

What is a Logic Gate?

A **logic gate** is an electronic circuit designed by using electronic components like diodes, transistors, resistors, and more. It performs basic logic functions that are fundamental to digital circuits. Logic gates can be found in many digital electronics such as smart phones, tablets or even in memory devices (hard disk, USB, Cache Memory) etc.

The logic gates can be classified into 3 groups:

1. Basic Logic Gates

1. AND Gate
2. OR Gate
3. NOT Gate

2. Universal Logic Gates

1. NOR Gate
2. NAND Gate

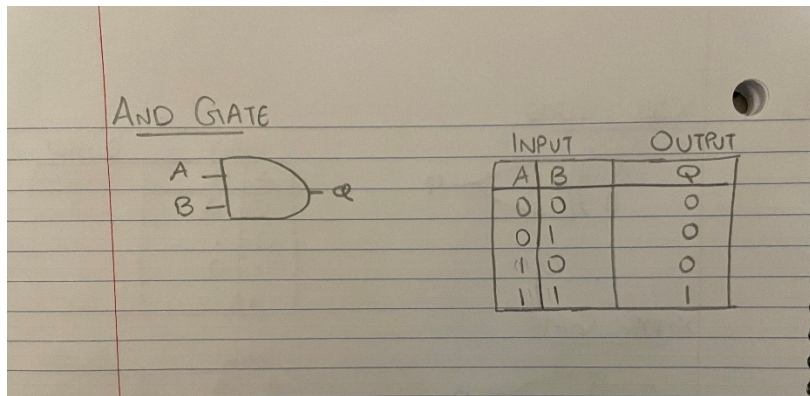
3. Arithmetic Logic Gates

1. XOR Gate
2. XNOR Gate

Logic Gates Explained

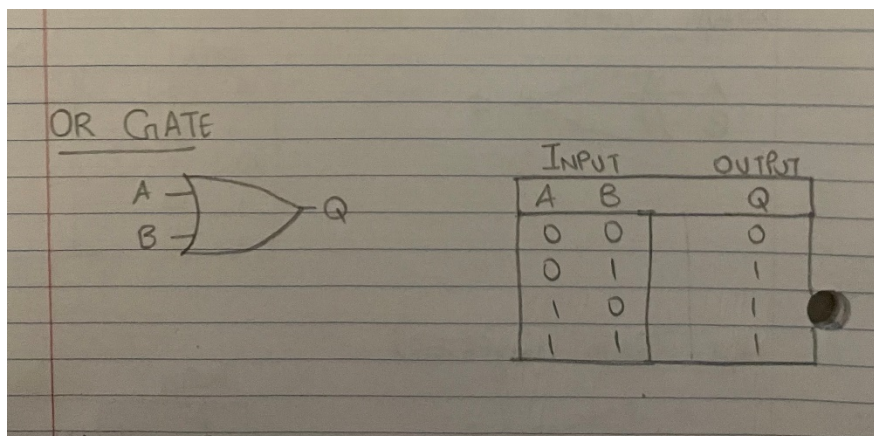
AND Gate

The AND gate works like the logical "and" operator. If you think of 0 as false and 1 as true, this gate gives a true (1) output only when both inputs are true (1). So, the output is 1 only if both inputs are 1; otherwise, the output is 0.



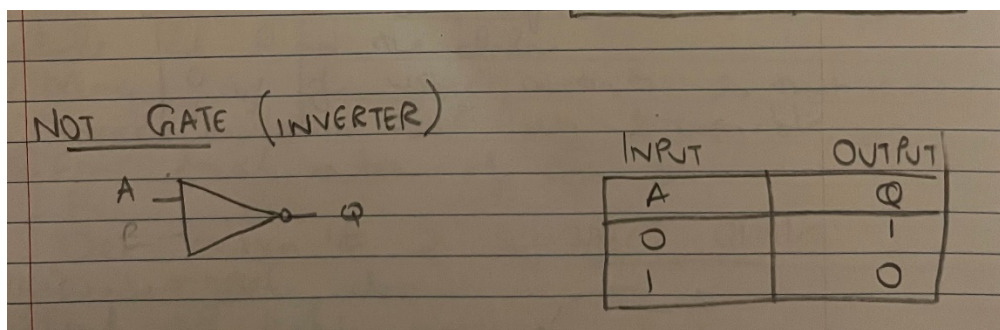
OR Gate

The OR gate gives a true (1) output if at least one of the inputs is true (1). If both inputs are false (0), then the output is false (0). So, the output is 1 if either or both inputs are 1.



