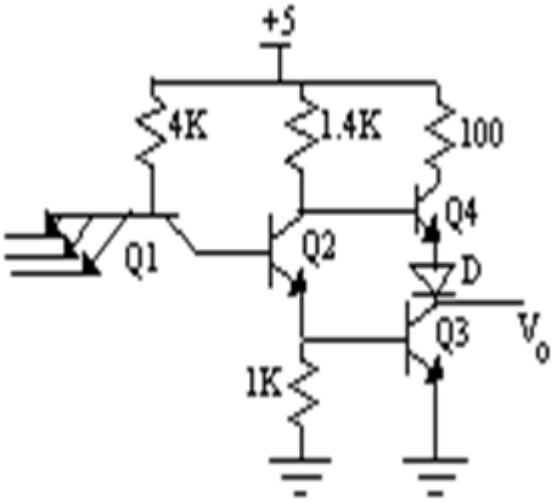
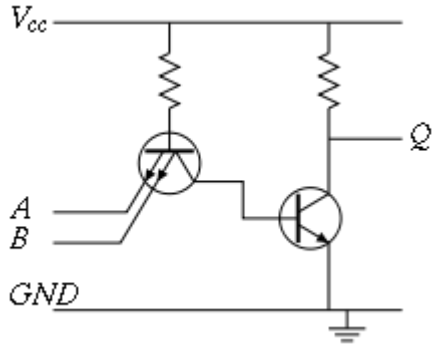
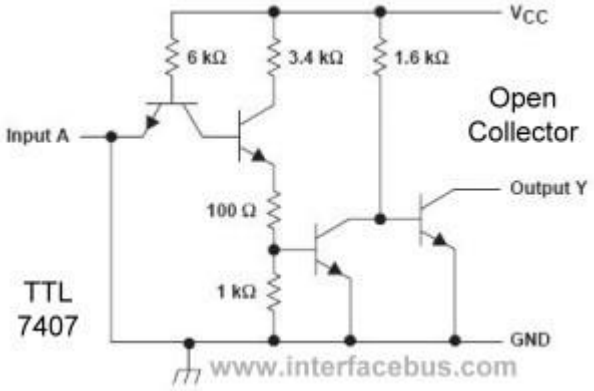
Funçoes Logicas

Os números 1 e 0 em cada casa binária são associados a Estados lógicos: High =Verdadeiro=1; Low= Falso=0.
Um conjunto de variáveis lógicas (digitais), A, B, C, D, pode refletir uma função lógica F(A,B, C, D). Os valores das variáveis e das funções resultantes ***só podem ser 1 ou 0***.

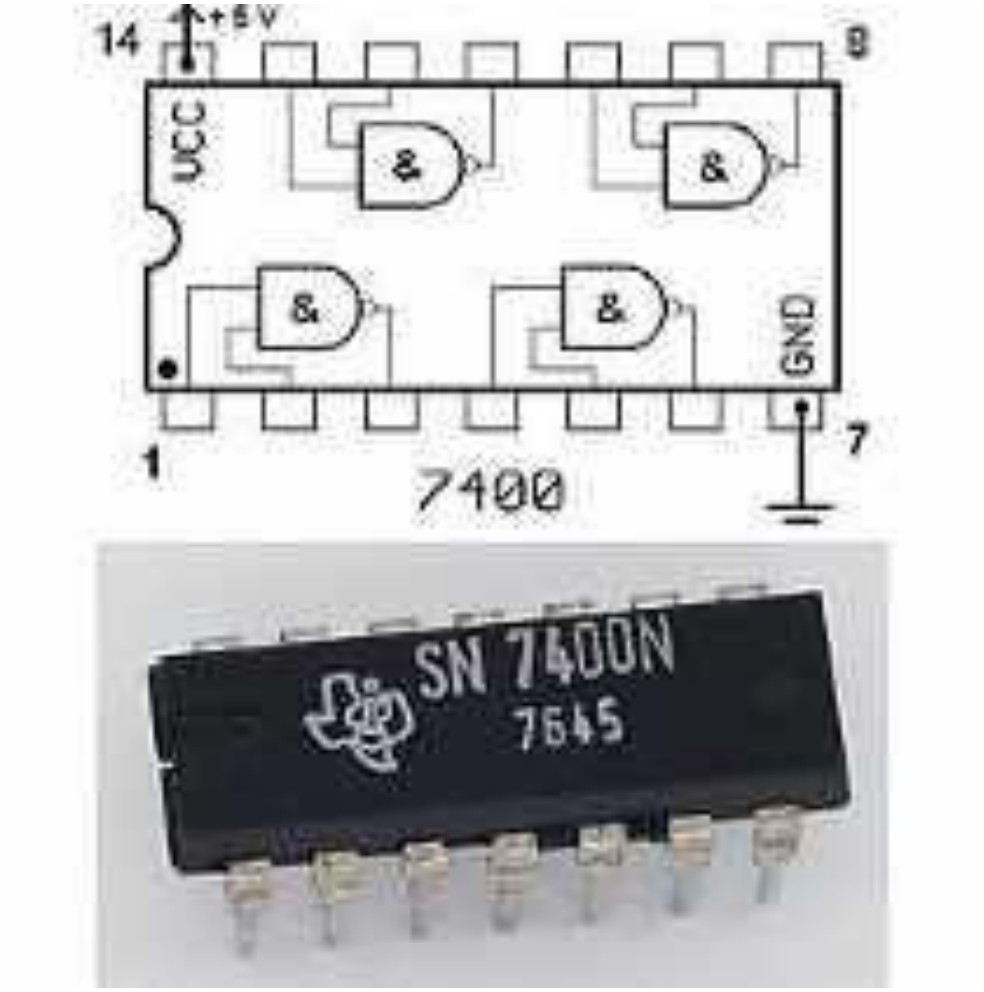
Circuito TTLO NAND. Saida “totem pole” e saida “open collector”



