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Karnaugh Map

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I. ABSTRACT

The document explains Karnaugh maps by finding the boolean expressions for the incrementing as well as decrementing decoder.

II. COMPONENTS

The required components list is given in Table: I. The pin diagram of the seven segment display is shown in Fig.1.
The pin diagram of IC 7447 is shown in Fig.2

Components	Value	Quantity
Seven Segment Display		1
IC	7447	1
Arduino	UNO	1
Jumper Wires		10
Breadboard		1

TABLE I

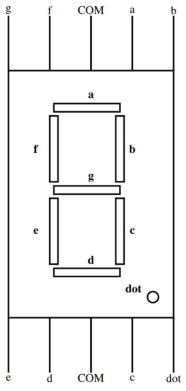

Fig. 1.

III. PROCEDURE

1) Make the connections between 7447 and Seven segment display as per the Table: II.

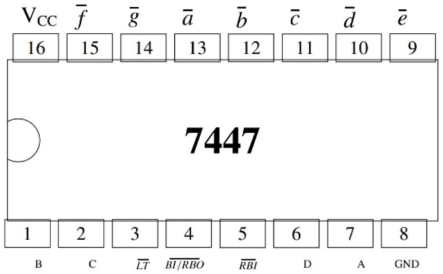

Fig. 2.

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

TABLE II

2) Make the connections between Arduino and 7447 as per the Table: III.
3) The truth table for the increment decoder is shown in Table IV.

7447	D	C	B	A
Arduino	5	4	3	2

TABLE III

Z	Y	X	W	D	C	B	A
0	0	0	0	0	0	0	1
0	0	0	1	0	0	1	0
0	0	1	0	0	0	1	1
0	0	1	1	0	1	0	0
0	1	0	0	0	1	0	1
0	1	0	1	0	1	1	0
0	1	1	0	0	1	1	1
0	1	1	1	1	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	0	0

TABLE IV

4) The truth table for the increment decoder is shown in Table IV and decrement decoder is shown in Table V.

Z	Y	X	W	D	C	B	A
0	0	0	0	1	0	0	1
0	0	0	1	0	0	0	0
0	0	1	0	0	0	0	1
0	0	1	1	0	0	1	0
0	1	0	0	0	0	1	1
0	1	0	1	0	1	0	0
0	1	1	0	0	1	0	1
0	1	1	1	0	1	1	0
1	0	0	0	0	1	1	1
1	0	0	1	1	0	0	0

TABLE V

5) Run the code. And observe the output in the display as in Fig.3.

IV. RESULTS

Download the codes given in the link below and execute them to see the output as shown in Fig.3 and Fig.4 by observing in seven segment display.
https://github.com/Tabassum4930/FWC-1/tree/main/Ide/K-map

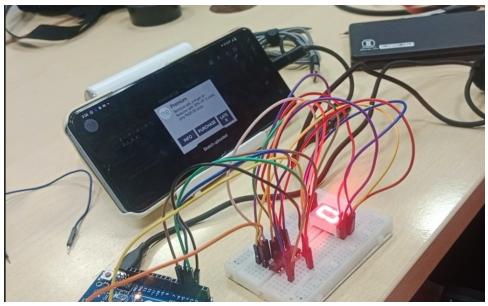

Fig. 3.

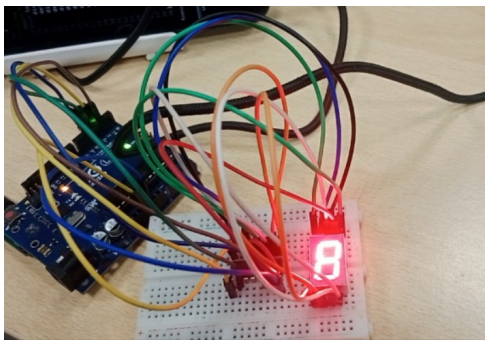

Fig. 4.

V. CONCLUSION

Therefore, it is an essential component in the experimentation of digital circuits.