

Raciocínio Computacional

CENTRO UNIVERSITÁRIO UNIDOMBOSCO

UniDBSCO

GRUPO **SEB**



Circuitos Lógicos

Objetivos

- ✎ Embasar os princípios da lógica matemática.
- ✎ Dialogar sobre Circuitos lógicos.
- ✎ Identificar por meio dos circuitos a correspondência em tabelas verdade.

Conteúdos

- ✎ Lógica matemática circuitos lógicos.
- ✎ Definições da lógica matemática
- ✎ Domínio básico sobre a lógica matemática

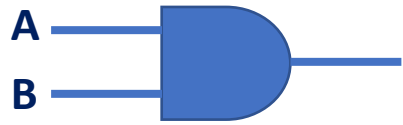
Prof. Osmar Betazzi Dordal

CENTRO UNIVERSITÁRIO UNIDOMBOSCO

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GRUPO **SEB**

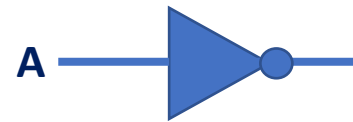
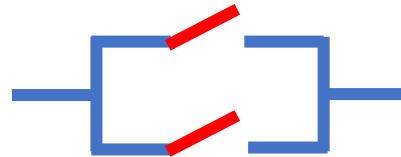
Portas Lógicas



And



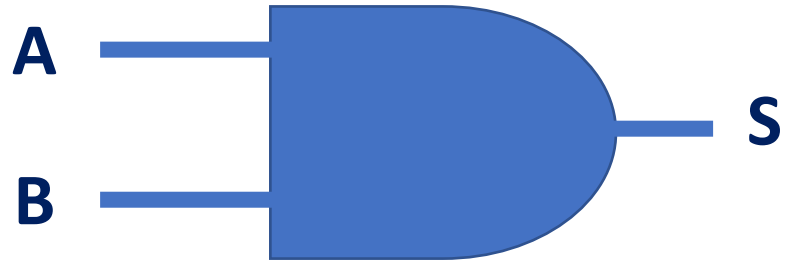
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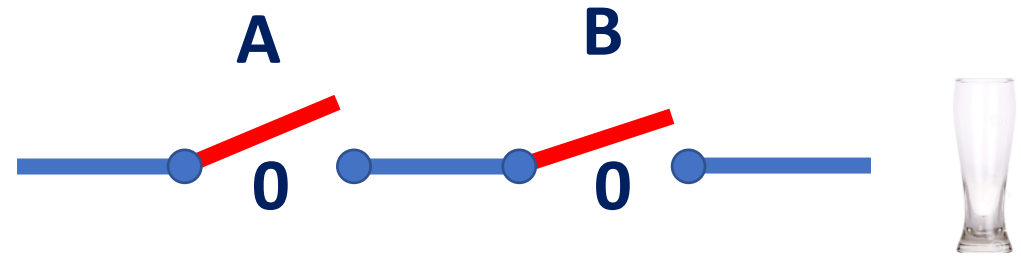
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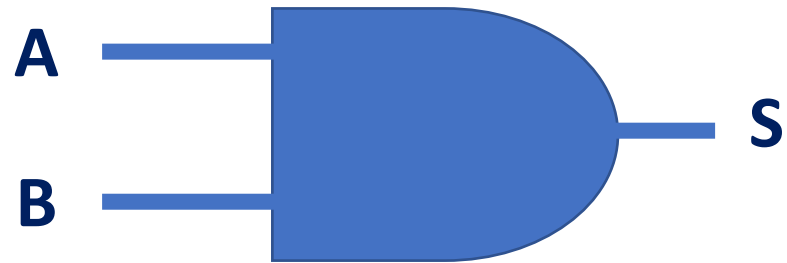
Portas Lógicas



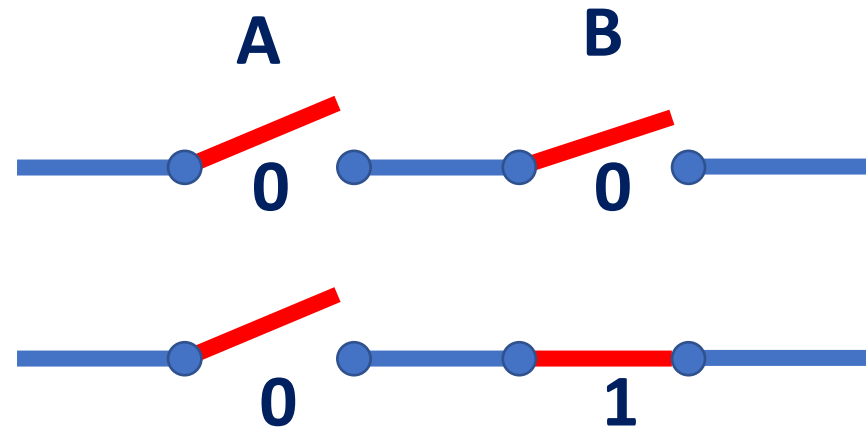
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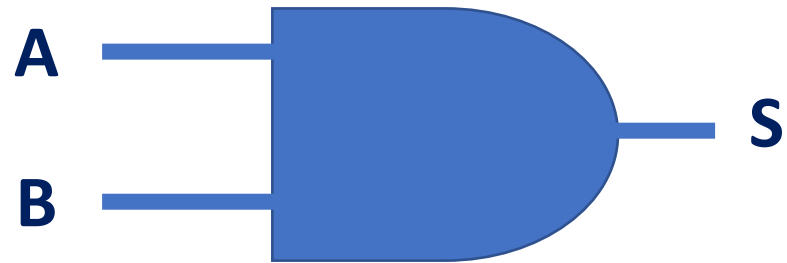
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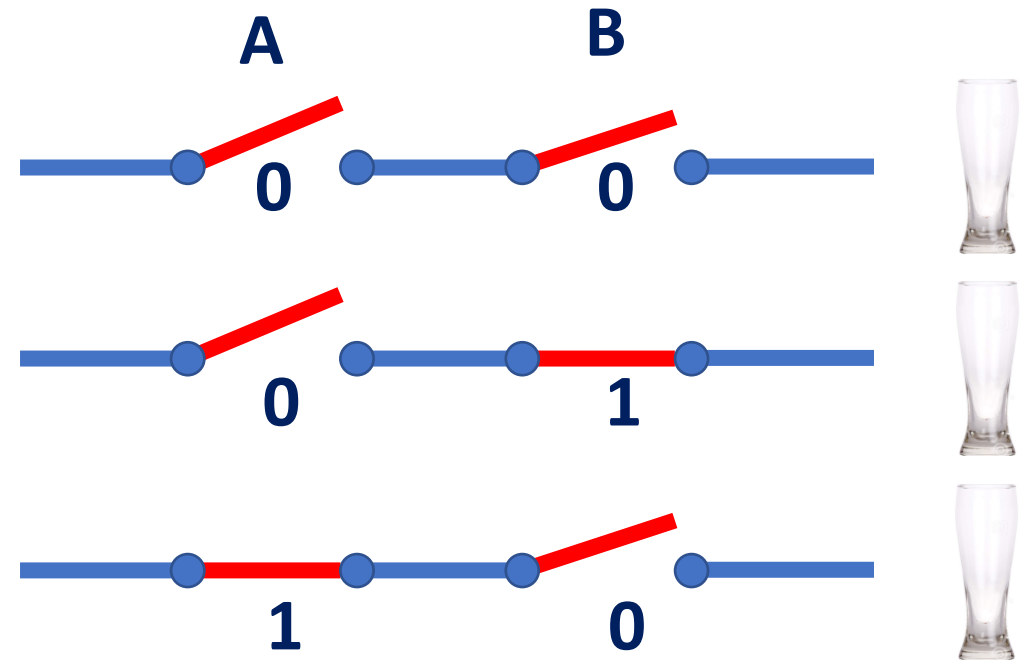
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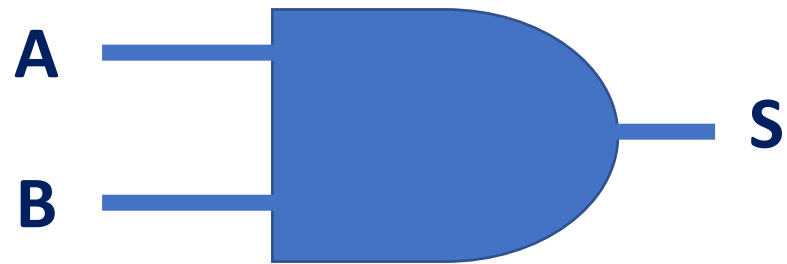
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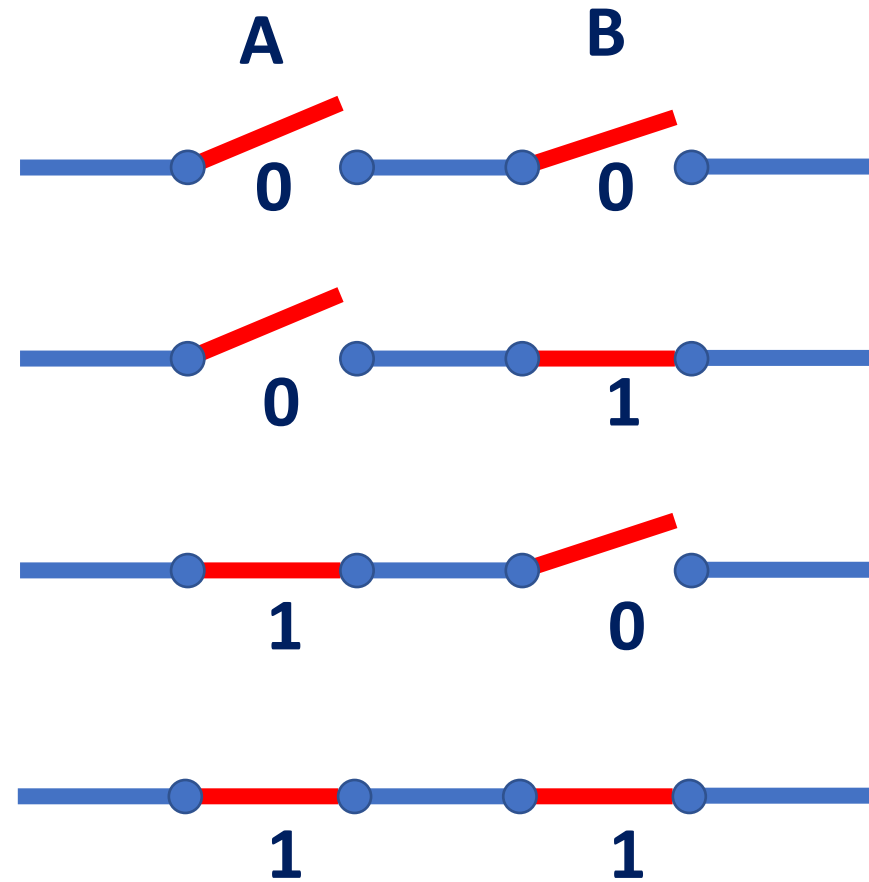
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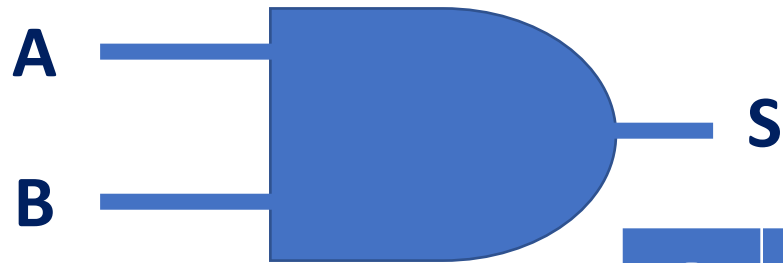
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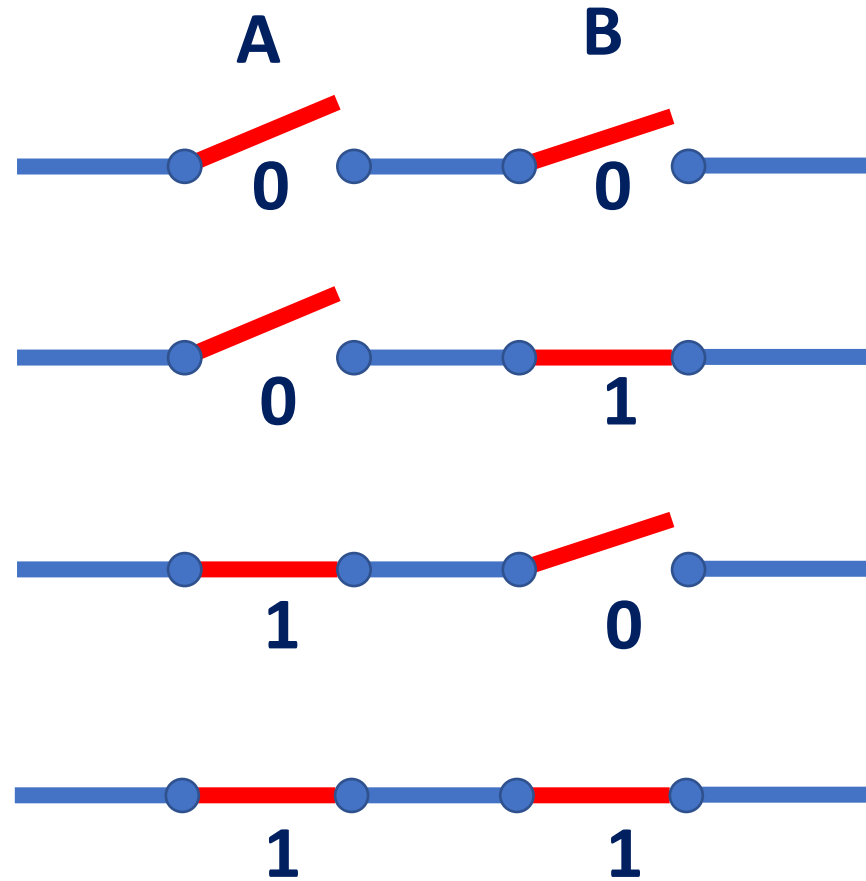


Portas Lógicas

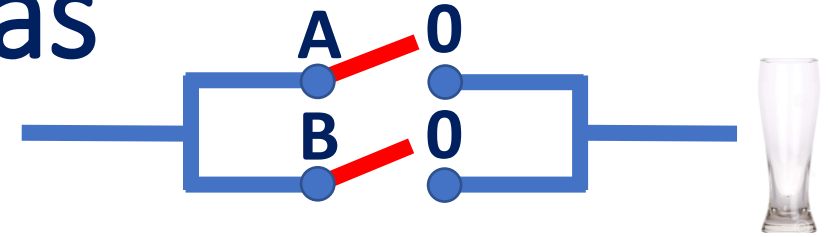
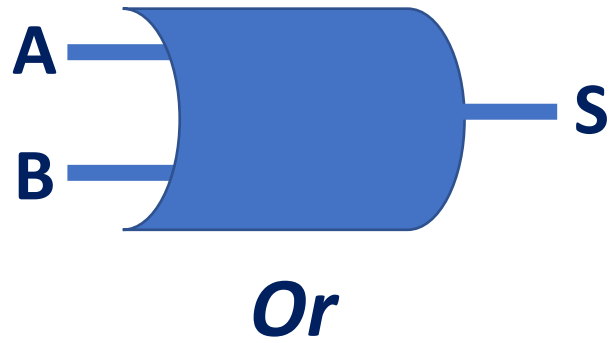


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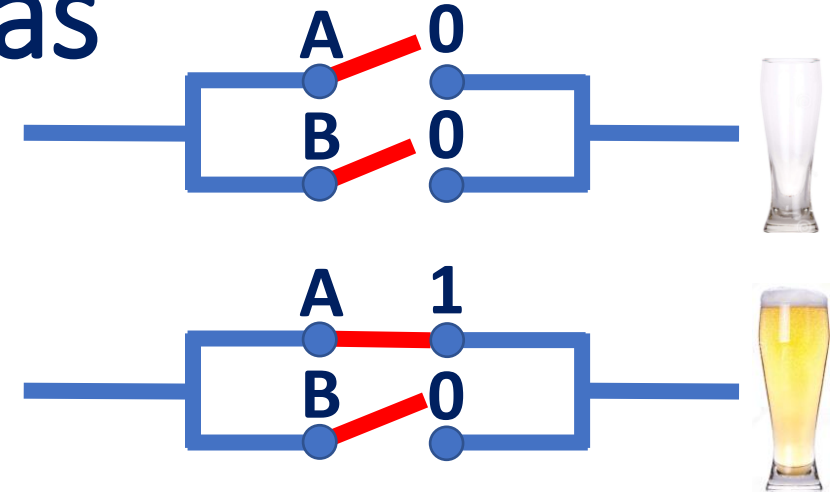
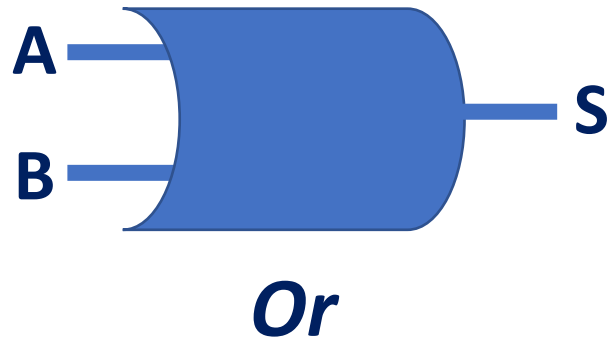
A	B	S
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0	1	0
1	0	0
1	1	1



