{B}	\bar{C}	$A \cdot \bar{B} \cdot C$	$A \cdot \bar{D}$	$\bar{A} \cdot B \cdot D$	S
1	0	0	0	0	1	1	1	0	0	0	0
2	0	0	1	1	1	1	0	0	0	0	0
3	0	0	1	1	1	1	0	0	0	0	0
4	0	1	0	0	1	0	1	0	0	0	0
5	0	1	0	1	1	0	1	0	0	1	1
6	0	1	1	0	1	0	0	0	0	0	0
7	0	1	1	1	1	0	0	0	0	1	1
8	1	0	0	0	0	1	1	0	1	0	1
9	1	0	0	1	0	1	1	0	0	0	0
10	1	0	1	0	0	1	0	1	1	0	1
11	1	0	1	1	0	1	0	1	0	0	1
12	1	1	0	0	0	0	1	0	1	0	0
13	1	1	0	1	0	0	1	0	0	0	1
14	1	1	1	0	0	0	0	0	1	0	0
15	1	1	1	1	0	0	0	0	0	0	0
16	0	0	1	0	1	1	0	0	0	0	0

PROVAR:

- a) $\bar{A} \cdot \bar{B} \neq \overline{A \cdot B}$ ✓
- b) $\bar{A} + \bar{B} \neq \overline{A+B}$ ✓
- c) $\bar{A} \cdot \bar{B} = \overline{A+B}$ ✓
- d) $\bar{A} + \bar{B} = A \cdot B$ ✓

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

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

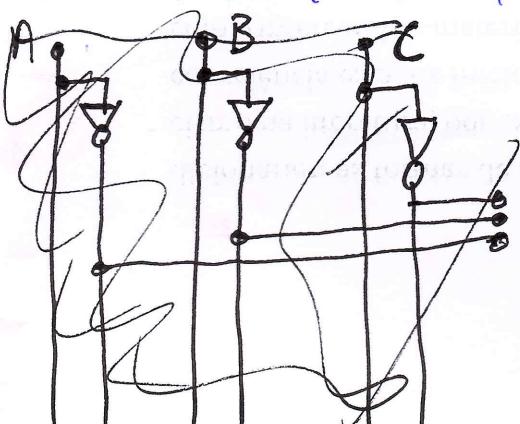
$$\bar{A} + \bar{B} = \bar{A} \cdot \bar{B}$$

