# MES Wadia College of Engineering Pune-01

## Department of Computer Engineering

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|---|---|
| **Name of Student:** | **Class: TE Comp** |
| **Semester/Year: 6th** | **Roll No:** |
| **Date of Performance:** | **Date of Submission:** |
| **Examined By: Prof(Dr.)S.K.Wagh** | **Experiment No: Part 2-IS-01** |

### PART 2- LPII-ELII-IS-ASSIGNMENT NO: 01

**AIM**:

Write a Java/C/C++/Python program that contains a string (char pointer) with a value \Hello World'. The program should AND or and XOR each character in this string with 127 and display the result.

**OBJECTIVE:**

- To write a program in Java, C, C++, or Python that performs bitwise AND or XOR operations on each character of a given string and then displays the result.

Steps to accomplish this task:

1. Initialize a string (char pointer) with the value "\Hello World".
2. Iterate through each character in the string.
3. Perform either bitwise AND or XOR operation with 127 on each character.
4. Display the result of each operation.

**APPRATUS:**

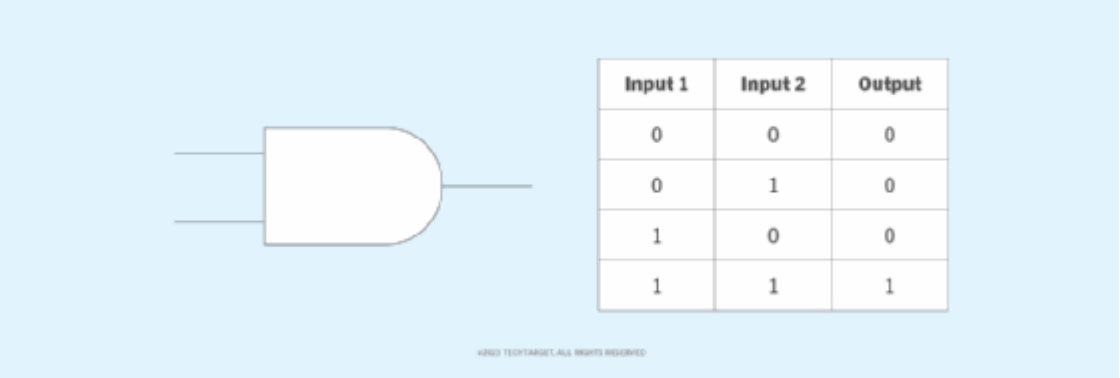
- Operating System recommended: 64-bit Open source Linux or its derivative.
- Java, C, C++, or Python

**THEORY:**

Basic logic gates

There are seven basic logic gates: AND, OR, XOR, NOT, NAND, NOR and XNOR.

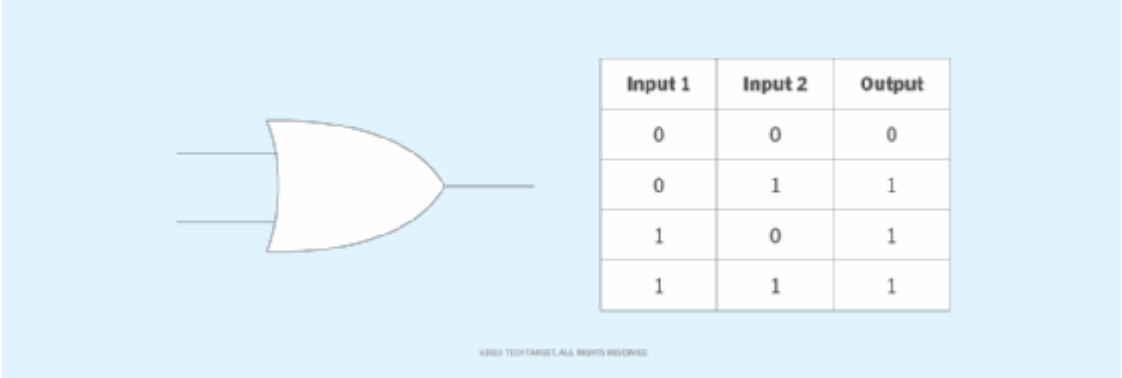
The AND gate is named so because, if 0 is false and 1 is true, the gate acts in the same way as the logical "and" operator. The following illustration and table show the circuit symbol and logic combinations for an AND gate. (In the symbol, the input terminals are on the left, and the output terminal is on the right.) The output is "true" when both inputs are "true." Otherwise, the output is "false." In other words, the output is 1 only when both inputs are 1.



