

LÓGICA DIGITAL

Conceitos Básicos

CURSO SUPERIOR DE ANÁLISE E DESENVOLVIMENTO DE SISTEMAS
FACULDADE DE TECNOLOGIA DE AMERICANA
Prof. Ms Diógenes de Oliveira

Revisão: Julho/2017

1.2 - LÓGICA DIGITAL

TÓPICOS:

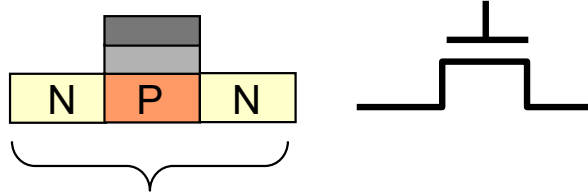
- Transistor;
- Portas Lógicas;
- Álgebra Booleana;
- Circuitos Lógicos.

BIBLIOGRAFIA:

- [1] MONTEIRO, M.A. **Introdução a Organização de Computadores**. Rio de Janeiro, Livros Técnicos e Científicos, 1995.
- [2] FERRI, E.H. **Introdução 80386**. São Paulo, Erica, 1990.
- [3] TOKHEIM, R.L. **Princípios Digitais**. São Paulo, Makron Books, 1996.
- [4] STALLING, W. **Computer Organization and Architecture, Designing for Performance**. 5.ed. USA, Prentice Hall, 1999.
- [5] TANEMBAUM, A. S. **Organização Estruturada de Computadores**, Rio de Janeiro: Livros Técnicos e Científicos, 2000. 460p. Cap.3

TRANSISTOR

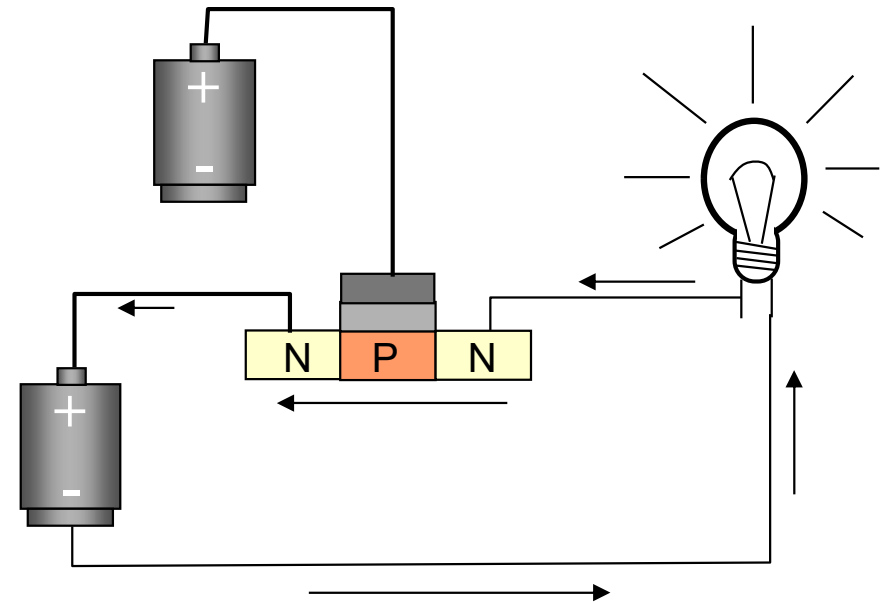
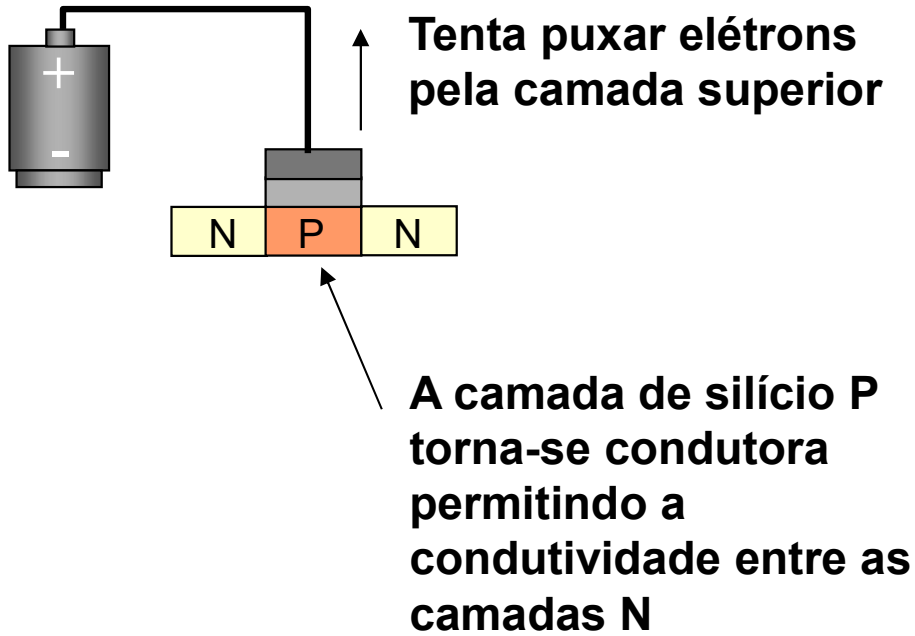
Transistor NPN



Silício tratado quimicamente

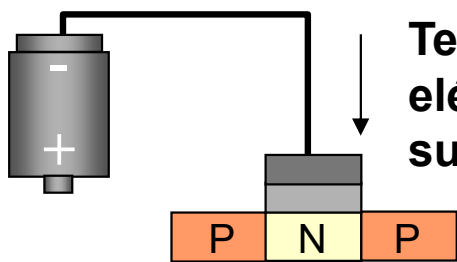
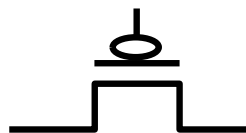
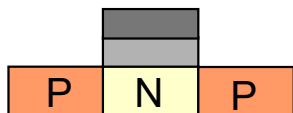
Silício tipo N