EXPRESSÕES BOOLEANAS OBTIDAS DE TABELAS DA VERDADE

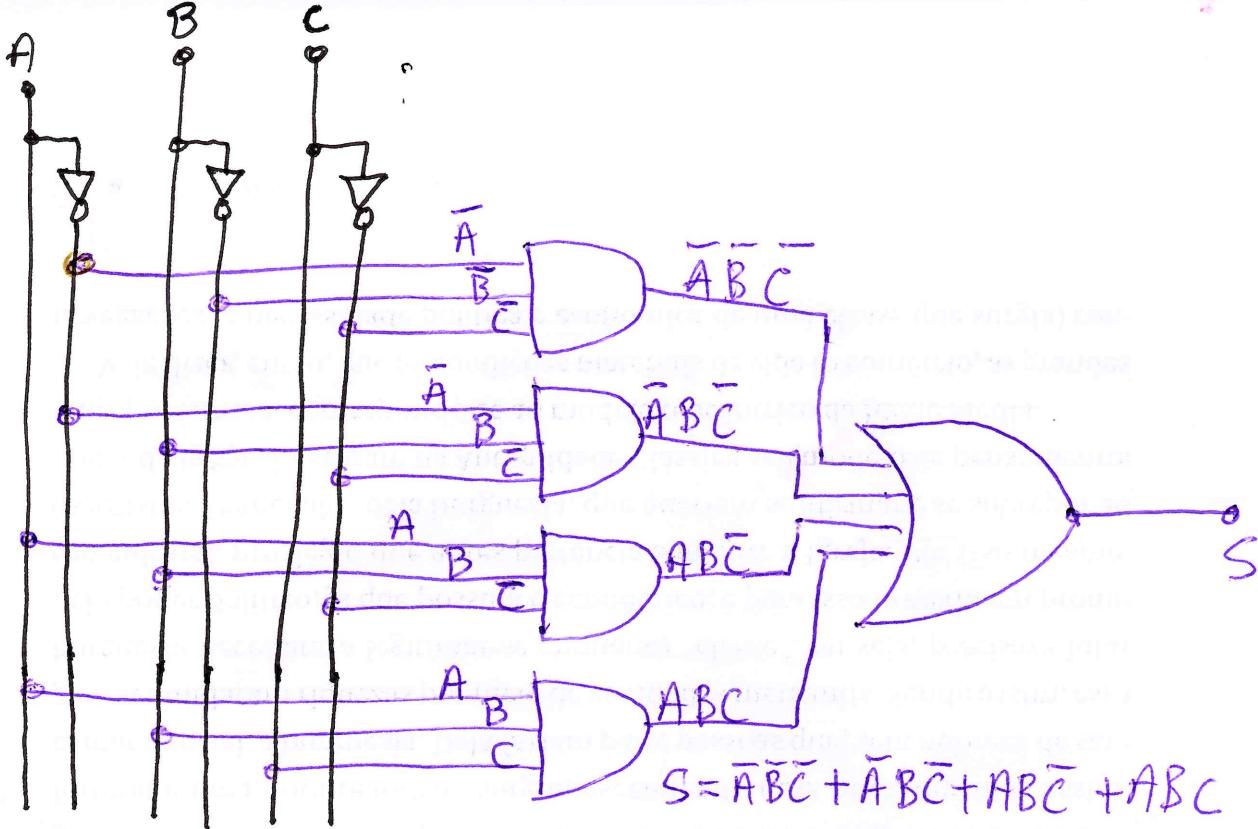
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A	B	C	S	Selecionar opções onde $S=1$
0	0	0	1	$\bar{A} \cdot \bar{B} \cdot \bar{C}$
0	0	1	0	
0	1	1	0	
1	0	0	0	
1	0	1	0	
1	1	0	1	$A \cdot B \cdot \bar{C}$
1	1	1	1	$A \cdot B \cdot C$
0	1	0	1	$\bar{A} \cdot B \cdot \bar{C}$

$$S = \bar{A} \bar{B} \bar{C} + A \bar{B} \bar{C} + A B \bar{C} + \bar{A} B \bar{C}$$



(7)



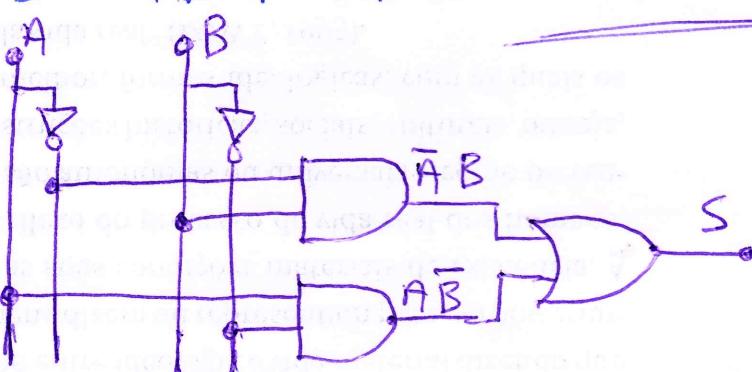
BLOCOS LÓGICOS OU EXCLUSIVOS E COINCIDÊNCIA

OU EXCLUSIVO (XOR)



