

Title: 1-Way Traffic Control Light Using 555 Timer

Course: Digital Logic and Circuits Lab

Group: 02 Section: C

Date of Presentation: 18th January, 2025

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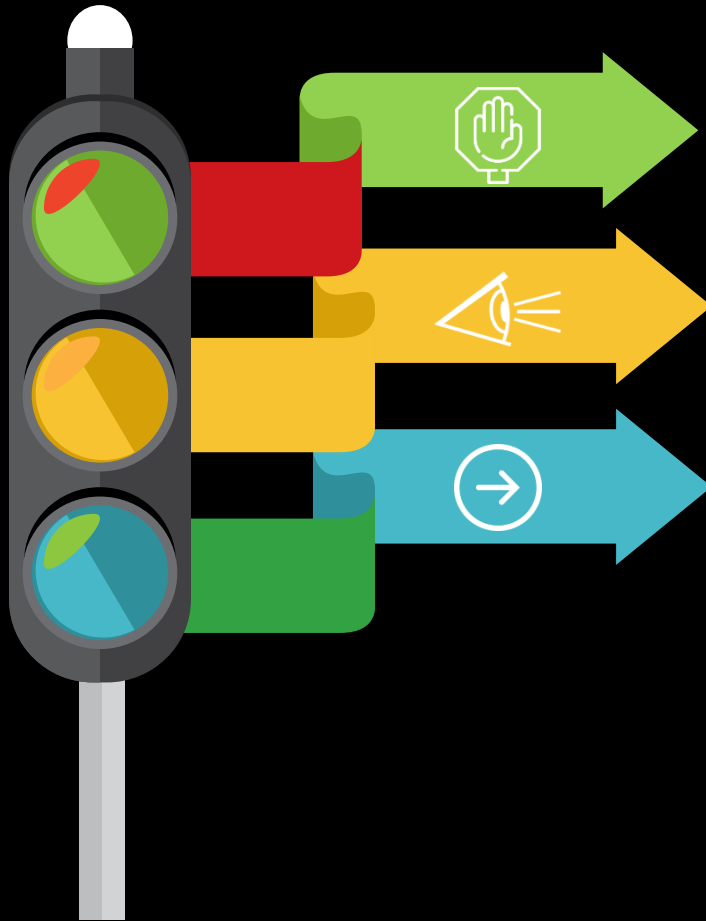
Group Introduction

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Objectives

- To design and implement a 1-way traffic control light using a 555 timer and CD4017 IC
- To understand the working principle of sequential circuits and the interaction of various components like the 555 timer, CD4017 IC, diodes and transistors in real-time applications.
- To simulate a real-world traffic control system and explore its functionality on a smaller scale.
- To explore the scalability of this circuit design for more complex traffic management systems, such as multi-way or adaptive traffic control systems involving sensors.

Real Life Traffic Light



Red Light

Halts traffic, signaling stop for safety and road regulation.

Yellow Light

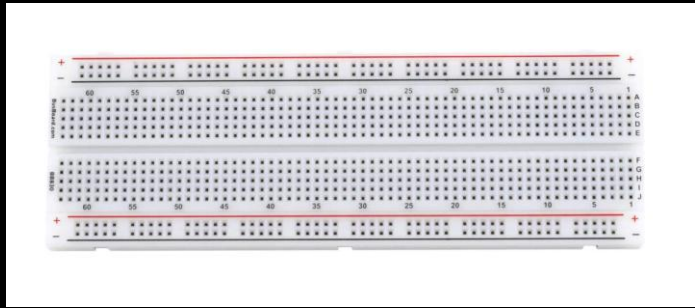
Indicates caution, prompting drivers to slow down and prepare.

Green Light

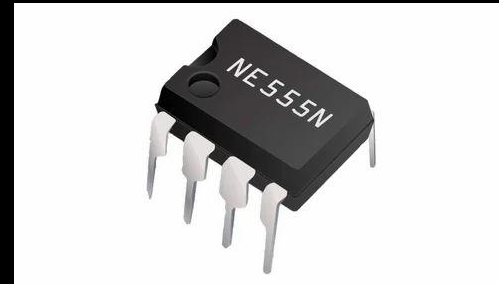
Grants permission to proceed, ensuring smooth flow of traffic.

