

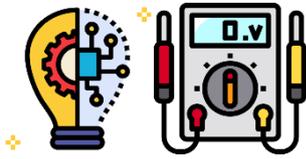
3. PORTAS LÓGICAS

COM CIRCUITOS INTEGRADOS

Portas Lógicas são dispositivos que operam e trabalham com um ou mais sinais lógicos de entrada para produzir uma e somente uma saída, dependente da função implementada no circuito.

Circuitos Lógicos são dispositivos que podem ter uma ou mais portas lógicas, de forma a rentabilizar o espaço em circuitos eletrónicos que se constroem com elas.

De seguida, para cada porta, apresentaremos a sua simbologia, a sua tabela de verdade, a configuração do circuito lógico que a implementa, o esquema no simulador e uma imagem real de montagem do circuito.

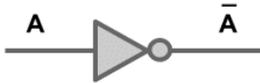


3.1. PORTAS LÓGICAS

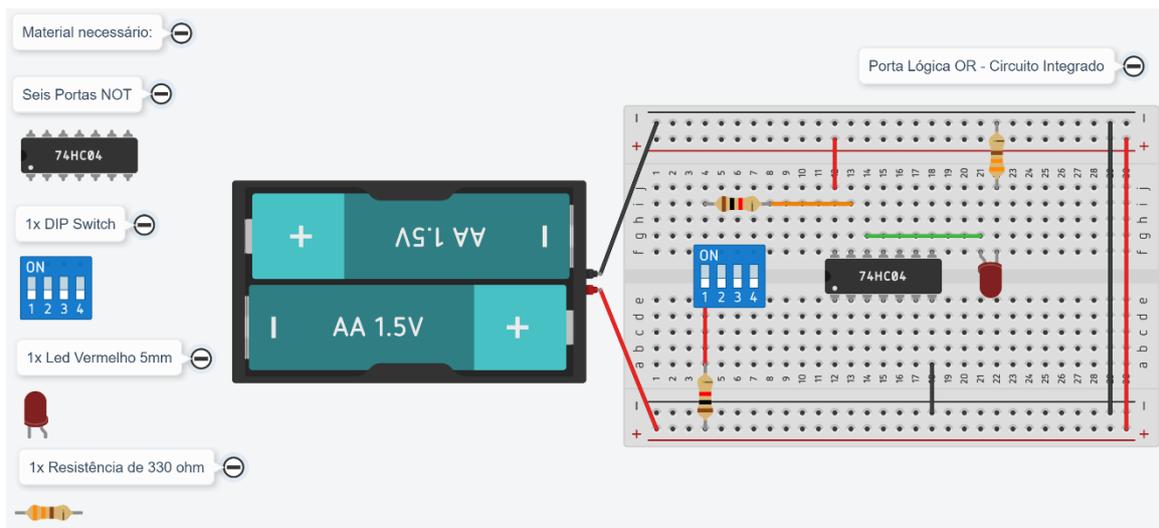
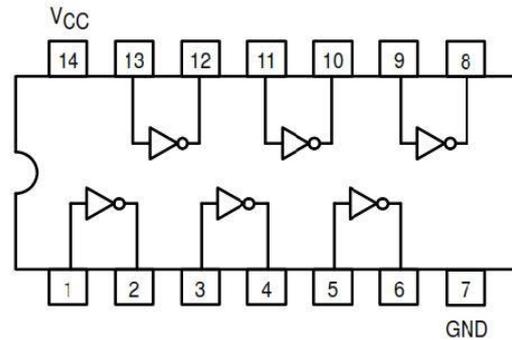
COM CIRCUITOS INTEGRADOS

NOT (74xx04):

