

# VERIFICATION OF BOOLEAN IDENTITIES

*Rudra Pratap Singh*

## Contents

### 1 PROBLEM

### 2 COMPONENTS

### 3 TRUTH TABLE

### 4 ARDUINO CONNECTIONS

### 5 CODE

## 1 PROBLEM

(GATE CS-2008) Q.5 In the Karnaugh map shown below, X denotes a don't care term. What is the minimal form of the function represented by the Karnaugh map?

	ba			
cd	1	1		1
	X			
	X			
	1	1		X

- (A)  $b'd' + a'd'$   
(B)  $a'b' + b'd' + a'bd'$   
(C)  $b'd' + a'bd'$   
(D)  $a'b' + b'd' + a'd'$

	ba			
cd	1	1		1
	X			
	X			
	1	1		X

One group consists of (0000, 0010, 1000, 1010) which gives  $b'd'$ . Other group is (0000, 0001, 1000, 1001) which gives  $a'd'$ . So, solution is  $b'd' + a'd'$ . Hence, correct option is a).

## 2 COMPONENTS

Component	Value	Quantity
1 Arduino	UNO	1
1 Bread board	-	1
1 Jumper wires	M-M	10
1 LED	-	1

## 3 TRUTH TABLE

The Truth Table for the identity is as follows:

(A)  $Y = b'd' + a'd'$

a	b	d	Y
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

Table 1

## 4 ARDUINO CONNECTIONS

1) The connections taken from Arduino as Input and Output is as follows:

Input	a	b	d	Y
Arduino	3	4	5	6

Table 2

- 2) The input **a,b,c** here are connected to Arduino D3,D4,D5 pins.  
3) The output **Y** here are connected to Arduino D6 pins.  
4) The values for these inputs are connected either to GND or 5V according to the truth table.

## 5 CODE

The arduino code can be downloaded from the below link.

```
https://github.com/Rudrapratap1404/  
Rudrapratap1404/blob/main/Arduino/src/  
code.ino
```