ASSEMBLY ASSIGNMENT

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CONTENTS

I. QUESTION

A Boolean function F of three X, Y and Z is given as $F(X,Y,Z) = (X'+Y+Z)\cdot(X+Y'+Z')\cdot(X'Y+Z')\cdot(X'Y'Z'+X'YZ'+XYZ')$. Which one of the following is true?

(a) $F(X,Y,Z) = (X+Y+Z')\cdot(X'+Y'+Z')$
(b) $F(X,Y,Z) = (X'+Y)\cdot(X+Y'+Z')$
(c) $F(X,Y,Z) = X'Z'+YZ'$
(d) $F(X,Y,Z) = X'Y'Z+XYZ$

II. ANSWER

The above question can reduced as follows
$\rightarrow (X'+Y+Z)\cdot(X'+Y+Z')\cdot(X+Y'+Z')\cdot(X'Y'Z'+X'YZ'+XYZ')$
$\rightarrow (X'+Y)\cdot(X+Y'+Z')\cdot(X'Z'+XYZ')$
$\rightarrow (X'+Y)\cdot(X+Y'+Z')\cdot(X'Z'+YZ')$
$\rightarrow (X'Y'+X'Z'+YX+YZ')\cdot(X'Z'+YZ')$
$\rightarrow X'Y'Z'+X'Z'+X'YZ'+XYZ'+X'YZ'+YZ'$
$\rightarrow X'Z'+YZ'+YZ'$
$\rightarrow X'Z'+YZ'$
Therefore, the Boolean function $F(X,Y,Z) = (X'+Y)\cdot Z'$

III. LOGIC DIAGRAM

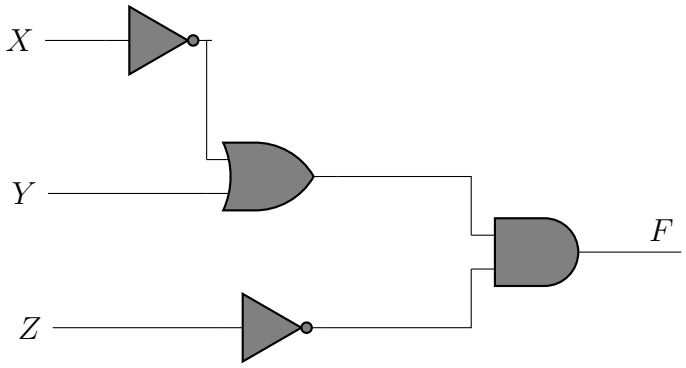

Fig. 1

IV. TRUTH TABLE

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

Truth table for Boolean Function F

V. 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.

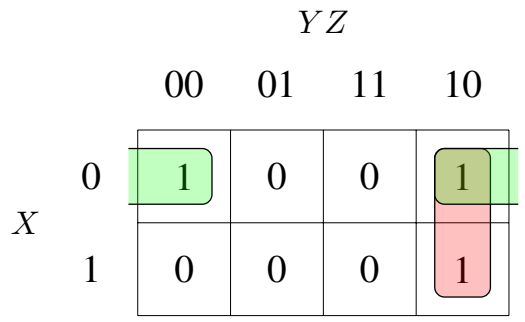

Fig. 2

VI. COMPONENTS

Component	Values	Quantity
Arduino	UNO	1
LED		1
Resistor	220ohms	1
Jumper Wires	M-M	5
Breadboard		1

VII. IMPLEMENTATION

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

Connections

Procedure

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

https://github.com/Chakali23/FWC/tree/main/IDE/Assembly

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