

ASSIGNMENT-1

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Abstract

This manual explains about a logic circuit by taking two inputs $A=WX$ and $B=YZ$ so we compare these two inputs and if $A \leq B$ then the function $F=1$ if not $F=0$ so for that we are deriving minimized sum of product for F :

1 Components

Component	Values	Quantity
Arduino	UNO	1
JumperWires	M-M	10
Breadboard		1
LED		1
Resistor	220ohms	1

Figure.a

2 Truth Table

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

Truth table Boolean Function "F"

3 K-map Implementation

		X_1X_0			
		00	01	11	10
X_3X_2	00	0	0	0	0
	01	1	0	0	0
	11	1	1	0	1
	10	1	1	0	0

Figure.a

Reducing the boolean Function :

$$F = wxy'z' + wxy'z + wxy'z' + w'xy'z' + wxy'z' + wxy'z + wx'y'z' + wx'y'z$$

$$F = wxy'(z+z') + xy'z'(w+w') + wxy'(z+z') + wx'y'(z+z')$$

$$F = wxy' + xy'z' + wy'(x+x')$$

Reduced expression using K-maps is

$$F = wxy' + xy'z' + wy'$$

4 Implementation

Arduino PIN	INPUT	OUTPUT
2	W	
3	X	
4	Y	
5	Z	
8		F

Connections

Problem-1 :

1. Connect the circuit as per the above table.
2. Connect the output pin to LED
3. Connect inputs to Vcc for logic 1, ground for logic 0
4. Execute the circuit using the below code.

<https://github.com/vaibhavapraneeth/FWC/blob/main/assignments/ide/src/assign1.cpp>

Problem-2 :

1. Change the values of W,X,Y,Z in the code and verify the Truth Table