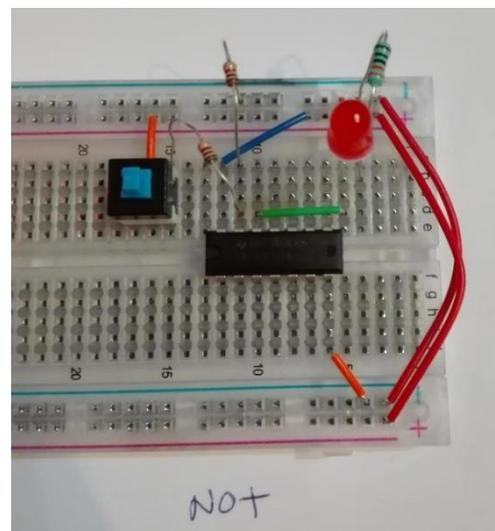
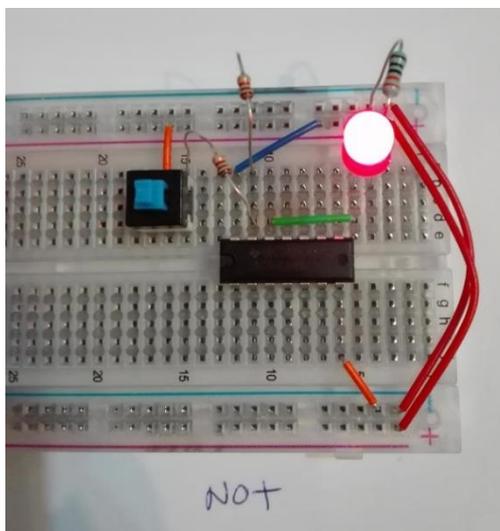
PORTA NÃO (NOT)

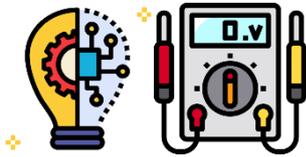


A	\bar{A}
0	1
1	0



Tinkercad: <https://www.tinkercad.com/things/hTFdSCBXfoN>



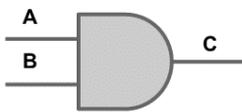


3.2. PORTAS LÓGICAS

COM CIRCUITOS INTEGRADOS

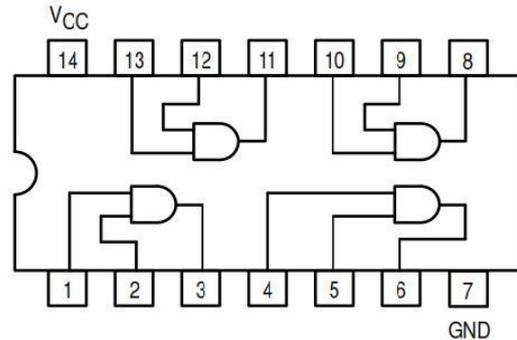
AND (74xx08):

PORTA E (AND)

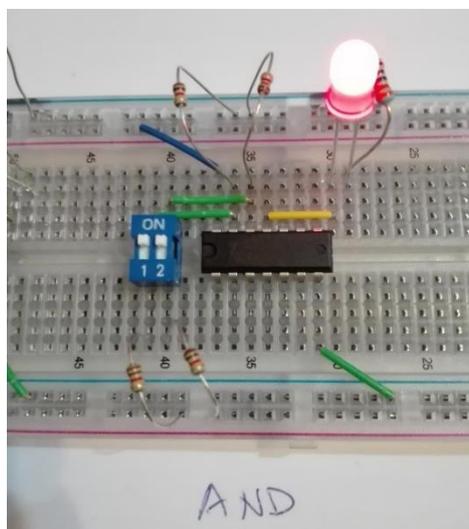


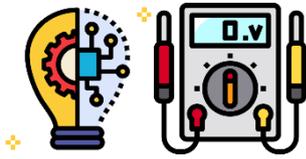
$$C = A \cdot B$$

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



Tinkercad: <https://www.tinkercad.com/things/jpO8U6lIPZZ>



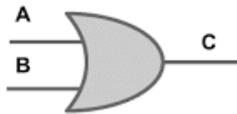


3.3. PORTAS LÓGICAS

COM CIRCUITOS INTEGRADOS

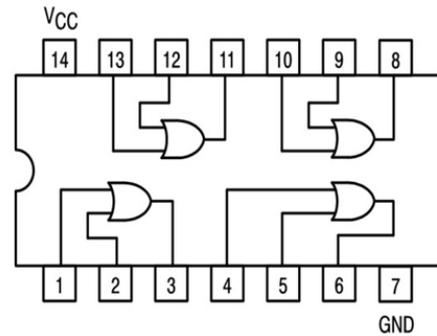
OR (74xx32):