Components used

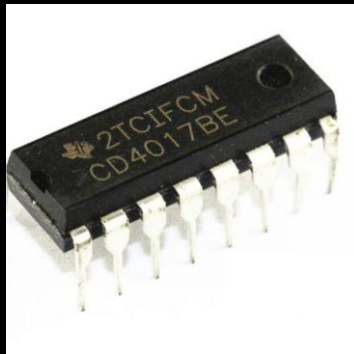
➤ Breadboard



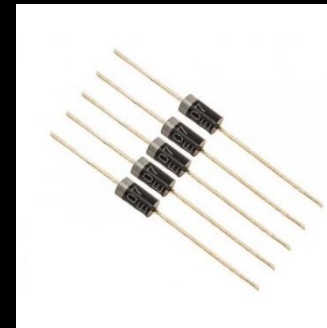
➤ 555 Timer IC



➤ CD4017 Counter IC



➤ Diode (1N4007, Zener)

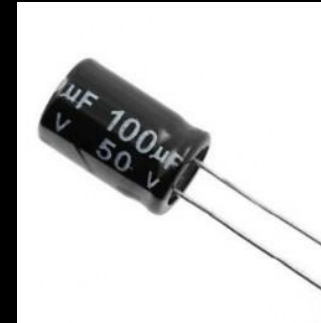


Components used

➤ Resistors



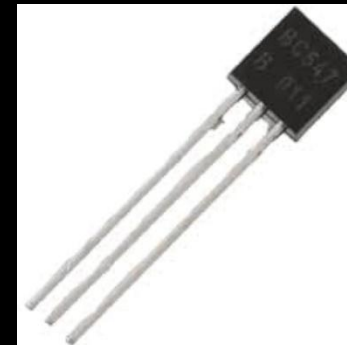
➤ Capacitor (100uF)



➤ 100K ohm Potentiometer



➤ BC547 NPN Transistor

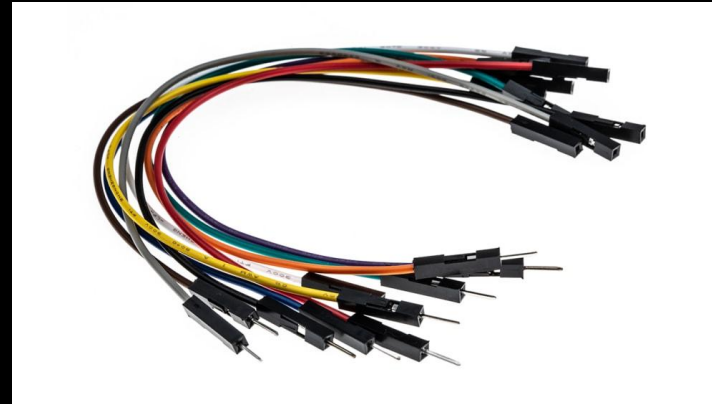


Components used

➤ 9V Battery



➤ Jumper Wire



Working Principle

555 Timer: Pulse generator for clock signal.

CD4017: Decade counter IC for controlling LED sequence.

Resistors & Capacitors: Determine timing and stability of the circuit.

