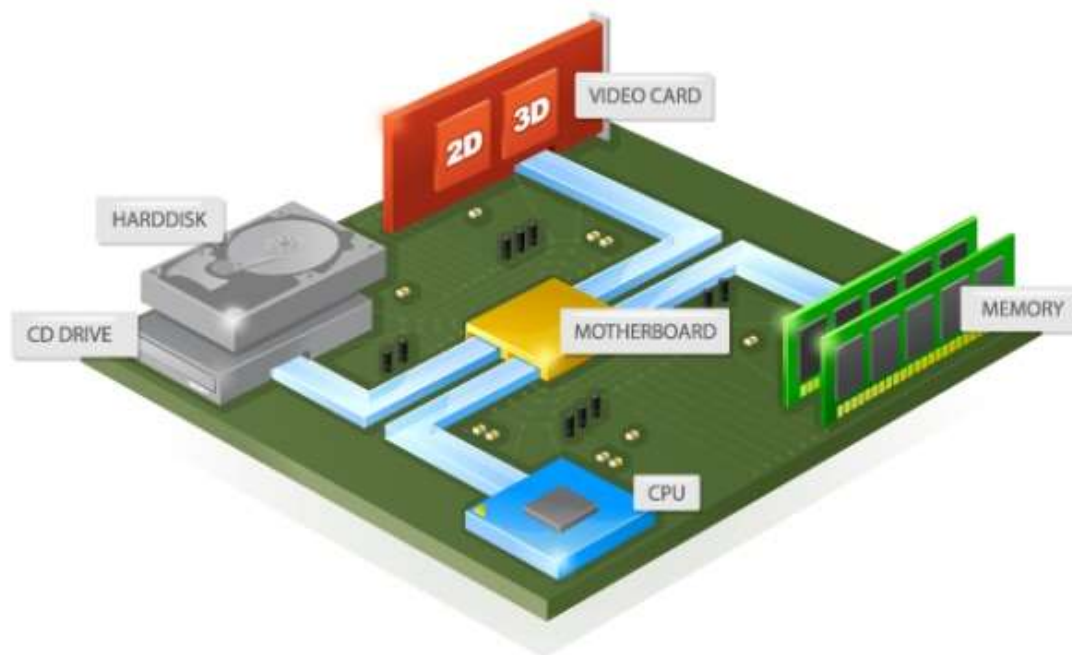




Pontifícia Universidade Católica de Minas Gerais

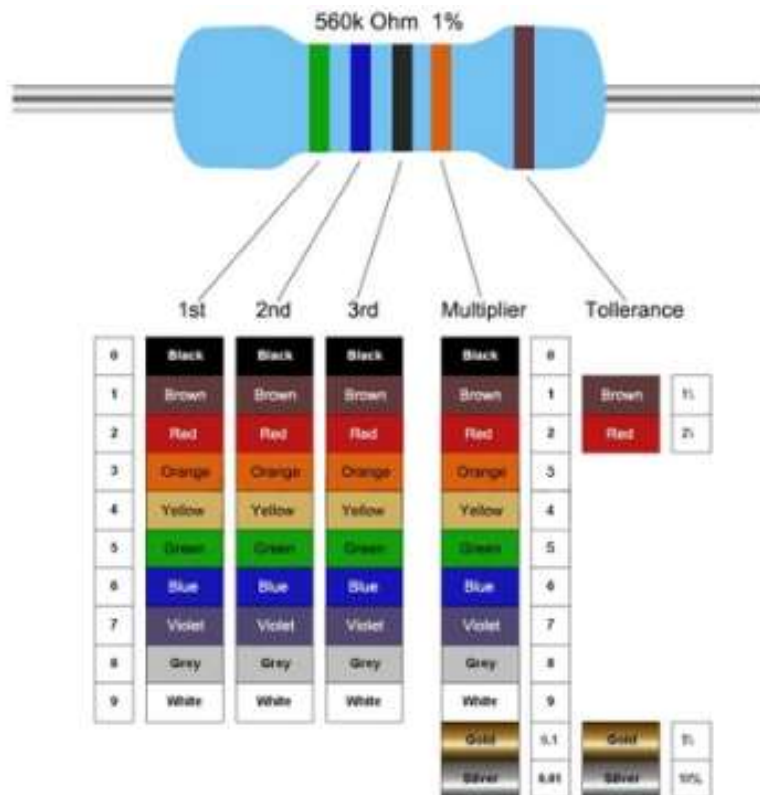
Introdução de Arquitetura de Computadores



