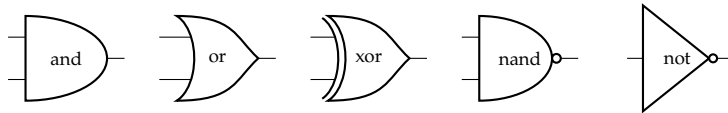


## Boolean Logic Gates

ian.mcloughlin@atu.ie

Last updated: 16 September 2023

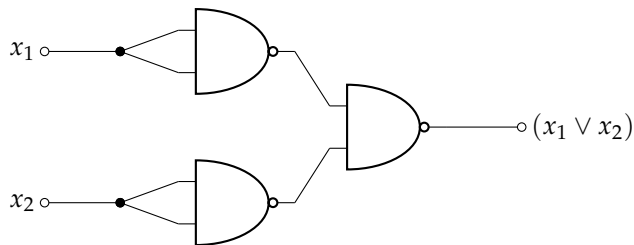
### Gates



### Tables

$x_1$	$x_2$	$\wedge$	$\vee$	$\oplus$	$\bar{\wedge}$	$\bar{x}_1$
0	0	0	0	0	1	1
0	1	0	1	1	1	1
1	0	0	1	1	1	0
1	1	1	1	0	0	0

### Universal nand



Nand logic - wikipedia, 2023. URL  
[https://en.wikipedia.org/wiki/NAND\\_logic](https://en.wikipedia.org/wiki/NAND_logic)

$x_1$	$x_2$	$x_1 \bar{\wedge} x_1$	$x_2 \bar{\wedge} x_2$	$\bar{\wedge}$	$x_1 \vee x_2$
0	0	1	1	0	0
0	1	1	0	1	1
1	0	0	1	1	1
1	1	0	0	1	1

### All Possible One-Bit Gates

$g_i : \{0,1\} \rightarrow \{0,1\}$

$x$	$g_0$	$g_1$	$g_2$	$g_3$
0	0	0	1	1
1	0	1	0	1

### All Possible Two-Bit Gates

$$g_i : \{0, 1\}^2 \rightarrow \{0, 1\}$$

[illegible]