



# Lottery Number Generator

It's a game of chance!

# Welcome!

Team Members:

1. Anusha C S
2. Rohan K
3. Shaheen Khan
4. Vinod Patil

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01

# Introduction

Problem Statement: Design and implement digital system for lottery number generation

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Digits of lottery ticket: 3

Mode of result: One number at a time.

Display: Common anode 7 segment display

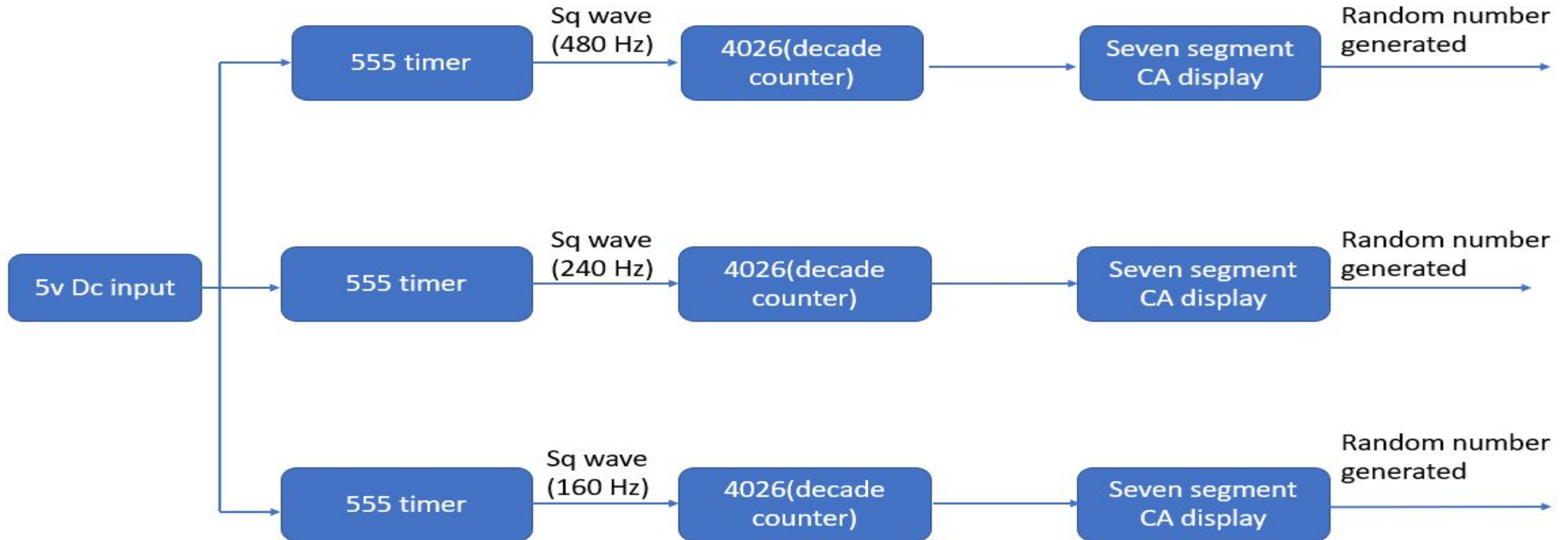
## Understanding of the Problem Statement:

A random number is a number chosen from a pool of limited or unlimited numbers that has no pattern for prediction. This project considers the numbers from 0-9 which will be displayed on the 7-segment display

In this circuit the user will be given a switch which needs to be pressed to generate the sequence of numbers.

When the switch is pressed the circuit will increment the sequence at high speed and upon release of the switch the number is presented on the display.

