



IMPLEMENTATION OF BOOLEAN LOGIC USING D FLIPFLOPS IN ARDUINO IDE

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FWC220101 IITH-Future Wireless Communications Assignment-1

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3 flipflop way of working

the single input is called data input.if the data input is high the flipflop would be SET. when the data input is low the flipflop would be RESET.that was shown in the below table.ny below table if we give high value means 1 flipflop would be SET.if we give low value means 0 flipflop would be RESET

4 Transition table

Q	Q+	D
0	0	0
0	1	1
1	0	0
1	1	1

5 Components

Component	Value	Quantity
Arduino	UNO	1
Bread board	-	1
Jumper wires	M-M	28
sevensegment	-	1
Decoder	7447	1
Flipflop	7474	2

1 Abstract

This manual shows counter constructed with 3 D FLIPFLOPS getting boolean expressionscon using arduino in karnaugh map

2 source question given

counter constgtructed with 3 d-flipflops input and output pairs are named (d0,q0), (d1,q1),(d2,q2) output sequence be greycode sequence 000,001,011,010,110,111,100 repeated periodcally. combine logic expression of d1

5.1 Arduino

The Arduino uno has some ground pins, analog input pins A0-A3 and digital pins D1-D13 that can be used for both input as well as output. It also has two power pins that can generate 3.3V and 5V.In the following exercises, only the ground, 5V and digital

pins will be used.

check results of new numerical values shown seven segment like 0,1,3,2,6,7,5,4 as per truth table

6 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

7 procedure

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

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

Step 3: connect d13 pin in the arduino to connect breadboard 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 seven segment given a,b,c,d,e respectively and pin f to the 15 pin of seven segment.com of the seven segment connect to vcc by using through resistor

Step 6: now pins 8,9,10 and 2,3,4 pins in arduino 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

8 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)

9 Software

Execute the following code using the below provided link.

<https://github.com/satthish-devaragatla>

		YZ			
		00	01	11	10
X	0	0	1	1	1
	1	0	0	0	1

d1-k-map diagram

		YZ			
		00	01	11	10
X	0	0	0	0	1
	1	0	1	1	1

d2-k-map diagram

		YZ			
		00	01	11	10
X	0	1	1	0	0
	1	0	0	1	1

d0-k-map diagram

10 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

11 BooleanEquation

By solving the given K-map diagram we get the boolean equation as follows

$$D2 = AC + BC'$$

$$D1 = A'C + BC'$$

$$D0 = A'B' + AB$$