Silício tipo P



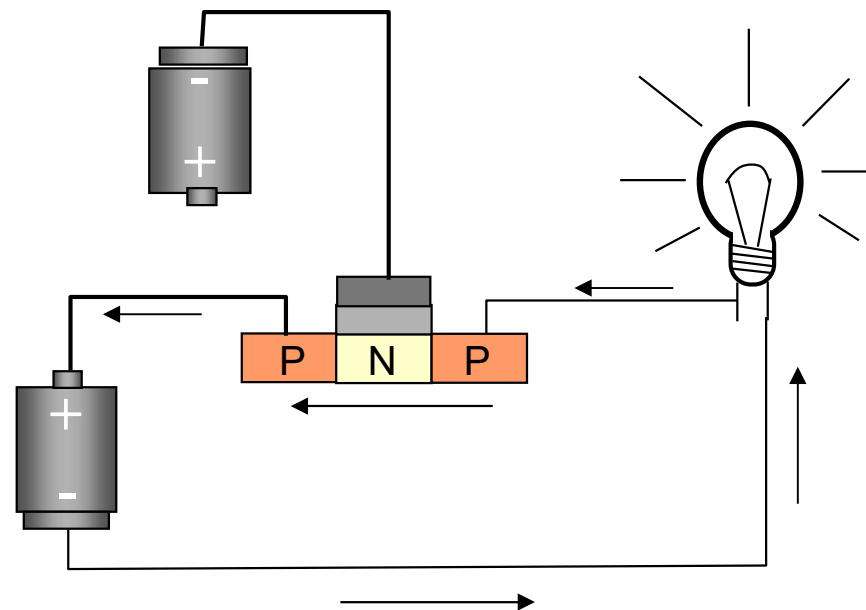
TRANSISTOR

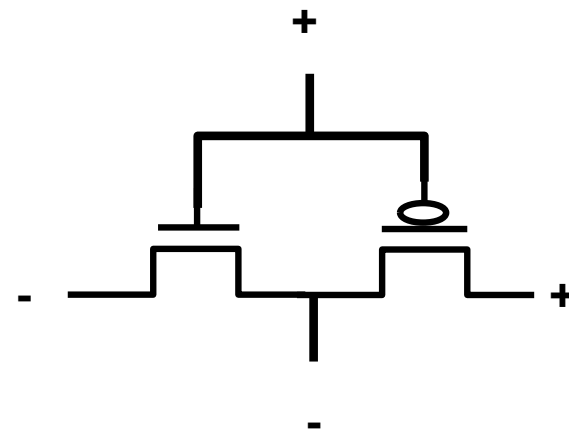
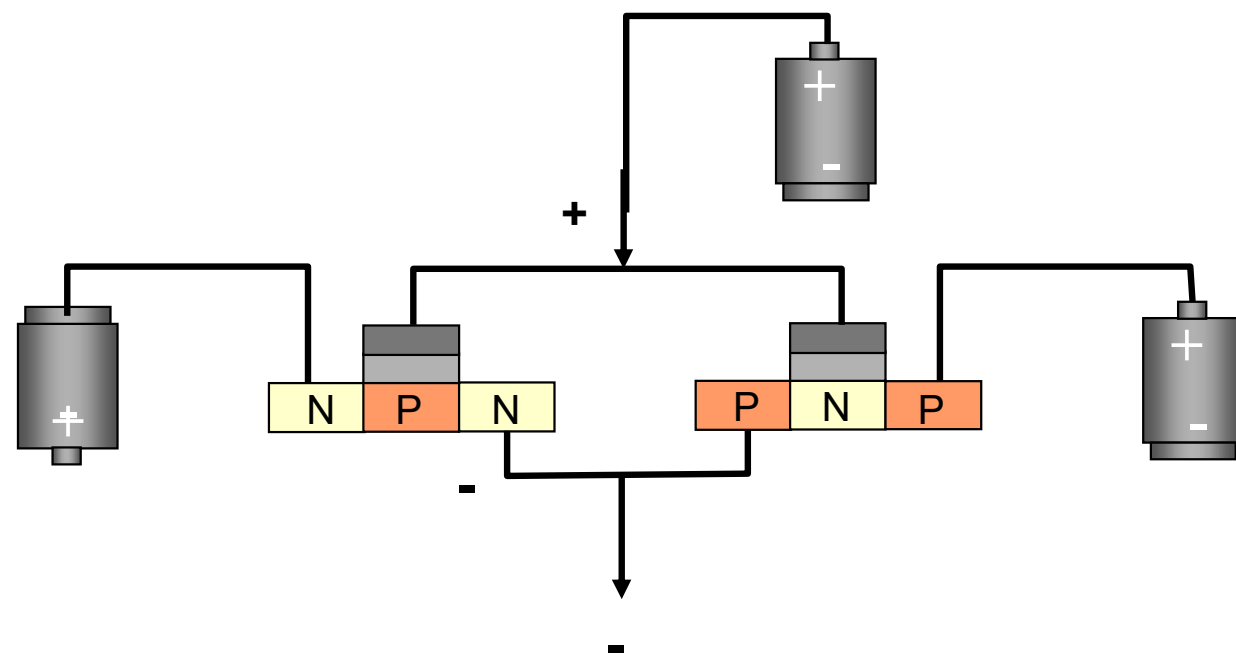
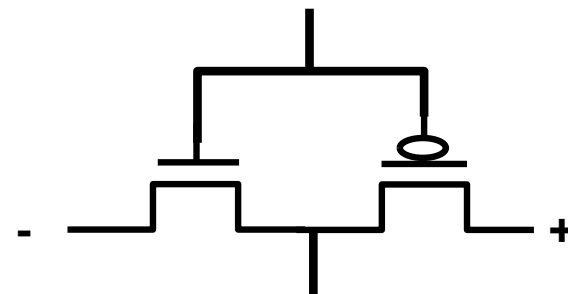
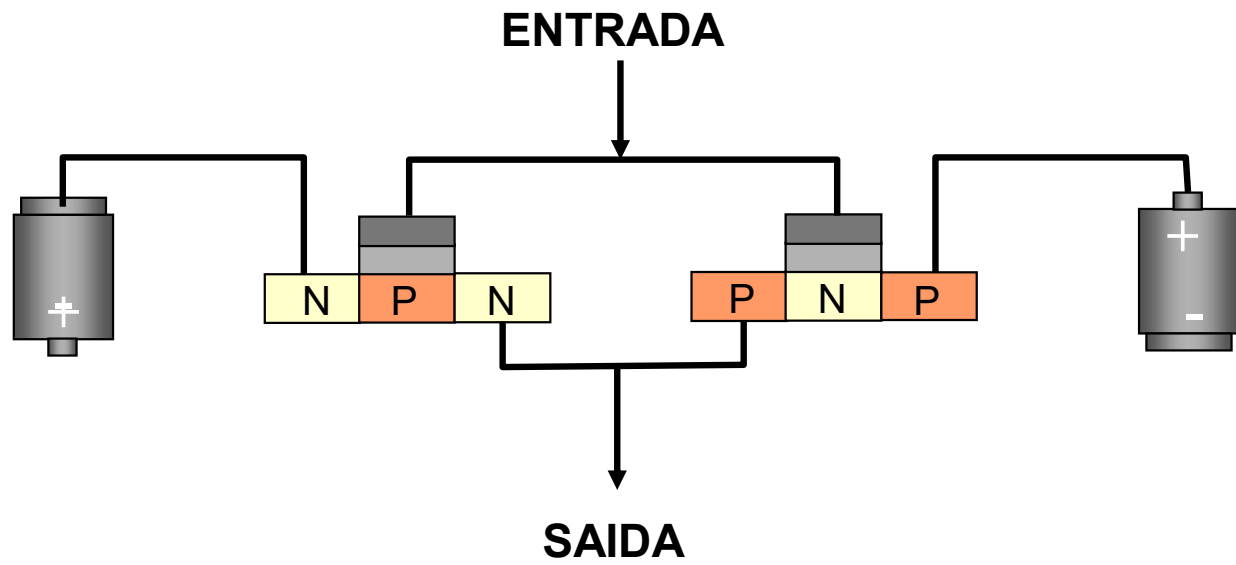
Transistor PNP

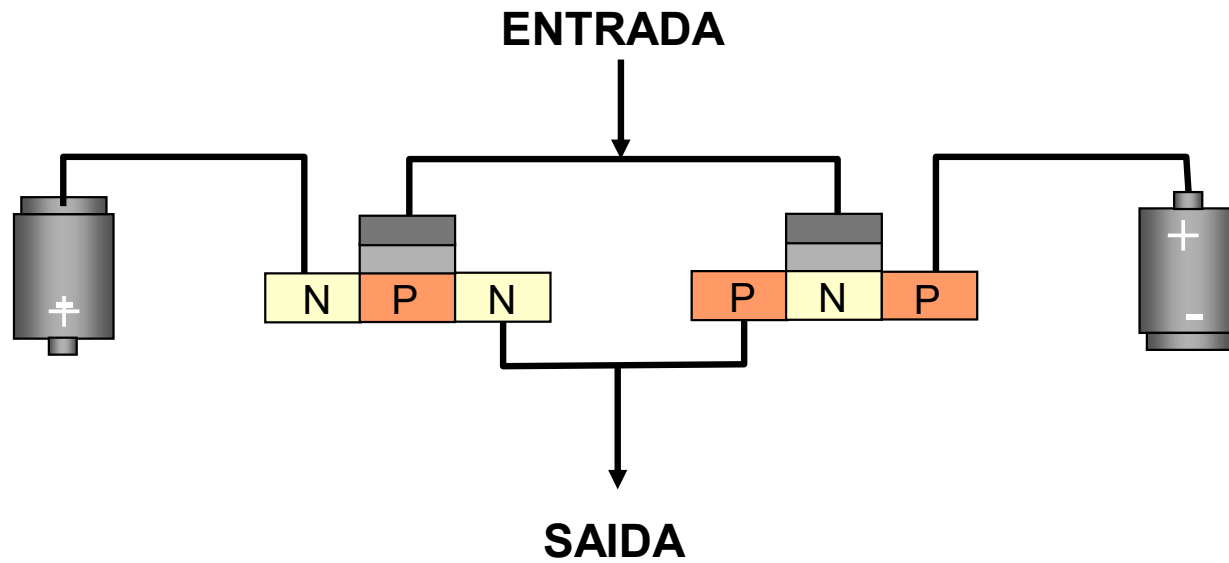


Tenta empurrar elétrons pela camada superior

A camada de silício N torna-se condutora permitindo a condutividade entre as camadas P

