Hardware Assignment Report

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EE22BTECH11208

Description

Circuit Overview

1. Flip flops 7474 This device contains two independent positive-edge-triggered D-type flip-flops with complementary outputs.The information on the D input is accepted by the flip-flops on the positive going edge of the clock pulse.The Flip-flops take the clock from the clock bus and, based on their initial state, output a sequence of numbers.
2. The sequence is fixed, and if the circuit is operated without concern for the initial state, the output number shown is generated randomly from 1 to 15 (both inclusive), with equal probability of all of them.
3. The 7 Segment Decoder using IC 7447 is generally used as numerical indicators and consists of several LEDs arranged in seven segments. The decoder can show numbers from 0 to 15, and the ABCD formed by the flip-flops do not become 0000 at any time.
4. This circuit is deterministic, hence, the randomness can be decoded by simply referring to the sequence. the sequence generated is 3,7,15,14,13,10,5,11,6,12,9,2,4,8,1,3,7...
5. The output repeats after all 16 numbers are shown.

Timer

1. The time period of the display can be changed using different values of Resistor and Capacitor.
2. A 10MΩ resistor and 47nF and 470nF capacitors are used in the project.
3. This allows us to get a square pulse of 5V every 0.9 seconds. Which is slow enough to allow us to take readings from the resistor.

Components

1. Breadboard
2. Seven Segment Display - Common Anode
3. 7447 Seven Segment Display Decoder
4. 7474 D Flip-Flop x2
5. 7486 XOR gate
6. 555 precision timer
7. Resistor 10MΩ

8. Resistor 1KΩ
9. Capacitor 47nF
10. Capacitor 470nF
11. USB micro B breakout board
12. Jumper wires

Practical Observations

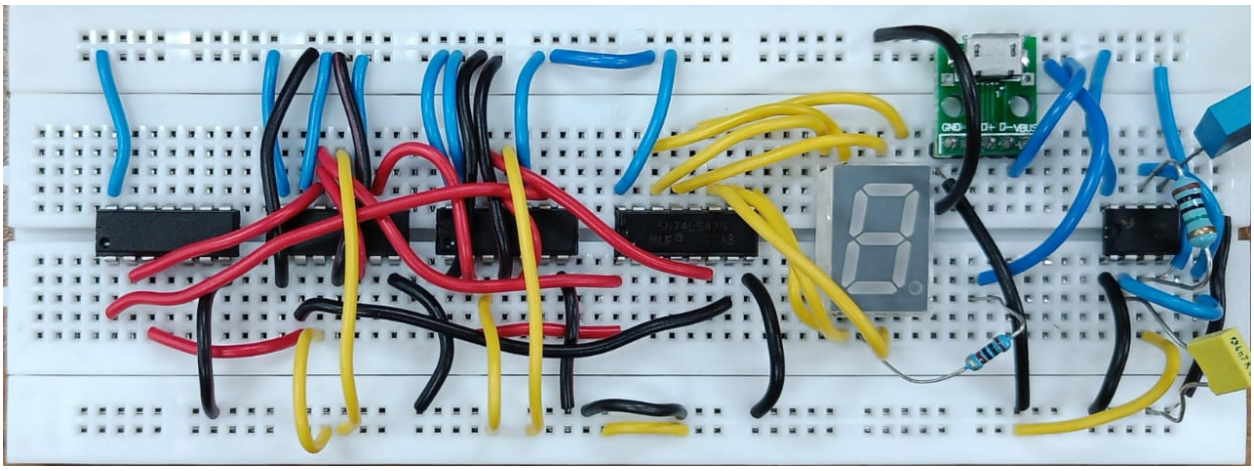

Figure 1: Circuit

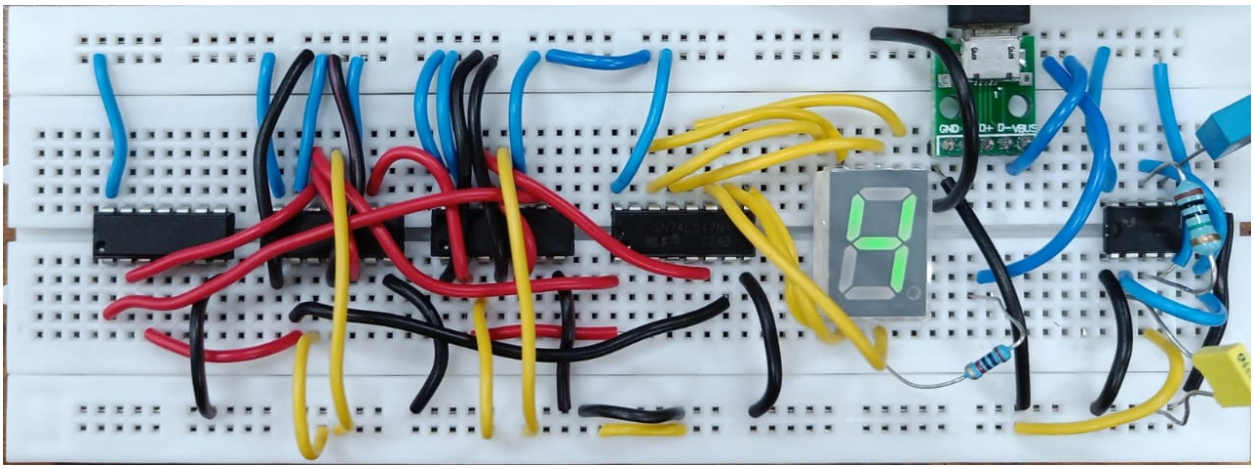

Figure 2: Circuit with power source

Block Diagram

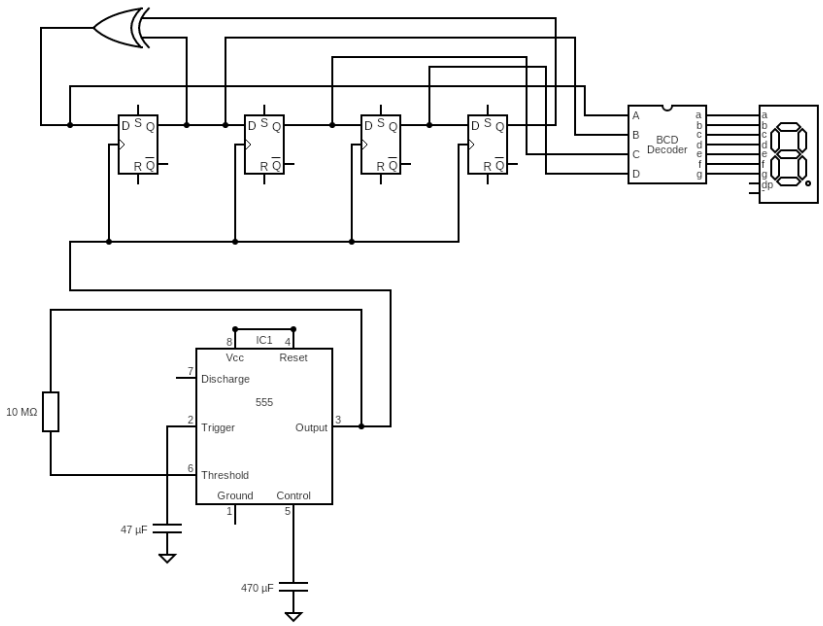

Figure 3: Block Diagram