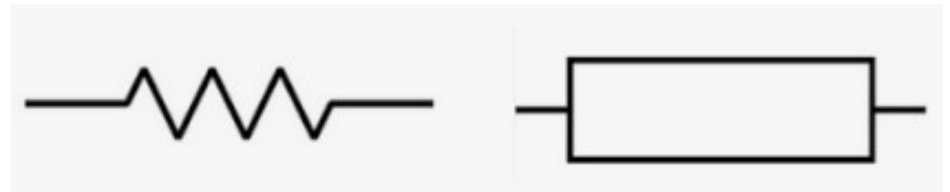
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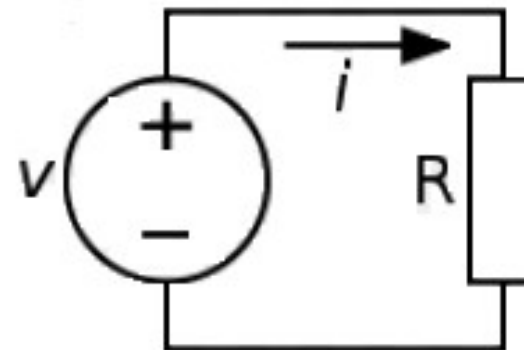
Resistor



Símbolo



$$V=R.i$$

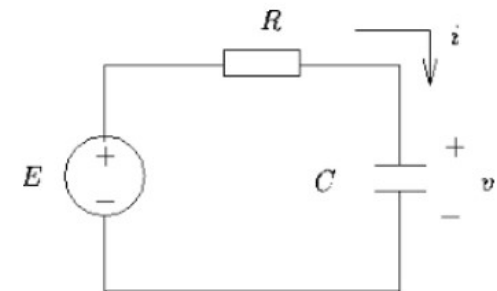
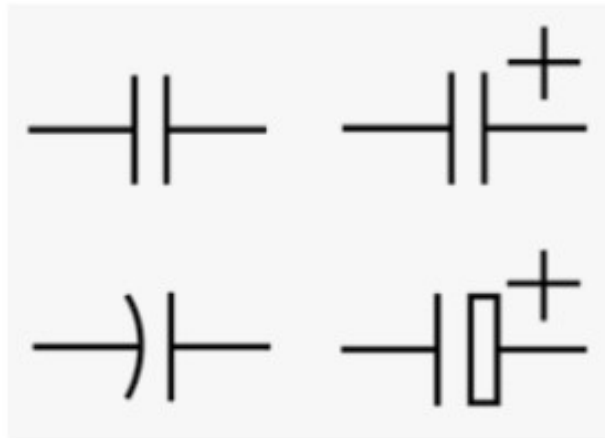


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Capacitor



Símbolo



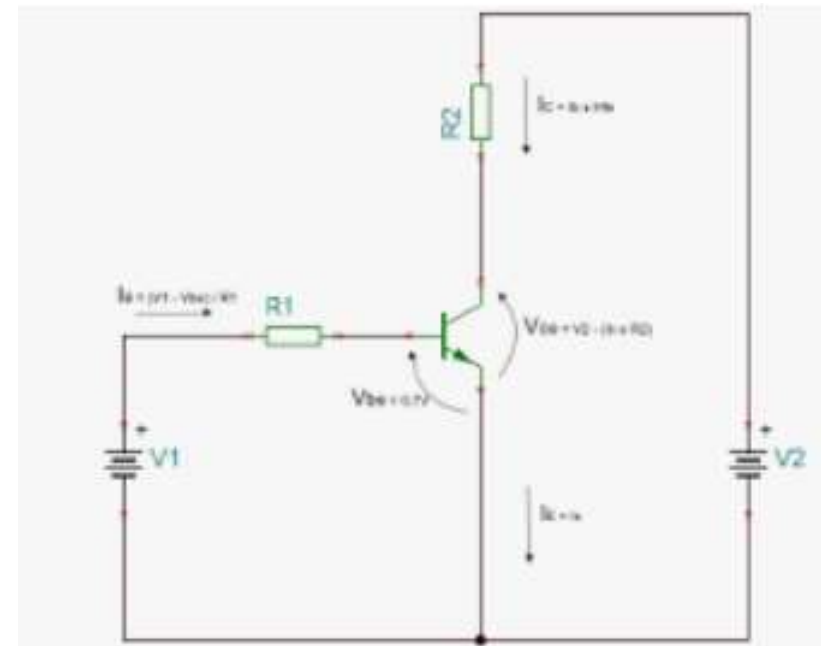
Filtragem de ruído
Temporização
Armazenar carga elétrica

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Transistor Bipolar

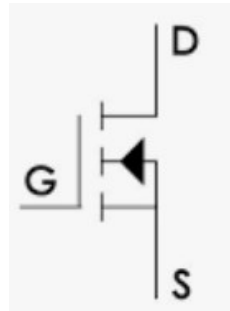


Amplificar sinais de corrente e tensão
Opera como chave
Base para circuitos lógicos da família TTL