A	B	S
0	0	0
0	1	1
1	0	1
1	1	0

$$S = \bar{A}B + A\bar{B} \Rightarrow S = A \oplus B$$

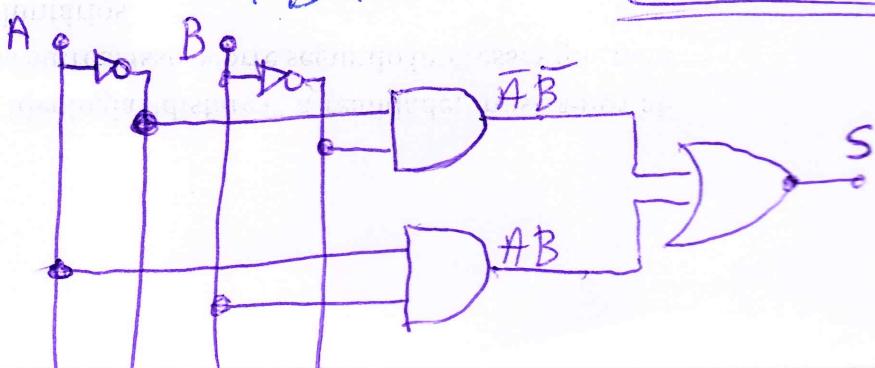


COINCIDÊNCIA (XNOR)



A	B	S
0	0	1
0	1	0
1	0	0
1	1	1

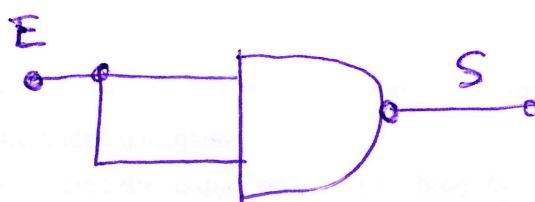
$$S = \bar{A}\bar{B} + AB \Rightarrow S = A \odot B$$



INVERSOR A PARTIR DE UMA PORTA NE

(8)

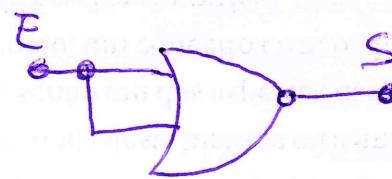
A	B	$A \cdot B$	$\bar{A} \cdot B$
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0



E	S
0	1
1	0

INVERSOR A PARTIR DE UMA PORTA NOU

A	B	$A+B$	$\bar{A}+B$
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0



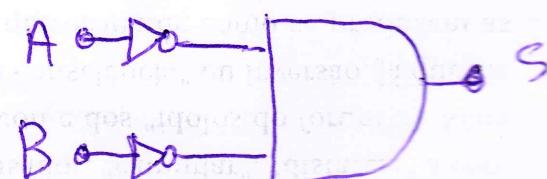
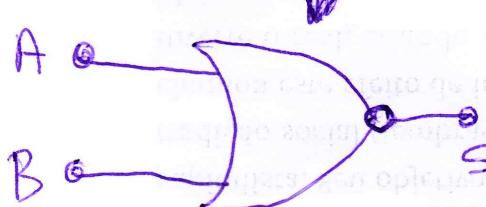
E	S
0	1
1	0

PORTRAS NOU E OU A PARTIR DE E, NE E INVERSORES

A	B	$A+B$	$\bar{A}+B$
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

$A \cdot B$	$\bar{A} \cdot B$	\bar{B}	$\bar{A} \cdot \bar{B}$
0	1	1	1
0	1	0	0
0	0	1	0
1	0	0	0

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

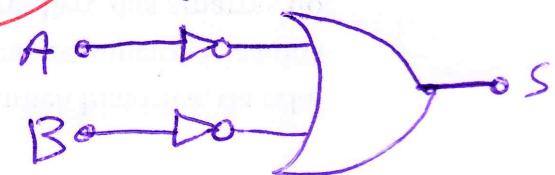
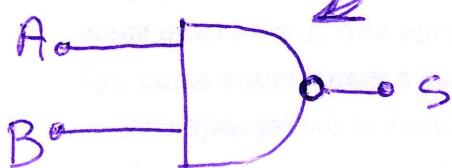


PORTRAS NE E E A PARTIR DE OU, NOV e INVERSORES

9

A	B	$A \cdot B$	$\bar{A} \cdot \bar{B}$
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

$A + B$	\bar{A}	\bar{B}	$\bar{A} + \bar{B}$
0	1	1	1
1	1	0	1
1	0	1	1
1	0	0	0



EQUIVALENCIAS