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

A diagram of the AND logic gate.

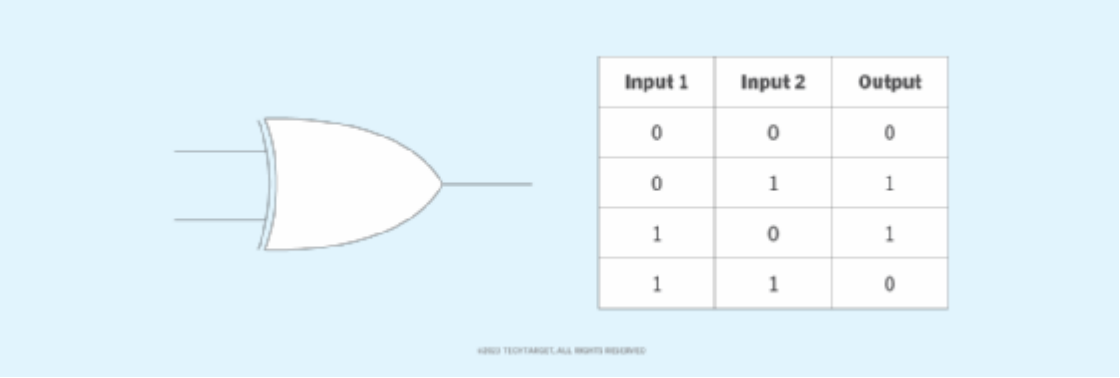
The OR gate gets its name from behaving like the logical inclusive "or." The output is true if one or both of the inputs are true. If both inputs are false, then the output is false. In other words, for the output to be 1, at least one input must be 1.



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

OR gate.

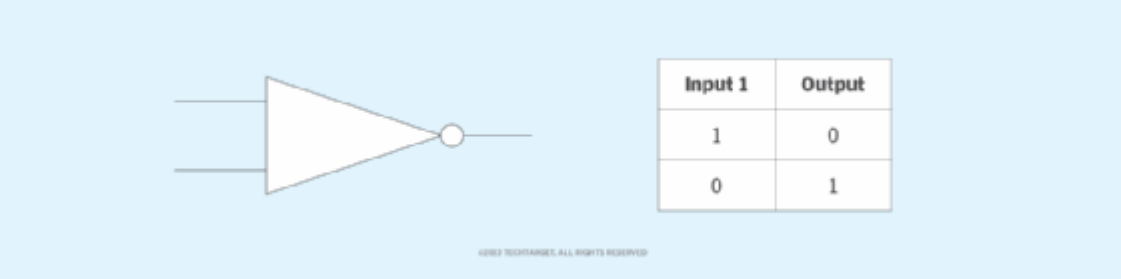
The XOR (exclusive-OR) gate acts in the same way as the logical "either/or." The output is true if either, but not both, of the inputs are true. The output is false if both inputs are "false" or if both inputs are true. Similarly, the output is 1 if the inputs are different but 0 if the inputs are the same.



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

XOR gate.

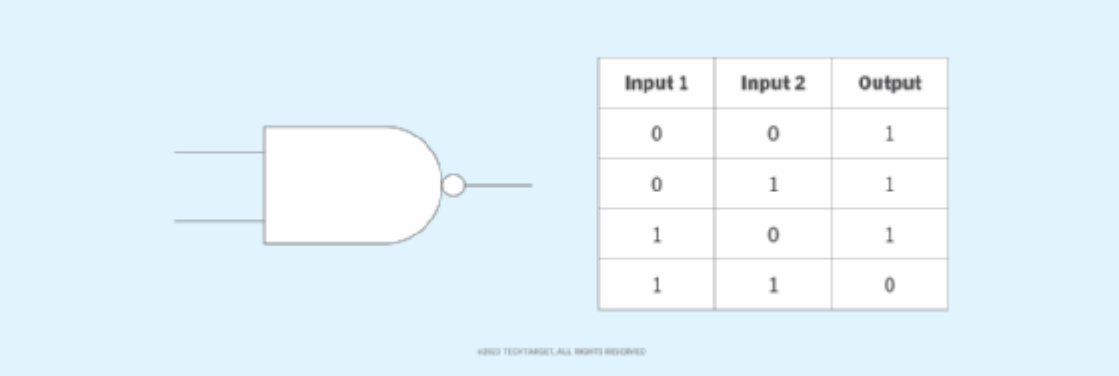
A logical inverter, sometimes called a NOT gate to differentiate it from other types of electronic inverter devices, has only one input. A NOT gate reverses the logic state. If the input is 1, then the output is 0. If the input is 0, then the output is 1.