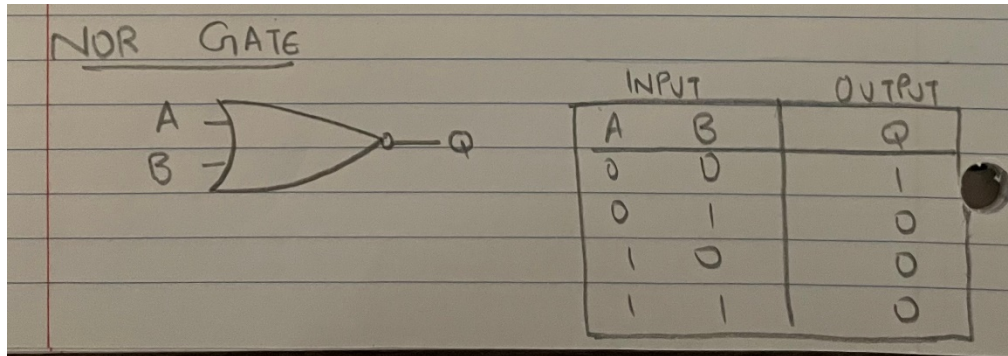
NOT Gate

The NOT gate reverses the input's logic state. If the input is 1, the output is 0, and if the input is 0, the output is 1. It's like flipping the input.



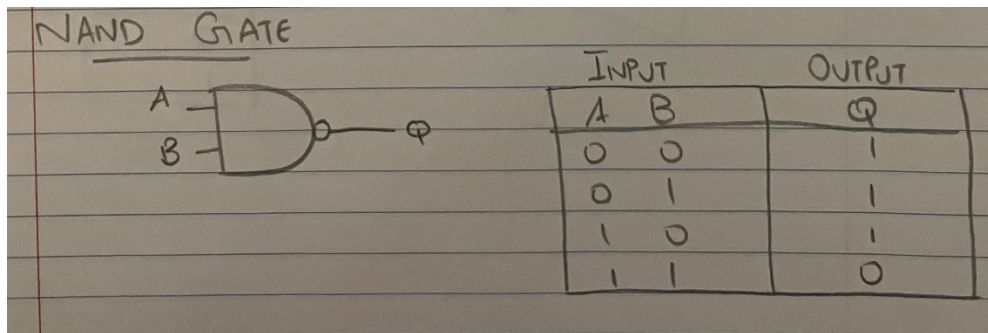
NOR Gate

The NOR gate is a combination of an OR gate followed by a NOT gate. Its output is true (1) only when both inputs are false (0). Otherwise, the output is false (0).



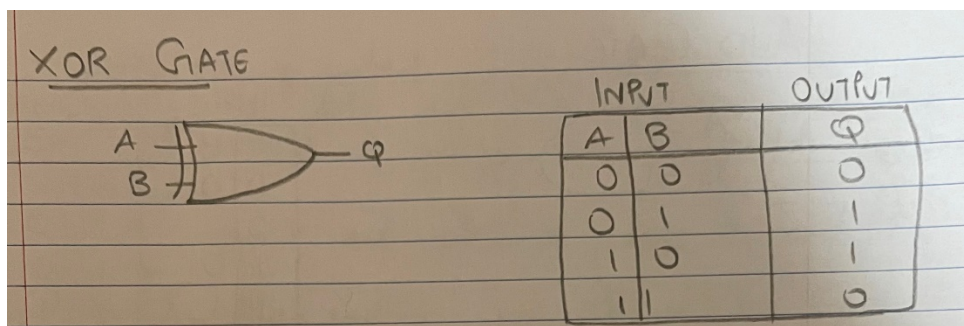
NAND Gate

The NAND gate works like an AND gate followed by a NOT gate. The output is false (0) only when both inputs are true (1). Otherwise, the output is true (1). You can think of it as inverting the output of an AND gate.



XOR Gate

The XOR (exclusive-OR) gate gives a true (1) output if either one of the inputs is true (1) but not both. If both inputs are false (0) or both are true (1), the output is false (0). So, the output is 1 if the inputs are different and 0 if they are the same.



XNOR Gate

The XNOR (exclusive-NOR) gate is like an XOR gate followed by a NOT gate. The output is true (1) if the inputs are the same and false (0) if the inputs are different.

