भारतीय प्रौद्योगिकी संस्थान हैदराबाद
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Finite State Machine

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I. ABSTRACT

This paper explains a Finite State Machine by deconstructing the decade counter and here we verified the both incrementing decoder from 0 to 9 and decrementing decoder from 9 to 0 using arduino uno.

II. COMPONENTS

The required components list is given in Table: I., seven segment display is shown in Fig.1, and 7474 D-Flip Flop pin diagram is shown in Fig-2.

Components	Value	Quantity
IC	7474	2
seven segment display		1
Arduino	UNO	1
Jumper Wires		50
Breadboard		1

TABLE I

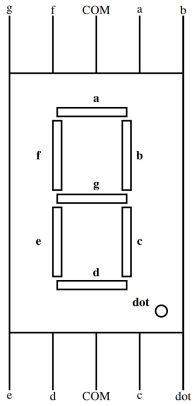

Fig. 1.

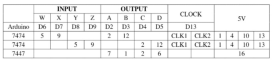

Fig. 2.

III. PROCEDURE

1) Make the connections of arduino, and two 7474 ICs according to Fig-4.

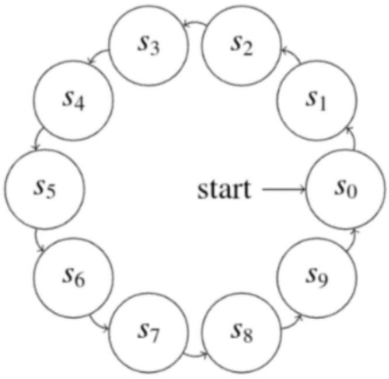

Fig. 3.

2) Block diagram of fsm for decade counter

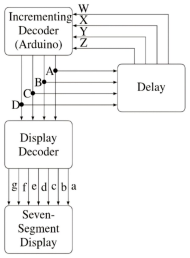

Fig. 4.

3) Block diagram of Decade Counter.

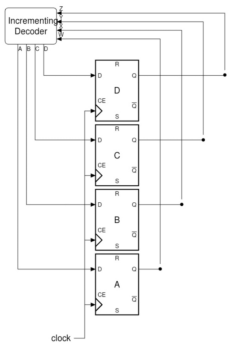

Fig. 5.

4) Truth Table for incrementing from 0 to 9 in seven segment display

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 II

5) Truth Table for decrementing from 9 to 0 in seven segment display

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 III

6) Execute the arduino code without any errors.
7) After upload the code into hardware setup using arduino IDE platform with hex file.

IV. RESULTS

1) Download the code given in the link below and execute them to see the output as shown in Fig.6,7.
2) https://github.com/rajib05ra/FWC-Assignments/tree/main/Assignment

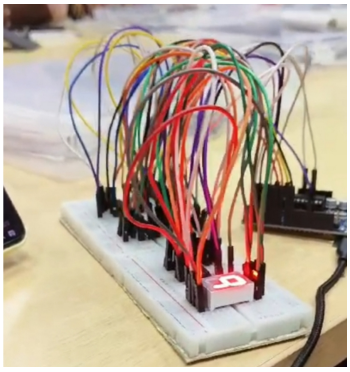

Fig. 6.

V. CONCLUSION

Hence implementation of 7474 IC Decade Couner on Seven segment dispaly using arduino UNO is done.