ASSIGNMENT

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IITH - Future Wireless Communications (FWC)

Contents

1 Question

A logic circuit implements the boolean function F=X'.Y+X.Y'.Z'. It is found that the input combination X=Y=1 can never occur. Taking this into account, a simplified expression for F is given by

2 Components

Component	Values	Quantity
Arduino	UNO	1
JumperWires	M-M	10
Breadboard		1
LED		2
Resistor	220ohms	1

Figure.a

3 Truth Table

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

Truth table Boolean Function "F"

4 Logical Diagram

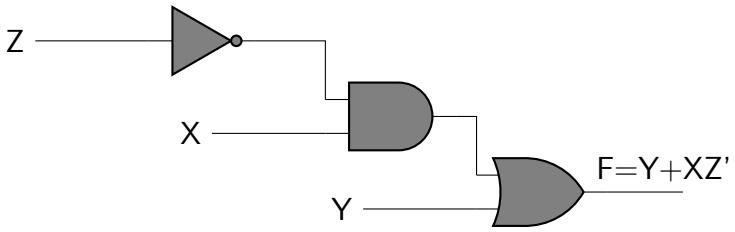

Fig. 1

5 K-map Implementation

Using the boolean logic output F can be expressed in terms of the inputs X,Y,Z with the help of the following Kmap.

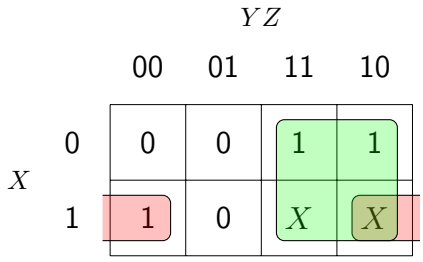

Fig. 2

a) Reducing the boolean Function

F=X'Y+XY'Z'
F=X'Y(Z+Z')+XY'Z'
X'YZ+X'YZ'+XY'Z'
Reduced expression using K-maps is
F=Y+XZ'

6 Implementation

Arduino PIN	INPUT	OUTPUT
2	X	
3	Y	
4	Z	
13		F

Connections

a) Procedure

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/aruniot099/FWC-1/blob/main/AVR-GCC/code/main.c

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