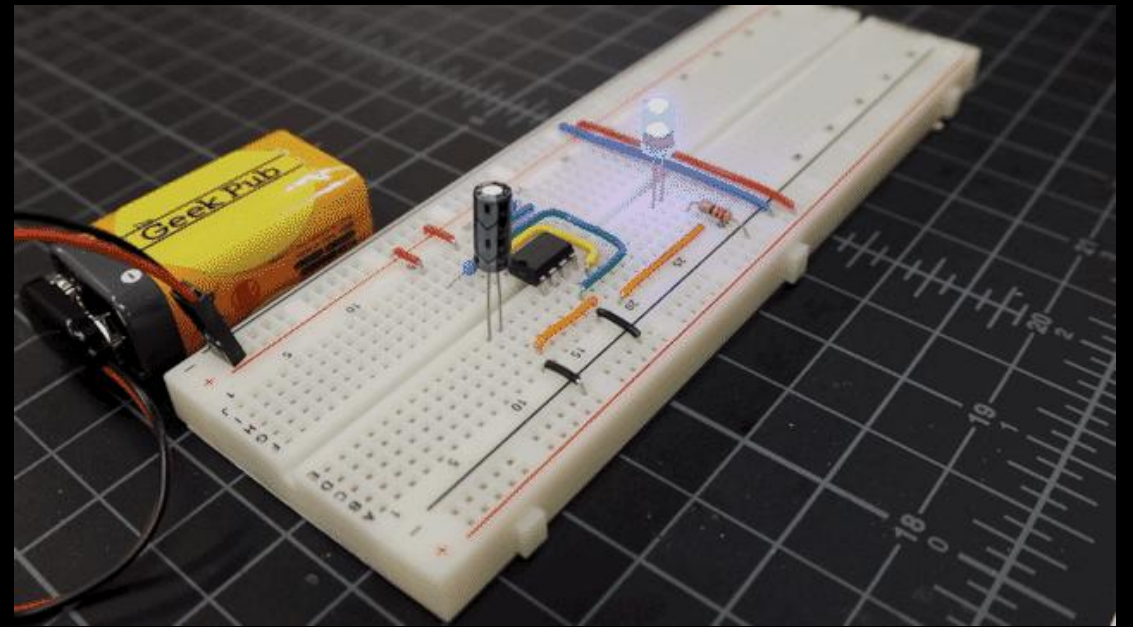
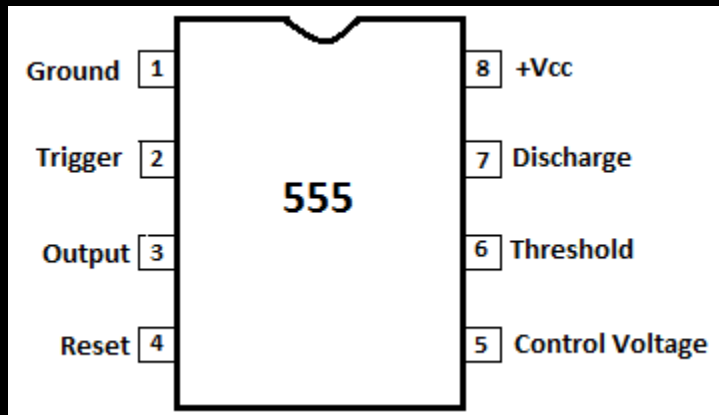
Zener Diode: Protects the circuit by maintaining voltage levels.

1N4007 Diode: Prevents reverse current flow.

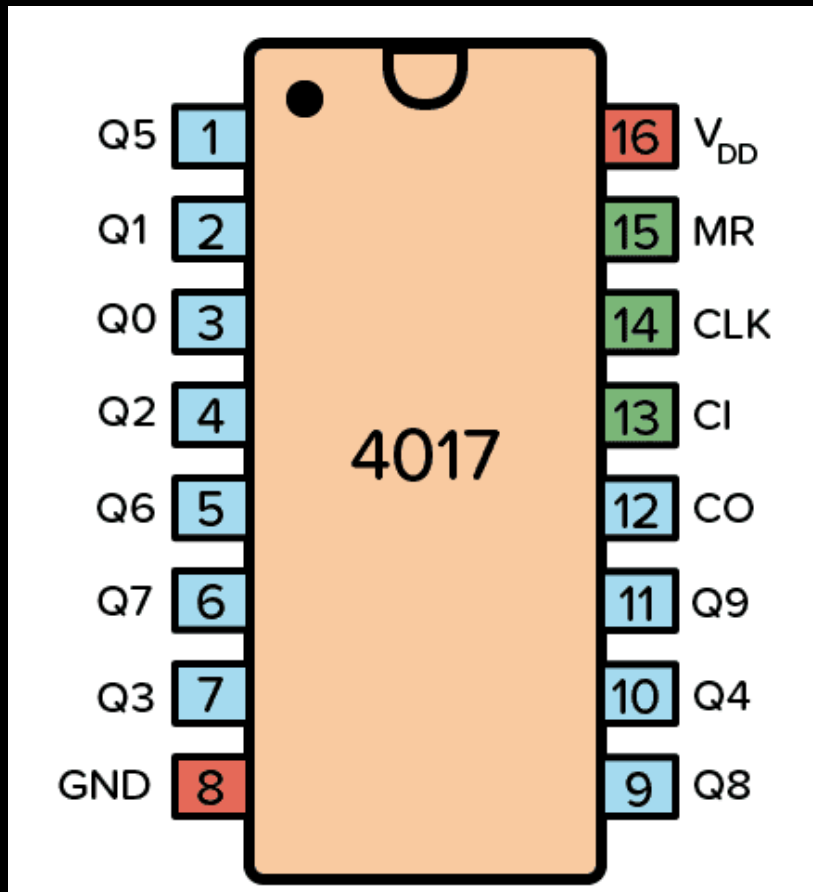
NPN Transistor: Amplifies signals for LED control.

