Platformio Assignment

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I. ABSTRACT

The sequence of states (Q_1Q_0) of the given synchronous sequential circuit is:

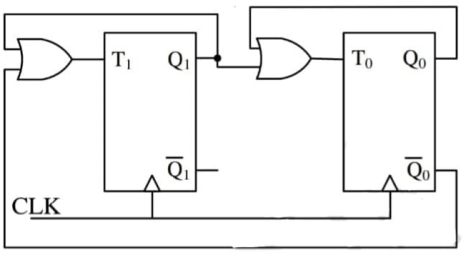

Fig. 1.

II. COMPONENTS

The required components list is given in Table: I. Flip-flop IC 7474 diagram is shown in Fig.2.

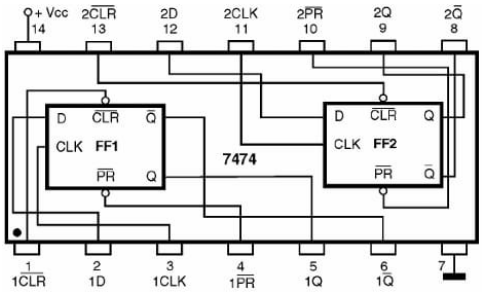

Fig. 2.

III. PROCEDURE

By using 7474 IC we can implement T-flip flop. 7474 IC contains two D-flip flops. T-flip flop logic is implemented by using D-flip flop, this is done by giving XOR logic to the output of D flip flop. The XOR and OR gate logic is given in the arduino code. Make the connections between the arduino and the IC according to the given circuit. The truth table for the given circuit is:

Components	Value	Quantity
IC	7474	1
LEDs		2
Arduino	UNO	1
Jumper Wires		20
Breadboard		1

TABLE I

CLK	T_1T_0	Q_1Q_0
		00
	10	10
	11	01
	01	00

TABLE II

IV. RESULTS

Download the code given in the link below and execute them to see the output as shown in Fig.3 by placing the LED at the output pin of 7474 IC, where the states of the sequential circuit are shown through the LED's : $00 \rightarrow 10 \rightarrow 01 \rightarrow 00$ https:

V. CONCLUSION

In conclusion, the T flip-flop, known for toggling its output with each clock pulse when the input is high, can be effectively implemented using the 7474 IC, a D flip-flop. By incorporating an XOR gate, the 7474 IC's behaviour is modified to achieve the desired toggling charecteristic of the T flip-flop. This setup demonstrates the versatility of the 7474 IC and highlights how flip-flops can be adapted for different digital logic functions, making them essential components in sequential circuits and therefore, we can design several circuits and can be implemented using Arduino and Platformio.

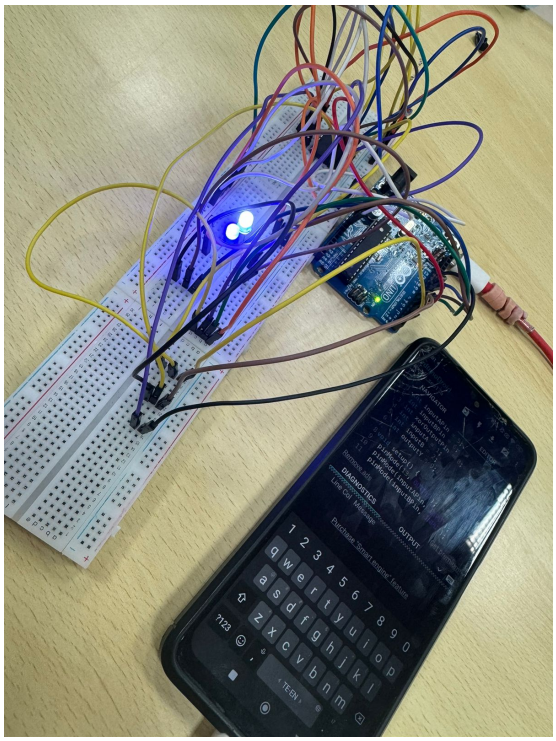

Fig. 3.