Probability Hardware Assignment

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1 Introduction

Task is to implement a random number generator using hardware components

2 Components used

component	quantity
Breadboard	1
Seven segment display	1
Decoder	1
D flip flop	2
XOR Gate	1
555 IC	1
Resistor 1KΩ	1
Resistor 1MΩ	1
Capacitor 100nF	1
Capacitor	10nF
Jumper wires	

TABLE 0

COMPONENTS

3 Implementation

3.1 Random bit generation:

- Connect D1 of first flipflop to XOR Gate output
- Connect Q1 and Q2 outputs of both flipflops to their D inputs
- Connect output of XOR gate to D1 input of first flip flop

3.2 Clock Signal generation:

- Connect 555 timer IC to generate clock pulses
- connect output of 555 IC to clock inputs of both flip flipflops

3.3 7-segment display

- Connect Q1 and Q2 outputs of second flipflop to inputs of 7 segment Decoder
- Connect outputs of decoder to 7 segment display

4 Functionality

- As the power is applied, 555 timer IC generates clock pulses
- As these clock pulses are applied to flipflops, flip flops set their output according to their inputs
- XOR gate combines Q1 and Q2 outputs of first flipflops and random bits are generated
- These random bits are decoded by 7 segment decoder
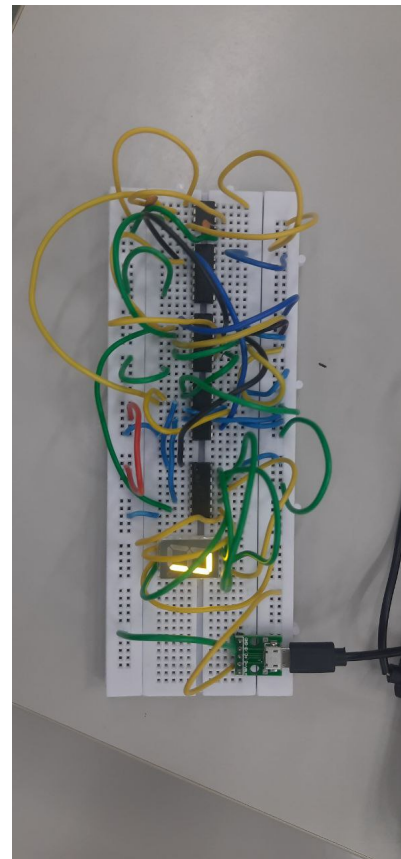- output of 7 segment decoder is fed into 7 segment display to display the randomly generated numbers generated by flipflops

Fig. 0. circuit generating random numbers