Working Principle

- Generating Pulse Using NE555 Timer IC



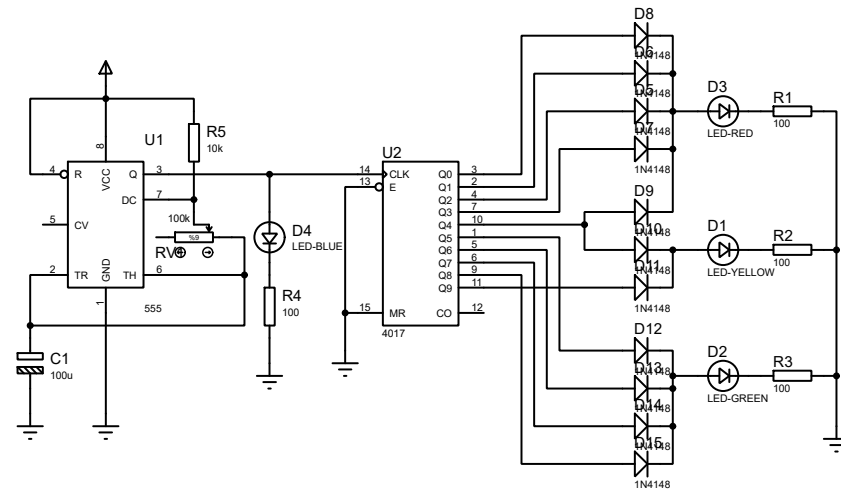
Working Principle



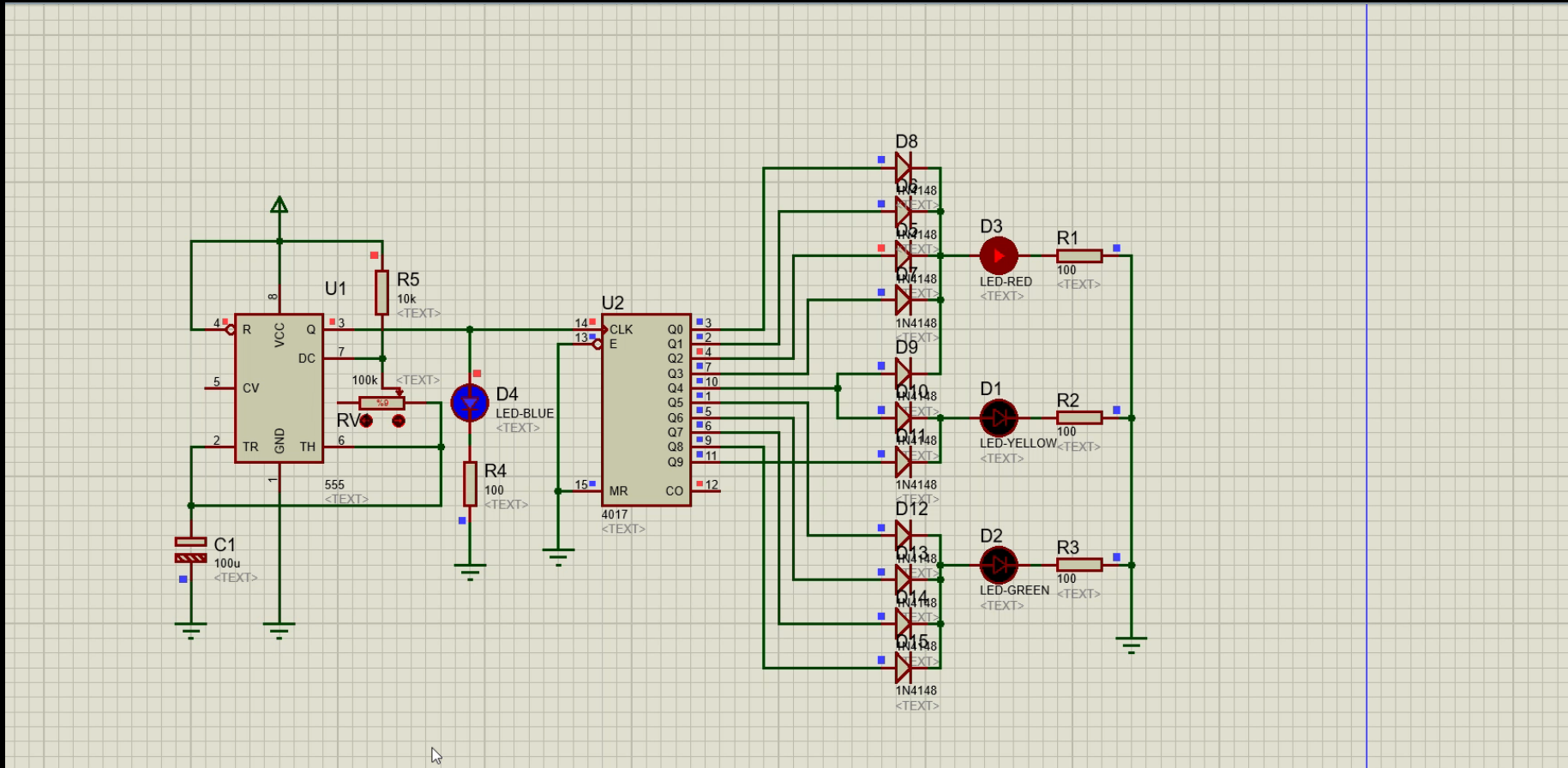
- To control LED Sequence using **CD4017** IC

