

Assignment-1

AI1110: Probability and Random Variables

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AIM : To generate random numbers using shift registers

Components Required :

Breadboard ,Seven Segment Display, 1μ F Capacitor, 2 Flip Flops(IC 7474), XOR Gate(IC 7486), 555 IC x1, $10K \Omega$ Resistor, $10M \Omega$ Resistor, USB-Type A adapter, $470n$ F Capacitor, Wires, Decoder(IC 7447)

Description :

1) The IC(555) network is also referred as the clock of the circuit. It generates a clock signal which is sent to the other 2 flipflops(7474). The main purpose of the clock is to provide certain amount of time for each number. The clock does not let the information go whenever clock signal is low. The frequency of the clock signal can be changed by changing the capacitances.

2) The circuit gets the the power through the micro USB jack. V_{cc} are connected to every element of the circuit, once the circuit is powered, the flip flops starts to produce random outputs.

3) The outputs from the flipflops are given to XOR (7486), the decoder decodes the output in such a way that the seven segment display could understand the code. It acts like a medium between the flip flops, XOR and the seven segment display. It lights up the segments it need to light to generate the required response.

4) At the same time, the output of the XOR gate also goes to the flip flops once again so the the flip flops process the numbers and generate next random numbers.

5) The brightness of the seven segment display is determined by the resistor connected to the COM. The more the resistance the less the brightness.

6) Here are some pictures of the circuit :

