BOOLEAN LOGIC IMPLEMENTATION BY USING DFLIPFLOP WITH ARDUINO ASSEMBLY

SATTHISH D
sathishmahadevvarma.ds55@gmail.com
FWC220101 IITH-Future Wireless Communications Assignment-1

Contents

1 **Abstract** 1
2 **Way of using arduino** 1
3 **Components** 1
4 **Truth table for given K-map** 1
5 **procedure** 1
6 **equation by truth table** 2
7 **circuit connections** 2
8 **BooleanEquation** 2
9 **Software** 2

1 Abstract

This shows counter constructed with 3 D FLIPFLOPS Implementation of boolean expressions by using arduino with assembly

2 Way of using arduino

in arduino we are having ports B,D,C.here we are using port D pin 2 is taken as output pin.port B pins 8,9,10 pins are taken as a inputs.pin 13 as clk

3 Components

Component	Value	Quantity
Arduino	UNO	1
Bread board	-	1
Jumper wires	M-M	22
sevensegment	-	1
7447		1
7474		2

4 Truth table for given K-map

X	Y	Z	X+	Y+	Z+	D2	D1	D0
0	0	0	0	0	1	0	0	1
0	0	1	0	1	1	0	1	1
0	1	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1	0
1	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	0	1
1	0	1	1	0	0	1	0	0
1	0	0	0	0	0	0	0	0

TABLE 1

5 procedure

Step 1: connect 5v of the Arduino to the top red of the bread board ang GND to the bottom green

Step 2: connect 2 7474 ics in the bread board for futher connections.1 st flipflop act as 2 flipflops

Step 3: connect d13 pin in the arduino to connect breabboard the to connect the as clk to the flipflop. d13 pin connect to the pin3 and pin 11

of 1st flipflop and pin3 of 2nd flipflop

Step 4: connect 5v to the pin 14 and pin 1 and pin4 and pin10 and pin 13 of the 1st flipflop and pin1 and pin 14 and pin4 of 2nd flipflop

Step 5: connect 7447 decoder pins 13 to 9 to the sevensegment given a,b,c,d,e respectively and pin f to the 15 pin of sevensegment.com of the seven segment connect to vcc by using through resisitor

Step 6: now pins 8,9,10 and 2,3,4 pins in ardino connect them in breadboard in parallel way

Step 7: take 3 new cables connect their one end in the end of the 3 parallel connected cables.other end of the cables connect to the 7,1,2 pins in the decoder serially and pin6 to the gnd

Step 8:finally run code in the arduino and check results of newmerical values shown sevensegment like 0,1,3,2,6,7,5,4 as per truthtable

6 equation by truth table

D2 have high logic(2,5,7,6)=sum(2,5,7,6)

D1 have high logic(1,3,2,6)=sum(1,3,2,6)

D0 have high logic(0,1,6,7)=sum(0,1,6,7)

7 circuit connections

Arduino	2,4	3	8,10	9	13	5V	GND
7474	2	12	5	9	3, 11	1, 4, 10, 13, 14	7
7447	7	1				16	2, 6, 8

8 BooleanEquation

By solving the given K-map diagram we get the boolean equation as follows
D2 = AC + BC'
D1 = A'C +BC'
D0 = A'B' +AB

9 Software

Execute the following code using the below provided link.

https://github.com/satthish-devaragatla