The Clock (CLK) pin increases the counter with one every time the pin goes from low to high. And as the count increases, the output pins (Q0-Q9) get high one by one. After the 10th input pulse, the counter resets and starts from 0 again.

Circuit Diagram

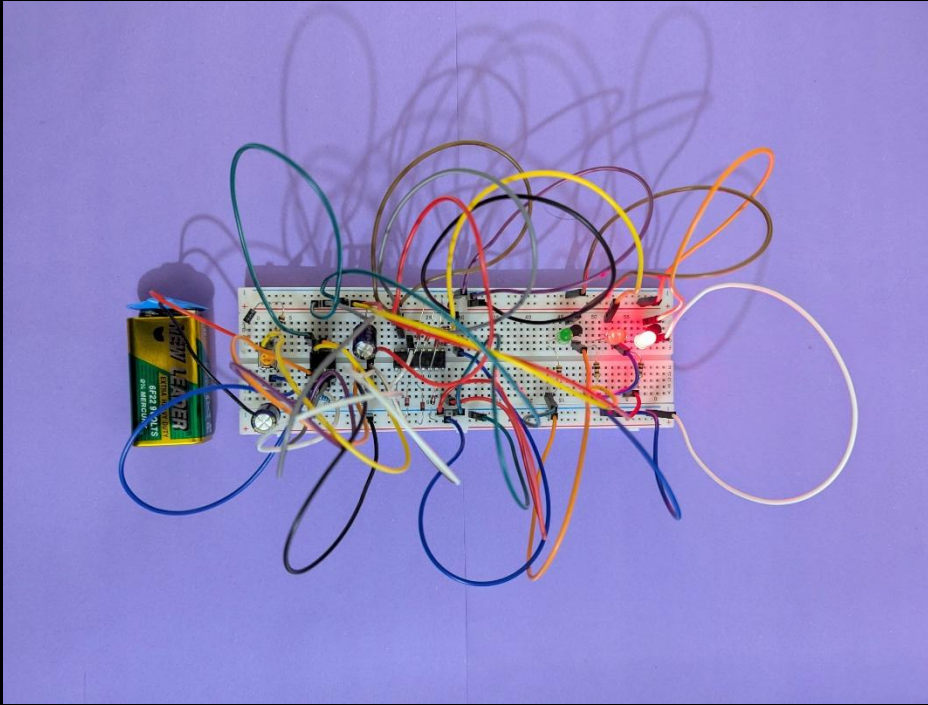


Simulation and Result

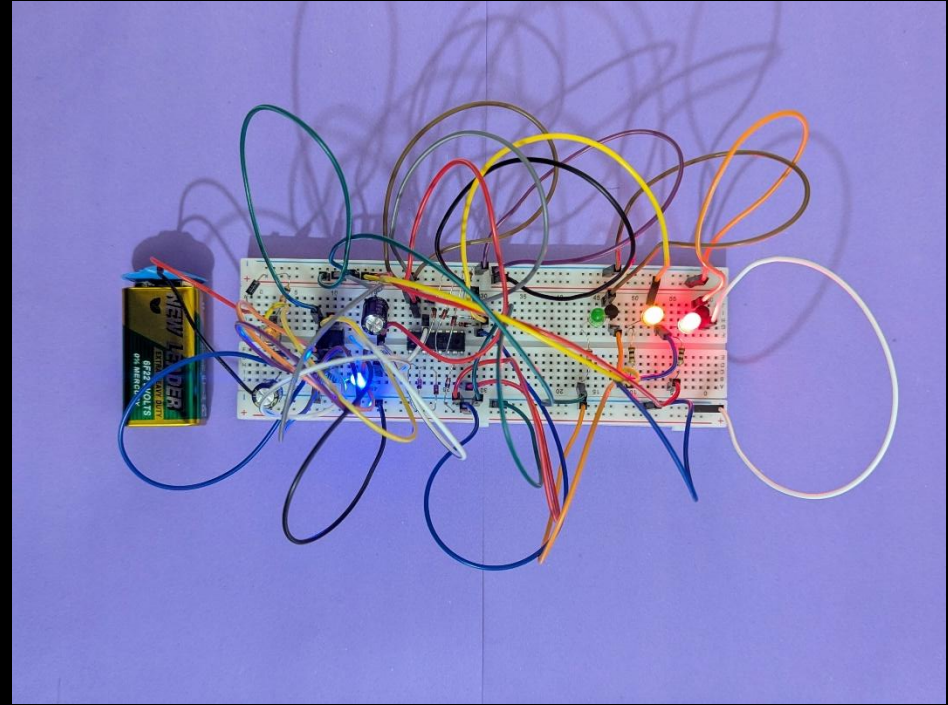


Demonstration

Red Led ON (STOP)

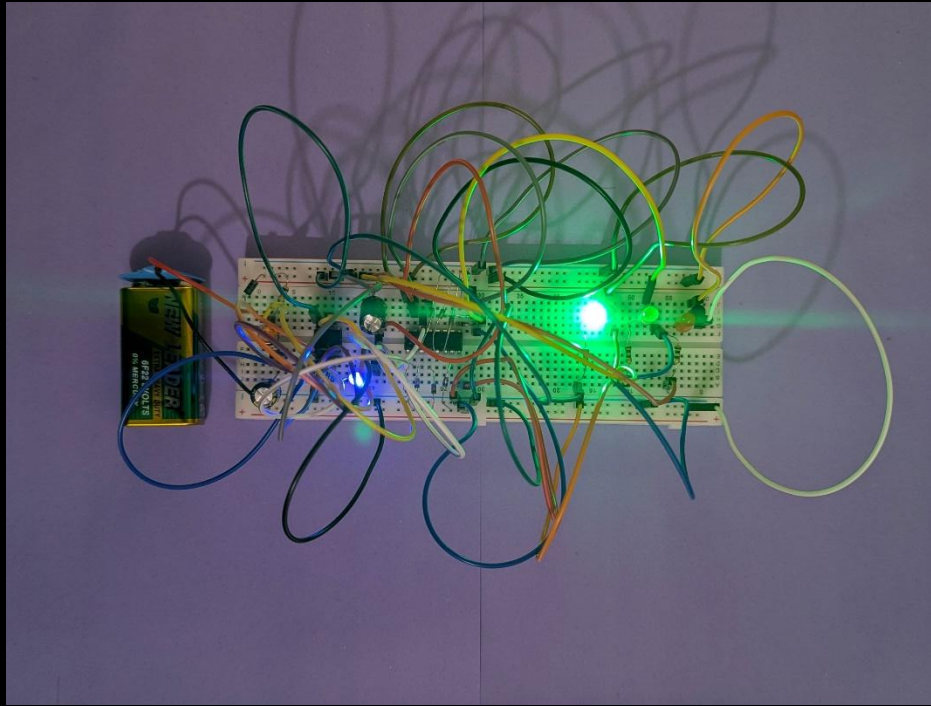


Red & Yellow Led ON (STOP & WAIT)