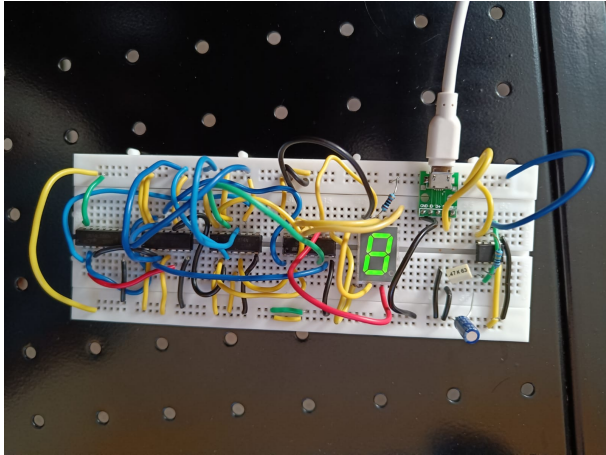


Fig. 0. Circuit

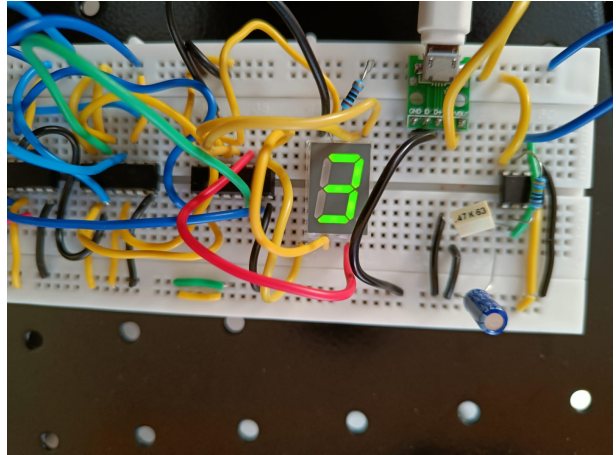


Fig. 0. 3

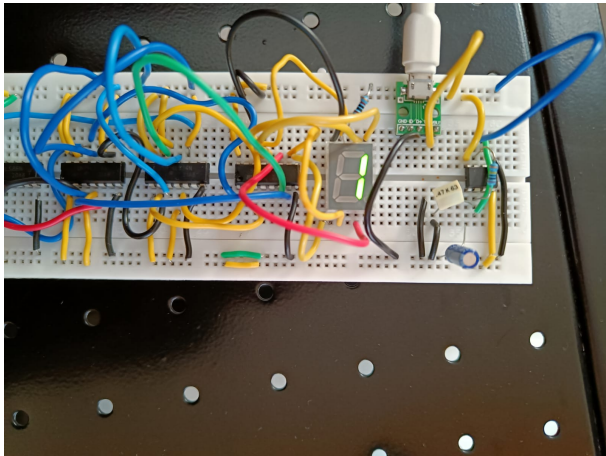


Fig. 0. 1

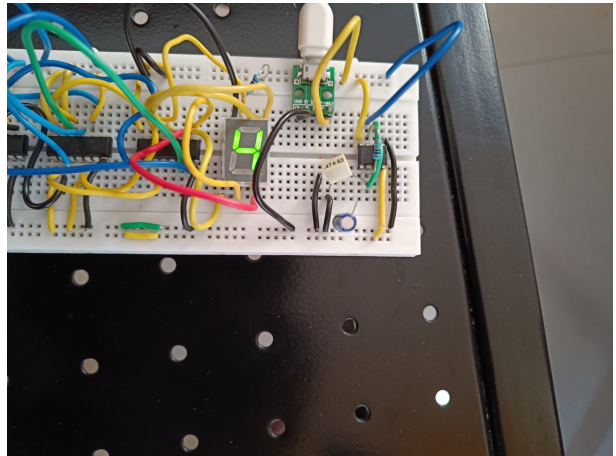


Fig. 0. 4

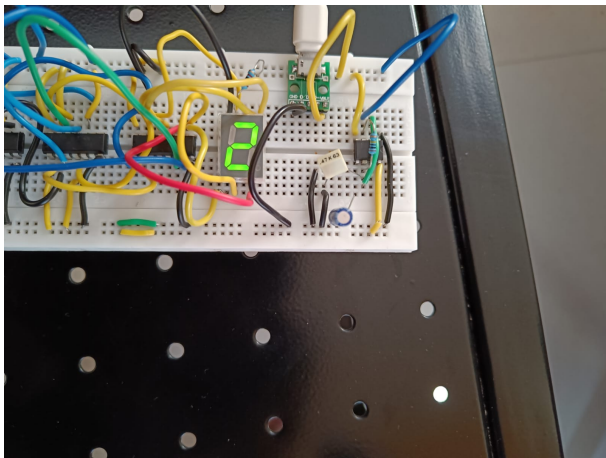


Fig. 0. 2

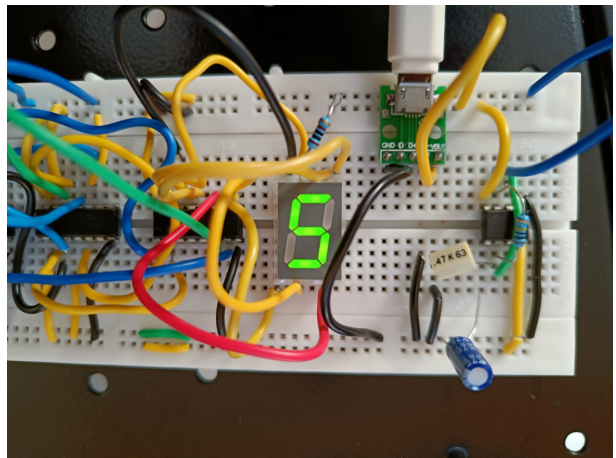


Fig. 0. 5

Block Diagram

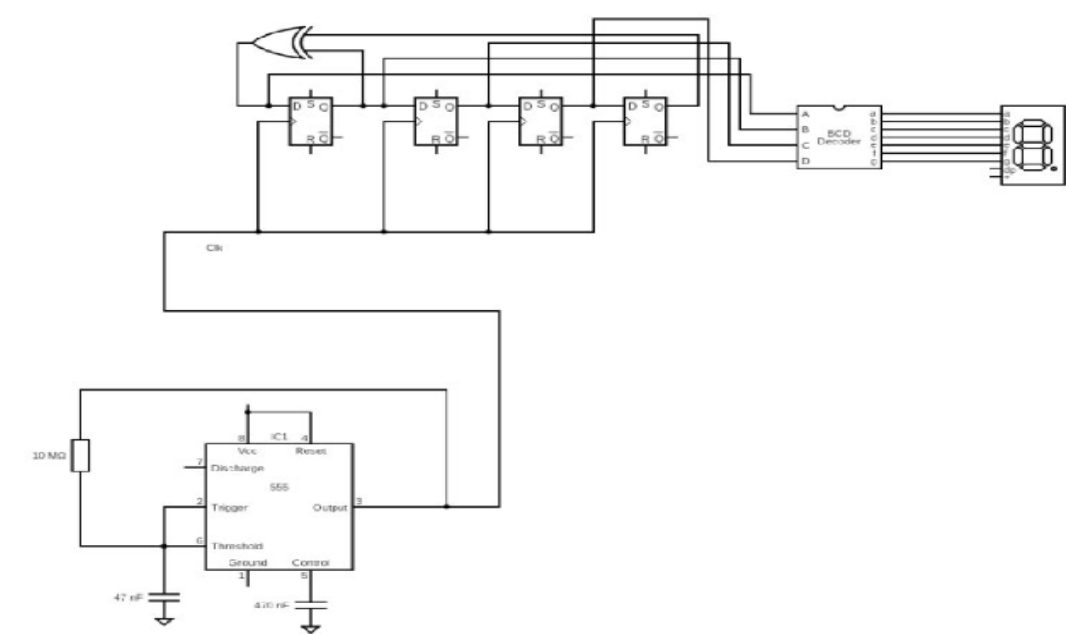


Fig. 0. This is the Block Diagram of the circuit