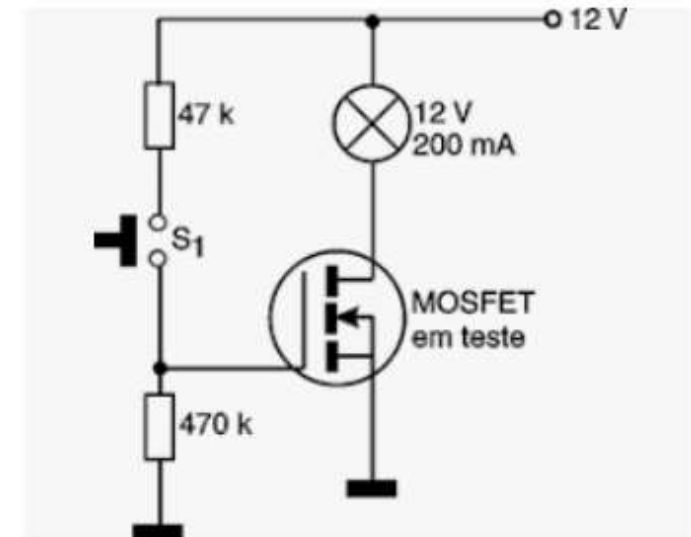


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Transistor MOSFET

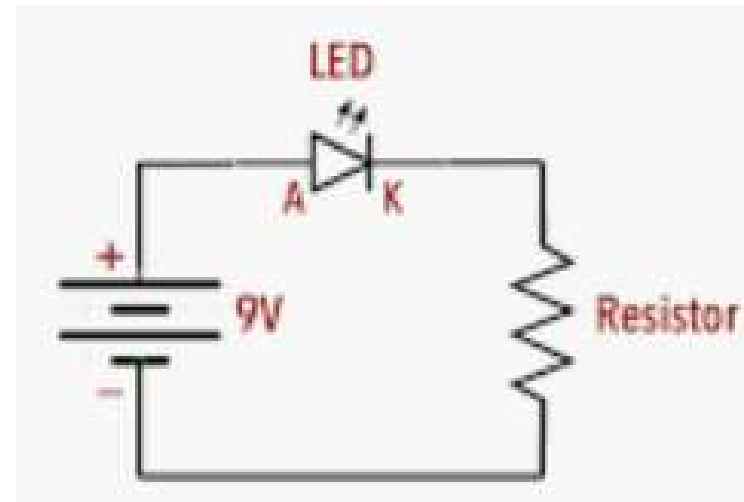
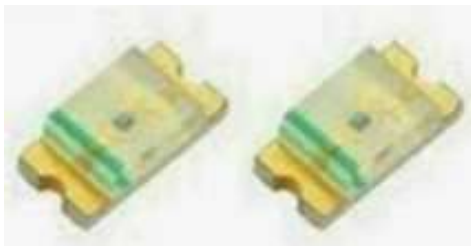
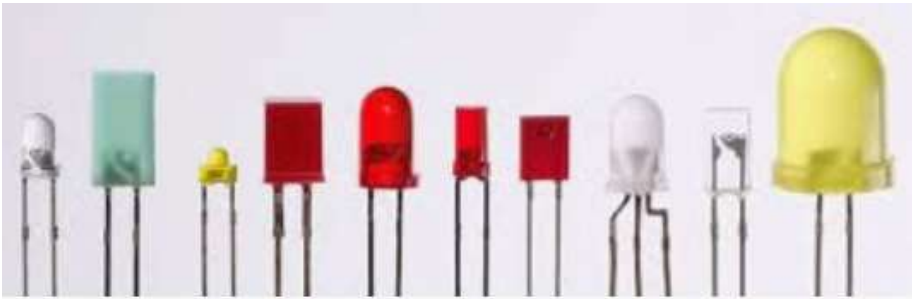


Amplificar sinais de tensão
Opera como chave
Base para circuitos lógicos da família CMOS



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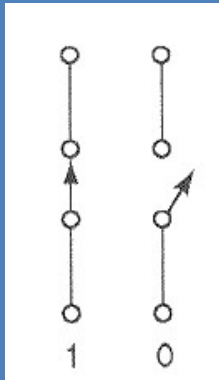
LED - Light Emitter Diode



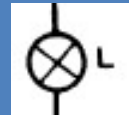
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Estados lógicos em sistemas digitais

Chave

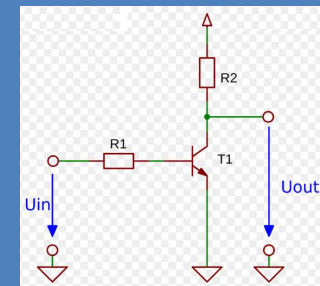


Lâmpada



Acesa = 1
Apagada = 0

Transistor



Saturado = 0
Cortado = 1



1



0

Disco rígido (HD)
Fita magnética)