PORTA OU (OR)



$$C = A + B$$

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

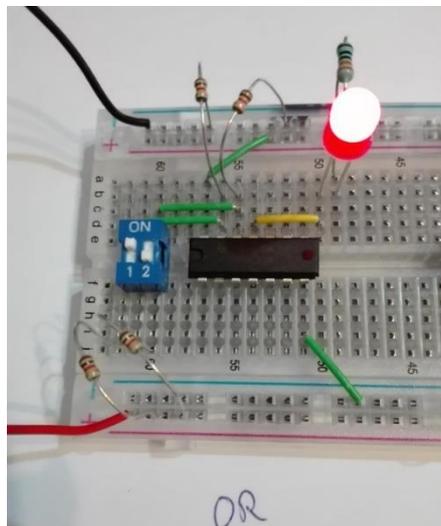


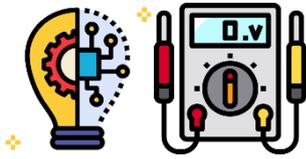
Material necessário:

- Quatro Portas OR
- 74HC32
- 1x DIP Switch
- 1x Led Vermelho 5mm
- 1x Resistência de 330 ohm

Porta Lógica OR - Circuito Integrado

Tinkercad: <https://www.tinkercad.com/things/6dohr97NpvM>

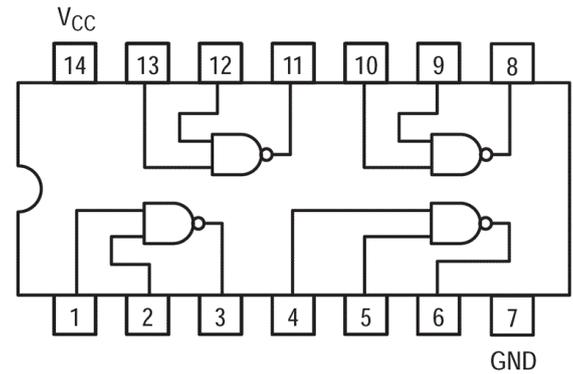
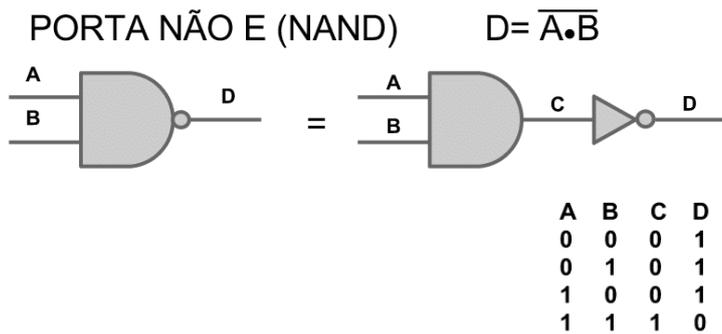




3.4. PORTAS LÓGICAS

COM CIRCUITOS INTEGRADOS

NAND (74xx00):

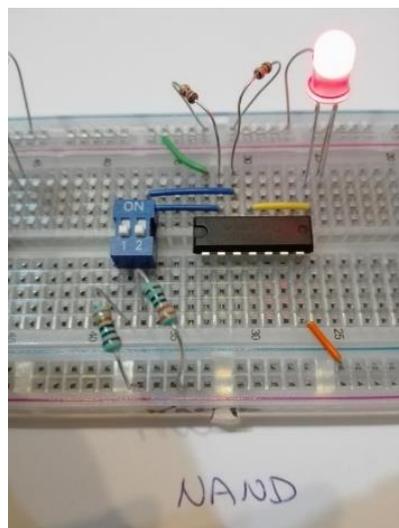


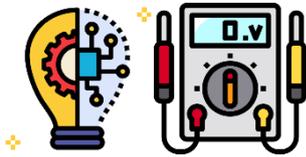
Material necessário:

- 4 Portas NAND
- 74HC00
- 1x DIP Switch
- 1x Led Vermelho 5 mm
- 1x Resistência de 330 ohm

