The minimized POS expression for the given boolean expression through Arduino

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Contents

1 Abstract

***Abstract*—This manual shows how to implement the minimized POS expression for the given boolean expression through Arduino.**

In the ciruit a,b and c are digital inputs, f is digital output.The given boolean expression is f=$\bar{a}\bar{b}\bar{c}$+$\bar{a}$b$\bar{c}$+a$\bar{b}\bar{c}$+abc+ab$\bar{c}$

2 Components

Component	Value	Quantity
Resistor	220 Ohm	1
Arduino	UNO	1
Seven Segment Display		1
Decoder	7447	1
Jumper Wires	M-M	20
Breadboard		1

TABLE I

1.The table given below is the connections between 7447 BCD Decoder and Seven Segment Display

7447	$\bar{a}$	$\bar{b}$	$\bar{c}$	$\bar{d}$	$\bar{e}$	$\bar{f}$	$\bar{g}$
Display	a	b	c	d	e	f	g

TABLE II

2.The figure given below is the pin diagram of Seven Segment Display.

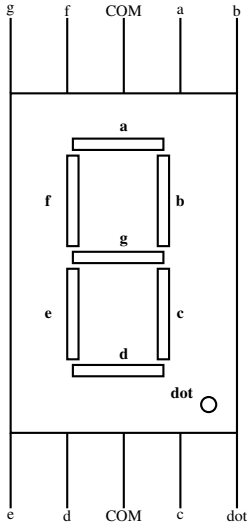


Fig. 1

3.The diagram below shows the pin diagram of 7447 BCD Decoder.The output pins of 7447 is connected to Seven Segment Display using Table 2.

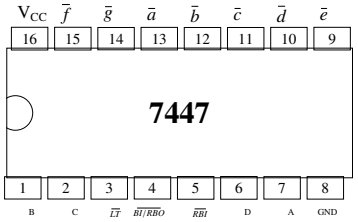
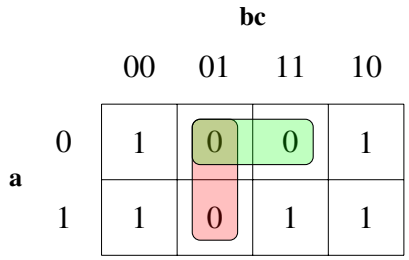


Fig. 2

3 TRUTHTABLE

a	b	c	f
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

4 K-MAP



The minimized expression is f=(b+$\bar{c}$)(a+$\bar{c}$)

5 PROCEDURE

1.The given boolean expression is f=$\bar{a}\bar{b}\bar{c}$+$\bar{a}$b$\bar{c}$+a$\bar{b}\bar{c}$+abc+ab$\bar{c}$
from this we can write the minimized POS expression as follows
f=$\bar{a}\bar{b}\bar{c}$+$\bar{a}$b$\bar{c}$+a$\bar{b}\bar{c}$+abc+ab$\bar{c}$
f=$\bar{a}\bar{c}$($\bar{b}$+b)+a$\bar{c}$($\bar{b}$+b)+abc
f=$\bar{a}\bar{c}$+a$\bar{c}$+abc
(additive identity [$\bar{b}$+b =1])
f=$\bar{c}$($\bar{a}$+a)+abc
f=$\bar{c}$+abc
(additive identity [$\bar{a}$+a=1])
f=($\bar{c}$+b)($\bar{c}$+a)($\bar{c}$+c)
(distributivelaw A+BC=(A+B)(A+C))
f=(b+$\bar{c}$)(a+$\bar{c}$)
(additive identity [$\bar{c}$+c=1])
2.connect the circuit using 7447 BCD-Seven segment display decoder and Arduino.
3.connect the seven segment pins to 7447 using Table 2.
4.connect the pin A of 7447 to D2 of Arduino and remaining pins B,C and D to GND.
5.connect the pins D4,D5,D6 to 0's and 1's.Change the pins simultaneously to verify the POS expression truth table.
6.Verify the miinimized POS expression operation in arduino using the following code and making pin connections according to fig 2,Table 2

Observe the truthtable and verify the program by executing the link provided below.

https://github.com/Shantipriya1919/fwc1