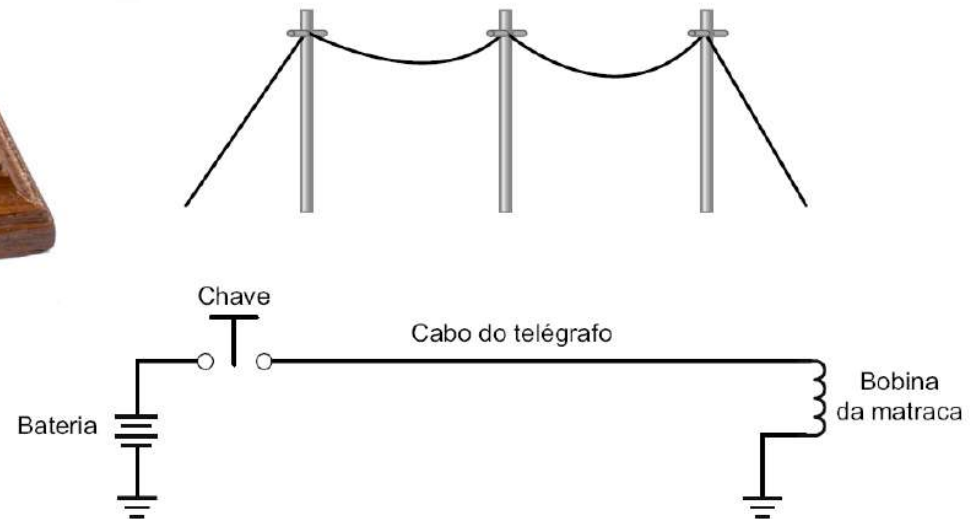
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Telégrafo



Fonte: shutterstock.com

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Telégrafo – Representação da informação

International Morse Code

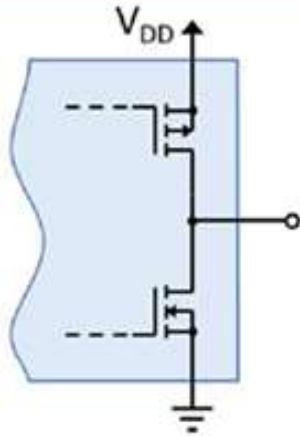
A	● —	Q	— ● —	1	● — — — —
B	— ● ● ●	R	● — ●	2	● ● — — —
C	— ● — ●	S	● ● ●	3	● ● ● — —
D	— ● ●	T	—	4	● ● ● ● —
E	●	U	● ● —	5	● ● ● ● ●
F	● ● — ●	V	● ● ● —	6	— ● ● ● ●
G	— — ●	W	● — —	7	— — — ● ●
H	● ● ● ●	X	— ● ● —	8	— — — — ●
I	● ●	Y	— ● — —	9	— — — — ●
J	● — — —	Z	— — ● ●	0	— — — — —
K	— ● —				
L	● — — ●	.	● — — — —	?	● ● — — — —
M	— —	,	— — — — —	/	— ● ● — —
N	— ●	!	— ● — — — —	=	— ● ● ● —
O	— — —				
P	● — — ●				
		SOS	● ● ● — — — —		

Telégrafo – Representação da informação

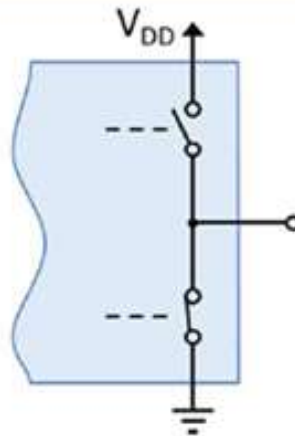
O diagrama ilustra um sistema de controle de velocidade baseado em chaveamento de tensão da bateria. A parte superior mostra a 'Tensão da bateria (chave pressionada)' com um gráfico de onda quadrada que alterna entre um nível alto e baixo. A parte inferior mostra o 'Chão (chave solta)' com um gráfico de onda quadrada que alterna entre um nível alto e baixo. O eixo horizontal representa o 'Tempo'. As legendas 'Traço' e 'Ponto' indicam os níveis de tensão da bateria.

Circuitos lógicos com transistor MOSFET

Estágio de saída típico de um circuito digital

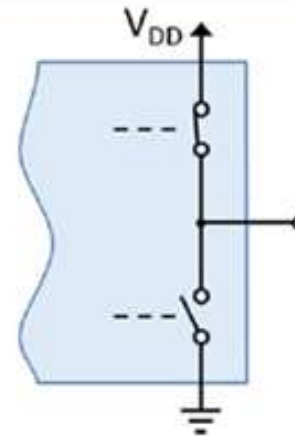


Circuito equivalente para nível lógico '0'



