Assignment

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Contents

Question

For the given boolean expression f=$\bar{a}\bar{b}\bar{c}$+$\bar{a}$b$\bar{c}$+a$\bar{b}\bar{c}$+abc+ab$\bar{c}$, the minimized Product of Sum (POS) expression is

1 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.

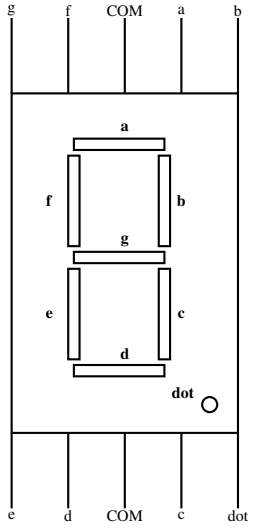


Fig. 1

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.

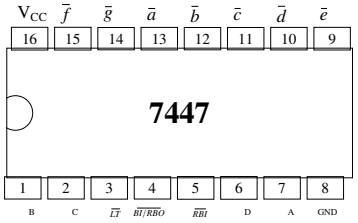
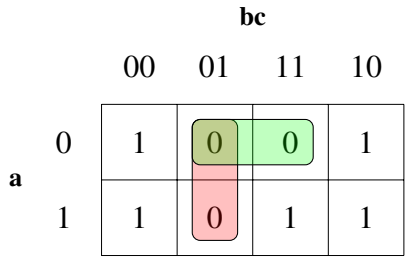


Fig. 2

2 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

3 K-MAP



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

4 PROCEDURE

1.The given boolean expression is
f=$\bar{a}\bar{b}\bar{c}$+$\bar{a}$bc̄+a$\bar{b}\bar{c}$+abc+abc̄
from this we can write the minimized POS expression as follows
f=$\bar{a}\bar{b}\bar{c}$+$\bar{a}$bc̄+a$\bar{b}\bar{c}$+abc+abc̄
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 D8,D9,D10 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 avr-gcc 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