

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

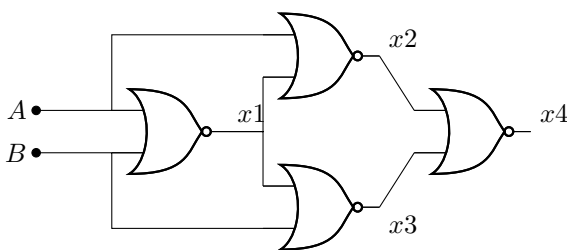


Figure 1

4 Boolean Logic

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

Arduino	D13	GND
Led	+VE	-VE

Table 3:

5 Hardware

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'