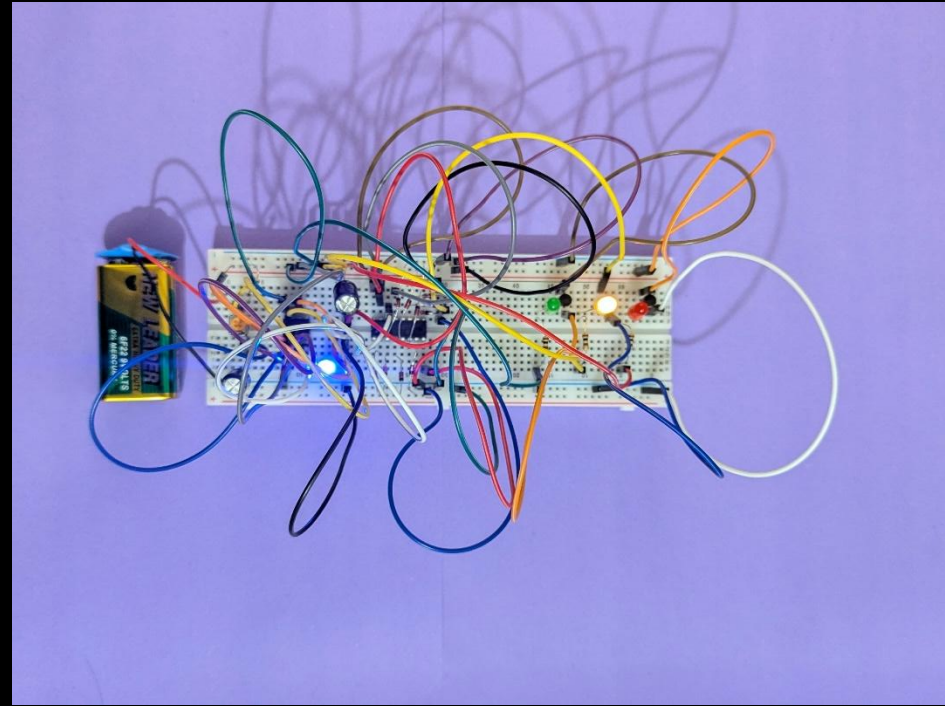


Demonstration

Green Led ON (GO)

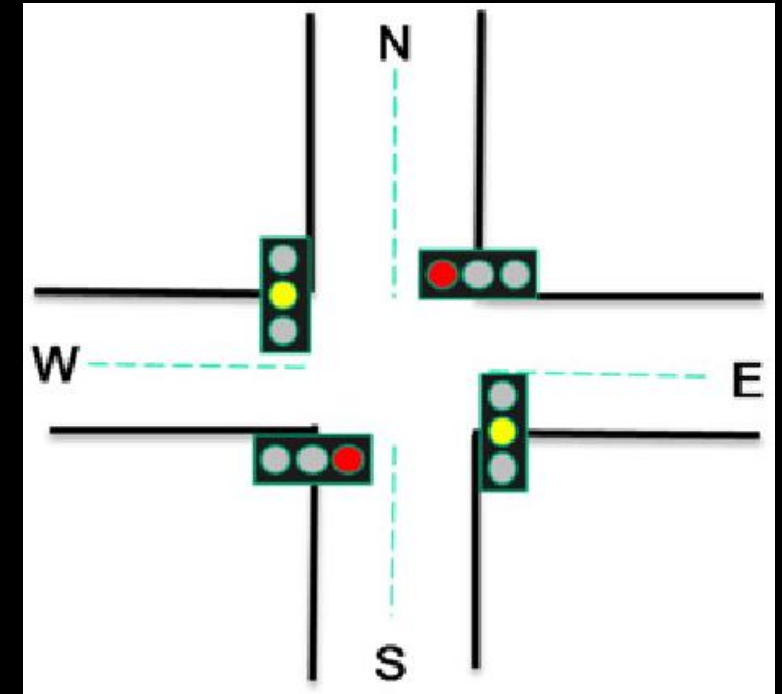


Yellow Led ON (GO SLOWLY)



Real-life Application And Future Improvements

- Multi way / 4-way Traffic Control system



Challenges and Solutions

➤ Challenges Faced

- Component compatibility
- Timing Adjustments

➤ Solutions Implemented

- Adjusted resistor and capacitor values (Using Potentiometer)
- Verified circuit functionality through simulation.

Thank You

Q&A