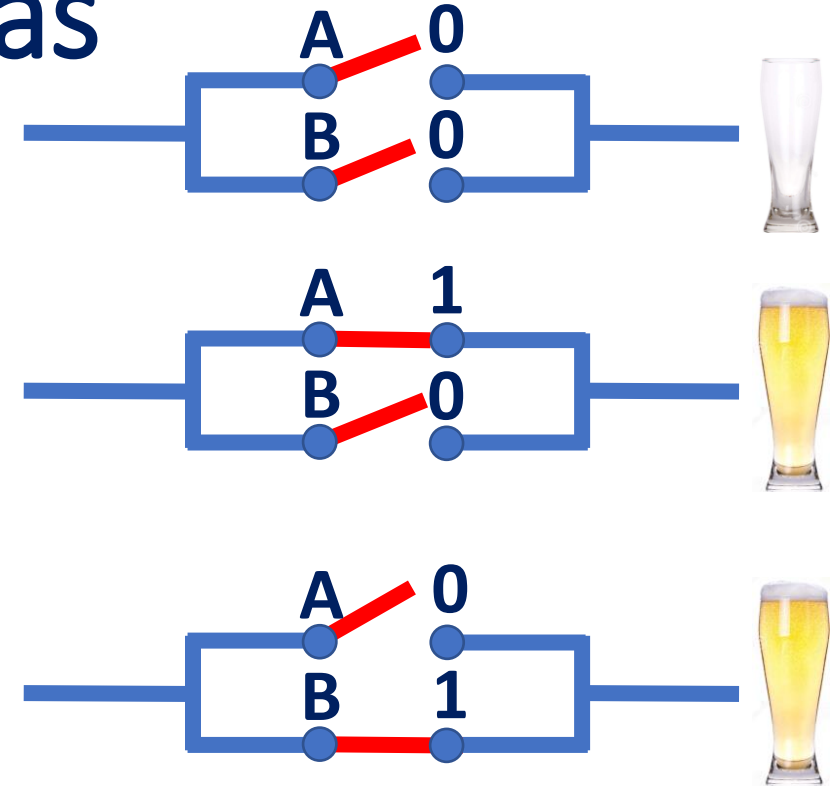
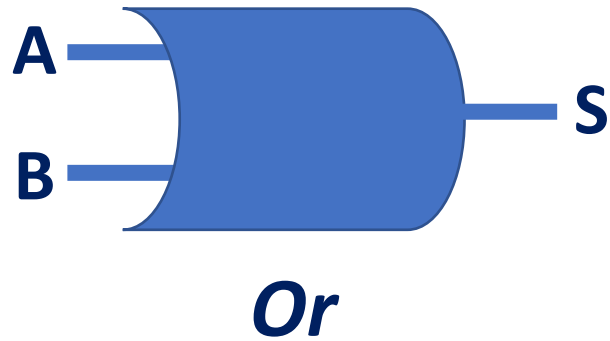
Portas Lógicas



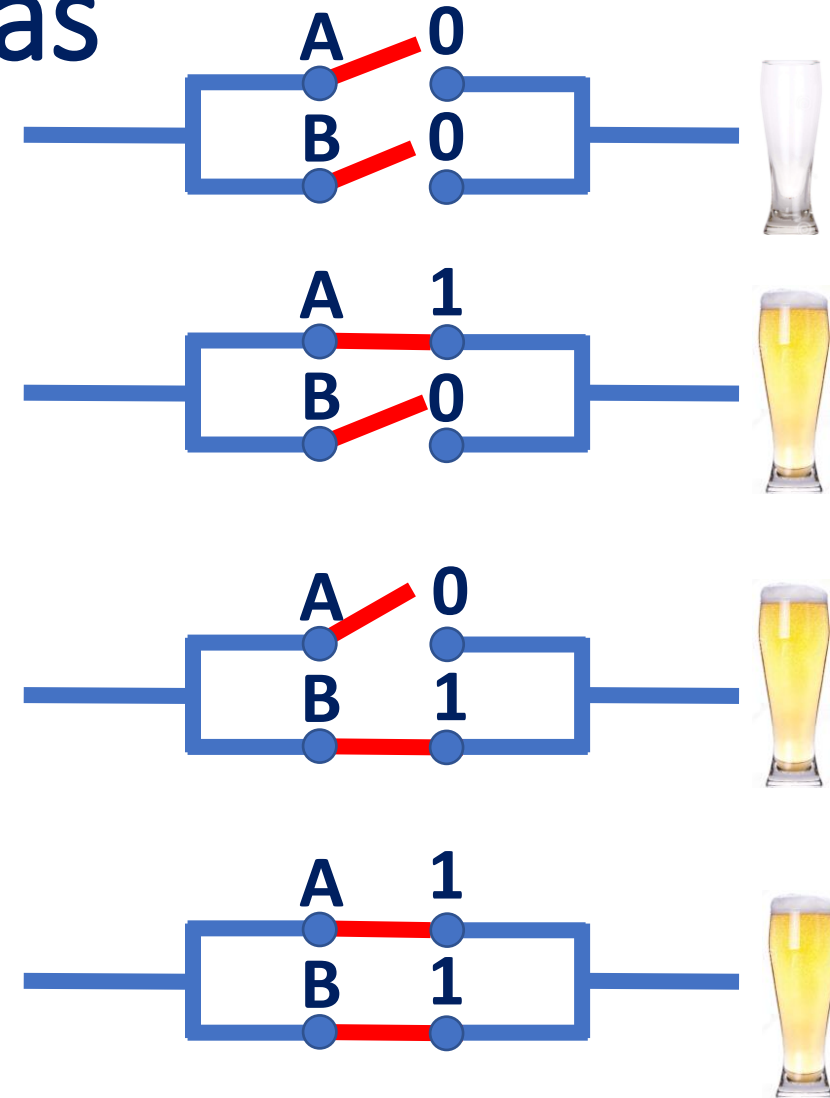
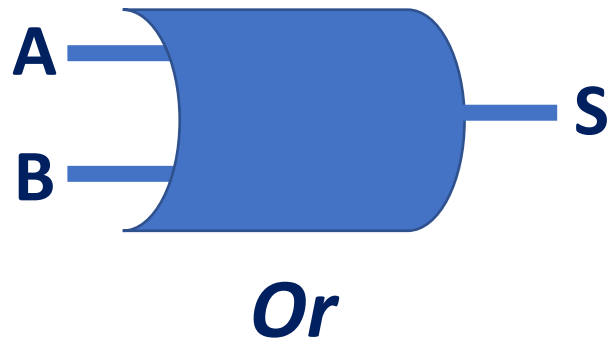
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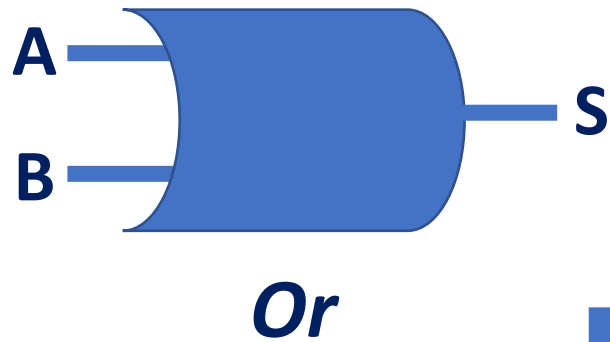
Portas Lógicas



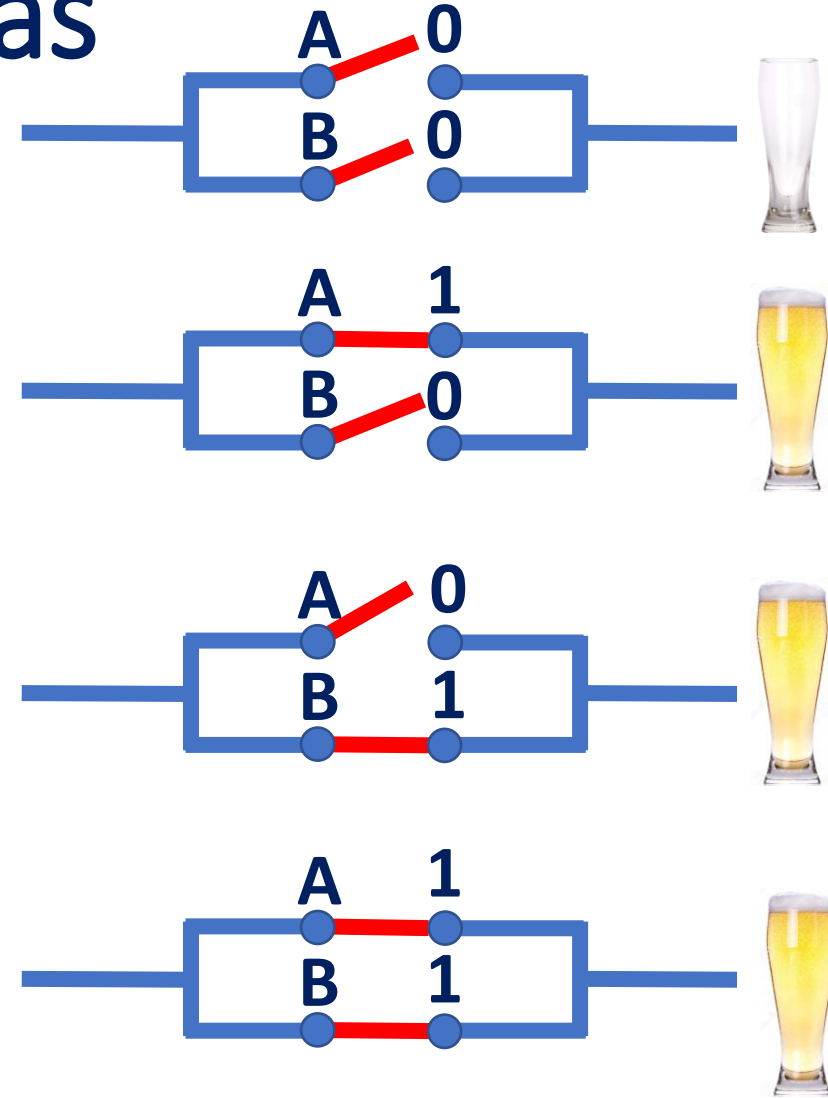
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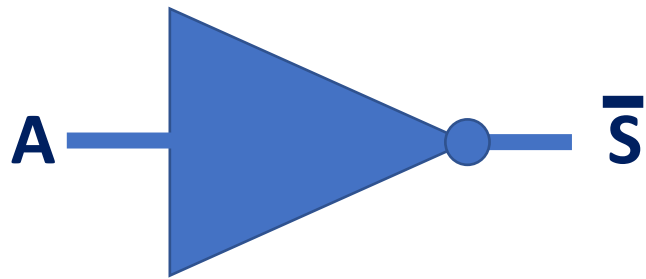
Portas Lógicas



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

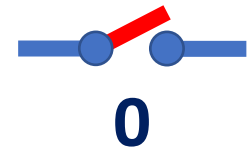
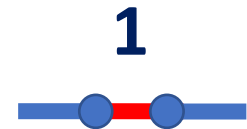


Portas Lógicas

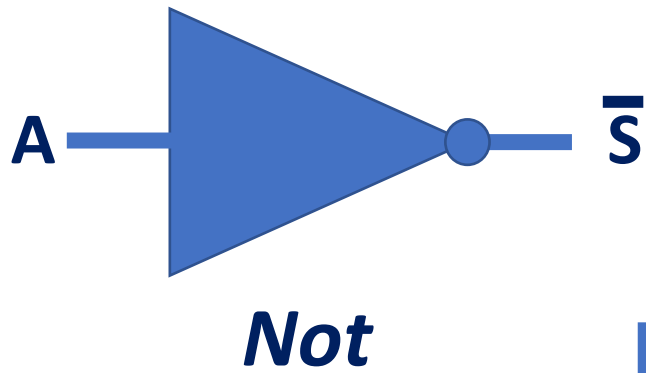


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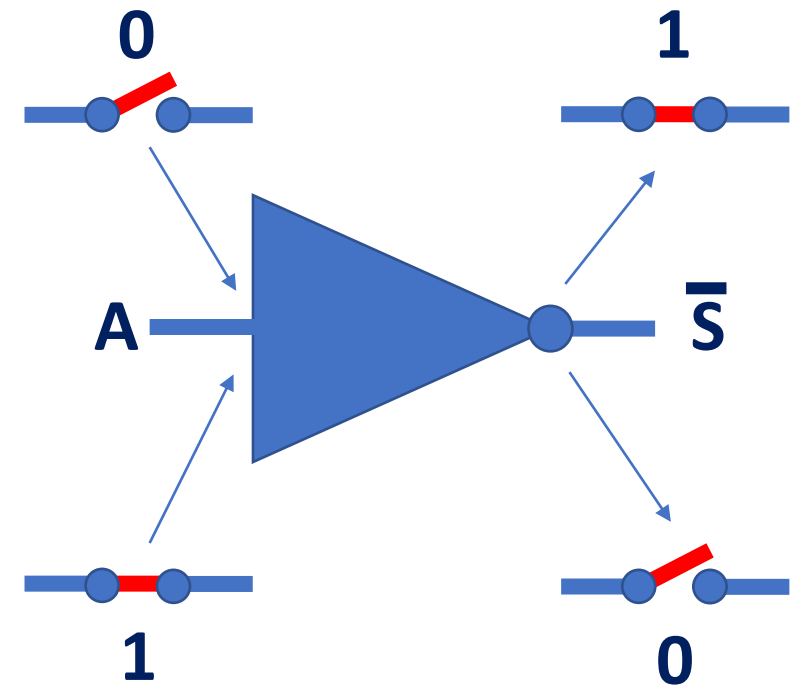
A	S	\bar{S}
0	0	1
1	1	0