# Block diagram

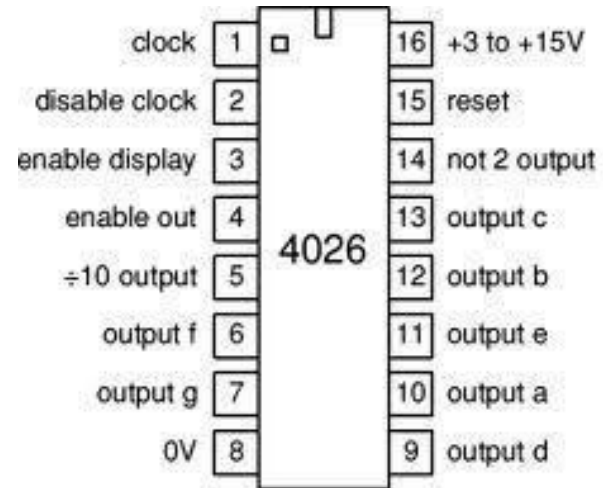


# 3

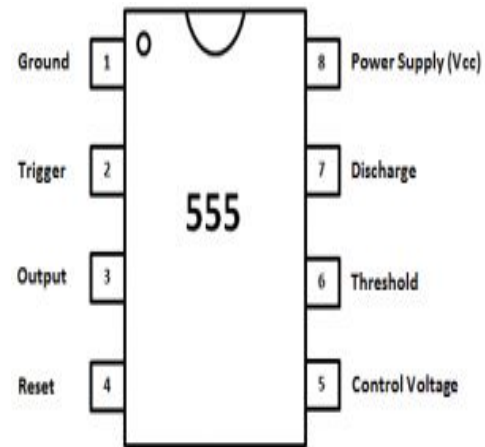
## Detailed design

Part name	Specification	Quantity
1. IC 555	multi vibrator ic	3
2. IC 4026	seven segment display decayed counter	3
3. Resistor	300 ohms, 1k ohms, 2k ohms, 3k ohms	21 2 2 2
4. Capacitor	1uF and 0.01uF	3
5. Push button	-	3
6. Power supply	5v dc	1
7. Common anode 7-segment display	-	3
8. Bread board	-	2
9. Wires	-	assorted

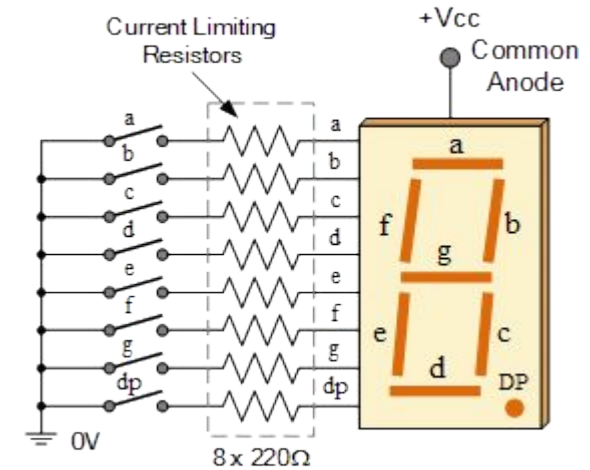
Pin diagram of IC 4026:



Pin diagram of IC 555:



Common Anode 7-segment display:





## Introduction to the parts we used:

- 4026 is a Johnson counter IC commonly used in digital display. It has a 5 stage Johnson decade counter with a decoder which converts the Johnson code to a 7 segment decoded output. To put it simply, it will convert the input into numeric display and can be seen on 7 segment display or with LED..
- IC 555 timer is a one of the most widely used IC in electronics and is used in various electronic circuits for its robust and stable properties. It works as square-waveform generator with duty cycle varying from 50% to 100%, Oscillator and can also provide time delay in circuits.
- There are two types of seven-segment displays: common anode and common cathode. The Internal structure of each of these types is nearly the identical. However, the polarity of the LEDs and common terminal are different. In a common anode display, the positive terminal of the eight-shaped LEDs are connected together.

In our circuit, we have used IC 555 as an astable timer which generates square waves to feed the IC 4026.

The frequency of this square wave is given by:

$$f = 1.44 / (R_2 + 2 \cdot R_1) C_1$$

here  $R_1 = R_2 = 1000 \text{ ohms}$

$$C_1 = 1 \mu\text{F}$$

The frequency set for the circuit is 480Hz.

This frequency should be kept as high as possible so that the user cannot judge the number sequence by any means.

The frequency of the second square wave is given by:

$$f=1.44/(R2+2*R1)C1$$

here  $R1=R2= 2000$  ohms

$$C1=1\mu F$$

The frequency set for the circuit is 240Hz.

This frequency should be kept as high as possible so that the user cannot judge the number sequence by any means.

The frequency of the third square wave is given by:

$$f=1.44/(R2+2*R1)C1$$

here  $R1=R2= 3000$  ohms

$$C1=1\mu F$$

The frequency set for the circuit is 160Hz.

This frequency should be kept as high as possible so that the user cannot judge the number sequence by any means.

A switch is placed between the timers and IC 4026. When the button is pressed the IC 4026 takes the clock signal as input. The IC counts from 0 to 9 with individual clock pulse and resets back to 0 once it hits 9.

1) For the first timer circuit:

Since the speed of the clock signal is high, the IC will count from 0 to 9 almost 480 times in 1 second (due to the frequency.) This is what makes the number appearing in the 7-segment display to be random in nature.

