

Hardware Assignment

AI1110: Probability and Random Variables

Indian Institute of Technology, Hyderabad

Gunethra Bommineni*

Abstract—Random Number Generation using Shift Registers

COMPONENTS USED:

Component	Value	Quantity
Timer	555 IC	1
X-OR Gate	7486	1
Decoder	7447	1
Flip Flop	7474	2
Capacitor	47 nF	1
Capacitor	470 nF	1
Resistor	1 KΩ	1
Resistor	10 MΩ	1
7-Segment Display	Common Anode	1
Breadboard	840 pins	1
Wires		20

TABLE 0
COMPONENTS USED

PROCEDURE:

- 1) We first connect the Timer-555 IC as shown in figure to generate the clock.1

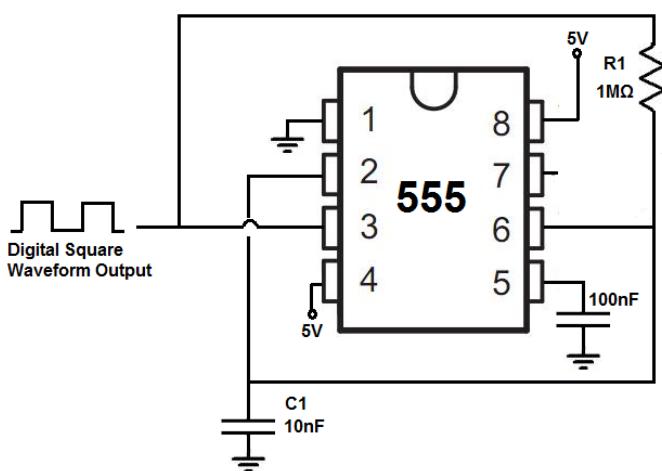
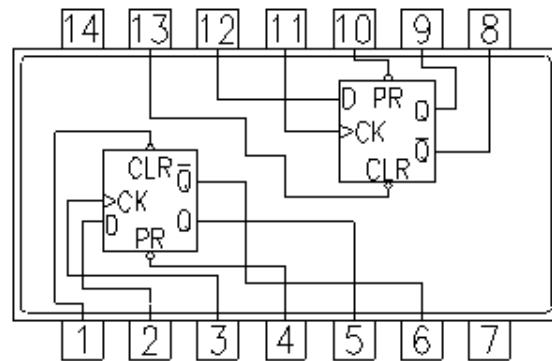


Fig. 1. Connecting the Timer-555 IC

- 2) We then connect this clock output to the clock signal of D-Flip flops.

- 3) Next we make the circuit for shift registers using a 4 D-Flip flops (using the two 7474 IC's) and an XOR gate (7486 IC) according to the figure 3



7474

Fig. 3. Pin out for IC 7474

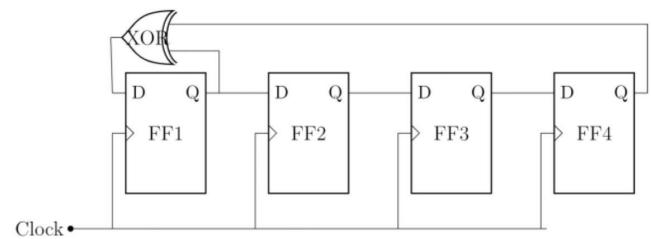


Fig. 3. Circuit diagram

- 4) Then we connect the output of each D-Flip Flop (Q_0, Q_1, Q_2, Q_3) to the Decoder (7447 IC) (A,B,C,D) respectively as per the figure4
- 5) Next we connect the 7-segment display and connect it with the decoder (7447 IC) according to the table 5 and the figure 5
- 6) Finally we connect all independent parts with each other and then turned on the power source.



Fig. 4. Pin out for Decoder gate IC 7447

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

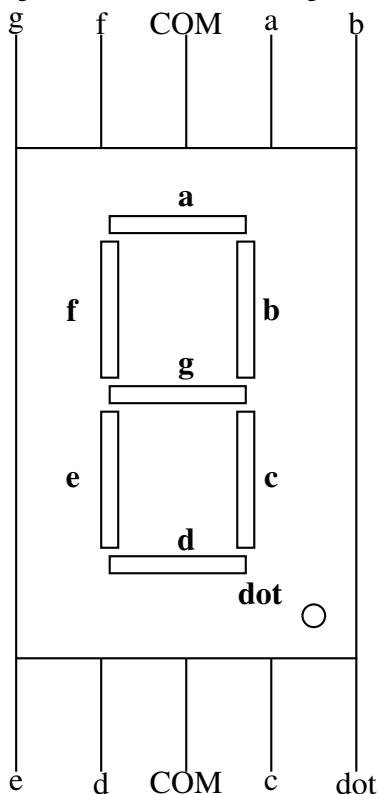


Fig. 5. 7-segment display

OUTPUT

Output was changing digits on the seven segment display the output is shown in figure 6

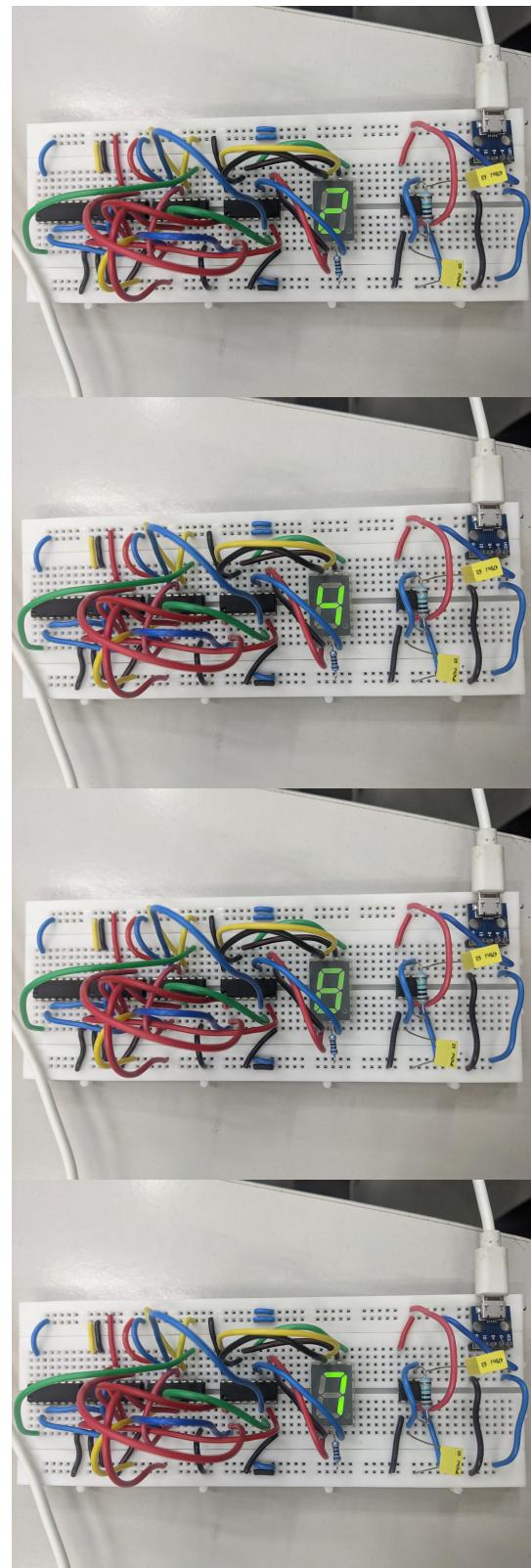


Fig. 6. Randomizer Output