Portas Lógicas

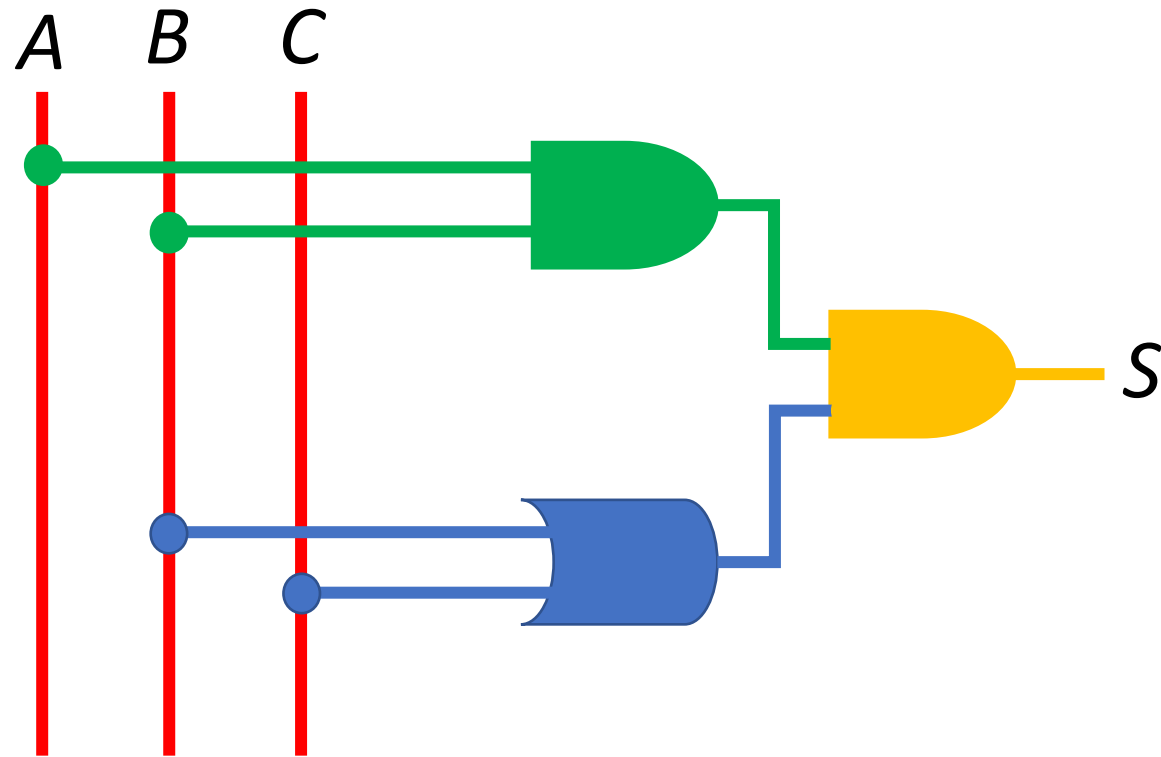


A	S	\bar{S}
0	0	1
1	1	0



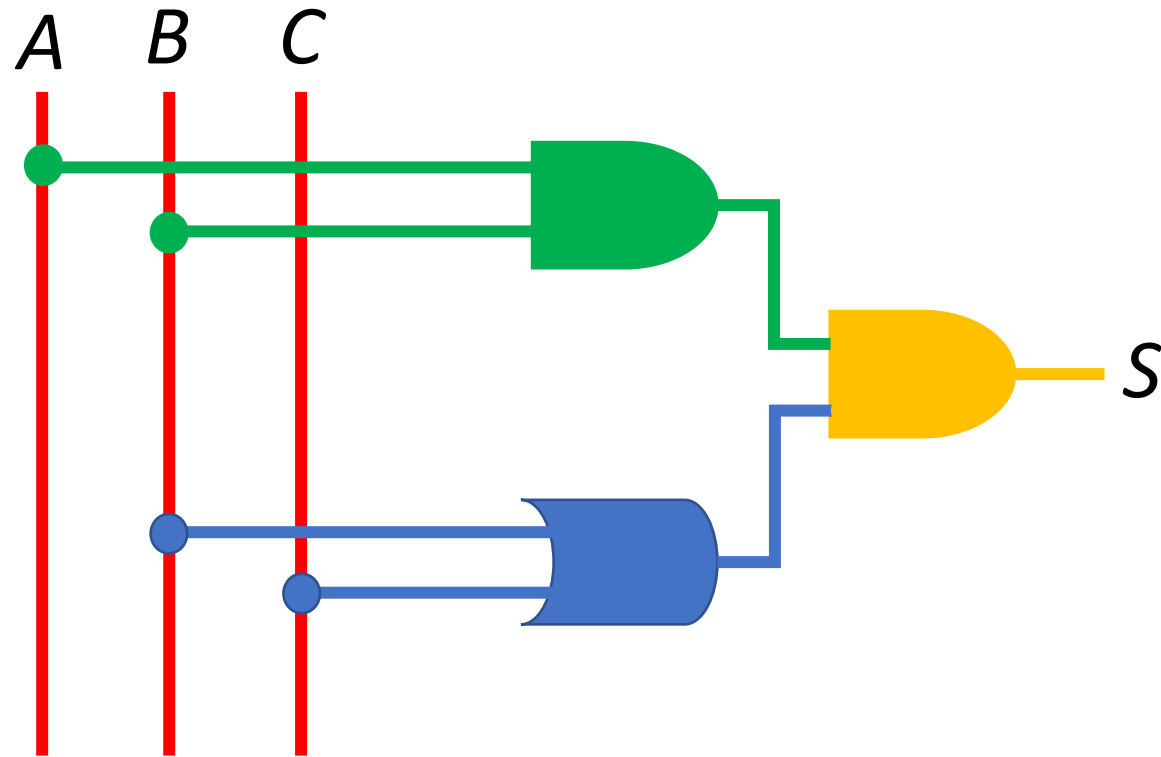
Expressões Booleanas

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



Expressões Booleanas

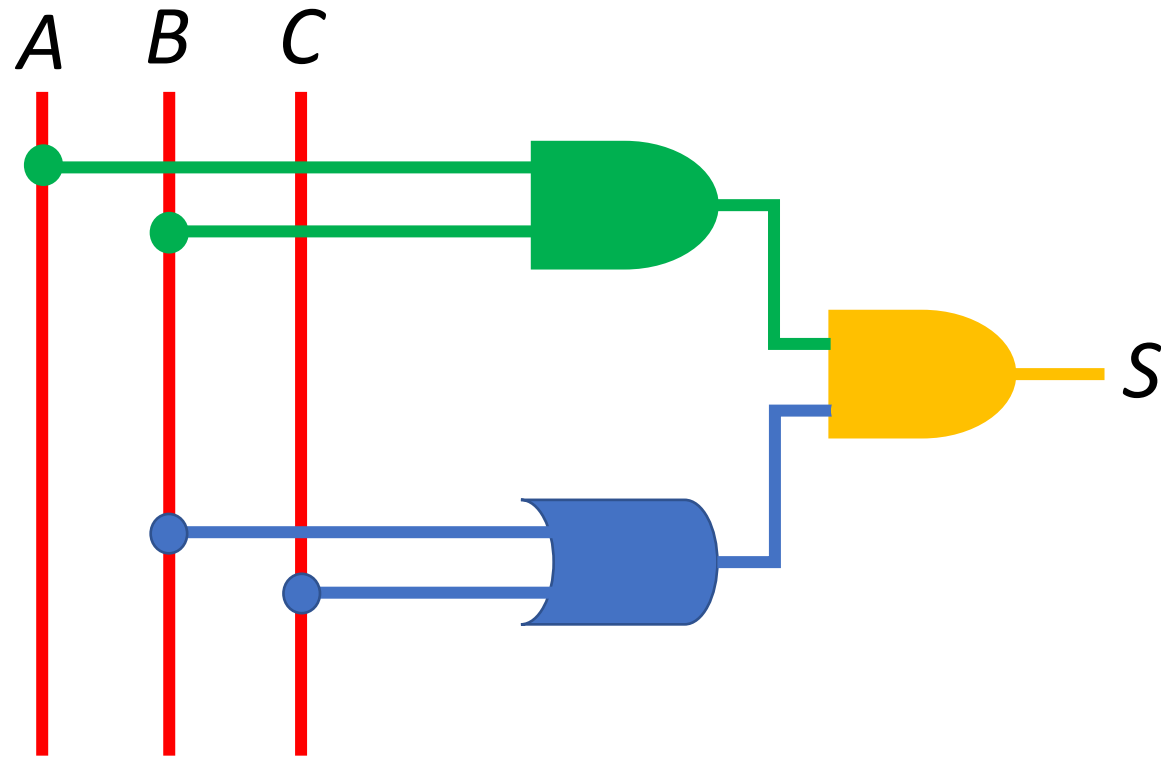
$$S = (A \cdot B) \cdot (B + C)$$



A	B	C
0	0	0
0	0	1
0	1	0
0	1	1
1	0	0
1	0	1
1	1	0
1	1	1

Expressões Booleanas

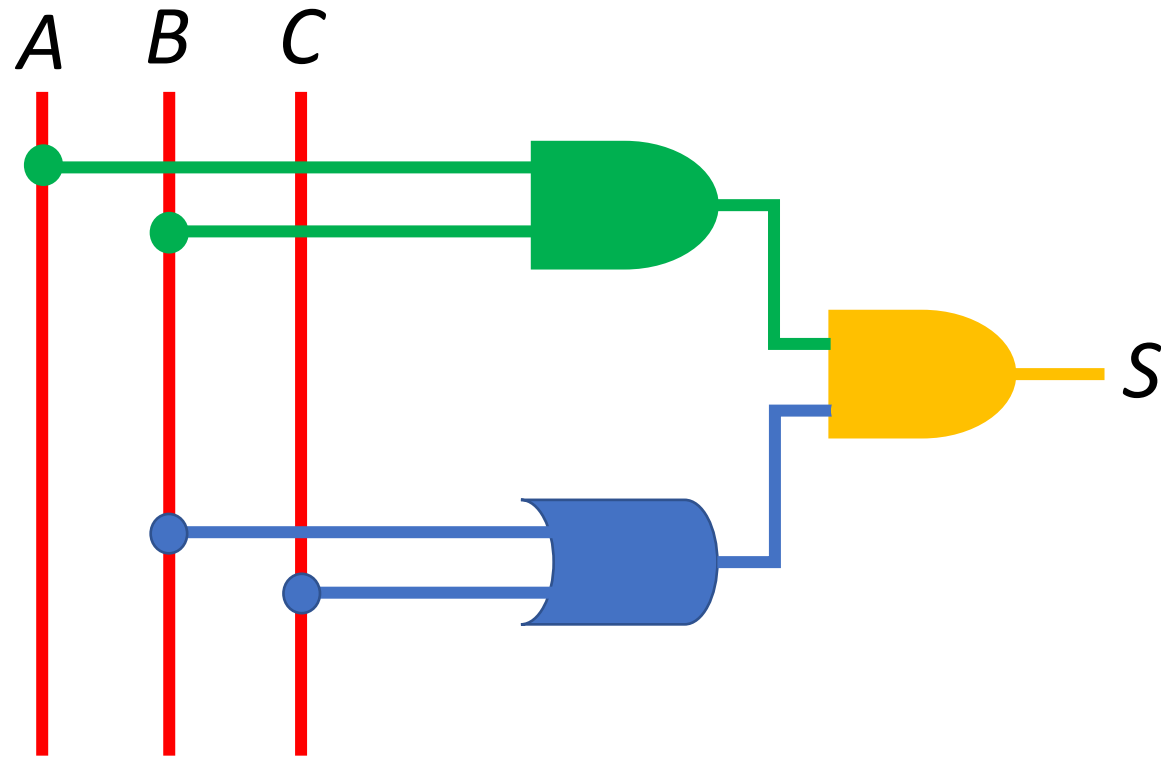
$$S = (A \cdot B) \cdot (B + C)$$



A	B	C	(A.B)
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

Expressões Booleanas

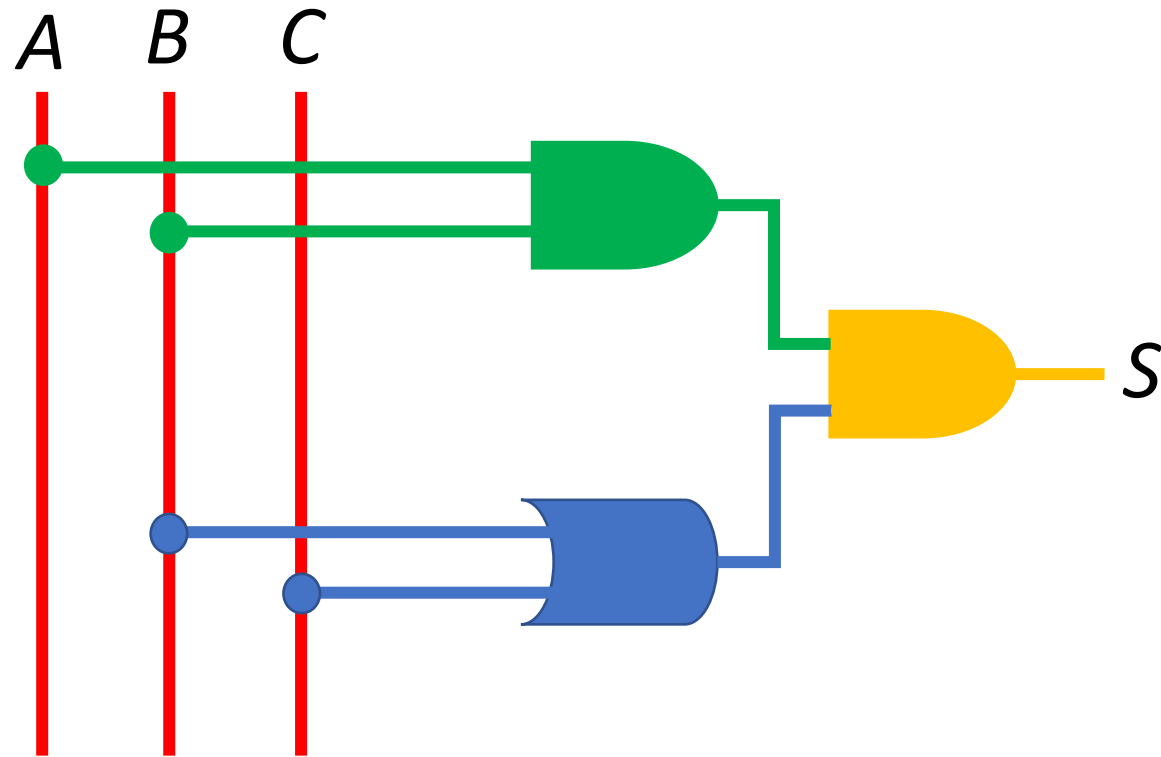
$$S = (A \cdot B) \cdot (B + C)$$



A	B	C	(A.B)
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Expressões Booleanas

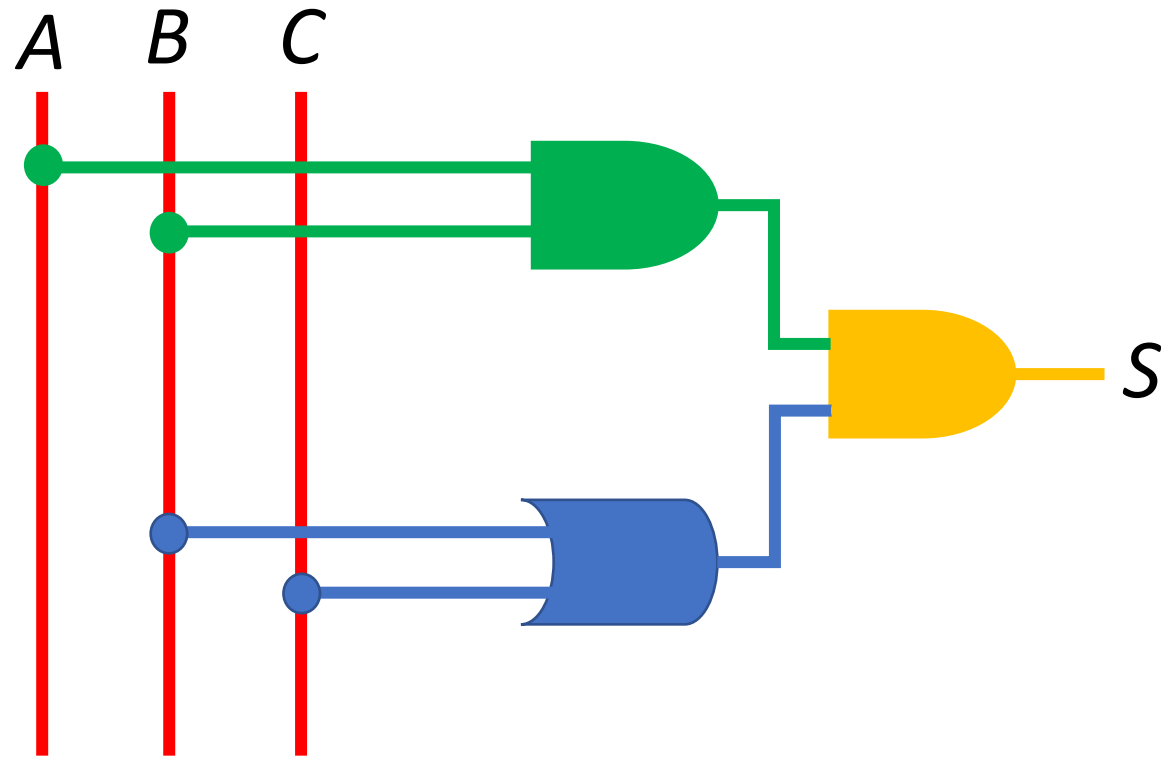
$$S = (A \cdot B) \cdot (B + C)$$



A	B	C	(A.B)	(B+C)
0	0	0	0	
0	0	1	0	
0	1	0	0	
0	1	1	0	
1	0	0	0	
1	0	1	0	
1	1	0	1	
1	1	1	1	

Expressões Booleanas

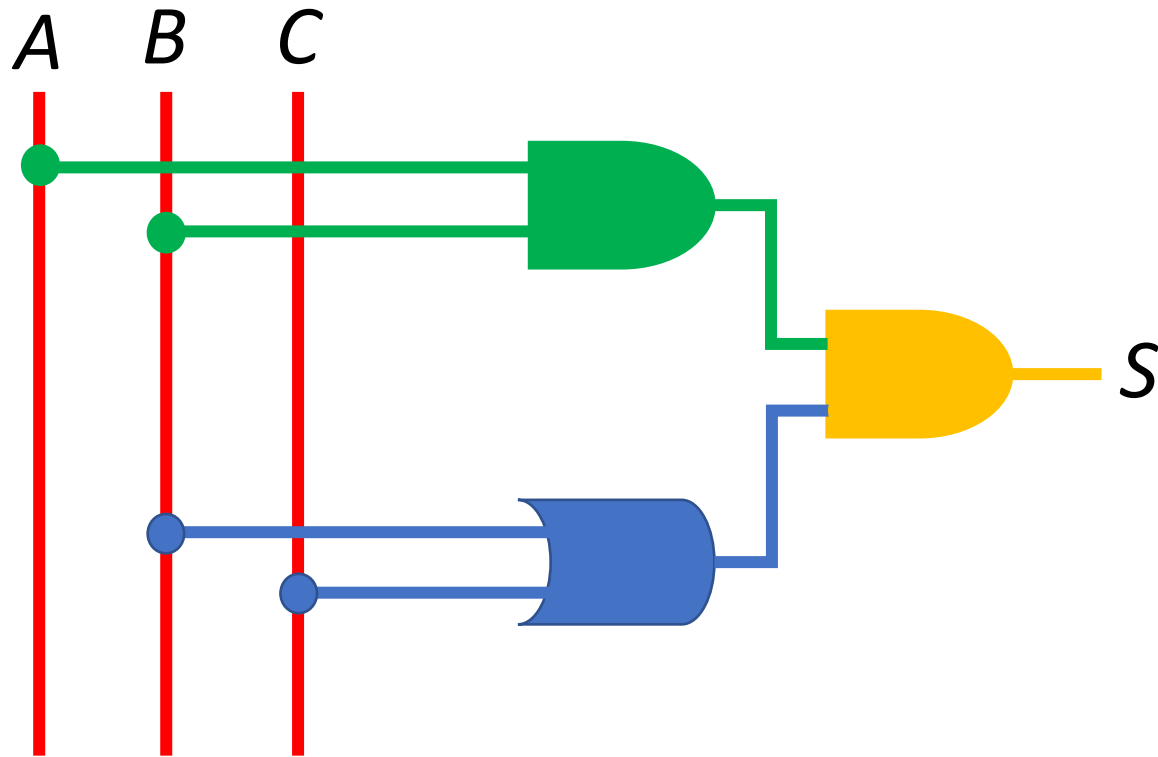
$$S = (A \cdot B) \cdot (B + C)$$



A	B	C	(A.B)	(B+C)
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	0	1
1	0	0	0	0
1	0	1	0	1
1	1	0	1	1
1	1	1	1	1