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

Inverter or NOT gate.

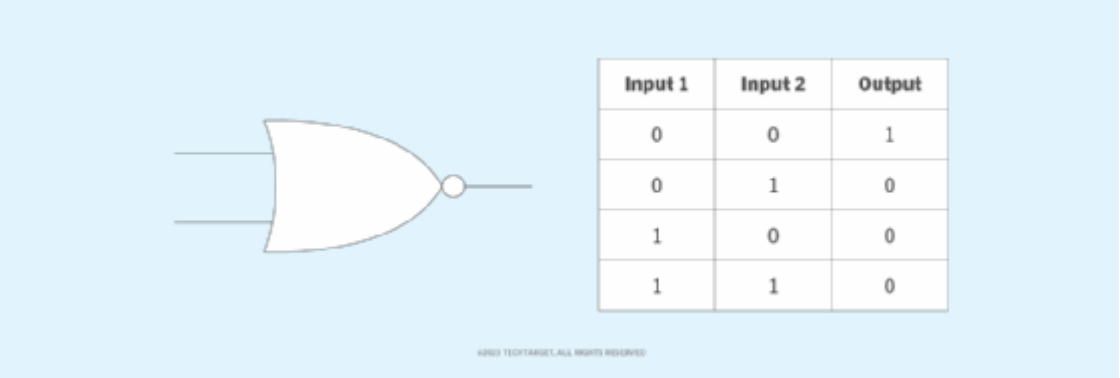
5. The NAND (Negated AND) gate operates as an AND gate followed by a NOT gate. It acts in the manner of the logical operation "and" followed by negation. The output is false if both inputs are true. Otherwise, the output is true. Another way to visualize it is that a NAND gate inverts the output of an AND gate. The NAND gate symbol is an AND gate with the circle of a NOT gate at the output.



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

NAND gate.

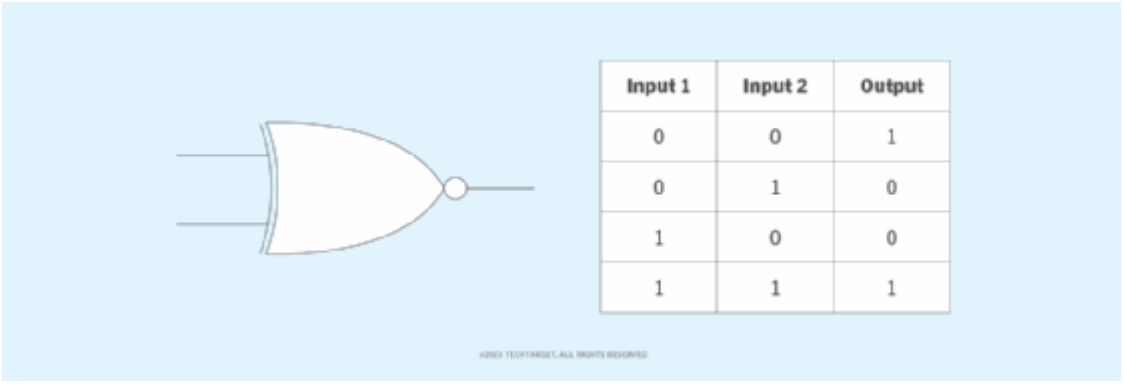
The NOR (NOT OR) gate is a combination OR gate followed by an inverter. Its output is true if both inputs are false. Otherwise, the output is false.



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

NOR gate.

The XNOR (exclusive-NOR) gate is a combination of an XOR gate followed by an inverter. Its output is true if the inputs are the same and false if the inputs are different.



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

XNOR gate.

Complex operations can be performed using combinations of these logic gates. In theory, there is no limit to the number of gates that can be arrayed together in a single device. But in practice, there is a limit to the number of gates that can be packed into a given physical space.

Arrays of logic gates are found in digital ICs. As IC technology advances, the required physical volume for each individual logic gate decreases, and digital devices become capable of performing more complicated operations at increasing speeds.

Quantum computers also have their own version of logic gates, called quantum logic gates, or qutrit quantum gates, which is a quantum circuit that operates using a small number of qutrits, which are qubits that have one added dimension. Similar to how logic gates are the building blocks of digital circuits, qutrit quantum gates are the building blocks of quantum circuits.

**CONCLUSION:**

**QUESTIONS:**

1. What is AND Operation?
2. What is Or Operation?
3. What is String?