# NOT Gate

The NOT gate is also known as an inverter because the output is the exact opposite of the input. It has one input and one output. The two possibilities are written out in the table below. Tables listing all logical possibilities like this are known as *truth tables*.

| Input | Output |
|-------|--------|
| 0 | 1 |
| 1 | 0 |

# AND Gate

The AND gate has two inputs and one output. The output is 1 if *both* inputs are 1, and for all other cases the output is 0.

| Input 1 | Input 2 | Output |
|---------|---------|--------|

| 0 | 0 | 0 |
| --- | --- | --- |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 1 | 1 |

# NAND Gate

The NAND gate behaves in the opposite fashion to an AND gate. You can think of it as an AND gate followed immediately by a NOT gate. Its output is 0 when the two inputs are 1, and for all other cases, its output is 1. The name NAND comes from joining NOT and AND. The symbol for NAND is the same as that for AND except for the addition of a small circle on the right side.

| Input 1 | Input 2 | Output |
|---------|---------|--------|
| 0 | 0 | 1 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 0 |

## OR Gate

The OR gate has two inputs and one output. If at least one of the inputs is 1, then the output will be 1. If neither input is 1, the output will be 0.

| Input 1 | Input 2 | Output |
|---------|---------|--------|
| 0 | 0 | 0 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 1 |

## NOR Gate

Just as the NAND gate could be thought of as an AND followed by a NOT, a NOR can be thought of as an OR also followed by a NOT.

| Input 1 | Input 2 | Output |
| --- | --- | --- |
| 0 | 0 | 1 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 1 | 0 |

# XOR Gate

With an OR gate, if both inputs were 1, the output was 1. However, with an XOR, (exclusive OR), if both inputs are 1, the output is 0. For all other scenarios, the XOR behaves the same as the OR.

| Input 1 | Input 2 | Output |
|---------|---------|--------|
| 0 | 0 | 0 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 0 |