Expressões Booleanas

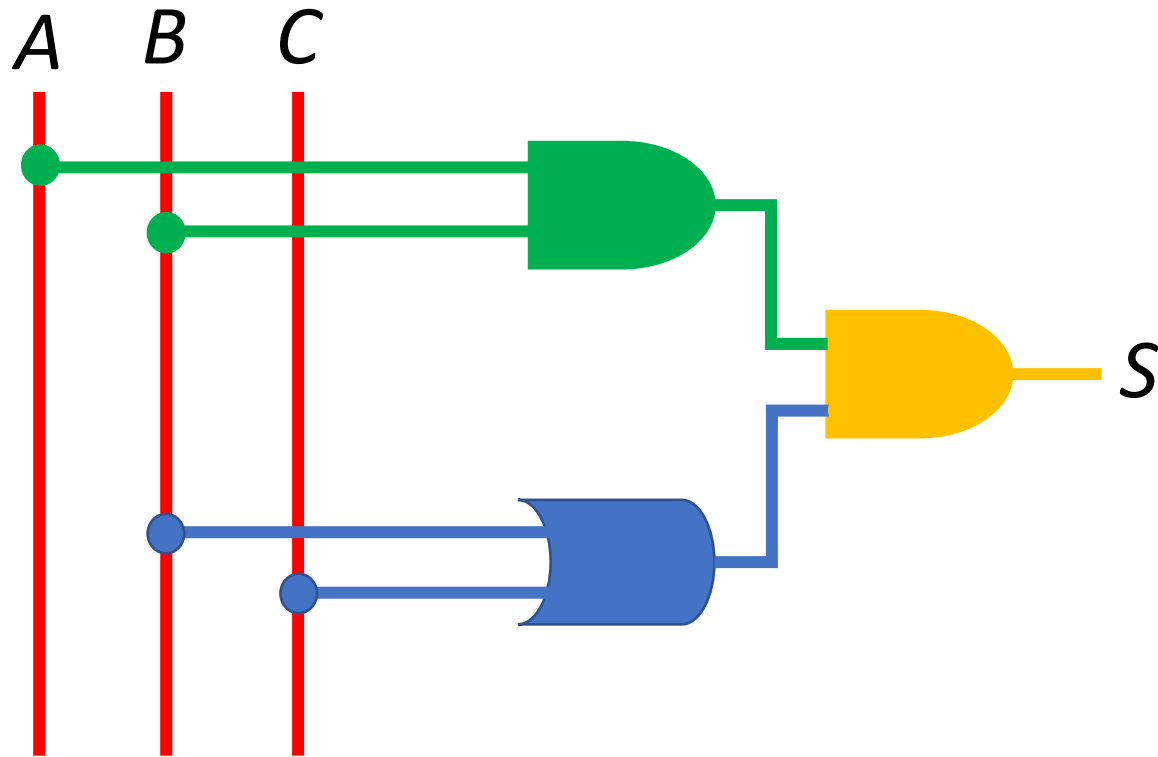
$$S = (A \cdot B) \cdot (B + C)$$



(A.B)	(B+C)	(A.B).(B+C)
0	0	
0	1	
0	1	
0	1	
0	0	
0	1	
1	1	
1	1	

Expressões Booleanas

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



(A.B)	(B+C)	(A.B).(B+C)
0	0	0
0	1	0
0	1	0
0	1	0
0	0	0
0	1	0
1	1	1
1	1	1

Expressões Booleanas – Exercício

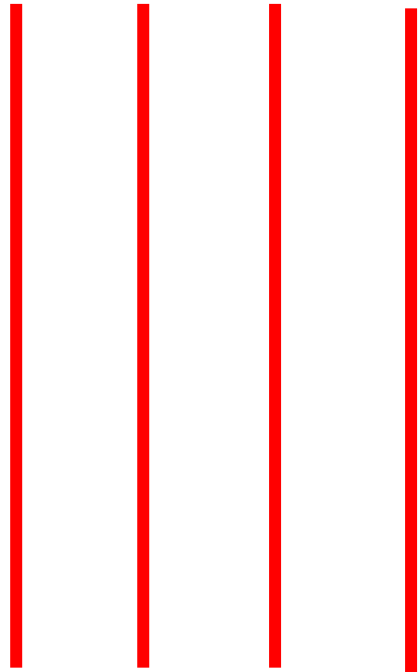
- Crie o circuito lógico e a tabela verdade da expressão abaixo:

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

Expressões Booleanas

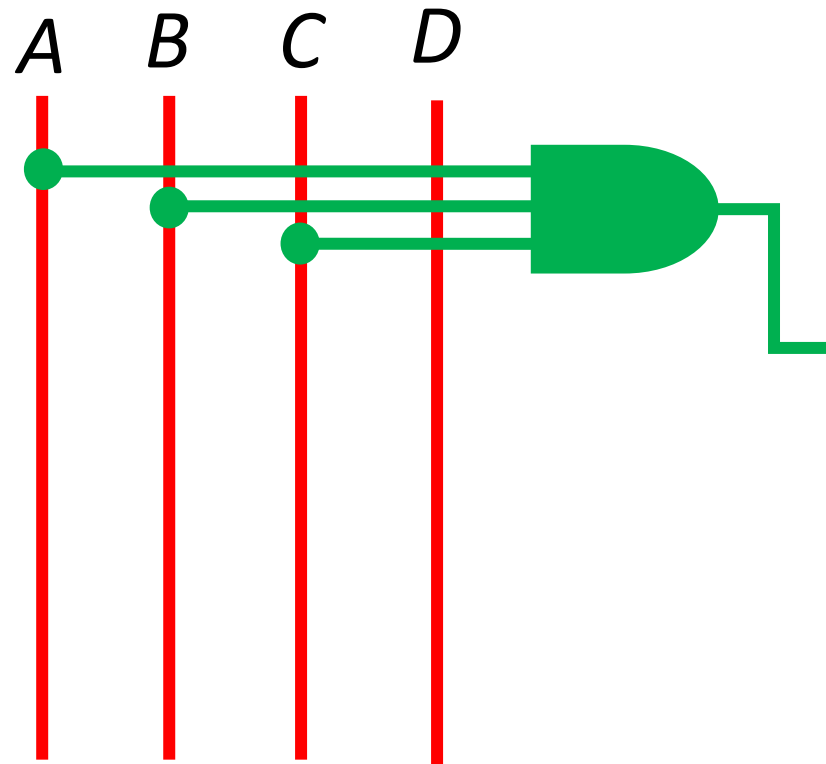
$$S = (A \cdot B \cdot C) + [(\overline{C + D}) + \bar{A}]$$

