

Boolean Expression to its simplest form using K-map

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Contents

1	Introduction	1
2	karnaugh-map	1
3	Components	1
4	Truth table for given expression	1
5	Connections and results	1
5.1	Code Link	1

1 Introduction

K maps are used to Simplify Boolean Expressions the given Expression to solve $F(X,Y,Z,W)=(0,1,4,5,6,7,8,9,11,15)$

2 karnaugh-map

		ZW			
		00	01	11	10
XY	00	1	1	0	0
	01	1	1	1	1
	11	0	0	1	0
	10	1	1	1	0

$$F=X'Z'+Y'Z'+X'Y+XZW$$

3 Components

Component	value	quantity
Resistor	220 ohm	1
Arduino	UNO	1
LED		1
Bread board		1
Jumper wires	M-M	10

Table 1:

4 Truth table for given expression

X	Y	Z	W	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1

Table 2:

5 Connections and results

Also make connections to arduino UNO ,led and inputs based on table3.

Arduino UNO	2	3	4	5	8	gnd
Input	X	Y	Z	W		
led					+	-

Table 3:

Sample input	X	Y	Z	W	LED
1	0	0	0	0	ON
2	0	0	1	0	OFF

Table 4:

5.1 Code Link

[https://github.com/19pa1a0405/sai1729/blob/main/assignment1\(ide\)/main.cpp](https://github.com/19pa1a0405/sai1729/blob/main/assignment1(ide)/main.cpp)