KARNAUGH MAP

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Abstract

This document shows how to find the boolean function of the output for the logic which is in given truth table by using KMap.

1 Components

Component	Value	Quantity
Arduino	UNO	1
Resistor	220ohm	1
Bread board	-	1
Jumber wires	M-M	20
Led	-	1

2 Logic

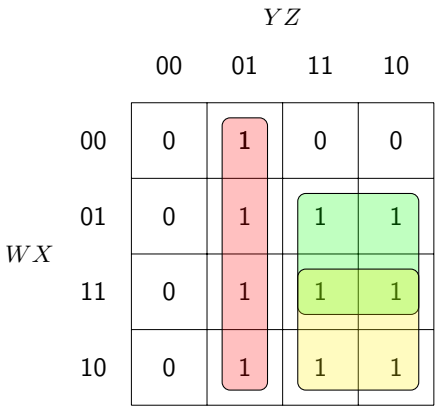
The circuit takes 4-bit number from (0-7) as input W,X,Y,Z and produces the F as output according to the logic given in table 1.

W	X	Y	Z	F(W,X,Y,Z)
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

Table 1:

3 Kmap

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



The boolean expression for the output F is obtained in the form of POS after minimizing the Kmap maxterm implicants.

F=XY'Z+X'Y'Z+W'XY+WX'Y+WXY

4 Hardware Connection

Arduino	6	7	8	9	5	GND
breadboard	0/1	0/1	0/1	-	-	
led	-	-	-	+ve	-ve	

Table 2:

Give the connections as per Table 2. For taking the inputs connect 5V of arduino to +ve line of bread board to consider it as logic 'HIGH'.connect GND pin of arduino to -ve line of bread board to consider it as logic 'LOW'.

For example if the inputs W,X,Y,Z are connected 1,0,1,1respectively the output should be 1 i.e., the LED connected to the 5th pin should glow.

In the another case if we connect the inputs W,X,Y,Z to 1,1,0,0 respectively the output should be 0 i.e., the LED connected to 5th pin should turn off

The circuit implementation of the above function is given in figure 1.

5 Software

1.Connect the arduino to the USB port of computer

2.Download the follwing code

https://github.com/Gowt-hami/fwc-1-module1/tree/main/codess

3.Upload the code into the arduino board.

4.The output '1' is represented as the state:'LED ON' and '0' is represented as the state 'LED OFF'