A *B* *C* *D*



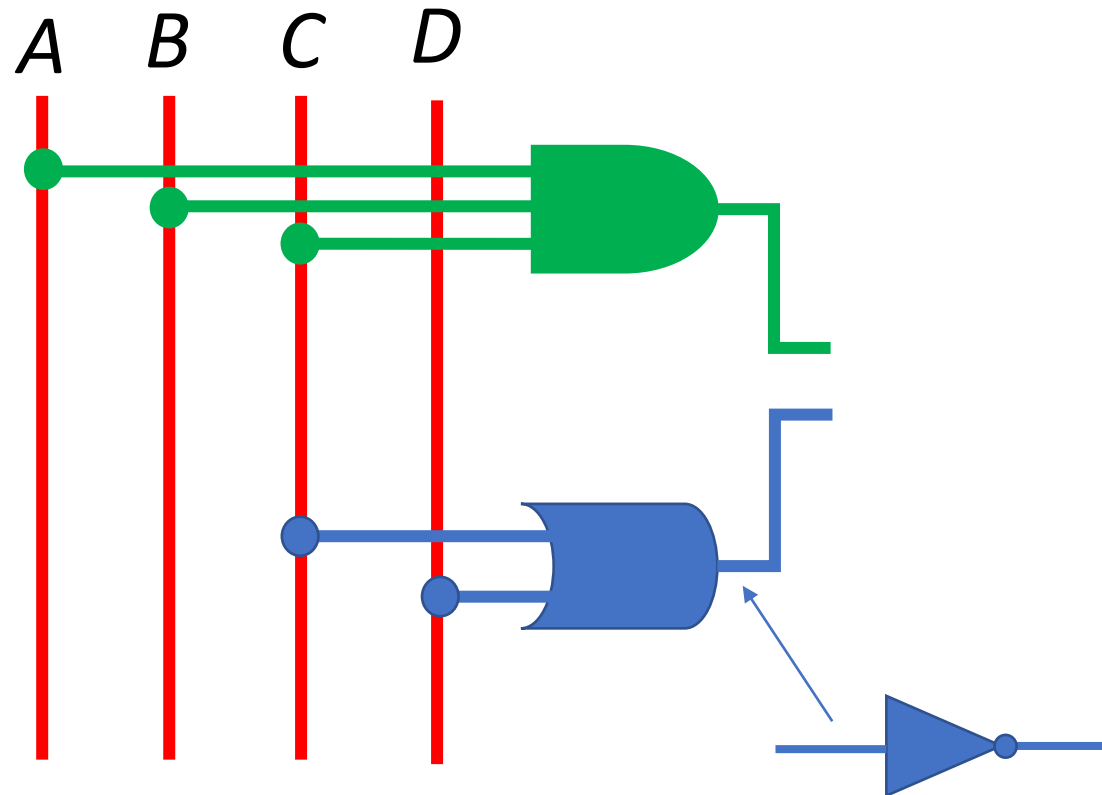
Expressões Booleanas

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



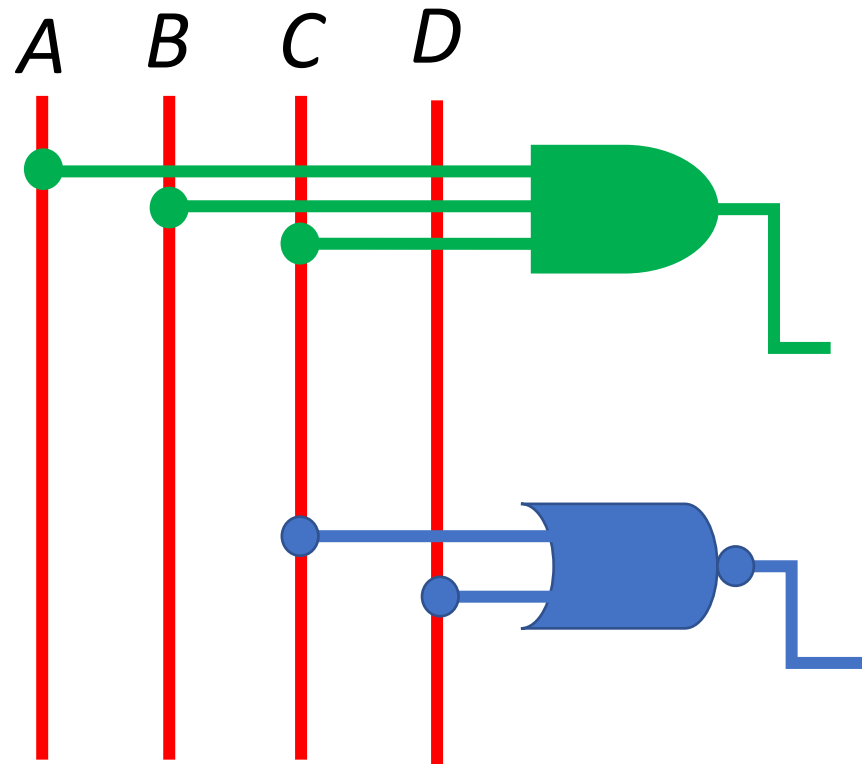
Expressões Booleanas

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



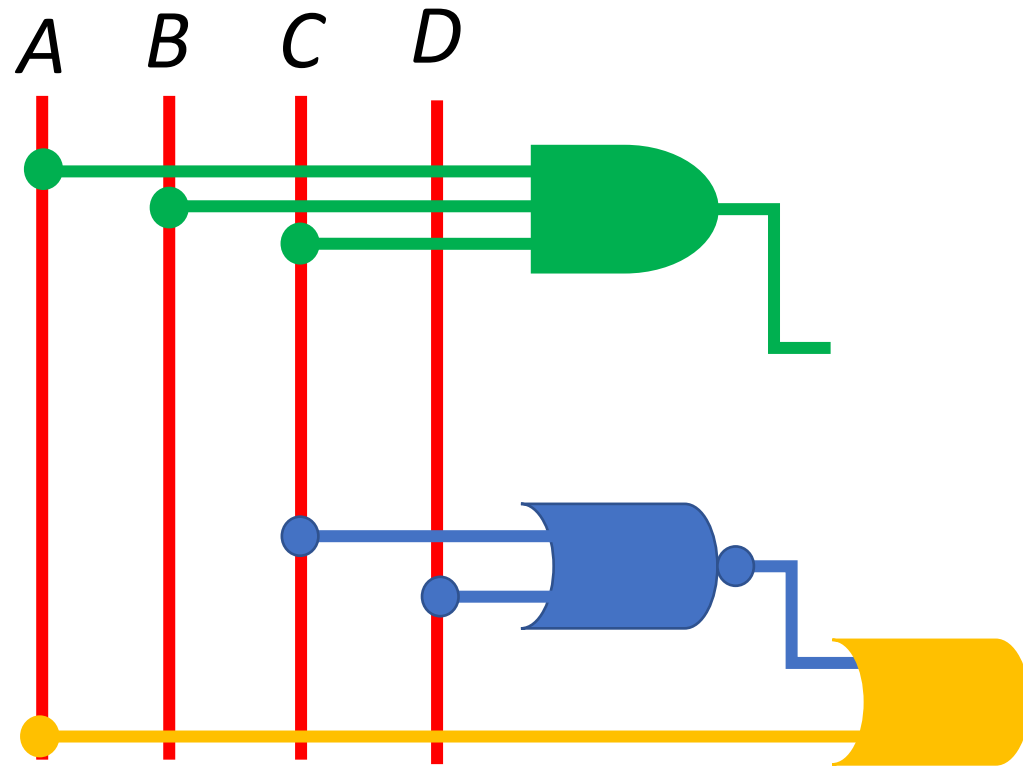
Expressões Booleanas

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



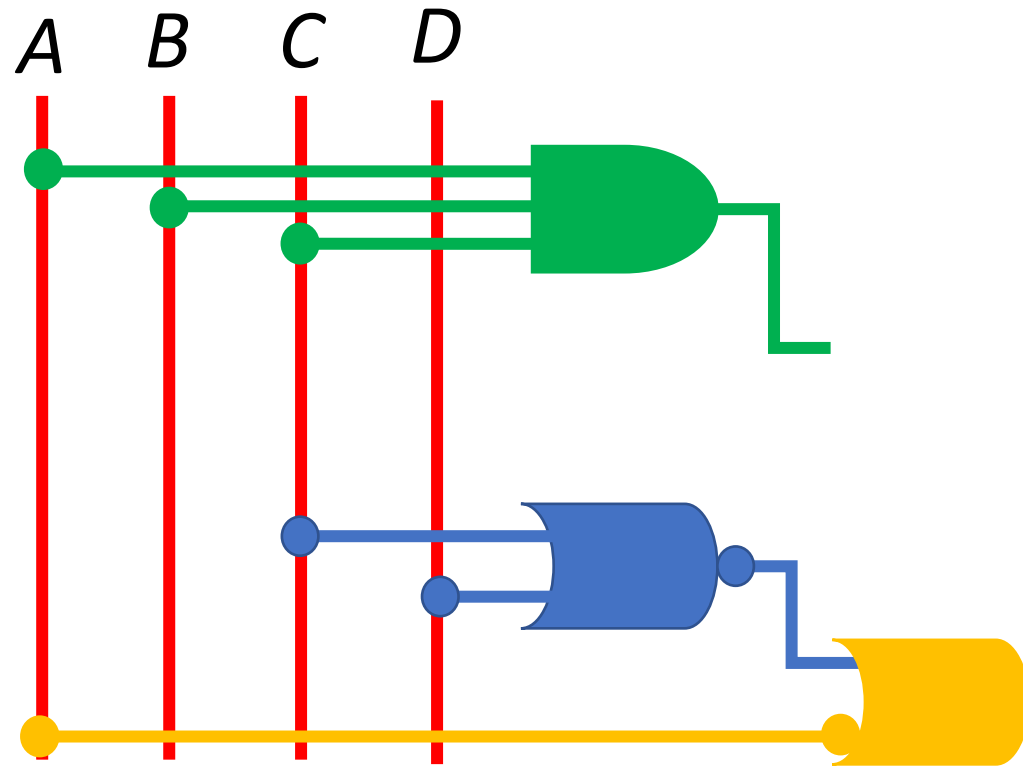
Expressões Booleanas

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



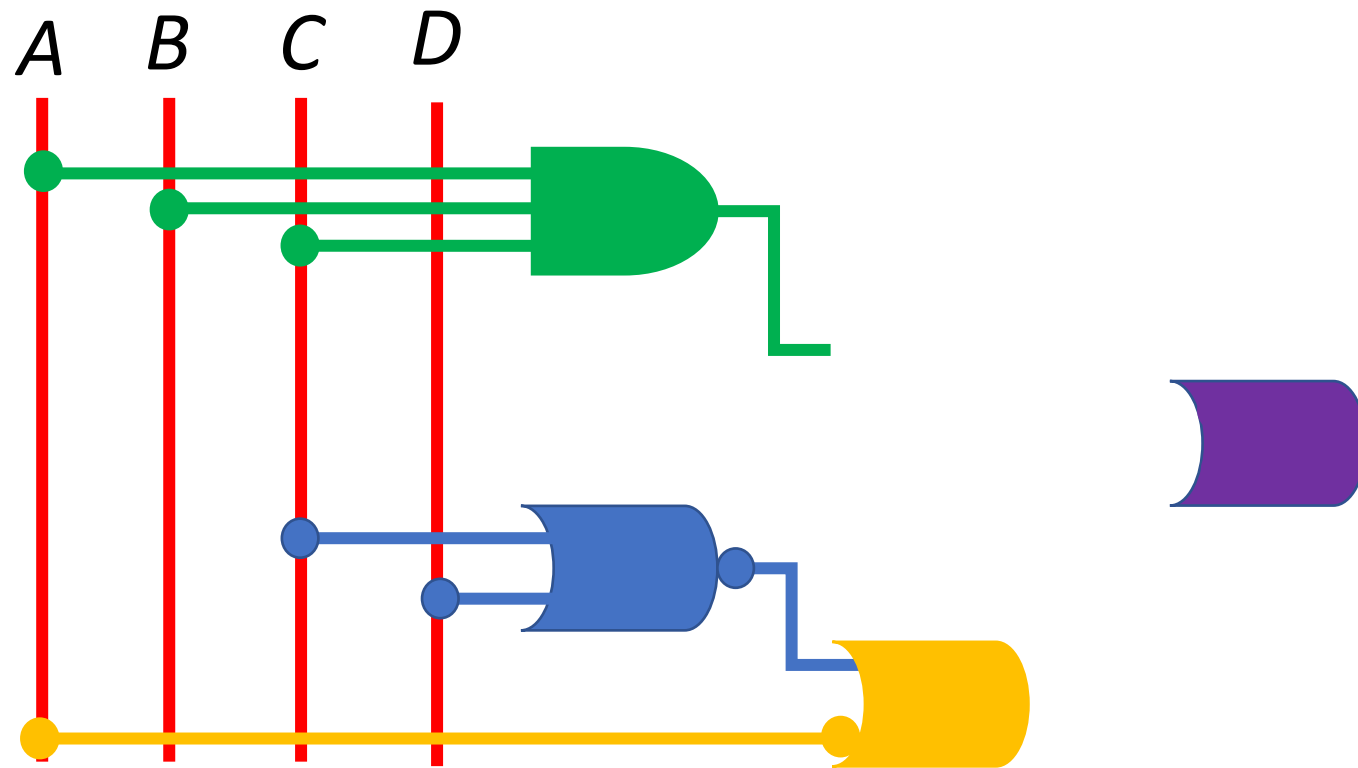
Expressões Booleanas

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



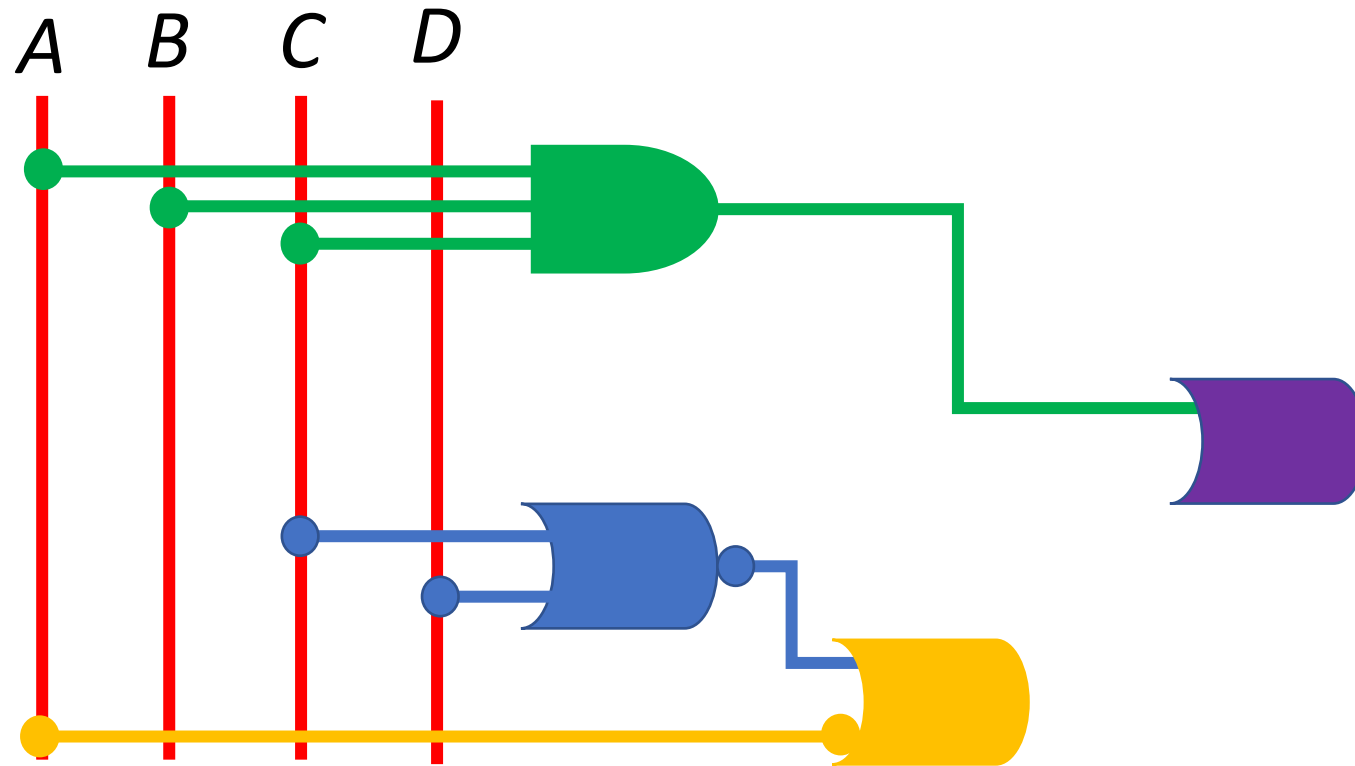
Expressões Booleanas

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



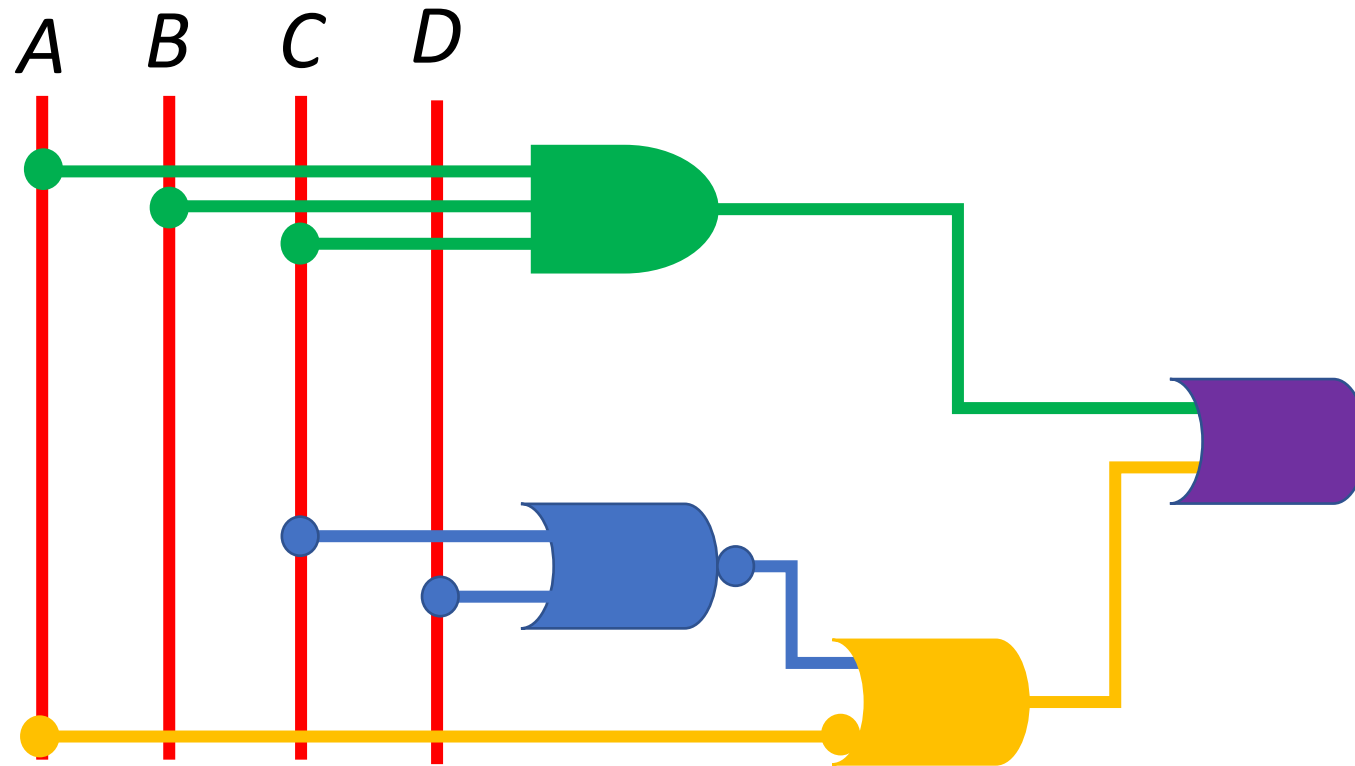
Expressões Booleanas

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



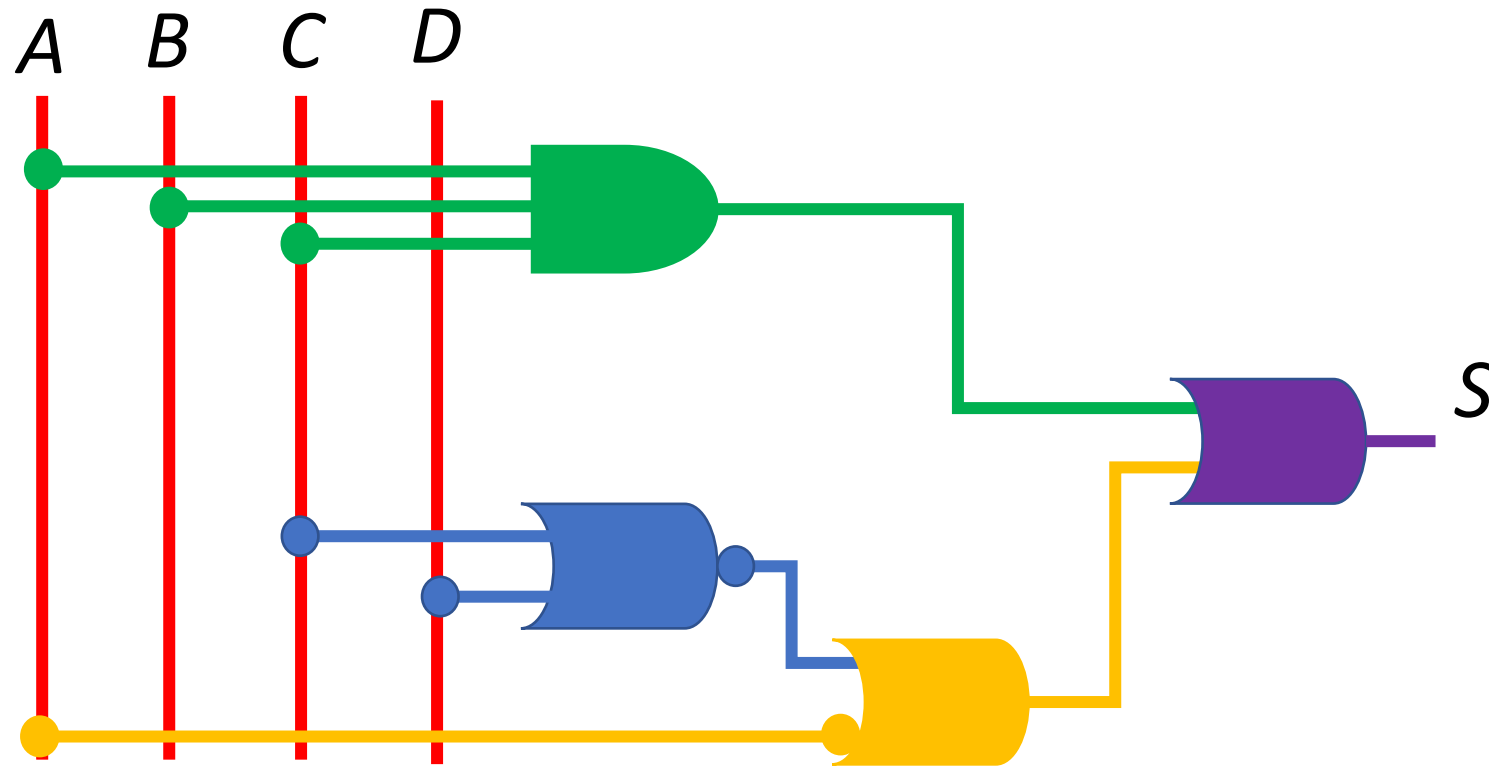
Expressões Booleanas

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



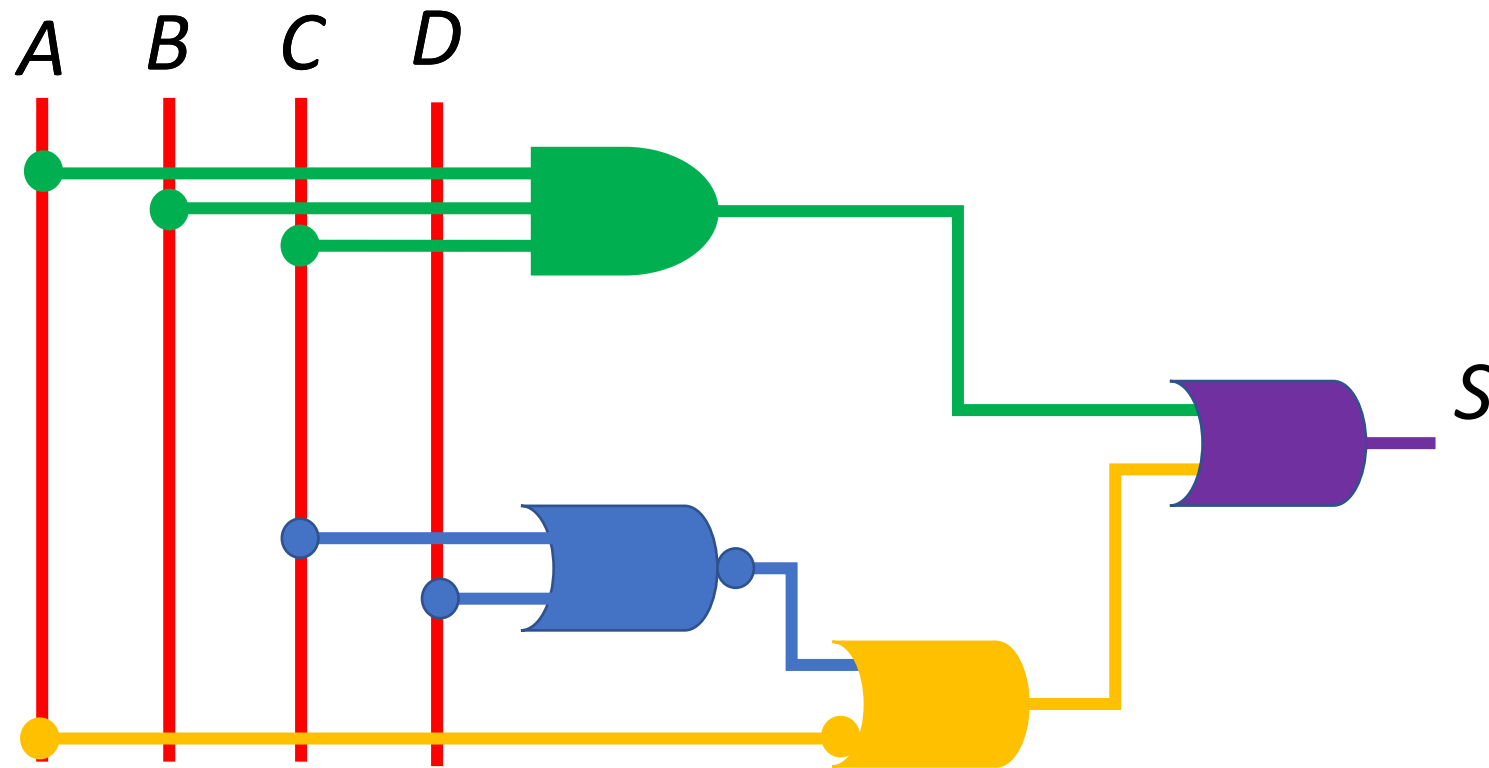
Expressões Booleanas

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



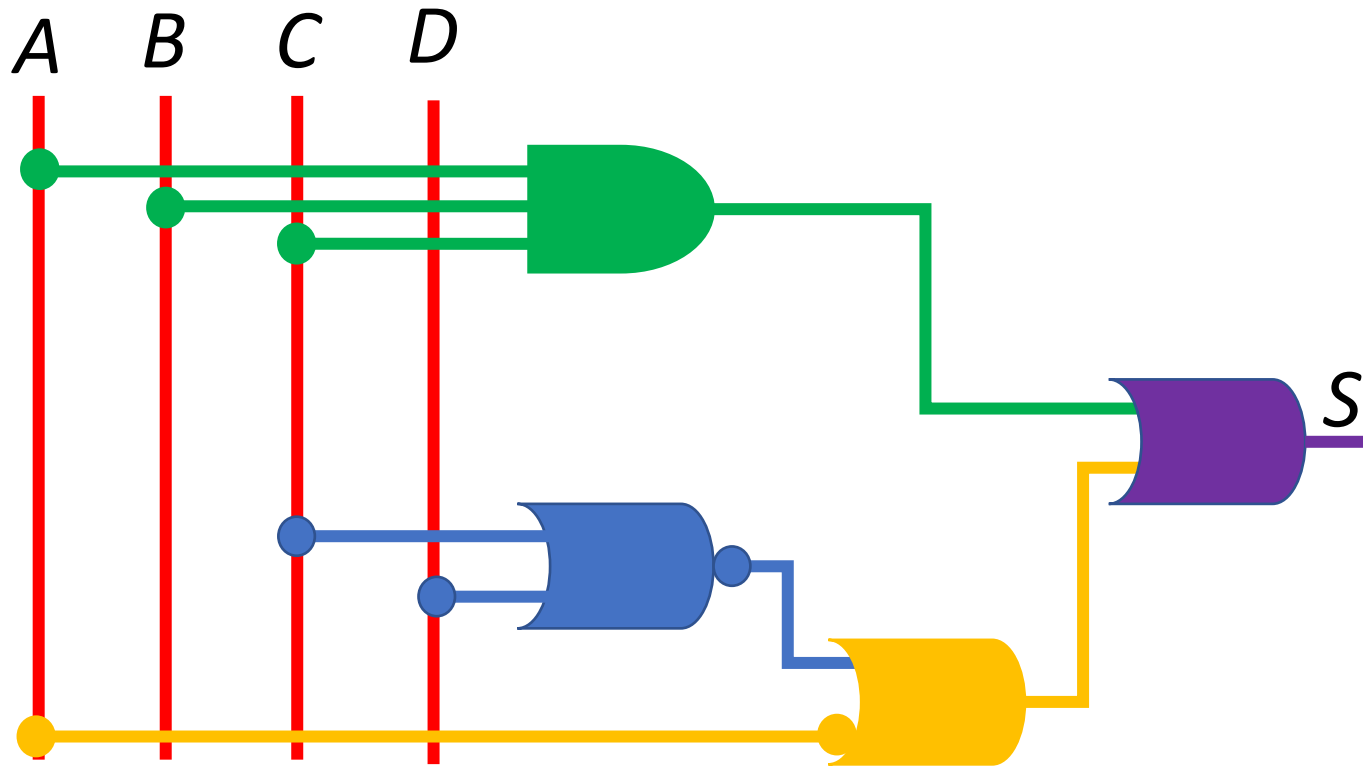
Expressões Booleanas