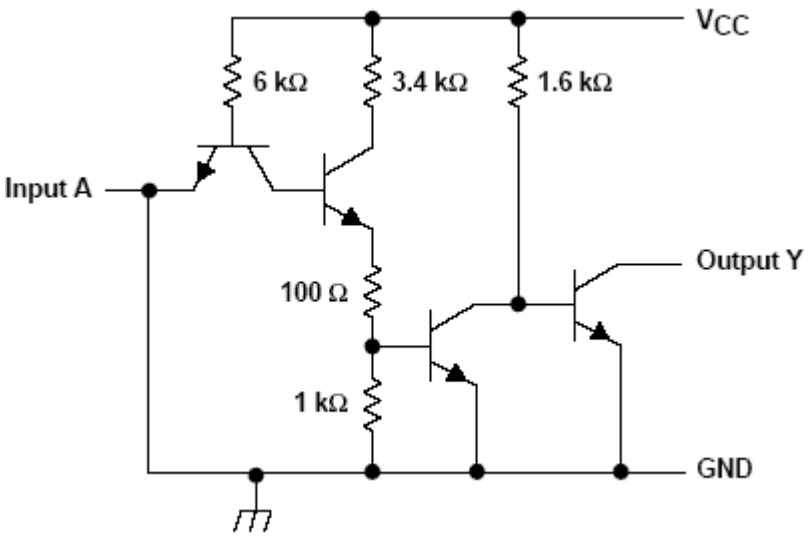


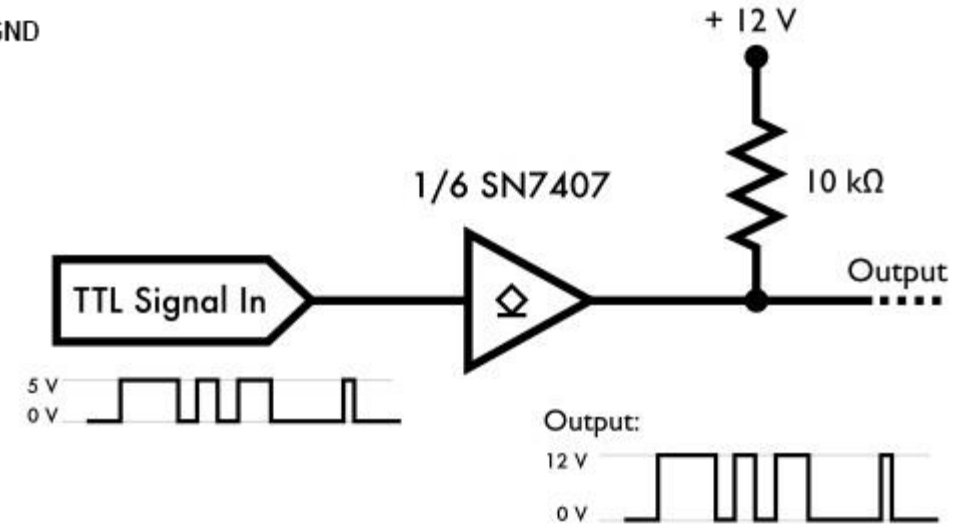


CI 7400



Open collector





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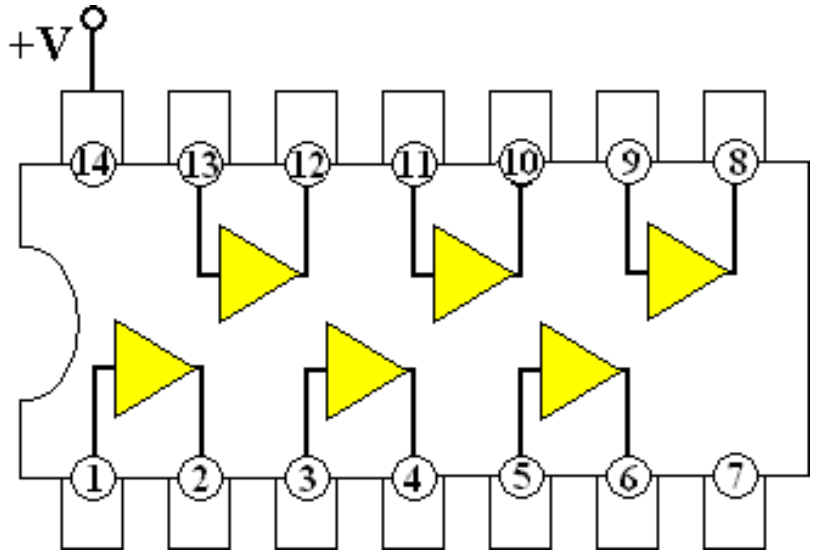
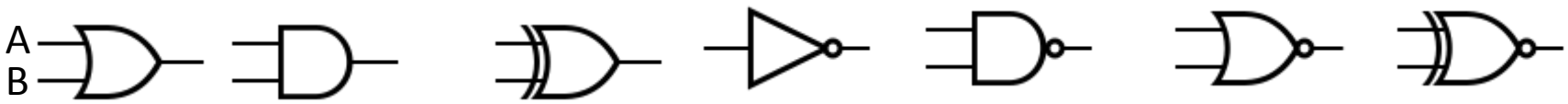