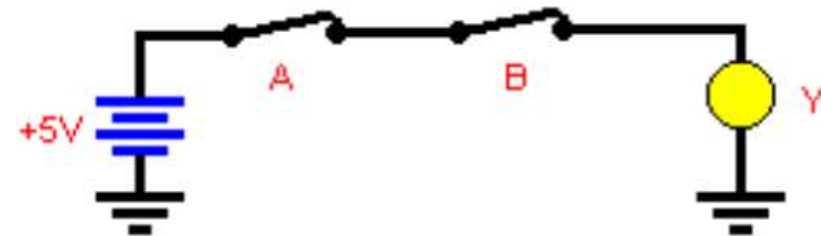
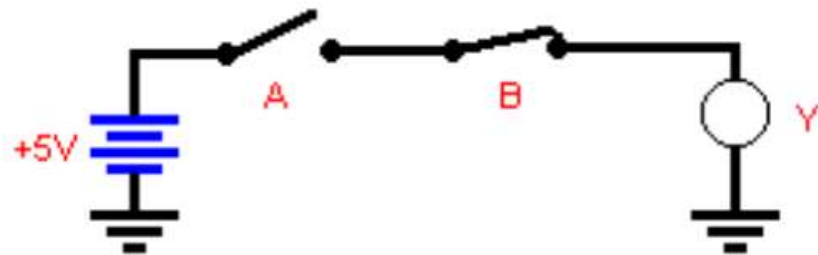
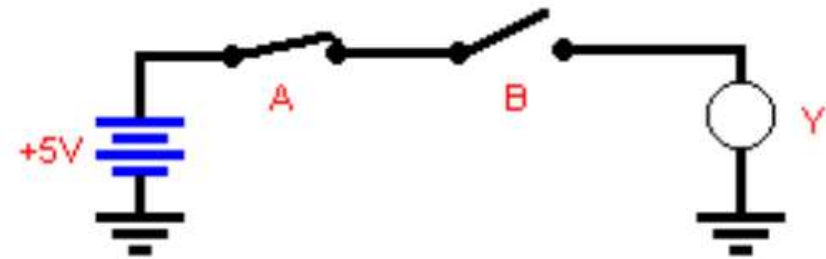
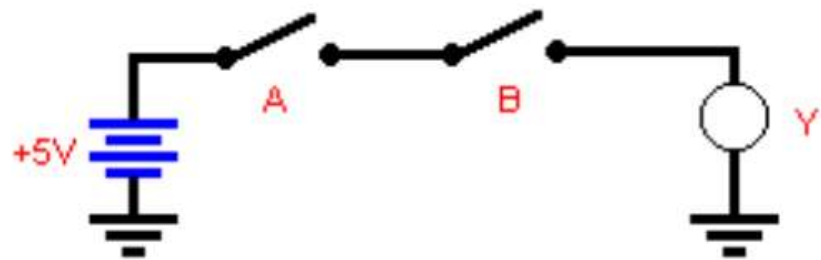
Tensão de saída próxima de 0V

Circuito equivalente para nível lógico '1'

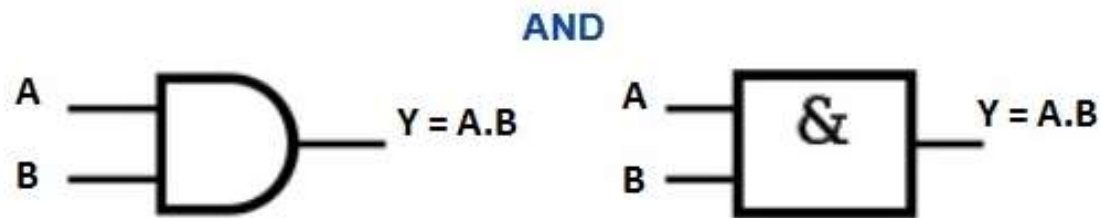


Tensão de saída próxima de V_{DD}

Circuitos lógicos com chaves e lâmpada

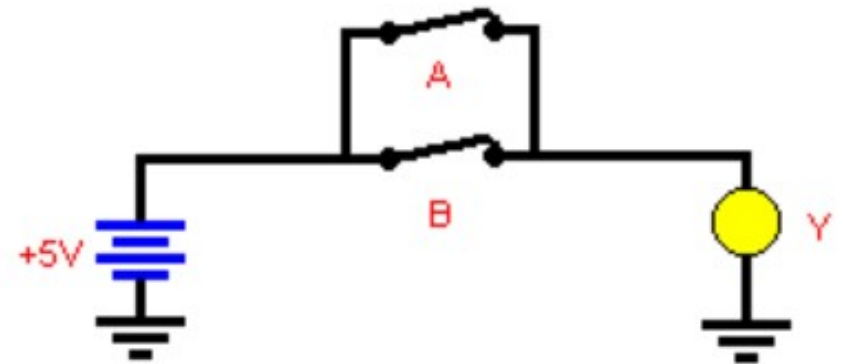
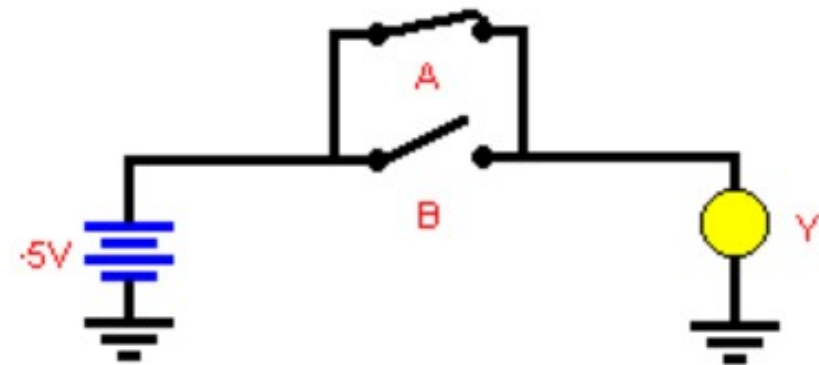
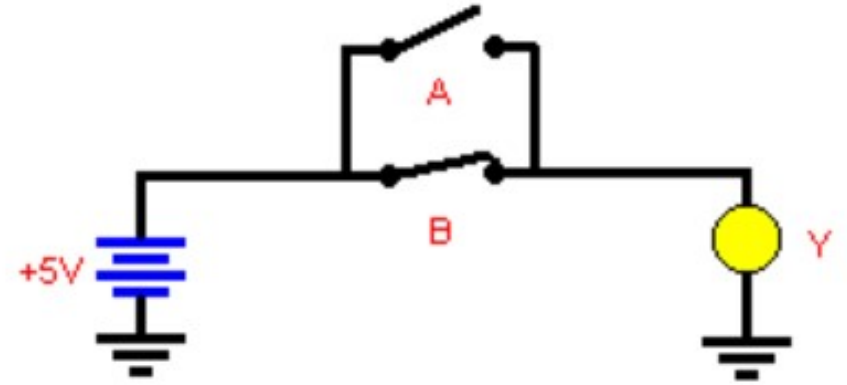
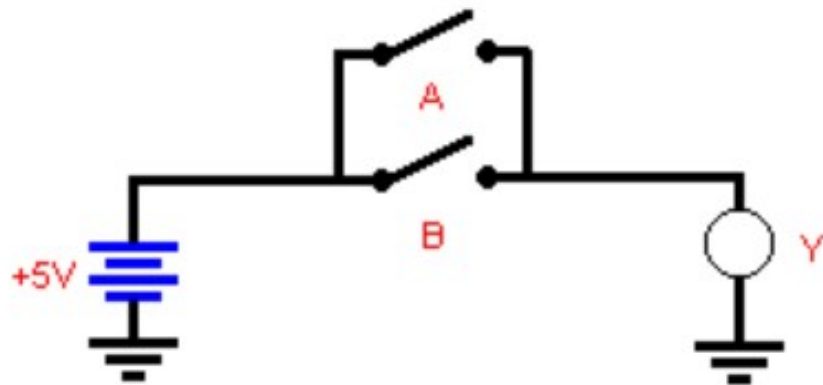