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



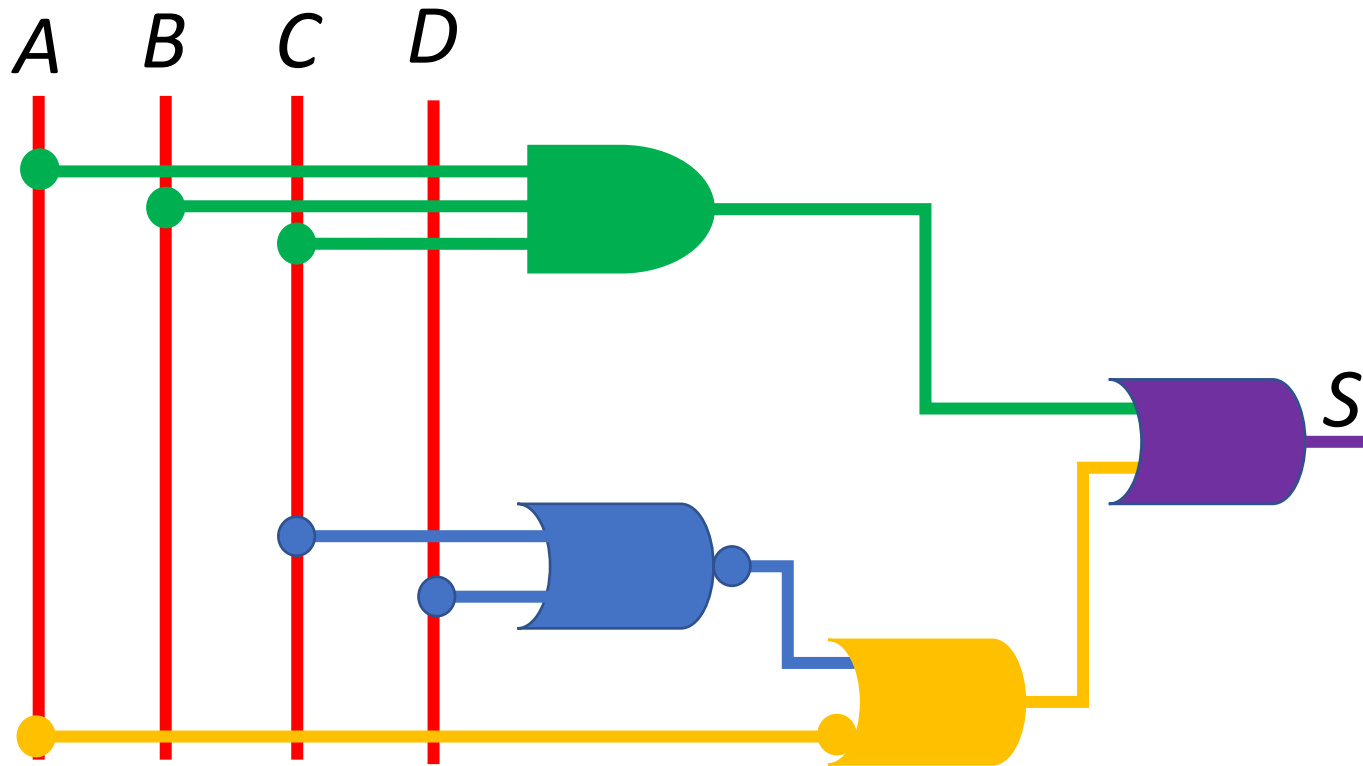
Expressões Booleanas

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

 2^4 [illegible]

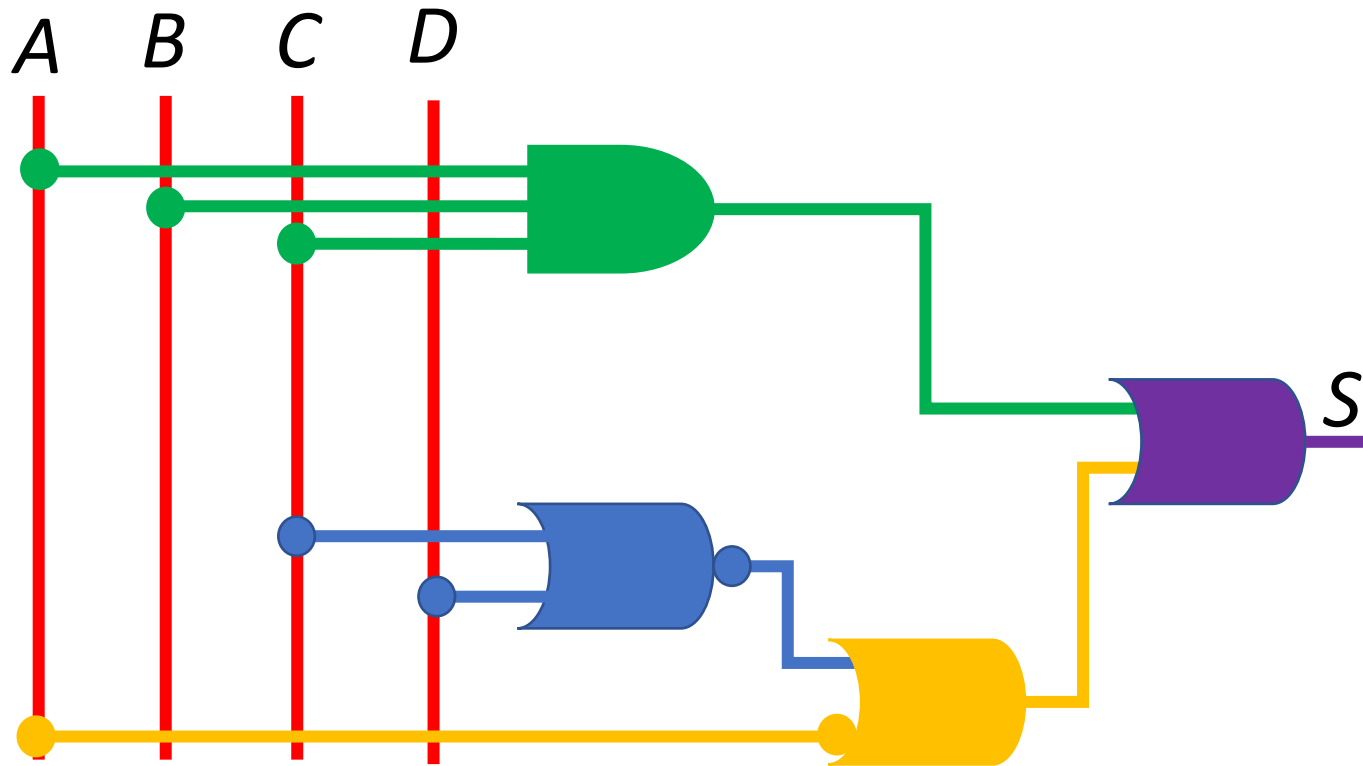
Expressões Booleanas

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

[illegible]

Expressões Booleanas

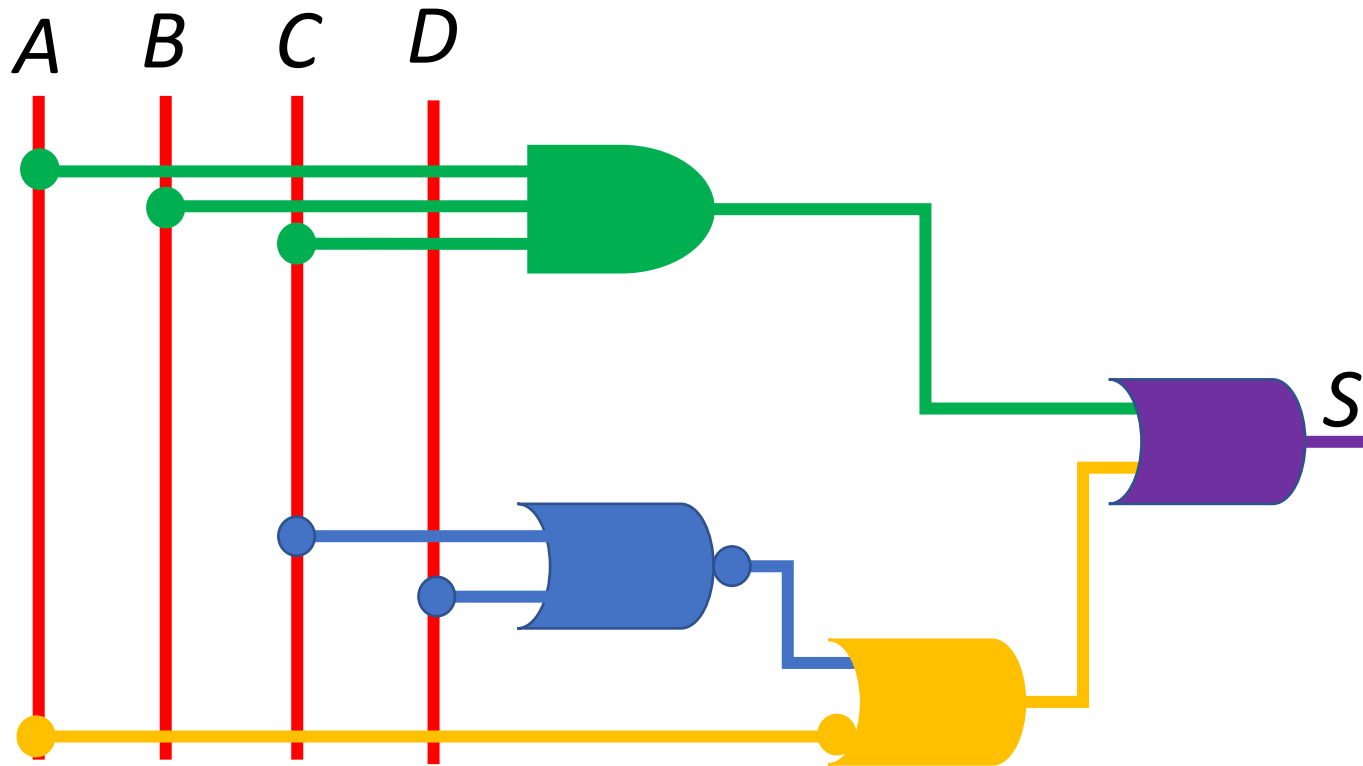
$$S = (A \cdot B \cdot C) + [(\overline{C + D}) + \bar{A}]$$



A	B	C	D
0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
0	1	0	0
0	1	0	1
0	1	1	0
0	1	1	1
1	0	0	0
1	0	0	1
1	0	1	0
1	0	1	1
1	1	0	0
1	1	0	1
1	1	1	0
1	1	1	1

Expressões Booleanas

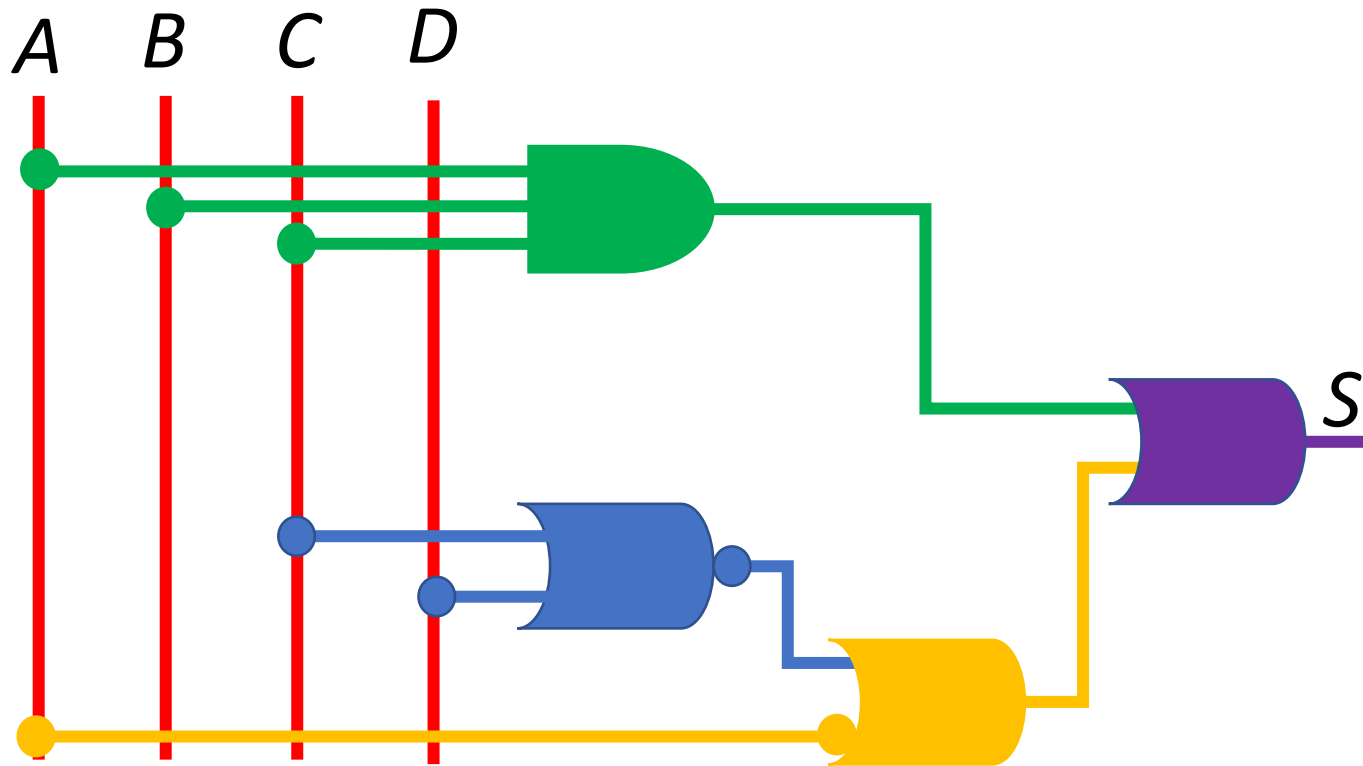
$$S = (A . B . C) + [(\overline{C + D}) + \bar{A}]$$



A	B	C	D	(A.B.C)
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

Expressões Booleanas

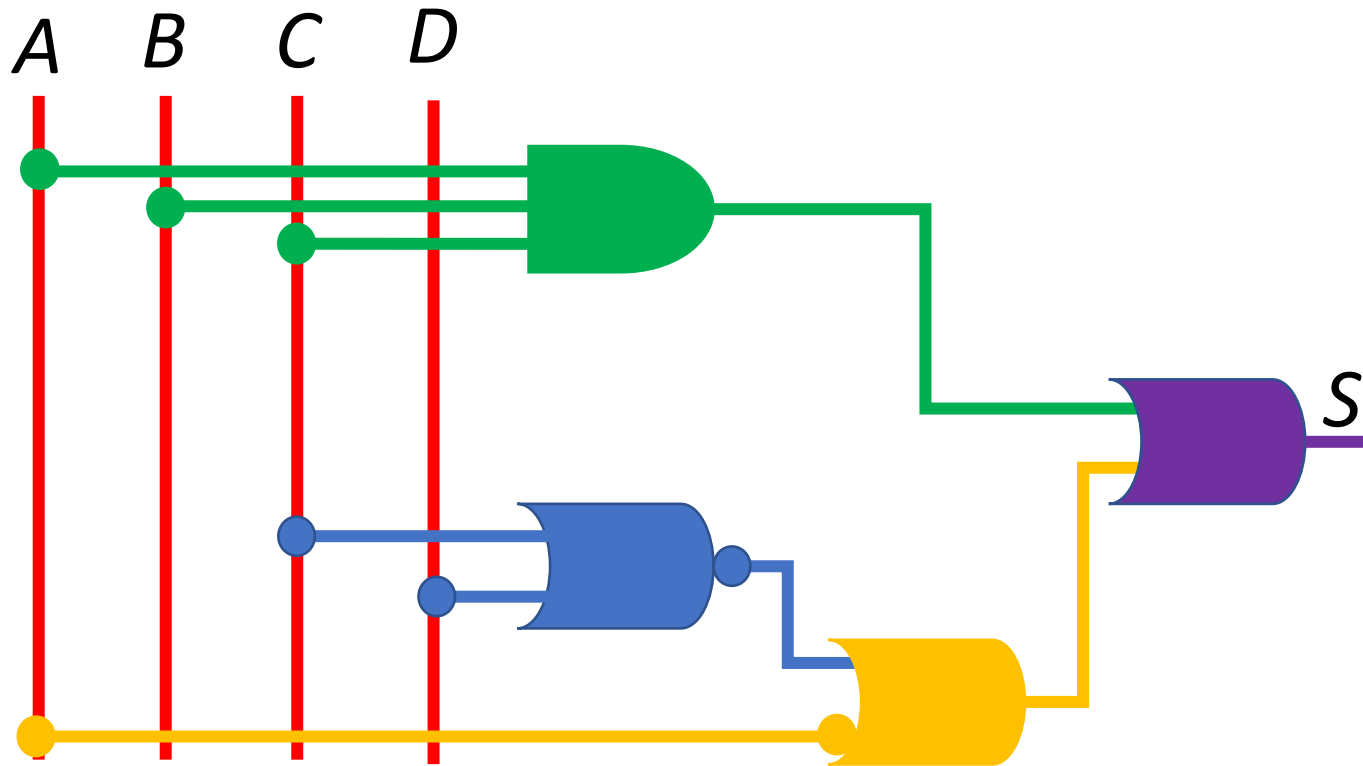
$$S = (A . B . C) + [(\overline{C + D}) + \bar{A}]$$



A	B	C	D	(A . B . C)	(C + D)
0	0	0	0	0	0
0	0	0	1	0	1
0	0	1	0	0	1
0	0	1	1	0	1
0	1	0	0	0	0
0	1	0	1	0	1
0	1	1	0	0	1
0	1	1	1	0	1
1	0	0	0	0	0
1	0	0	1	0	1
1	0	1	0	0	1
1	0	1	1	0	1
1	1	0	0	0	0
1	1	0	1	0	1
1	1	1	0	1	1
1	1	1	1	1	1