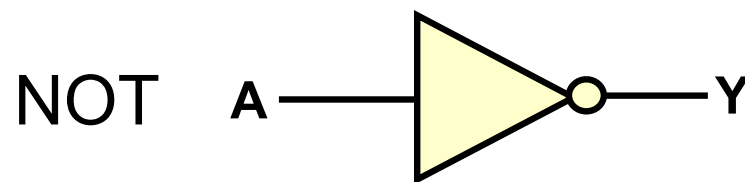




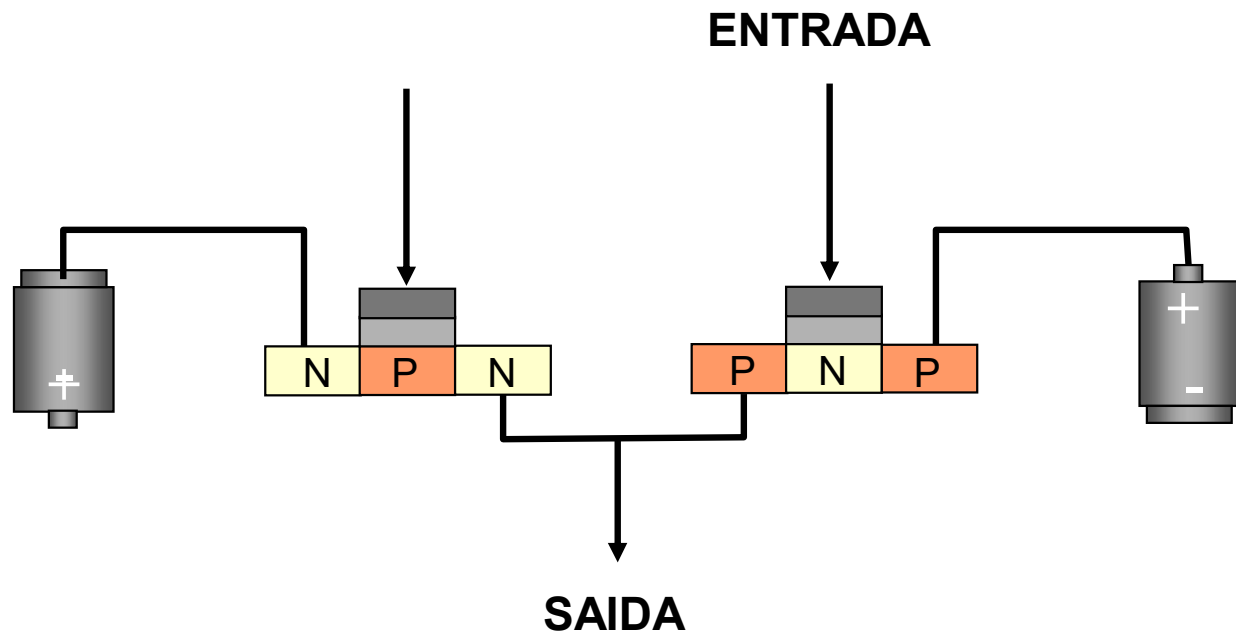


inversor

Porta lógica NOT

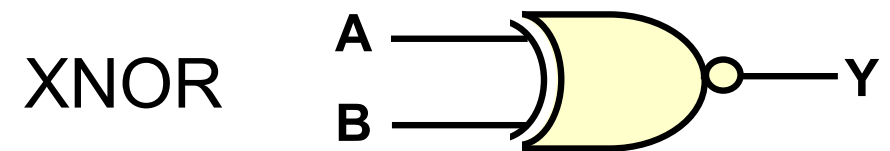
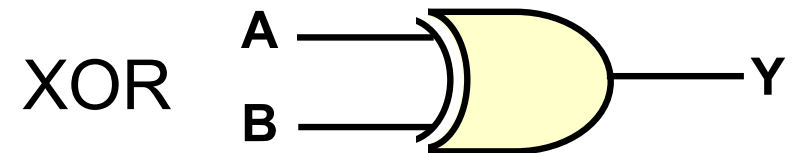
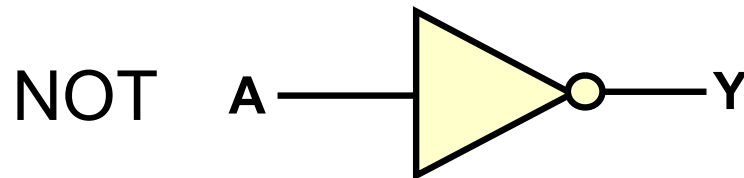
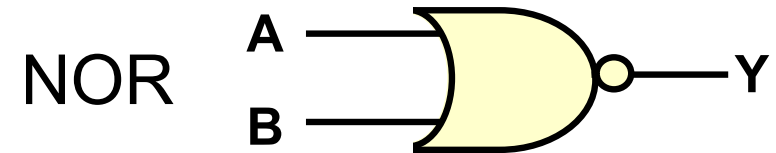
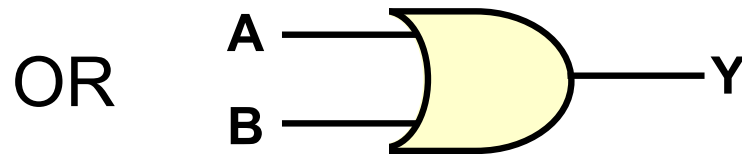
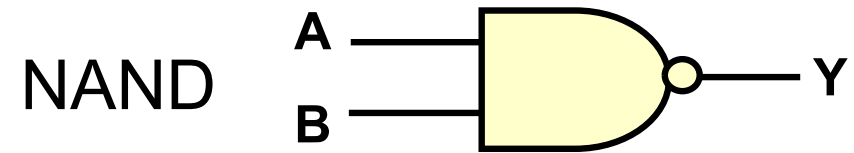
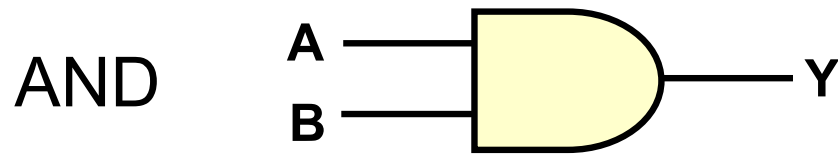


A	Y
0	1
1	0

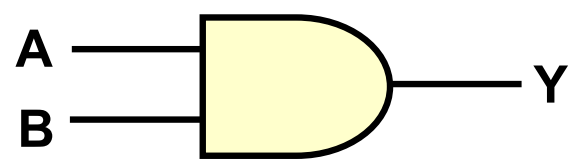


PORTAS LÓGICAS

Portas lógicas são dispositivos eletrônicos que operam um ou mais sinais **lógicos** de entrada para produzir um único sinal de saída.

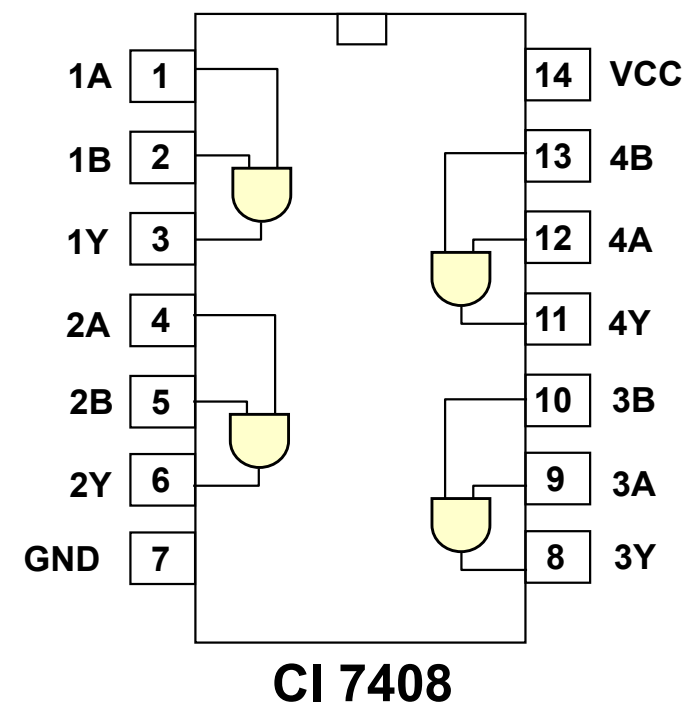
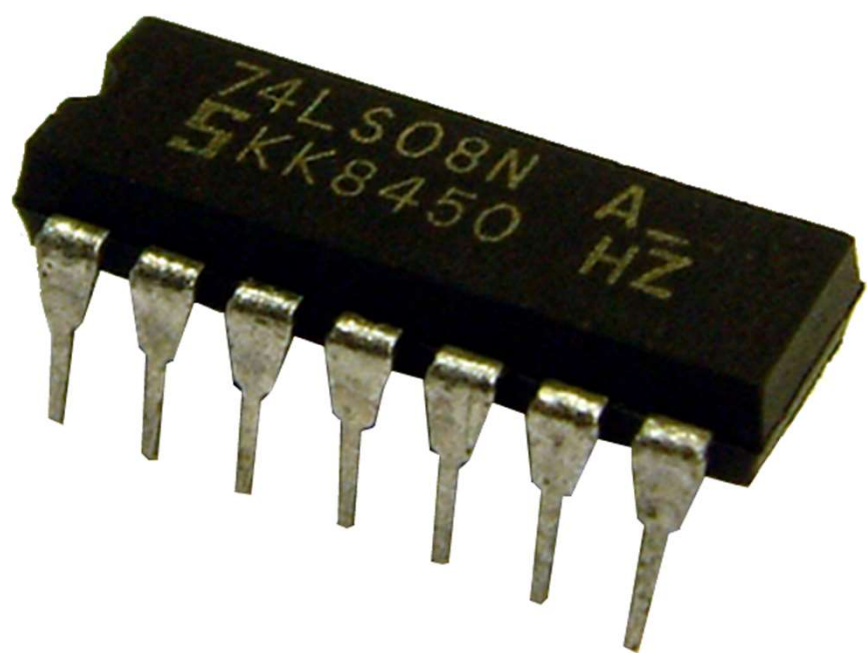