2) For the second timer circuit:

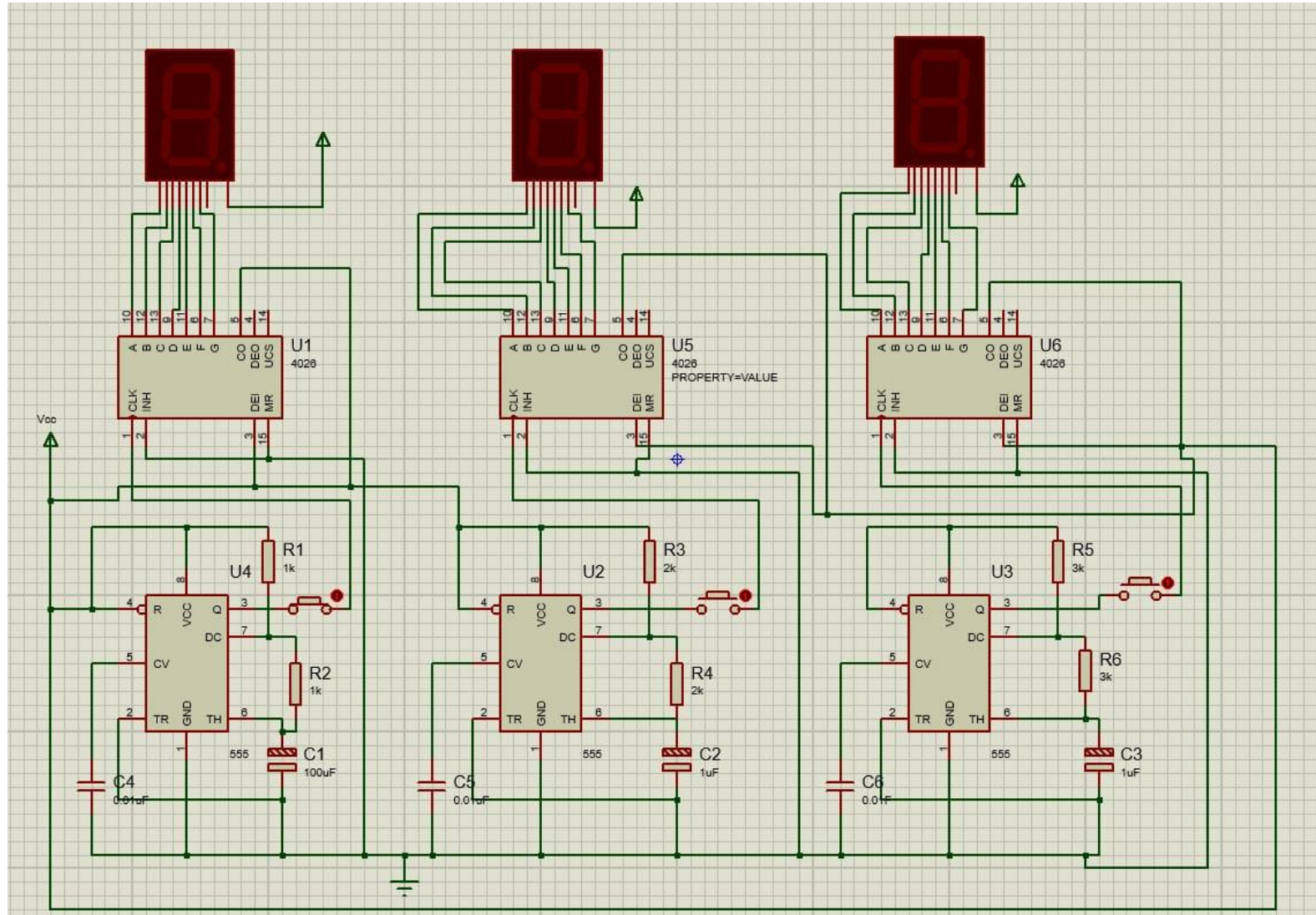
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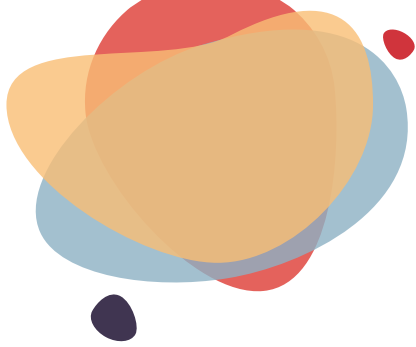
3) For third timer circuit:

Since the speed of the clock signal is high, the IC will count from 0 to 9 almost 160 times in 1 second (due to the frequency.) This is what makes the number appearing in the 7-segment display to be random in nature.

In this way the number is generated one by one as each switch is pressed and it is random in nature since the frequency for different timer circuits is set to different values.

# Circuit Diagram:





# Why 4026 IC ?

It contains counters and 7 segment decoded in one package, It can be easily interfaced with 7 segment types, Ideal for low power display, Operated at wide range of temperature from 5V to 20V and the biggest advantage of the 4026B counter IC is that it can drive a 7-segment display without needing a decoder driver IC.



# Alternate design

Since the original design has a higher score, it is selected for implementation.





# Thank You!

Do you have any questions?



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