Expressões Booleanas

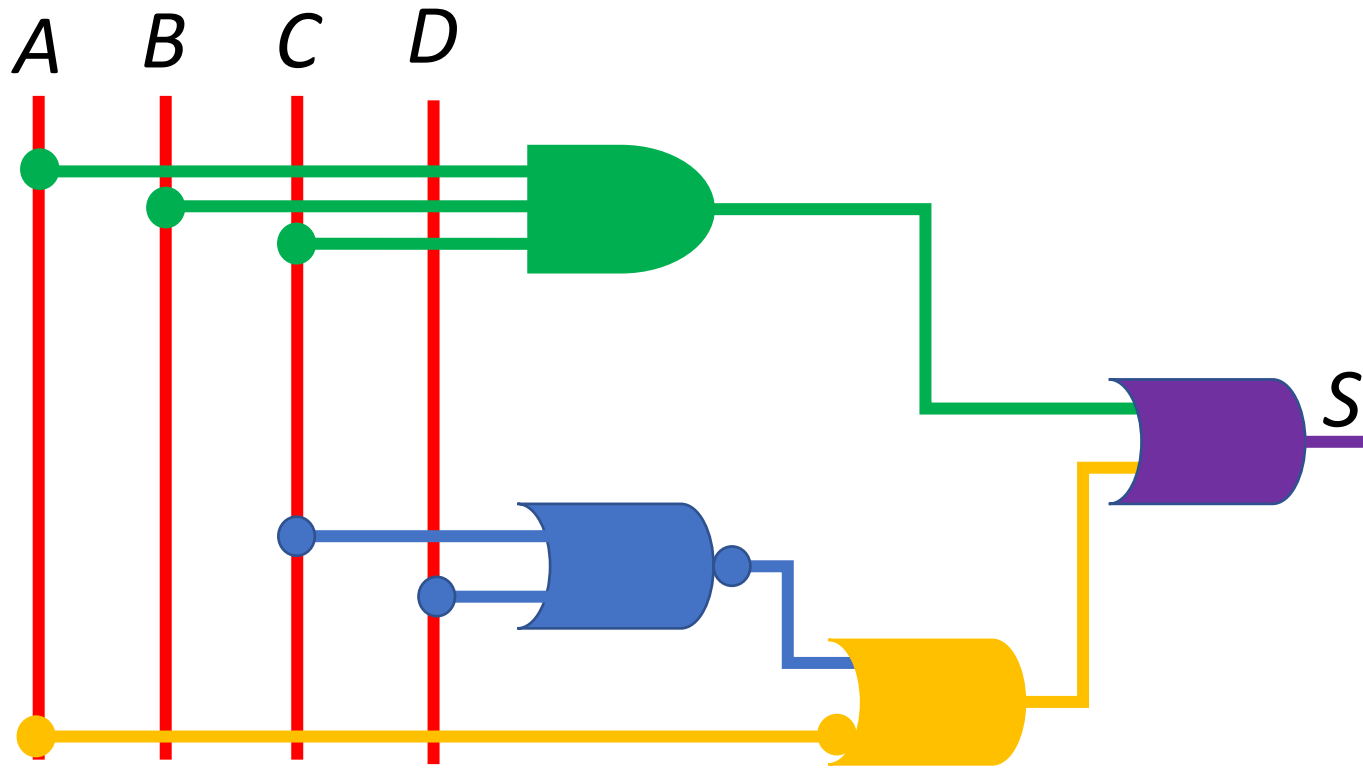
$$S = (A . B . C) + [(\overline{C + D}) + \bar{A}]$$



A	B	C	D	(A . B . C)	(C + D)	($\overline{C + D}$)
0	0	0	0	0	0	1
0	0	0	1	0	1	0
0	0	1	0	0	1	0
0	0	1	1	0	1	0
0	1	0	0	0	0	1
0	1	0	1	0	1	0
0	1	1	0	0	1	0
0	1	1	1	0	1	0
1	0	0	0	0	0	1
1	0	0	1	0	1	0
1	0	1	0	0	1	0
1	0	1	1	0	1	0
1	1	0	0	0	0	1
1	1	0	1	0	1	0
1	1	1	0	1	1	0
1	1	1	1	1	1	0

Expressões Booleanas

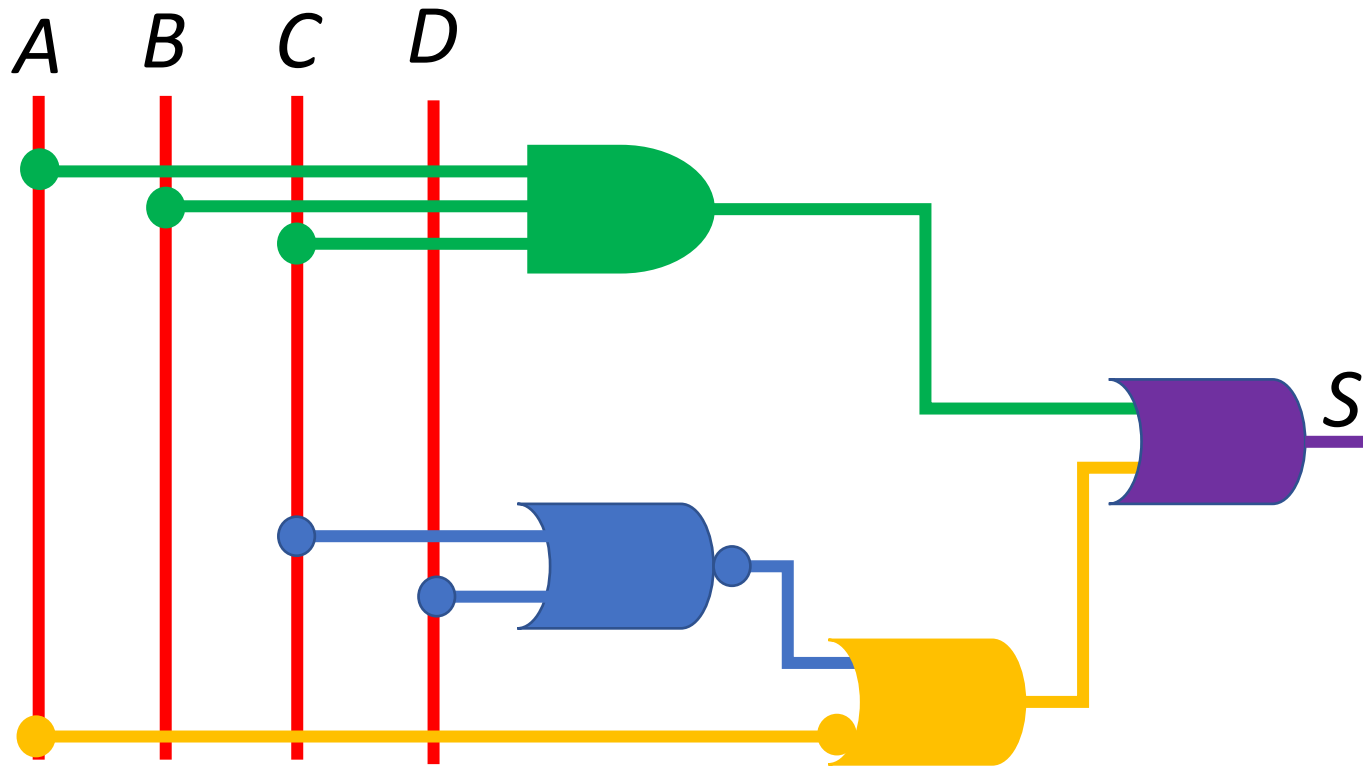
$$S = (A . B . C) + [(\overline{C + D}) + \bar{A}]$$



A	B	C	D	(A.B.C)	$(\overline{C + D})$	\bar{A}
0	0	0	0	0	1	
0	0	0	1	0	0	
0	0	1	0	0	0	
0	0	1	1	0	0	
0	1	0	0	0	1	
0	1	0	1	0	0	
0	1	1	0	0	0	
0	1	1	1	0	0	
1	0	0	0	0	1	
1	0	0	1	0	0	
1	0	1	0	0	0	
1	0	1	1	0	0	
1	1	0	0	0	1	
1	1	0	1	0	0	
1	1	1	0	1	0	
1	1	1	1	1	0	

Expressões Booleanas

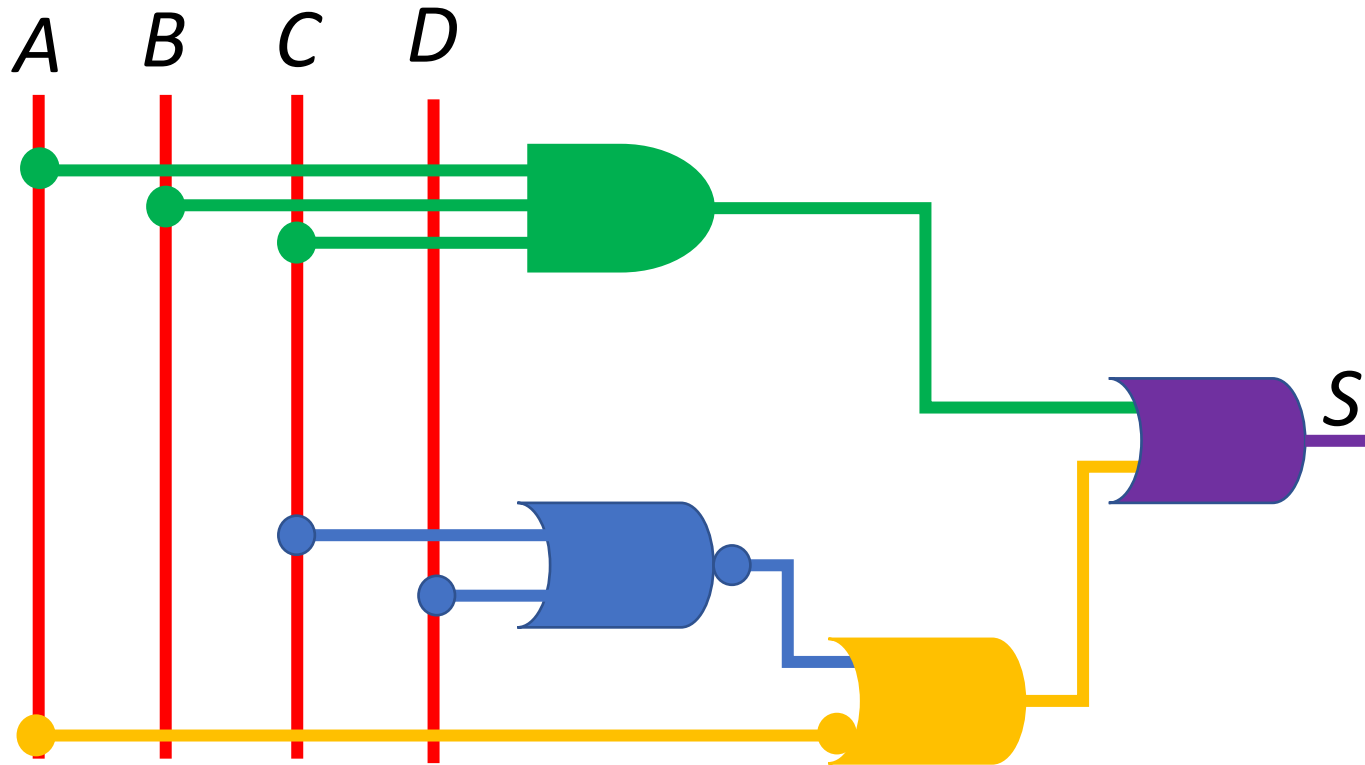
$$S = (A . B . C) + [(\overline{C + D}) + \bar{A}]$$



A	B	C	D	$(A . B . C)$	$(\overline{C + D})$	\bar{A}	$(\overline{C + D}) + \bar{A}$
0	0	0	0	0	1	1	1
0	0	0	1	0	0	1	1
0	0	1	0	0	0	1	1
0	0	1	1	0	0	1	1
0	1	0	0	0	1	1	1
0	1	0	1	0	0	1	1
0	1	1	0	0	0	1	1
0	1	1	1	0	0	1	1
1	0	0	0	0	1	0	1
1	0	0	1	0	0	0	0
1	0	1	0	0	0	0	0
1	0	1	1	0	0	0	0
1	1	0	0	0	1	0	1
1	1	0	1	0	0	0	0
1	1	1	0	1	0	0	0
1	1	1	1	1	0	0	0

Expressões Booleanas

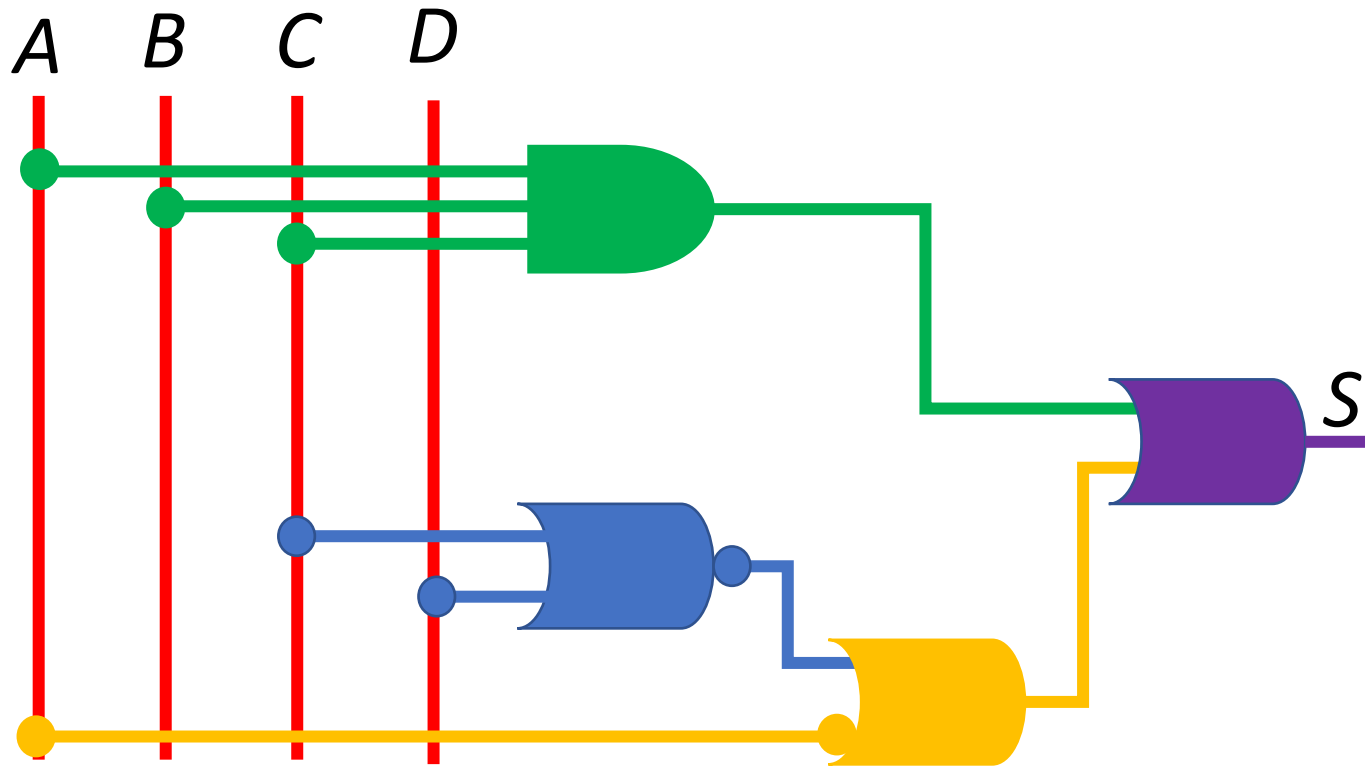
$$S = (A . B . C) + [(\overline{C + D}) + \bar{A}]$$



$(A.B.C)$	$(\overline{C + D}) + \bar{A}$	S
0	1	
0	1	
0	1	
0	1	
0	1	
0	1	
0	1	
0	1	
0	0	
0	0	
0	0	
0	1	
0	0	
1	0	
1	0	

Expressões Booleanas

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



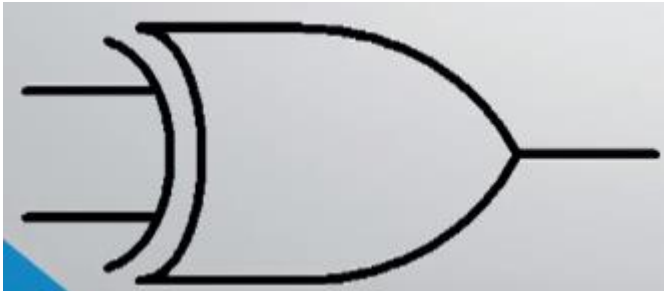
$(A.B.C)$	$(\overline{C + D}) + \bar{A}$	S
0	1	1
0	1	1
0	1	1
0	1	1
0	1	1
0	1	1
0	1	1
0	1	1
0	0	0
0	0	0
0	0	0
0	1	1
0	0	0
1	0	1
1	0	1

Portas Lógicas – Ou Exclusivo – XOR

- Introdução

- Como o próprio nome diz, consiste em fornecer saída igual a 1 EXCLUSIVAMENTE quando as variáveis forem diferentes entre si. Assim, tiramos o nome OU que lembra a porta lógica OU / OR.
- Ou seja: **S = 1 ou 0** ou **EXCLUSIVO S = 0 ou 1**