Circuitos lógicos com chaves e lâmpada

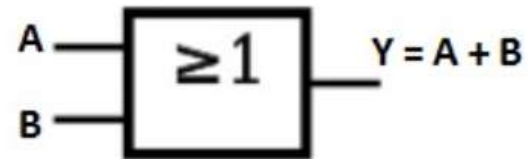
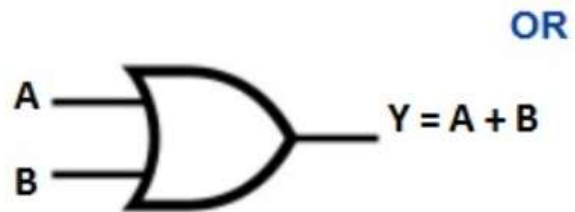


A	B	A AND B
0	0	0
0	1	0
1	0	0
1	1	1

Circuitos lógicos com chaves e lâmpada

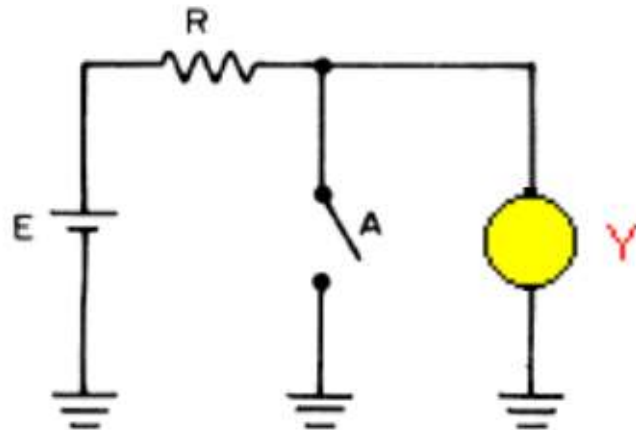
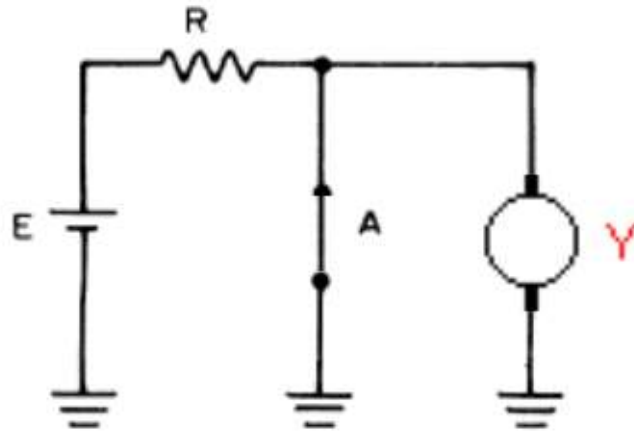


