

# Design of XNOR Gate Using NOR Gates

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## Abstract

We can able to design all other gates using the pair Universal gates i.e;(NAND and NOR).This document is to understand the behavior and demonstrate the Implementation of XNOR Gate using NOR gate.

## 1 Components

| Component    | Value | Quantity |
|--------------|-------|----------|
| bread board  | -     | 1        |
| led          | -     | 1        |
| Arduino      | -     | 1        |
| Jumper Wires | M-M   | 2        |

Table 1:

## 2 XNOR Truth Table

| A | B | G(A,B) |
|---|---|--------|
| 0 | 0 | 1      |
| 0 | 1 | 0      |
| 1 | 0 | 0      |
| 1 | 1 | 1      |

Table 2:

## 3 Circuit Diagram

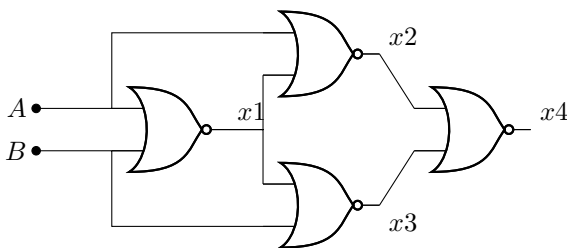


Figure 1

## 4 Boolean Logic

$$\begin{aligned} x1 &= (A+B)' \\ x2 &= (A+x1)' \\ x3 &= (B+x1)' \\ x4 &= (x2+x3)' \end{aligned}$$

## 5 Hardware

| Arduino | D13 | GND |
|---------|-----|-----|
| Led     | +VE | -VE |

Table 3:

## 6 Hardware Connection

Give the connections as per Table 3. For taking the inputs connect 5V of arduino to +ve line of bread board to consider it as logic 'HIGH'.Connect GND pin of arduino to -ve line of bread board to consider it as logic 'LOW'.

For example if the inputs A,B are connected 1,0 respectively the output should be 0 i.e., the LED connected to the 13th pin should turn off.

In the another case if we connect the inputs A,B to 1,1 respectively the output should be 1 i.e., the LED connected to 13th pin should glow.

The circuit implementation of the above function is given in figure 1.

## 7 Software

- 1.Connect the arduino to the USB port of computer
- 2.Download the follwing code

<https://github.com/kedareswari200/fwc—module1/blob/main/codes/src/main.cpp>

- 3.Upload the code into the arduino board.
- 4.The output '1' is represented as the state:'LED ON' and '0' is represented as the state 'LED OFF'