Representação Gráfica



Representação Algébrica



Tabela Verdade

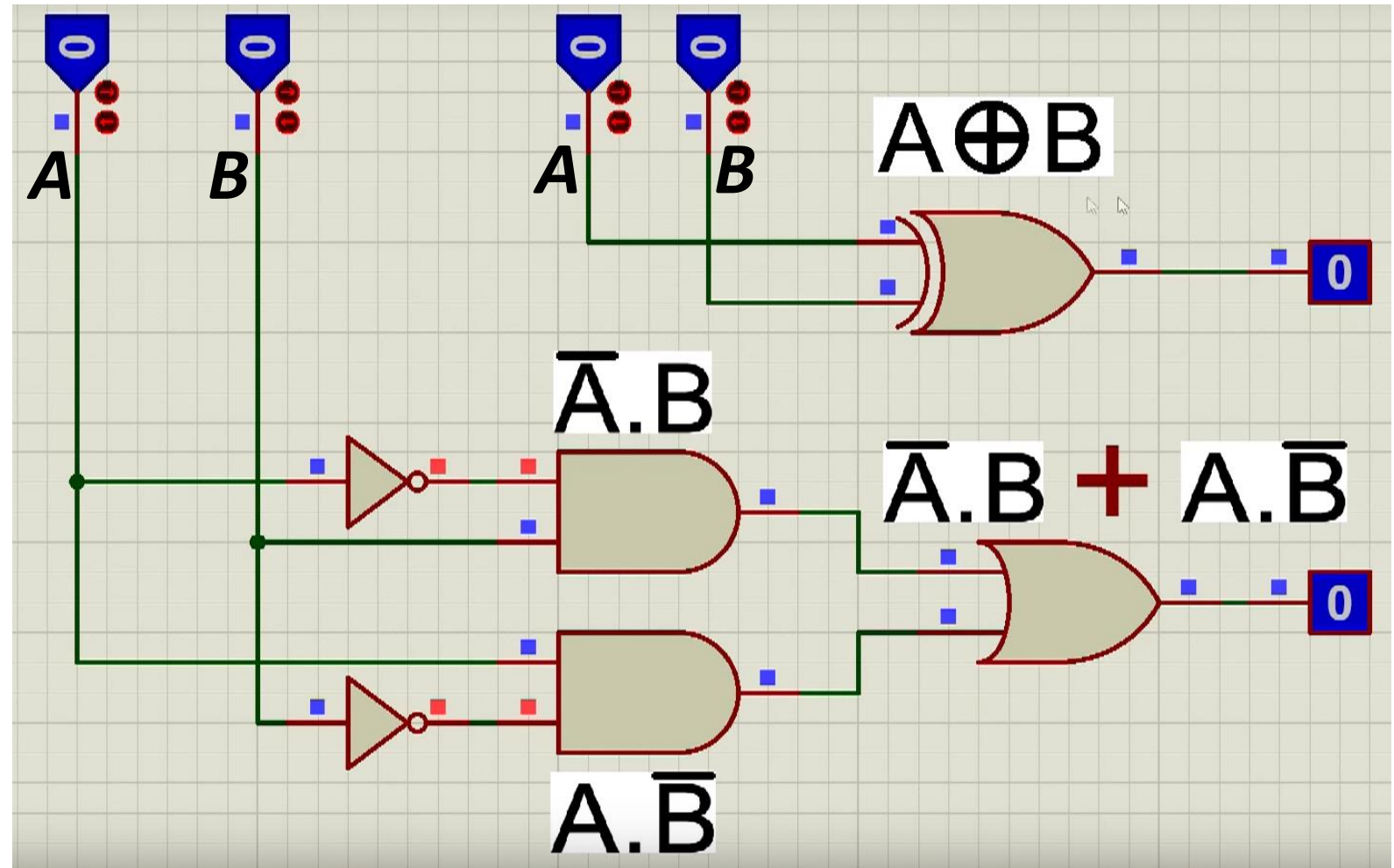
A	B	S
0	0	0
0	1	1
1	0	1
1	1	0

Portas Lógicas – Ou Exclusivo – XOR

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

$\bar{A}.B$

$\bar{B}.A$



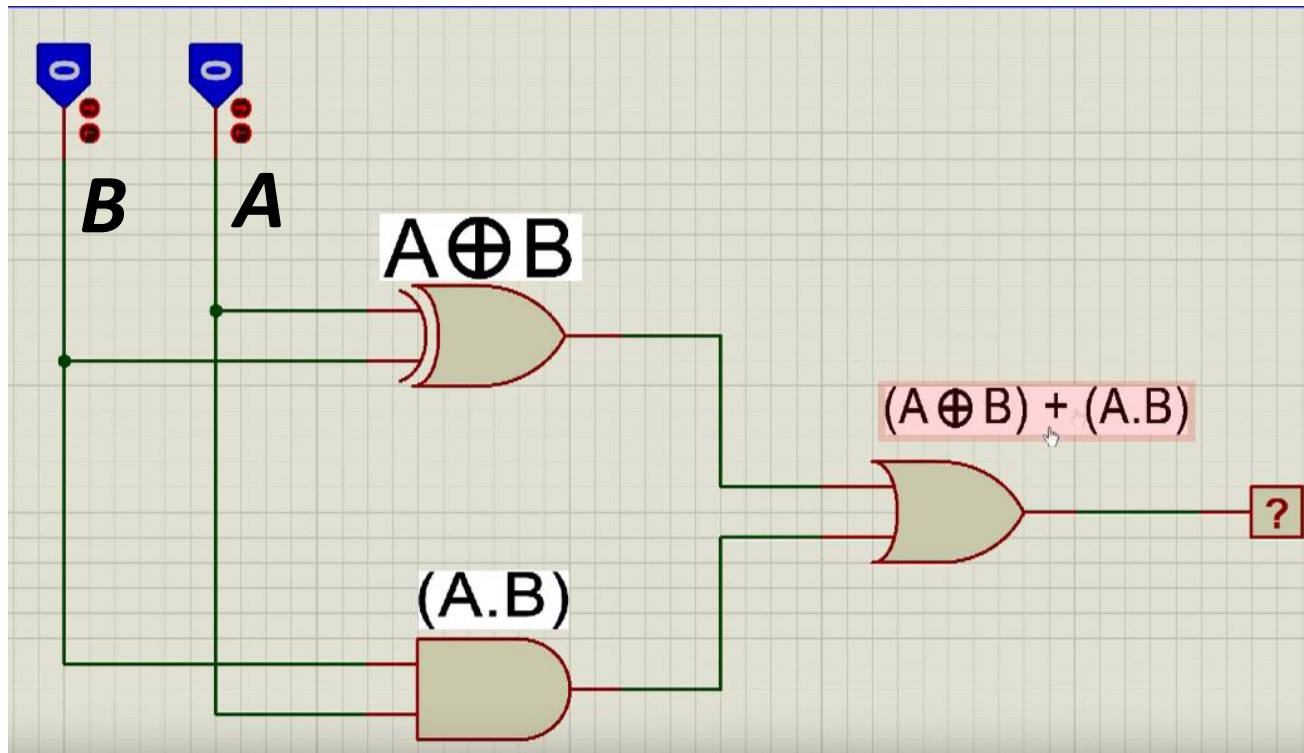
Expressões Booleanas

- Crie o circuito lógico e a tabela da expressão abaixo:

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

Expressões Booleanas

$$S = (A \oplus B) + (A.B)$$

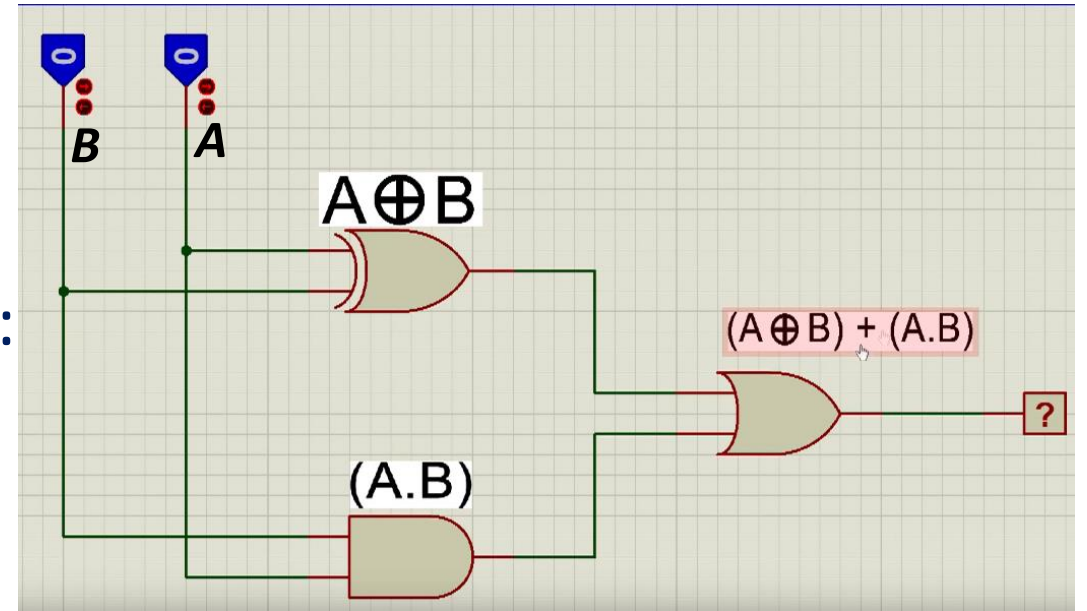


Expressões Booleanas

- Crie o circuito lógico da expressão abaixo:

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

A	B	$A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

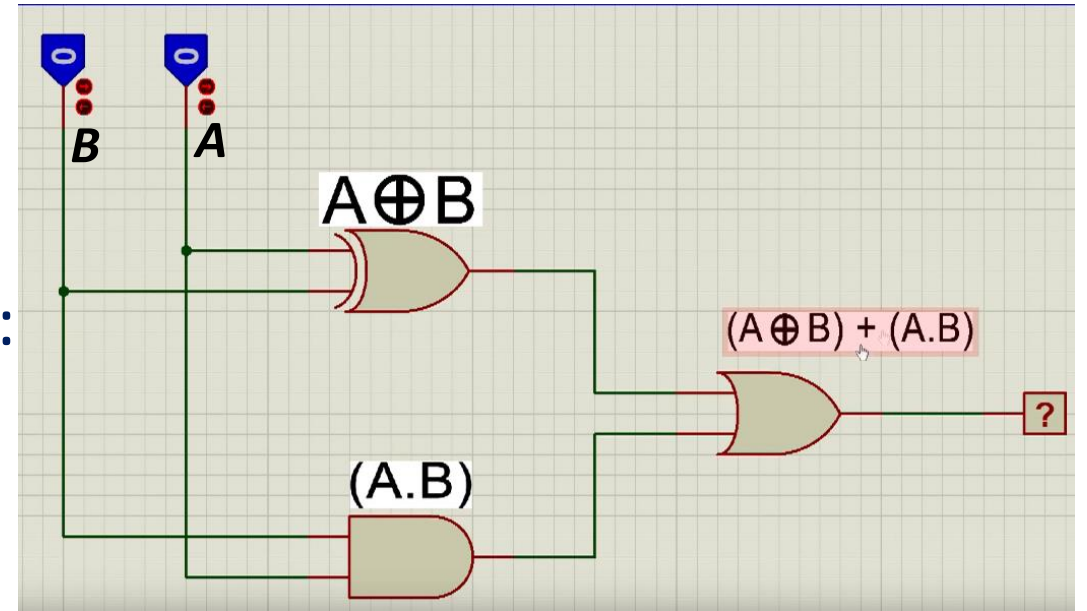


Expressões Booleanas

- Crie o circuito lógico da expressão abaixo:

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

A	B	$A \oplus B$		A	B	$A \cdot B$
0	0	0	+	0	0	
0	1	1		0	1	
1	0	1		1	0	
1	1	0		1	1	

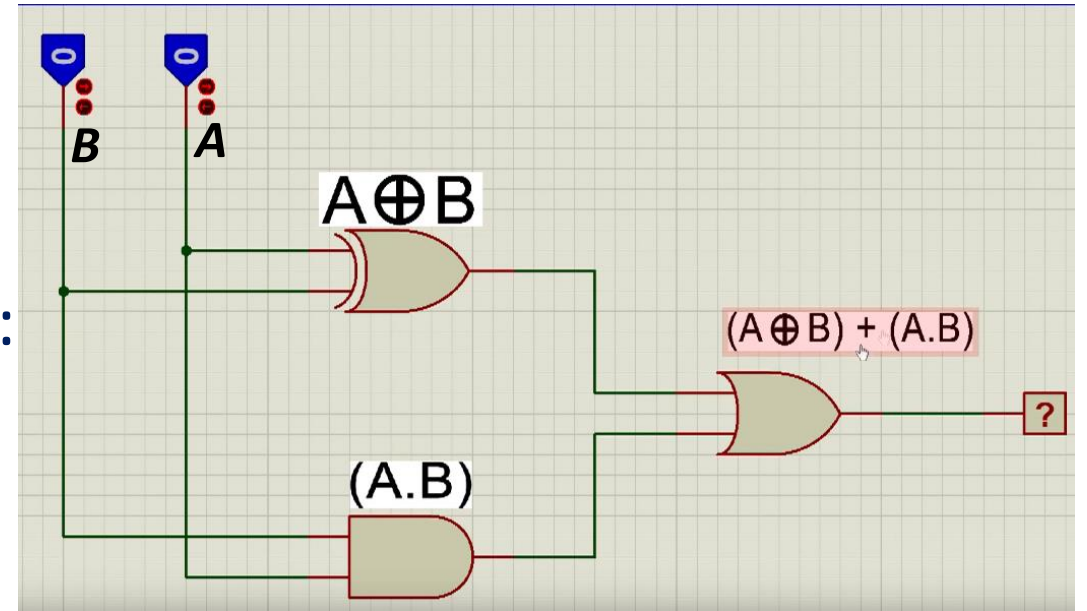


Expressões Booleanas

- Crie o circuito lógico da expressão abaixo:

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

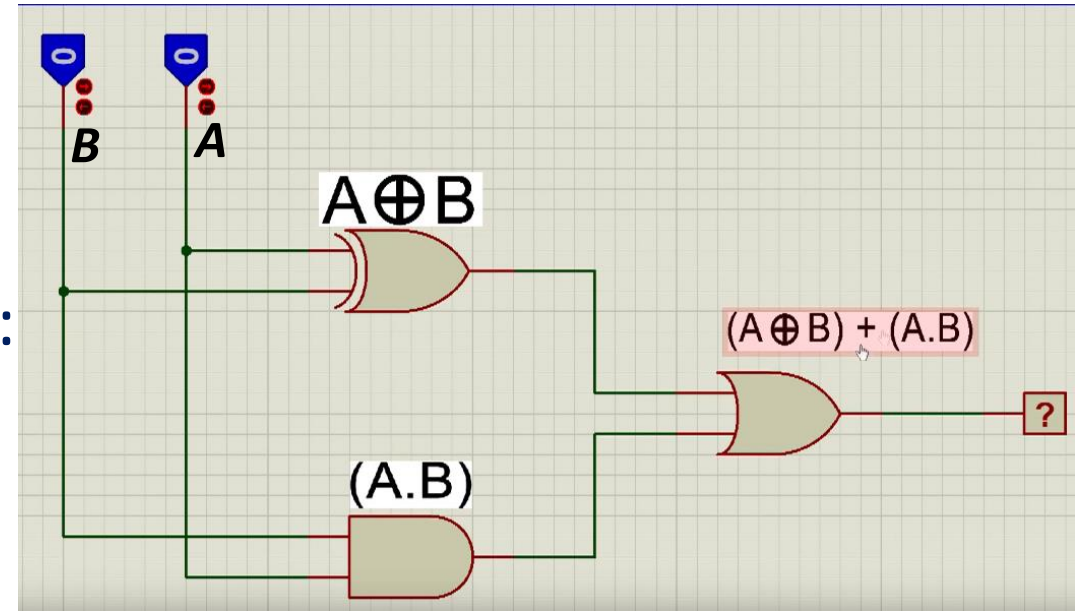
A	B	$A \oplus B$		A	B	$A \cdot B$
0	0	0	+	0	0	0
0	1	1		0	1	0
1	0	1		1	0	0
1	1	0		1	1	1



Expressões Booleanas

- Crie o circuito lógico da expressão abaixo:

$$S = (A \oplus B) + (A.B)$$



A	B	$A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

+

A	B	$A.B$
0	0	0
0	1	0
1	0	0
1	1	1

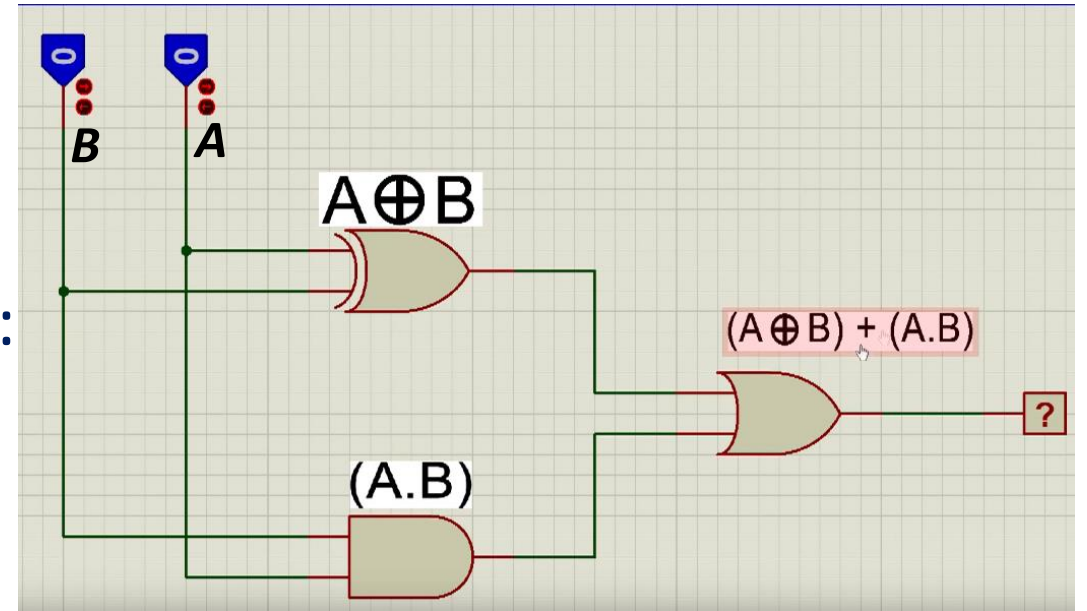
=

$A \oplus B$	$A.B$	$(A \oplus B) + (A.B)$
0	0	
1	0	
1	0	
0	1	

Expressões Booleanas

- Crie o circuito lógico da expressão abaixo:

$$S = (A \oplus B) + (A.B)$$



A	B	$A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

+

A	B	$A.B$
0	0	0
0	1	0
1	0	0
1	1	1

=

$A \oplus B$	$A.B$	$(A \oplus B) + (A.B)$
0	0	0
1	0	1
1	0	1
0	1	1

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Bom Estudo!

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