Porta Lógica NAND - Circuito integrado

Tinkercad: <https://www.tinkercad.com/things/hXD32dnfxqg>





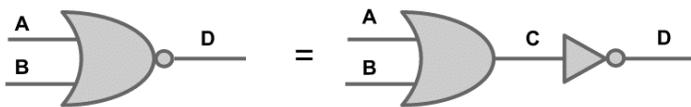
3.5. PORTAS LÓGICAS

COM CIRCUITOS INTEGRADOS

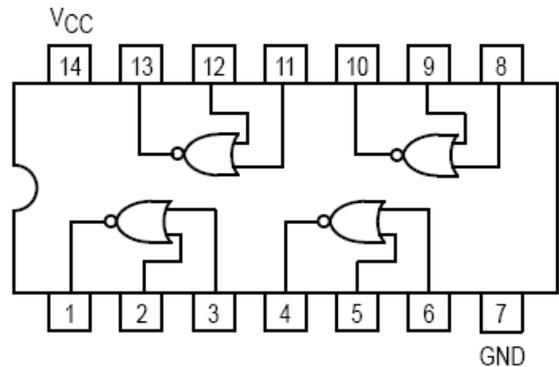
NOR (74xx02):

PORTA NÃO OU (NOR)

$$D = \overline{A+B}$$



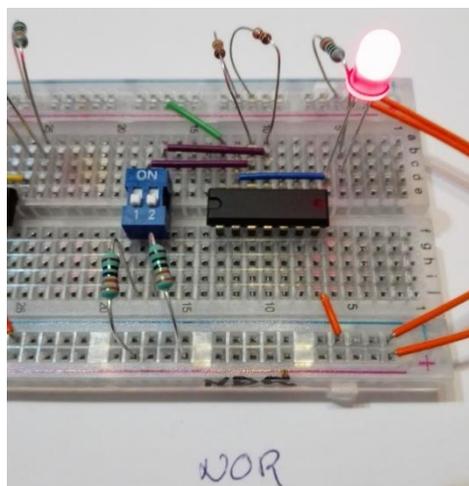
A	B	C	D
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

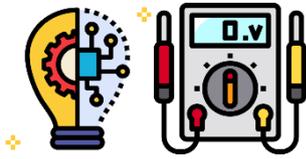


Material necessário:

- Porta Lógica NOR - Circuito Integrado
- Quatro Portas NOR
- 74HC02
- 1x DIP Switch
- 1x Led Vermelho 5mm
- 3x Resistências de 330 ohm

Tinkercad: <https://www.tinkercad.com/things/fPtv3L1h9gV>



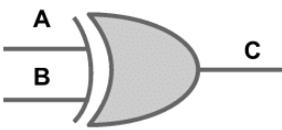


3.6. PORTAS LÓGICAS

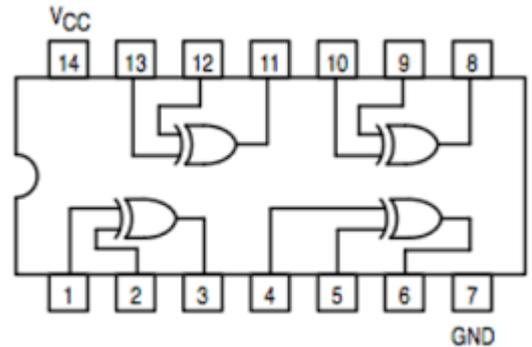
COM CIRCUITOS INTEGRADOS

XOR (74xx86):

PORTA OU EXCLUSIVO (XOR) $C=A \oplus B$



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



Material Necessário:

Porta Lógica XOR - Circuito Integrado

Quatro Portas XOR

74HC86

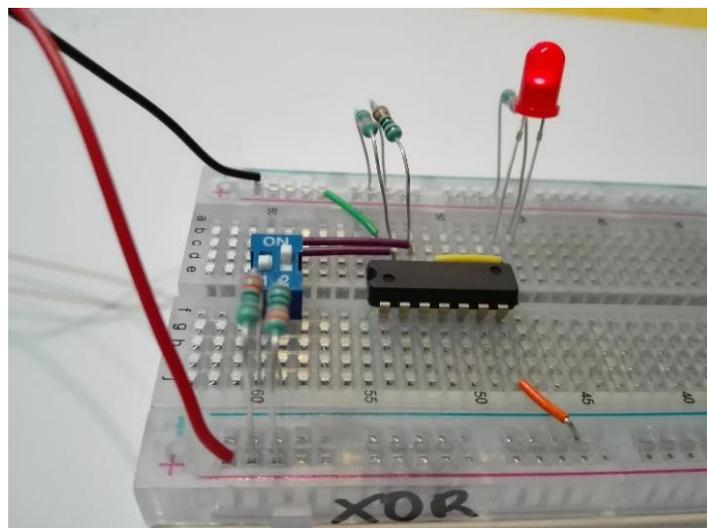
1x DIP Switch

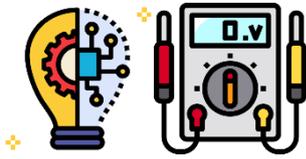
ON
1 2 3 4

1x Led Vermelho 5mm

3x Resistências de 470 ohm e 10 kohm

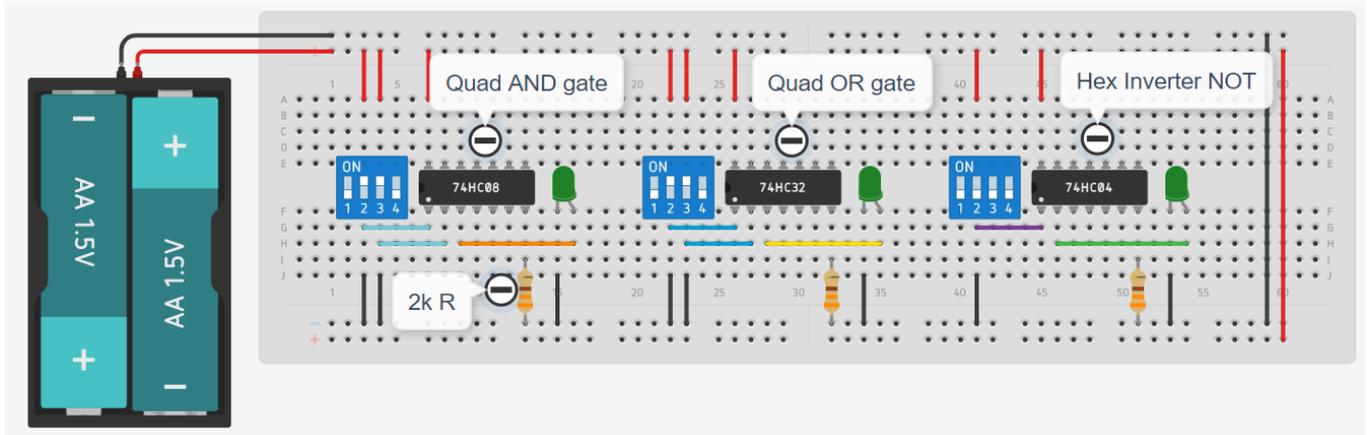
Tinkercad: <https://www.tinkercad.com/things/4rc7XmNYrXb>



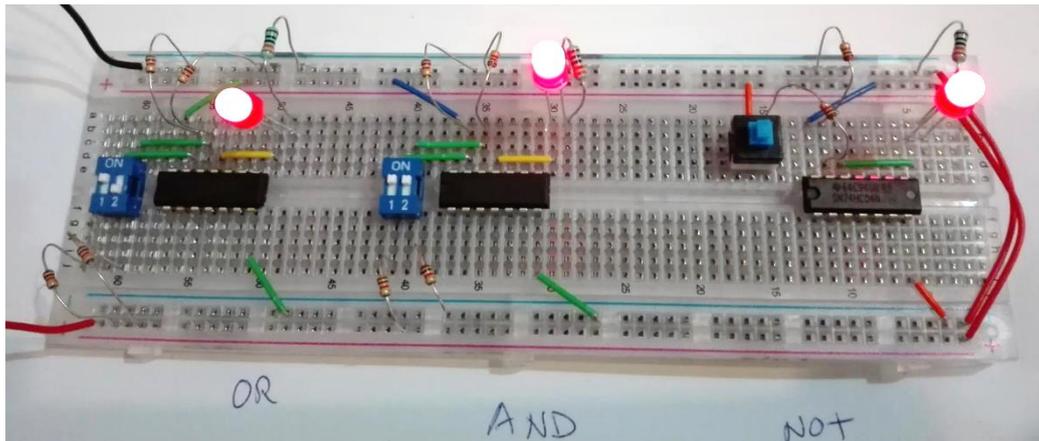


AND, OR e NOT

Para exemplificar o funcionamento das portas, podemos colocá-las todas na mesma *board*:



Tinkercad: <https://www.tinkercad.com/things/ctv0oXPYRdi>



NAND, NOR e XOR