Circuitos lógicos com chaves e lâmpada

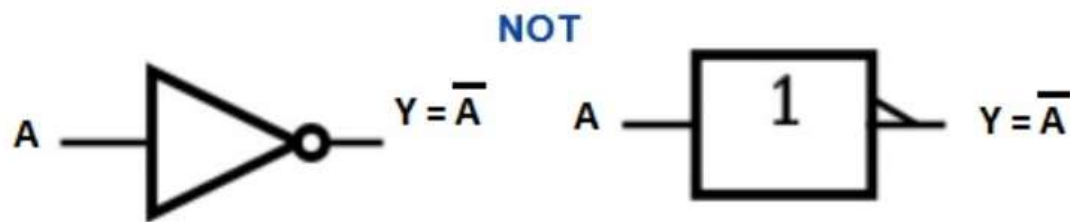


ENTRADA		SAÍDA
A	B	A OR B
0	0	0
0	1	1
1	0	1
1	1	1

Circuitos lógicos com chaves e lâmpada

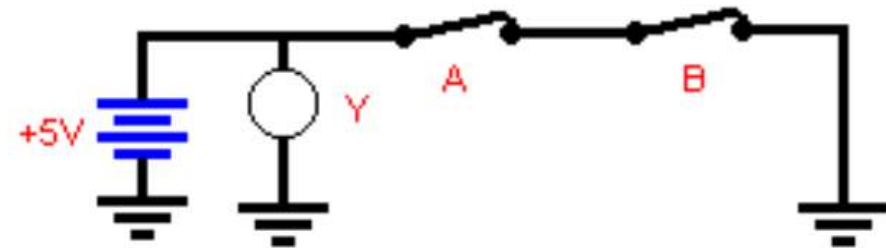
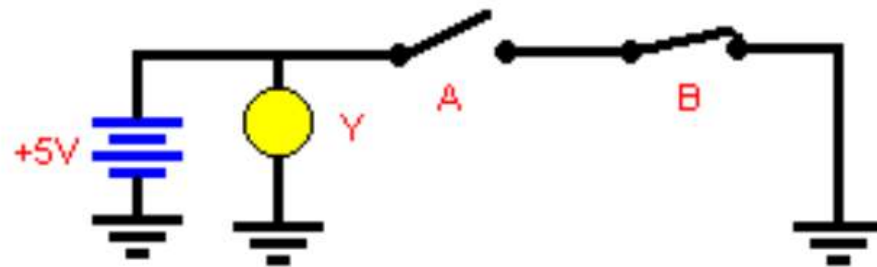
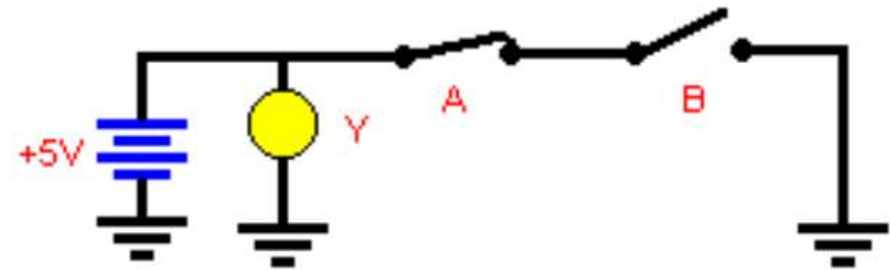
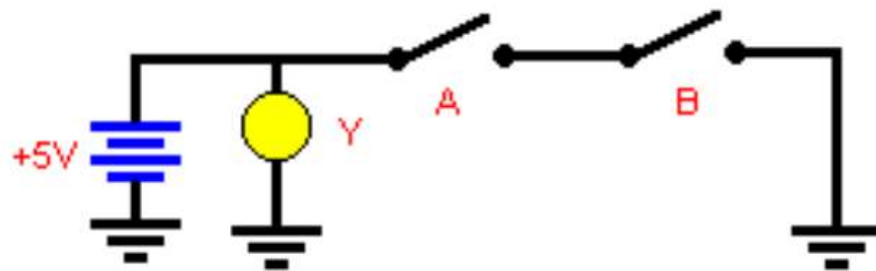


Circuitos lógicos com chaves e lâmpada

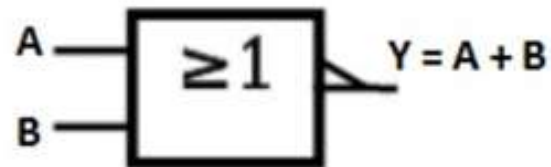
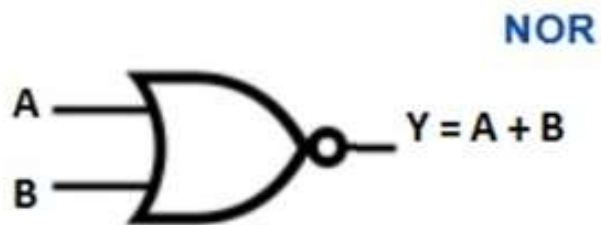


