COMBINATIONAL CIRCUITS

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IITH - Future Wireless Communication(FWC220107)

Abstract

This document shows how to find the boolean function of the output for the logic which is in given truth table by using karnaugh map.
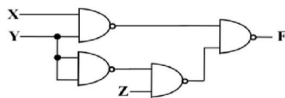
Figure 1:

Fig. 2

1 Components

Components	Values	Quantity
Arduino	UNO	1
JumperWires	M-M	6
Breadboard		1
LED		1

2 Logic

The circuit takes 3-bit number from (0-7) as input X,Y,Z and produces the F as output according to the logic given in table 1.

X	Y	Z	F(XY+Y!Z)
0	0	0	0
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	1

Table 1: abeltable:dummytable

3 karnaugh map

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

4 Hardware Connection

Arduino	2	3	4	5	GND	Vcc
breadboard	F	X	Y	Z	+ve	-ve
led	-	-	-	-	-	

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 X,Y,Z are connected 0,1,0 respectively the output should be 1 i.e., the LED connected to the GND LED should glow.

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

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

5 Procedure

1.Connect the arduino to the USB port of computer

2.Download the follwing code

```
https://github.com/srikanth9515/FWC/tree/main/
Assembly/codes
```

3.Upload the code into the arduino board.

```
pio run −t upload
```

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