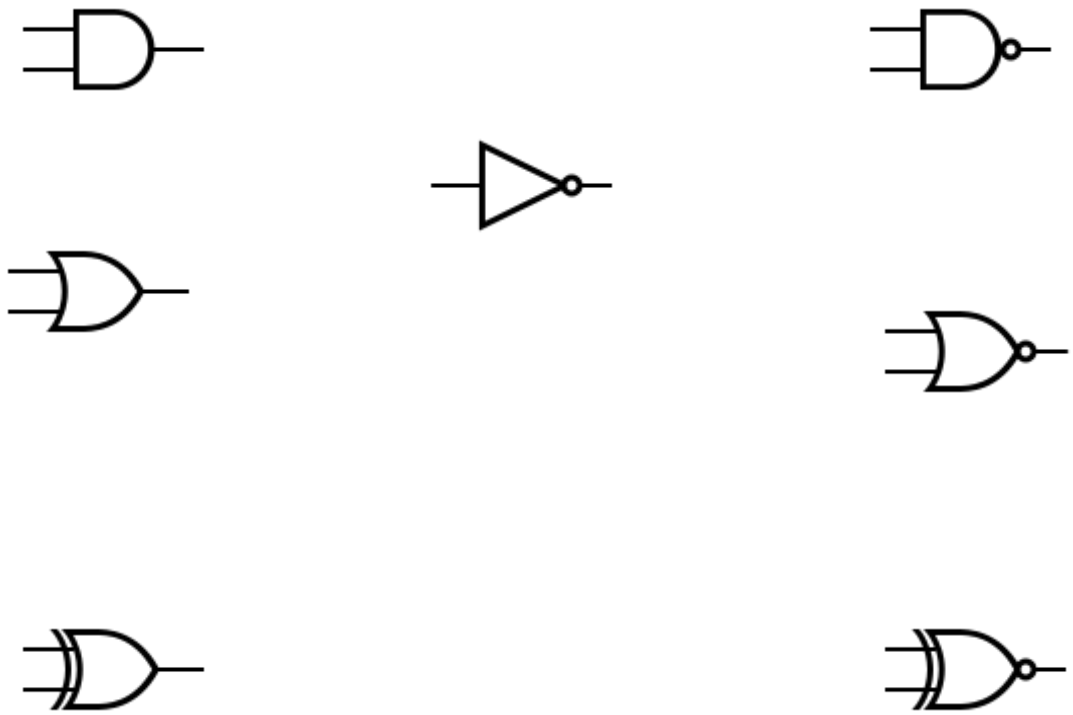
Funçoes lógicas

A funções mais comuns são: AND, OR, NOT, EXOR, NAND, NOR, conforme a Tabela abaixo.
Lembre que nas operações de OR (ou, soma) , AND (interseção, produto) , NOT (inversão, complemento) . Os elemento A, B, C, D, E só podem valer 1 ou 0.
A operação EXOR é conhecida como meia soma.

A	B	AND	NAND	OR	NOR	EXOR
0	0	0	1	0	1	0
0	1	0	1	1	0	1
1	0	0	1	1	0	1
1	1	1	0	1	0	0



Funçoes lógicas



Truth table

INPUT	OUTPUT
A	NOT A
0	1
1	0

INPUT		OUTPUT
A	B	A XNOR B
0	0	1
0	1	0
1	0	0
1	1	1

Algebra de Boole
e Mapas de Karnaugh

The Karnaugh map reduces the need for extensive calculations by taking advantage of humans' pattern-recognition capability. It also permits the rapid identification and elimination of potential race conditions.
The required boolean results are transferred from a truth table onto a two-dimensional grid where the cells are ordered in Gray code, and each cell position represents one combination of input conditions, while each cell value represents the corresponding output value. Optimal groups of 1s or 0s are identified, which represent the terms of a canonical form of the logic in the original truth table. These terms can be used to write a minimal boolean expression representing the required logic.
Karnaugh maps are used to simplify real-world logic requirements so that they can be implemented using a minimum number of physical logic gates.

Fim