AND



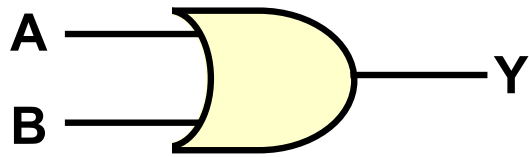
Expressão Booleana : $A \cdot B = Y$

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1



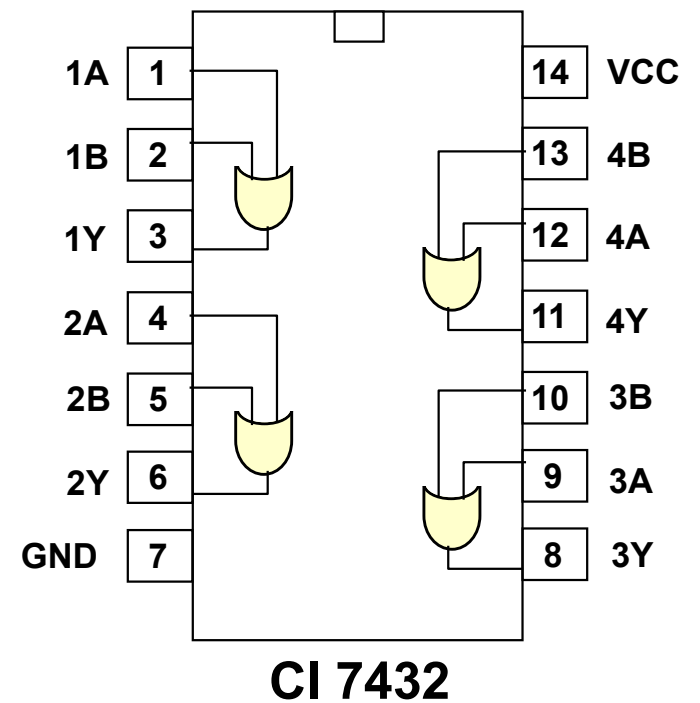
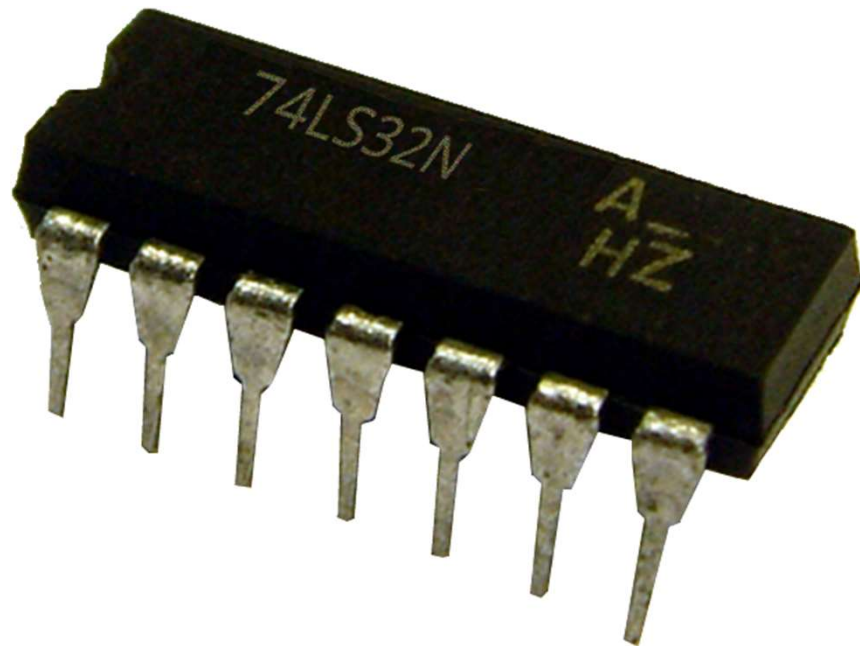
CI 7408

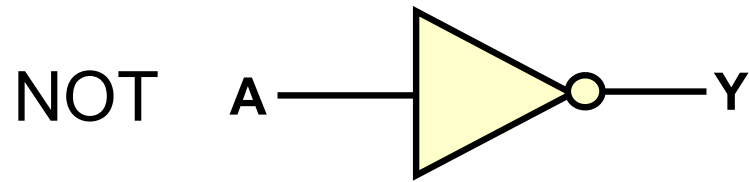
OR



Expressão Booleana : $A+B = Y$

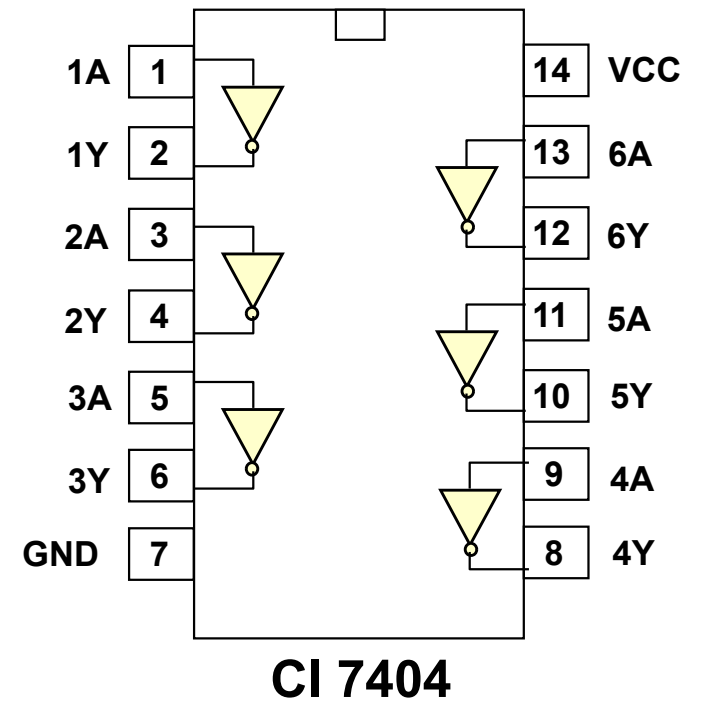
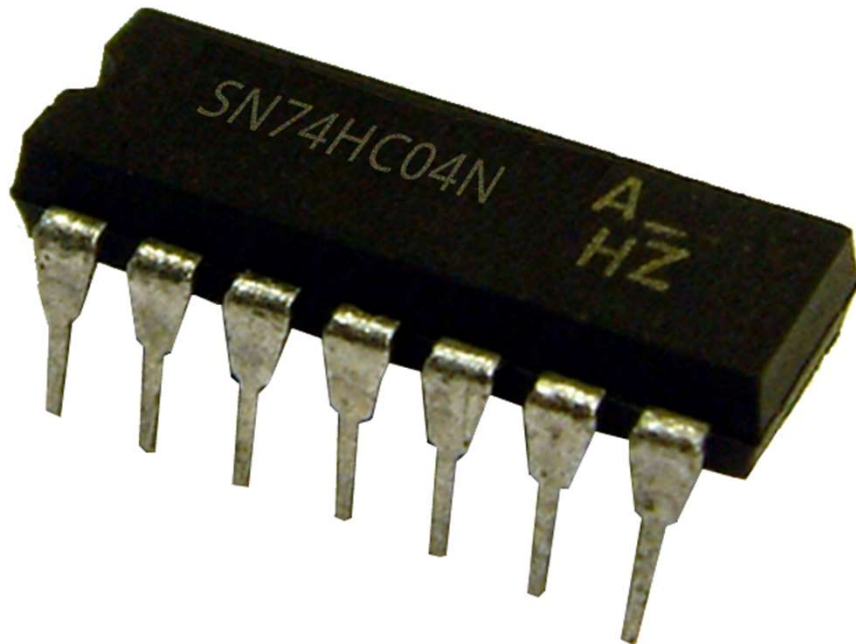
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1



