Probability Hardware Project
Random Number Generator

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***Abstract*—Here, we have made a Random Number Generator using shift registers.**

Components used

Component	Value	Quantity
Breadboard		1
Seven Segment Diplay	Common Anode	1
Decoder	7447	1
Flip Flop	7474	2
X-OR Gate	7486	1
555 IC		1
Resistor	1 KΩ	1
Capacitor	100 nF	1
Capacitor	10 nF	1
Jumper Wires		

TABLE I
Components used

Procedure

1) We connect the 555 timer circuit to generate a Square Waveform Output according to figure 1

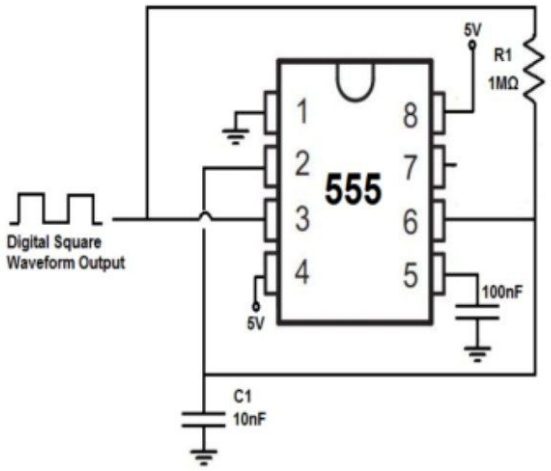

Fig. 1. 555 timer circuit

2) Then, the Square Waveform generated from 555 timer circuit is provided to D-Flip flops
3) Now, the circuit for shift registers is made using 4 D-Flip flops. So, we use two 7474 ICs.

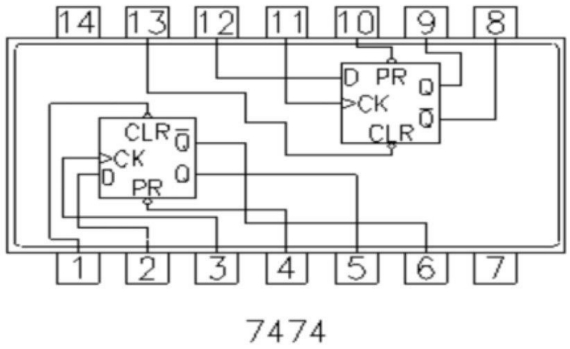

Fig. 2. Connection in 7474 IC

4) We then connect the XOR gate (7486 IC) to the system of D-Flip flops (shift register) according to the figure 3

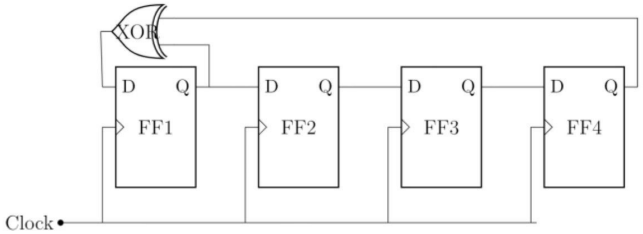

Fig. 3. Connection in XOR gate

5) Then, we connect the decoder (7447 IC) and connect its A,B,C,D with Q_0,Q_1,Q_2,Q_3 (outputs of the D-Flip flops) respectively as per the figure 4
6) The seven segmented display is then connected with the decoder (7447 IC) according to the table 5 and the figure 6

Fig. 4. Connection in Decoder gate

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

Fig. 5. Connection of seven segmented display with decoder

7) Finally, We connect all the independent parts with each other and then connect the circuit to the power source

Output

We get continuously changing digits on the seven segment display. The Output is shown in figures 7,8 and 9

