



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)
hline 0	0	1
0	1	0
1	0	0
1	1	1

Table 2:

3 Circuit Diagram

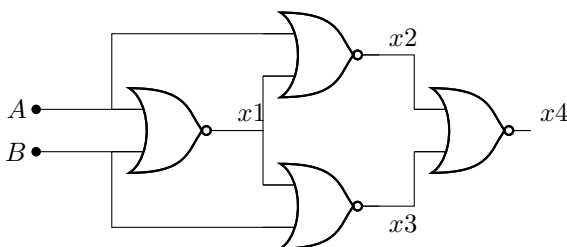


Figure 1

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 following 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'