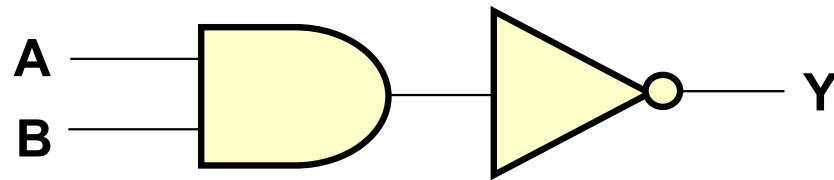


A	Y
0	1
1	0

Expressão Booleana : $A \equiv \bar{Y}$

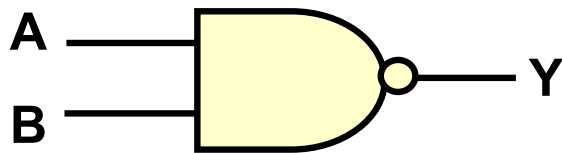


NAND

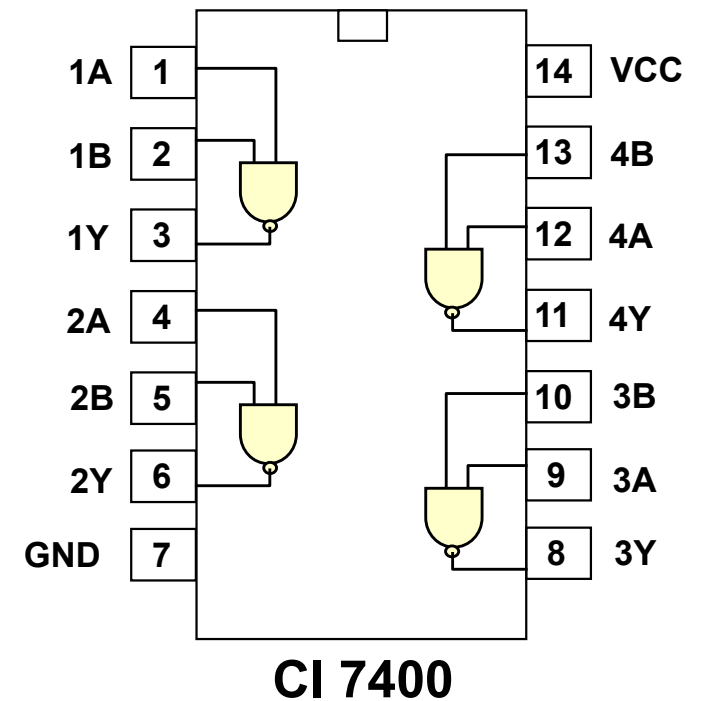


A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

NAND

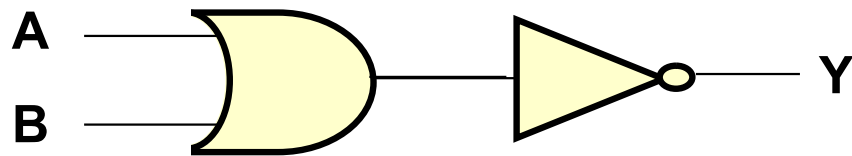


Expressão Booleana : $\overline{A \cdot B} = Y$



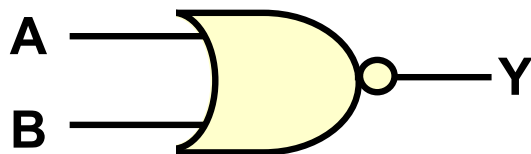
CI 7400

NOR

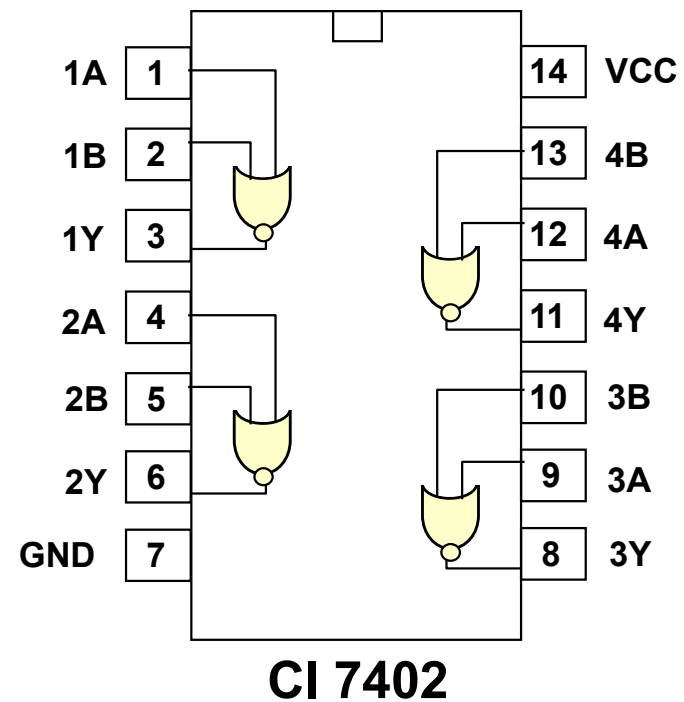


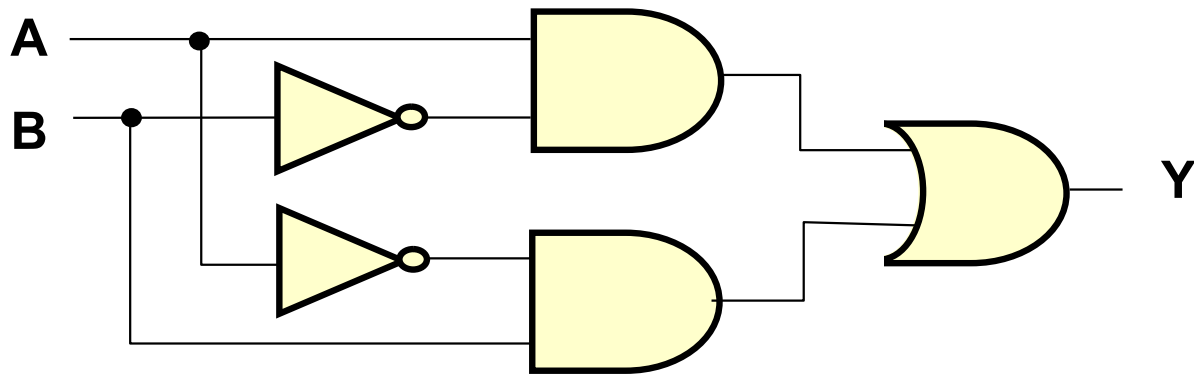
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

NOR



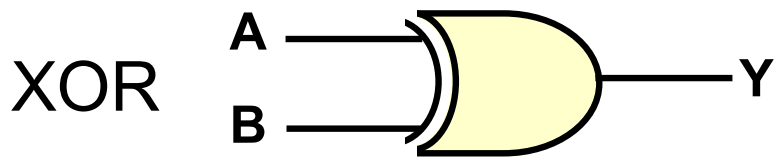
Expressão Booleana : $\overline{A+B} = Y$



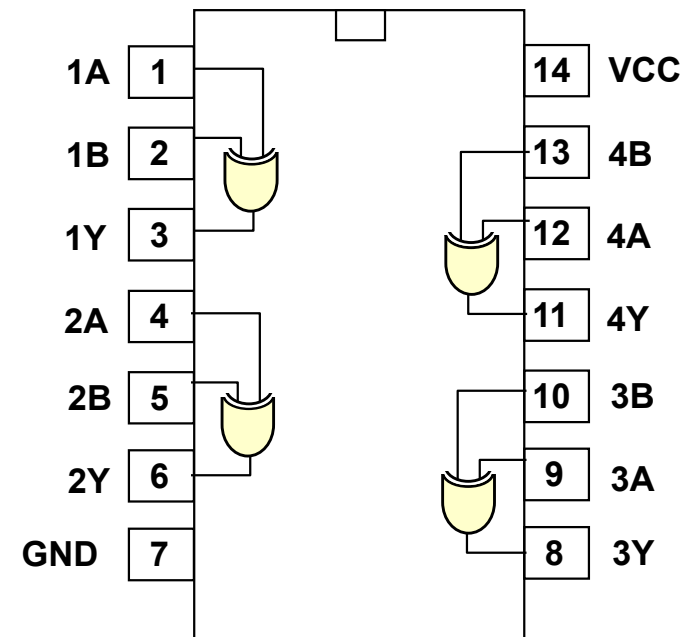


Expressão Booleana : $A \oplus B = Y$

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

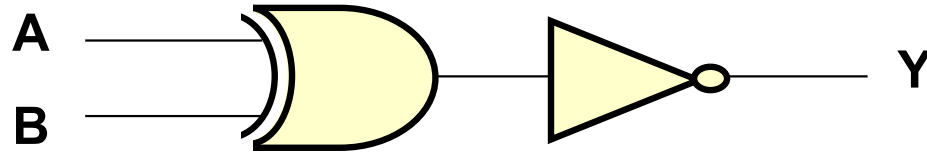


Expressão Booleana : $A \oplus B = Y$



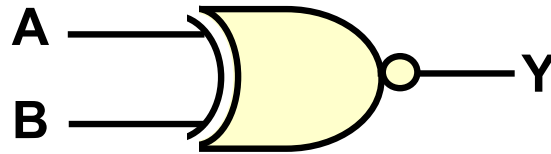
CI 7486

XNOR

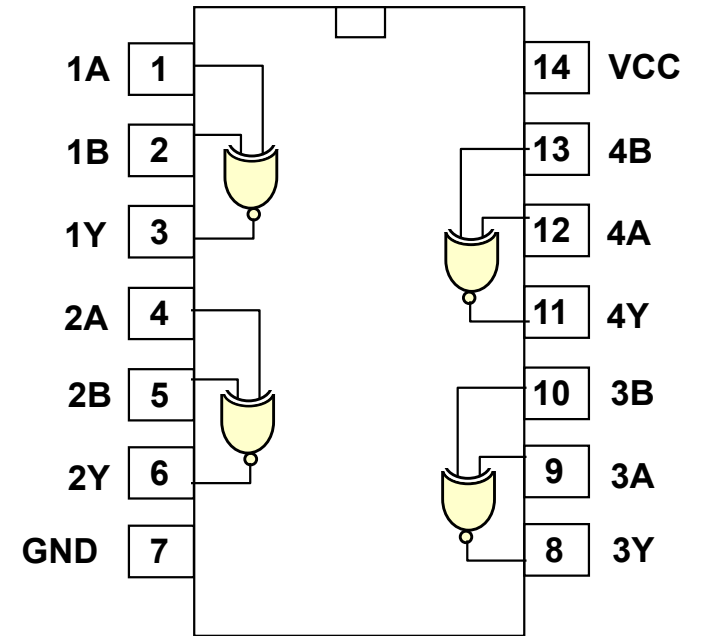


A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

XNOR



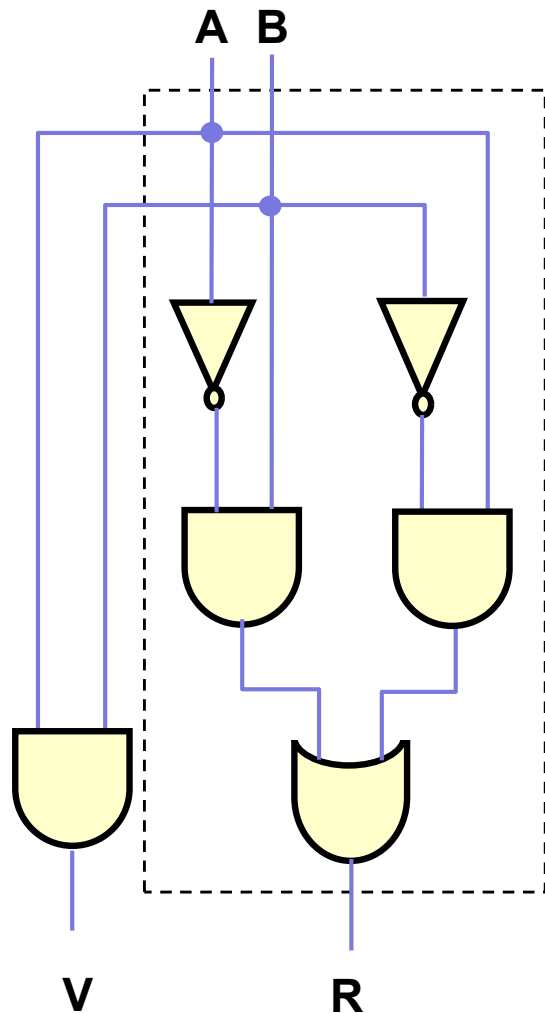
Expressão Booleana : $\overline{A+B} = Y$