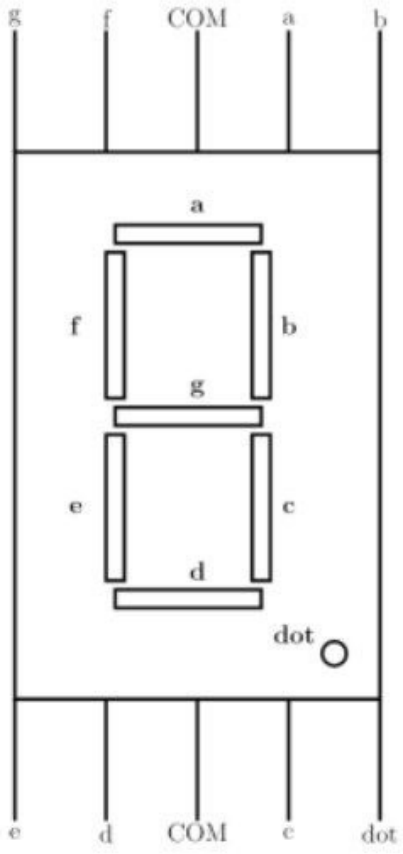

Fig. 6. Seven segmented display

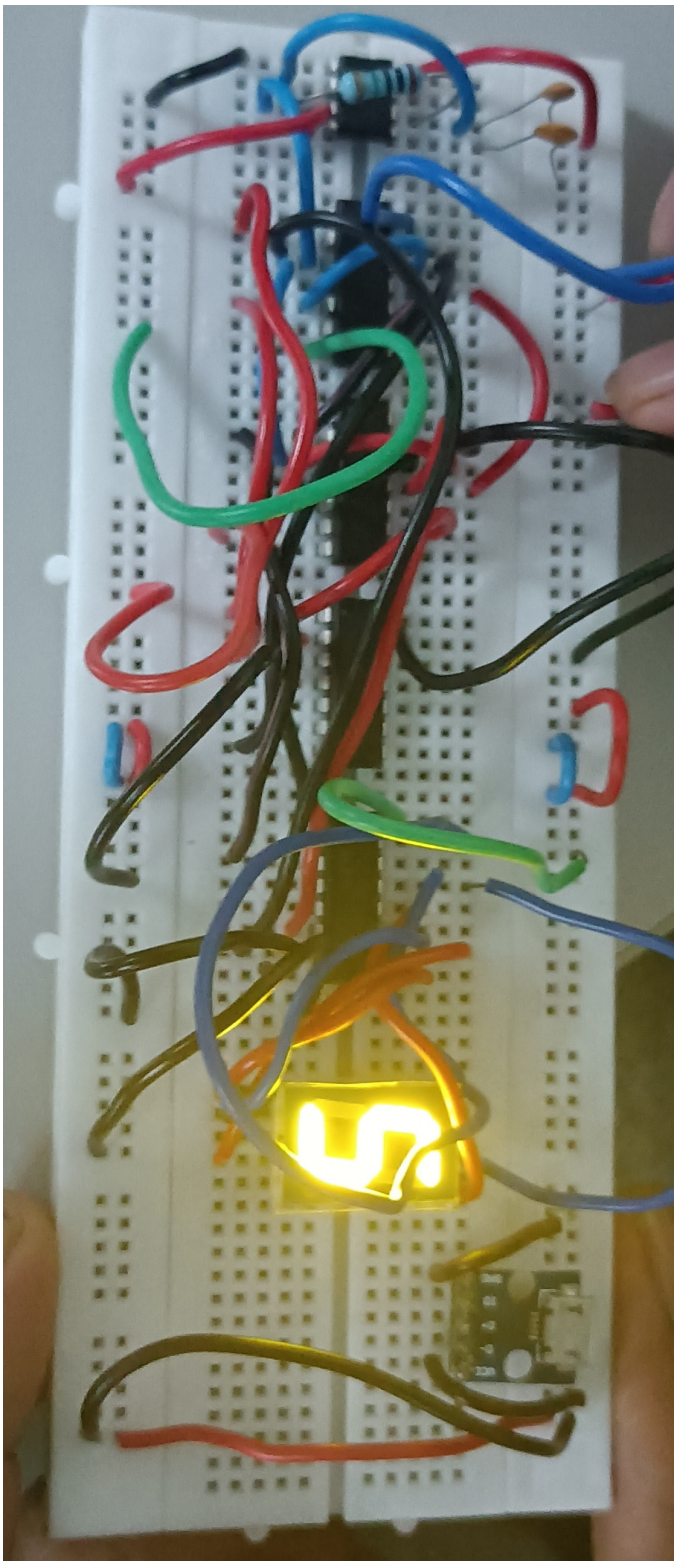