ENTRADA	SAÍDA
A	NOT A
0	1
1	0

Circuitos lógicos com chaves e lâmpada



Circuitos lógicos com chaves e lâmpada



ENTRADA		SAÍDA
A	B	$\overline{A \text{ OR } B}$
0	0	1
0	1	0
1	0	0
1	1	0

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Representação da informação

Sistema de numeração decimal

- Posicional
- Algarismos de 0 a 9
- Base 10

3 3 3 , 3

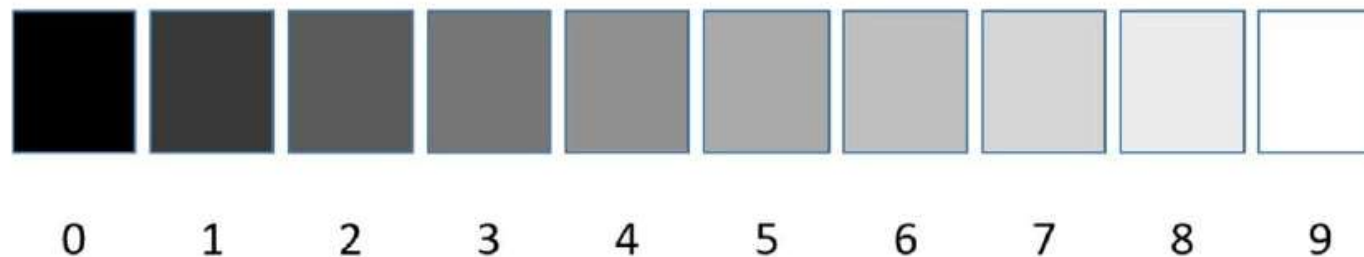
$3 = 3 \times 10^0$

$30 = 3 \times 10^1$

$300 = 3 \times 10^2$

$0,3 = 3 \times 10^{-1}$

Figura 0.1 – Sistema decimal em escala de cinzas



SISTEMAS DIGITAIS

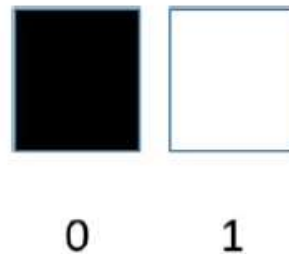
Representação da informação

Sistema de numeração binário

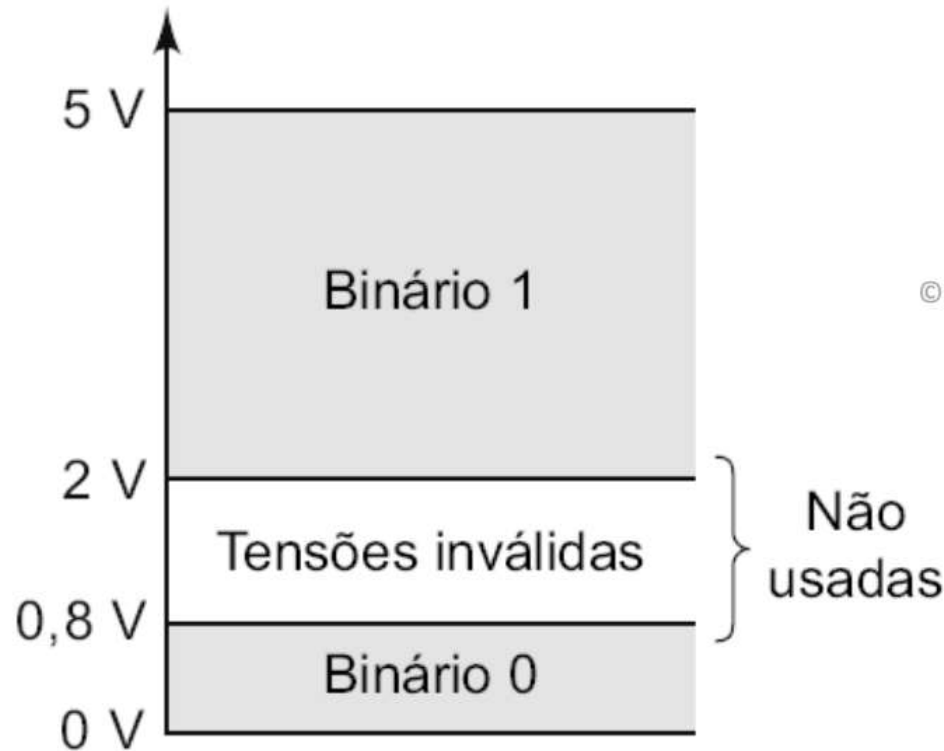
- Posicional
- Algarismos 0 e 1
- Base 2

$$\begin{aligned} 101,01_2 &= 1 \times 2^0 + 0 \times 2^1 + 1 \times 2^2 + 0 \times 2^{-1} + 1 \times 2^{-2} = 5 + 0,25 \\ &= 5,25_{10} \end{aligned}$$

Figura 0.2 – Sistema binário



Representação binária em circuitos eletrônicos



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(obs.: valores de tensão para a família lógica TTL)

Representação da informação

1 byte	8 bits
1 Kbyte	2^{10} bytes = 1024 bytes
1 Mbyte	2^{20} bytes = 1024^2 bytes
1 Gbyte	2^{30} bytes = 1024^3 bytes