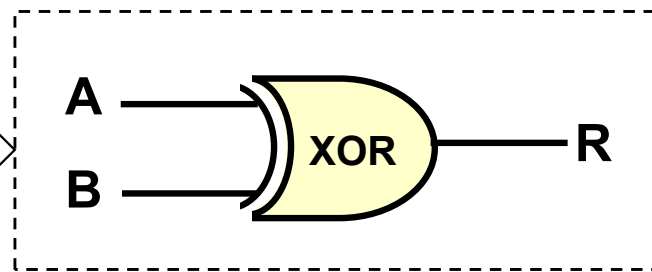
CIRCUITOS LÓGICOS

CIRCUITOS LÓGICOS

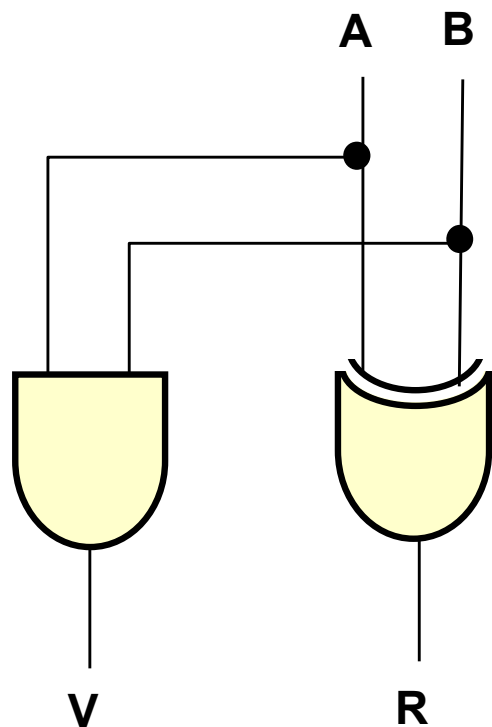
SOMADOR PARCIAL - 2 BITS



A	B	R	V
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1



SOMADOR PARCIAL



A	B	R	V
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

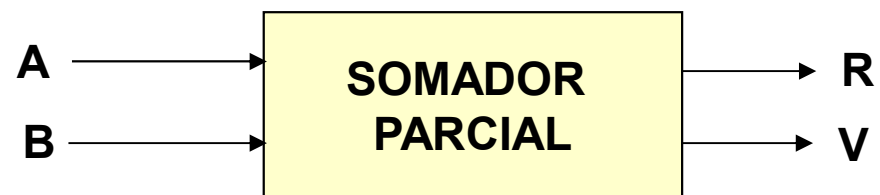


DIAGRAMA EM BLOCO

SOMADOR COMPLETO - 3 BITS

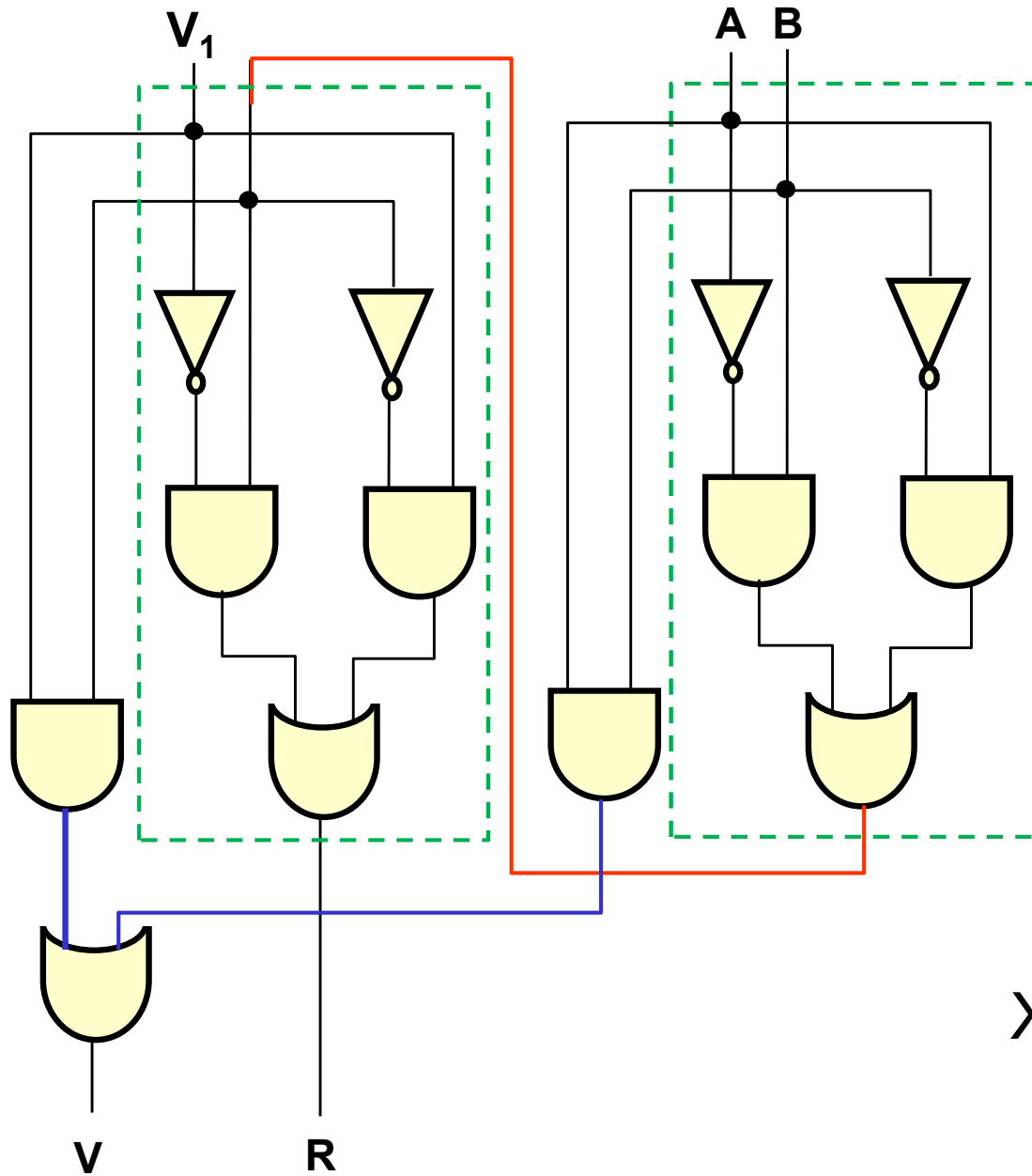
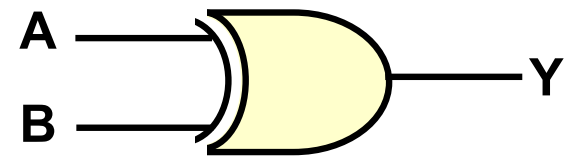


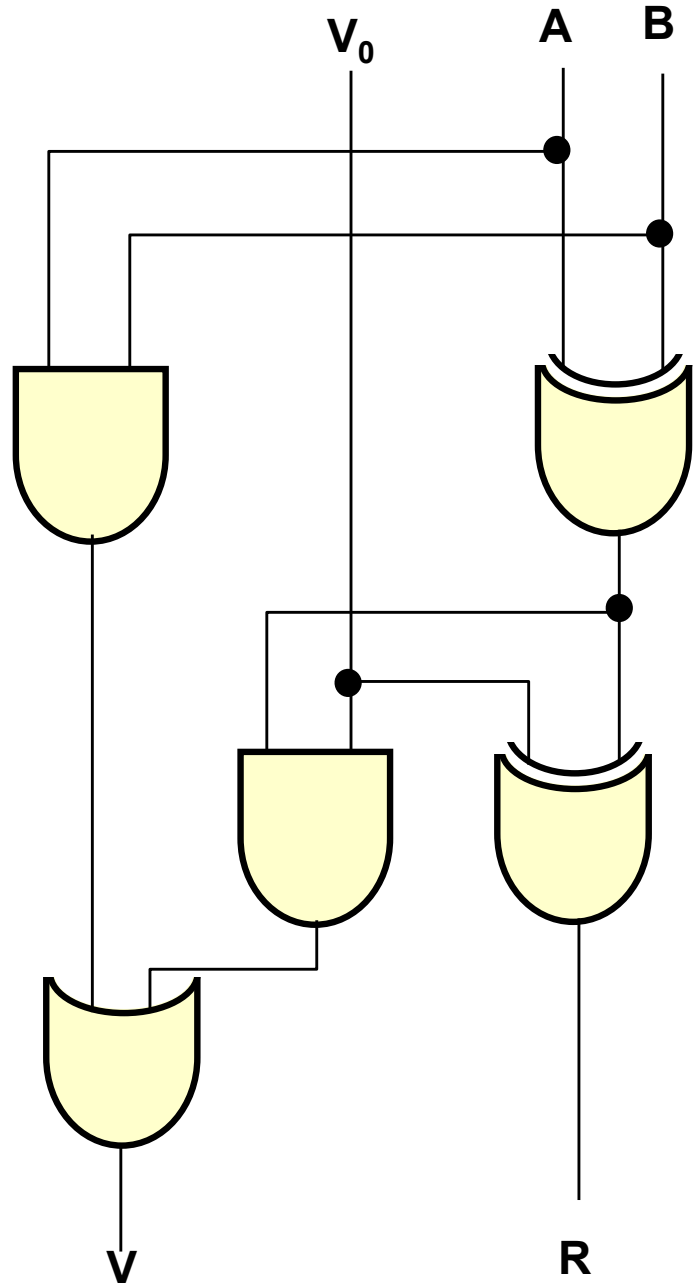
Tabela Verdade:

A	B	V ₁	R	V
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

XOR



SOMADOR COMPLETO 3 BITS



A	B	V ₀	V	R
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

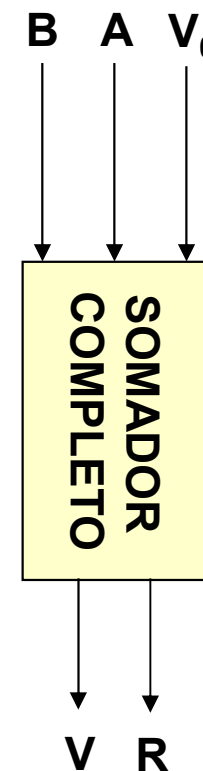
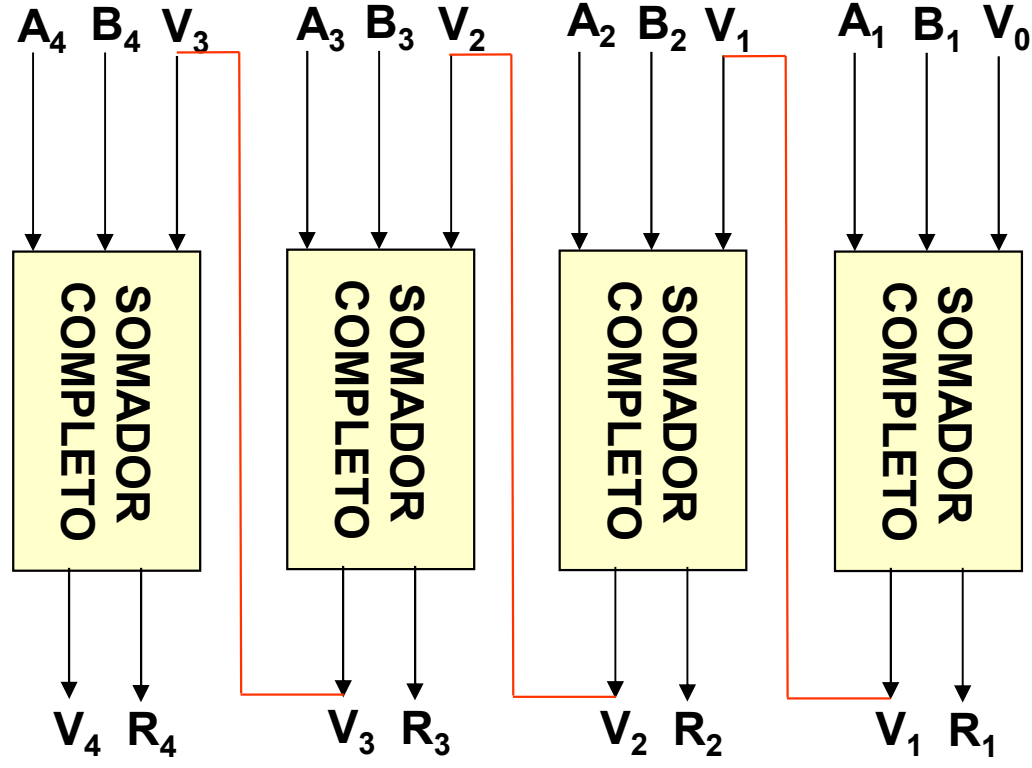
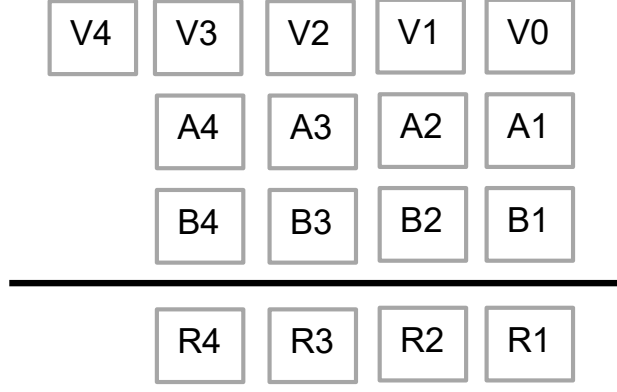


