Implementation of Gate ques over Arduino

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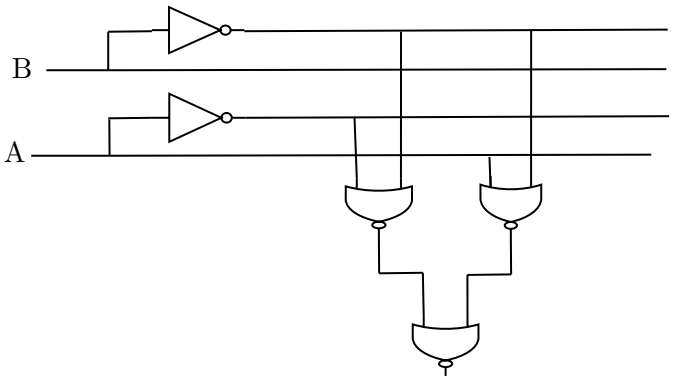
1 Problem

(GATE IN-2022 Ques 21)

Q.22 The logic block shown has an output F:



2 Introduction

For a given set of Boolean Logic Inputs, we can define the following terms:

- **Minterm** is a boolean expression resulting in an output of 1 for the minimum number of cells in a Karnaugh-Map (K-Map) and 0 in other cells.
- **Sum of Products** is a boolean expression for the *Sum* (OR) of various *Product* (AND) terms.
- **'do not care'** terms for a boolean expression are the set of input values for which the output of the function does not matter. The value for these can be taken as 0 or 1 by choice

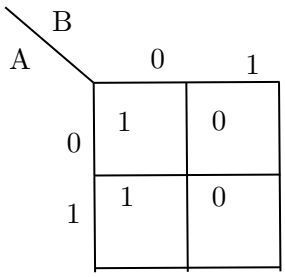
3 Components

Component	Value	Quantity
Arduino	UNO	1
Breadboard	-	1
LED	-	1
Jumper Wires	M-M	10
Resistor	220 Ω	1

Table 1: Table of Components

4 Solution

4.1 Karnaugh Map



The final expression is of output is Y = F(!B)

Logic for the code will be Y = !B

4.2 Truth Table

A	B	C
0	0	1
0	1	0
1	0	1
1	1	0

5 Connections

5.1 LED to Arduino

LED connections to Arduino are as follows:

Arduino	5	GND
LED	+	-

Table 2: LED Connections

5.2 Input Pins to Arduino

Input Pin Connections to Arduino are as follows:

Arduino	D2	D3
Term	A	B

Table 3: Input Pin Connections

5.3 Setting Input Pin Values

The values of the Input pins are taken by connecting them to either $5V$ or GND according to Truth Table

5.4 Repository

Code is also available online at the following repository:

https://github.com/Aditya2004-hue/LATEX/blob/main/codes/gate.ino