Fig. 7. Output1

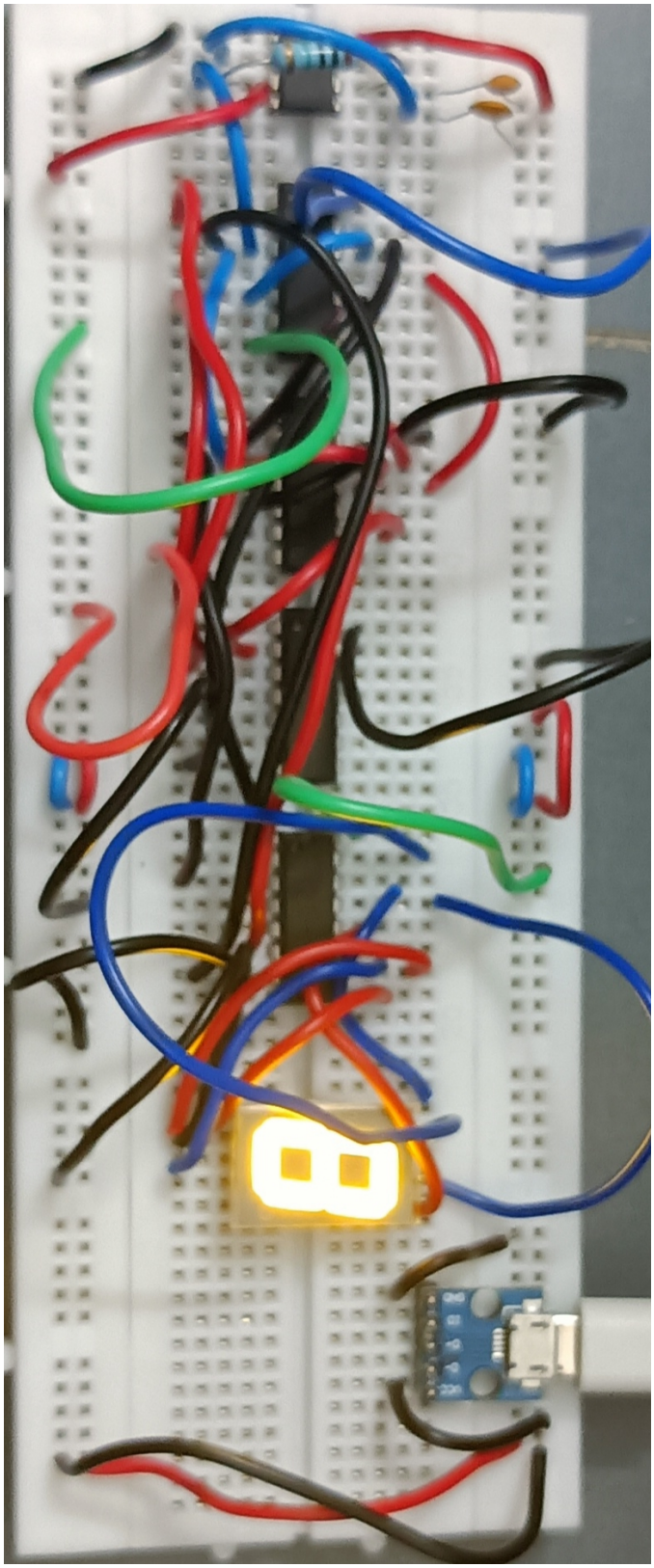

Fig. 8. Output2

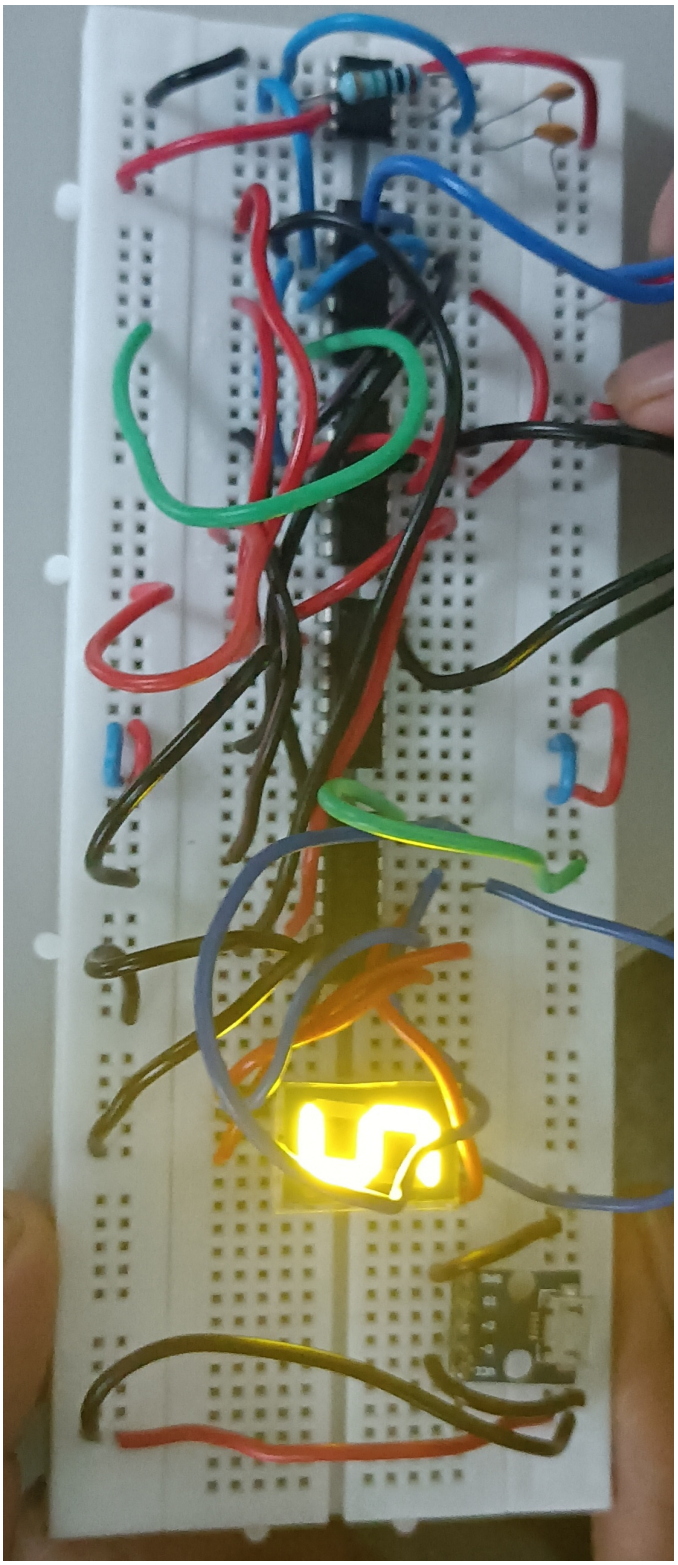

Fig. 9. Output3