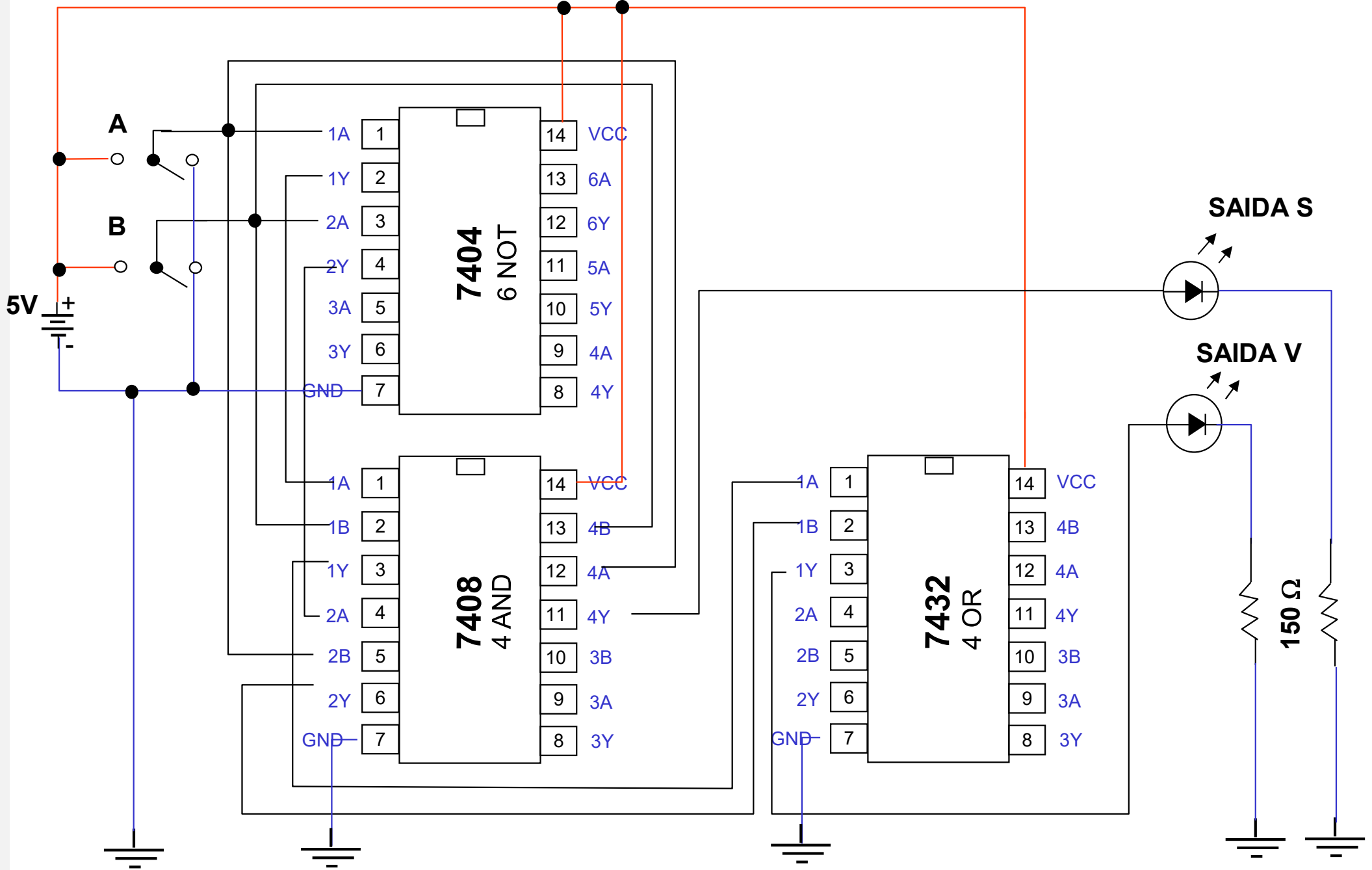
DIAGRAMA EM BLOCO



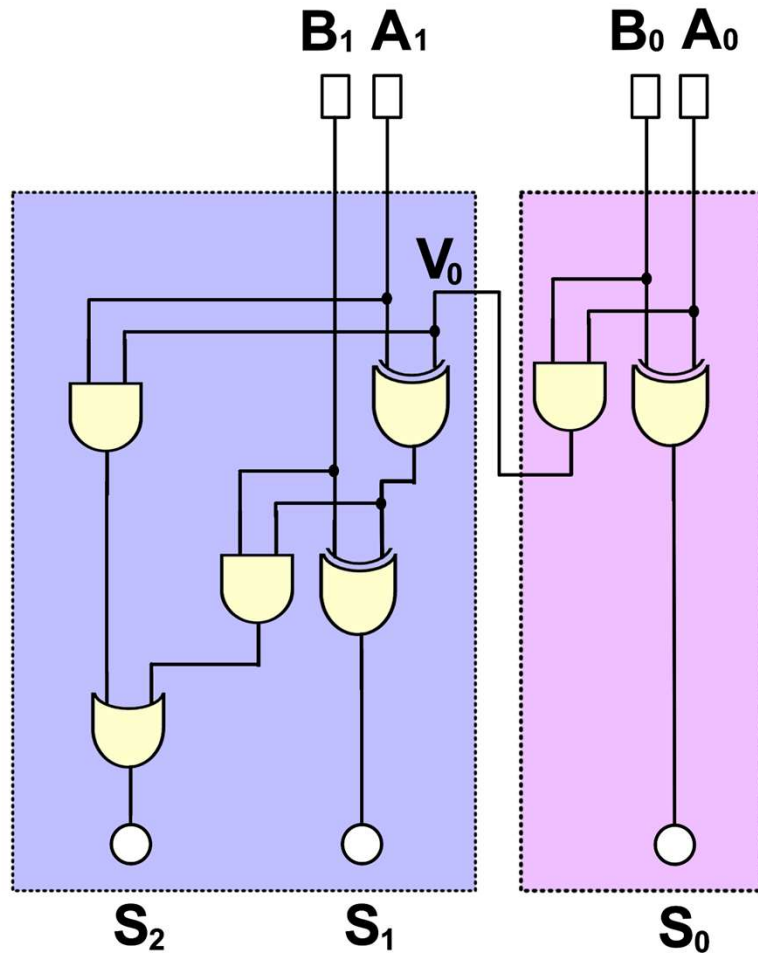
SOMADOR PARCIAL

CIRCUITOS LÓGICOS

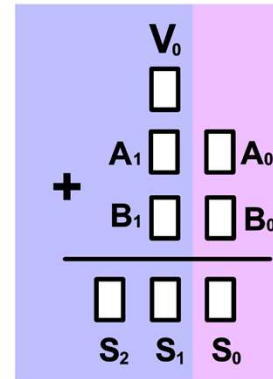
Prática de laboratório



UNIDADE ARITMÉTICA DE DOIS BITS



Soma 2 bits



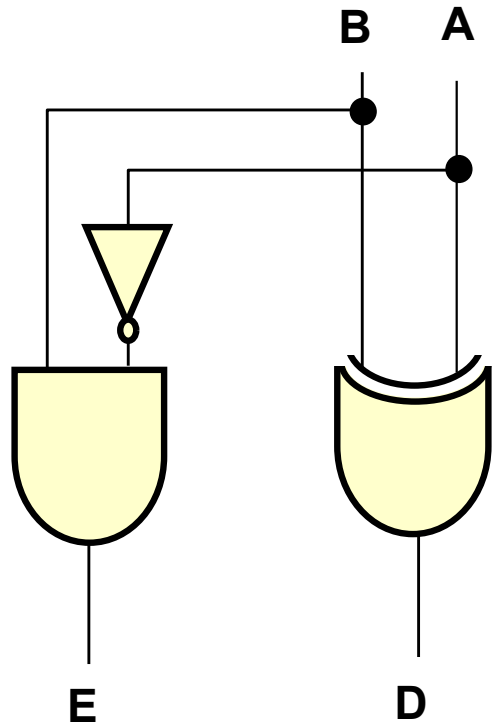
Portas Lógicas

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

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

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

SUBTRATOR PARCIAL



D = diferença
E = empréstimo

A	B	D	E
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

minuendo subtraendo

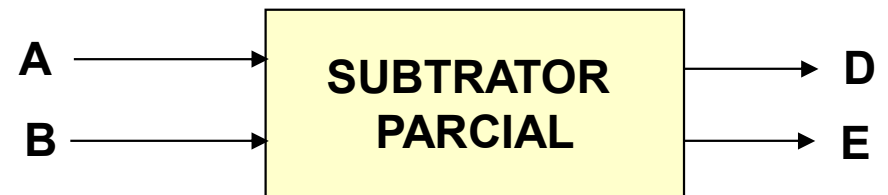
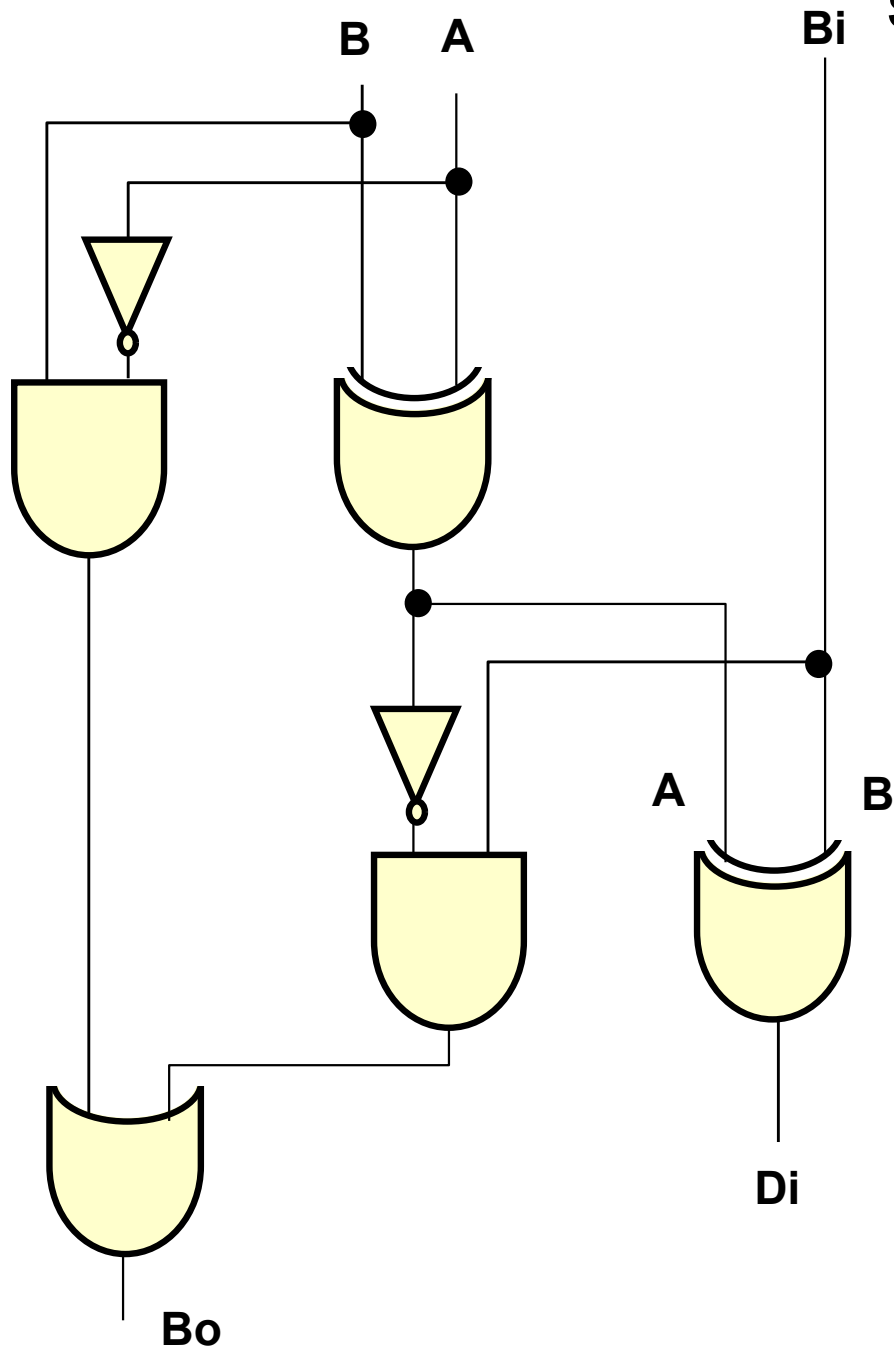


DIAGRAMA EM BLOCO

SUBTRATOR COMPLETO 3 BITS



A	B	Bi	Di	Bo
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

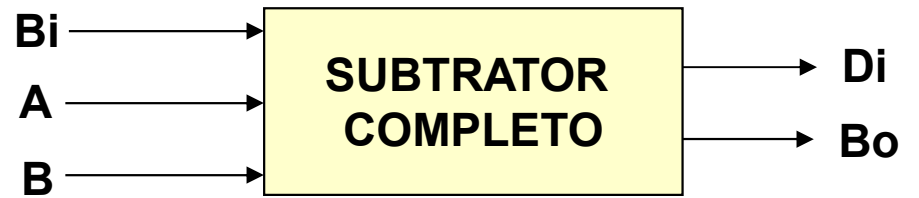


DIAGRAMA EM BLOCO

SUBTRAÇÃO EM COMPLEMENTO A DOIS

