Traffic Light Demo Project using TinkerCAD and Arduino

Components Used:

- Arduino UNO R3
- LED (Red, Yellow, Green)
- Resistors
- Push Button Switch

Arduino: A microcontroller board that acts as the brain of the project, controlling the LEDs based on programmed instructions.

LEDs: Light-emitting diodes that visually indicate traffic signals by turning on and off according to the control logic.

Resistors: Used to limit the current flowing through the LEDs, preventing damage and ensuring proper operation.

Push Button Switch: A simple input device that allows users to trigger the traffic light sequence by pressing it, sending a signal to the Arduino.
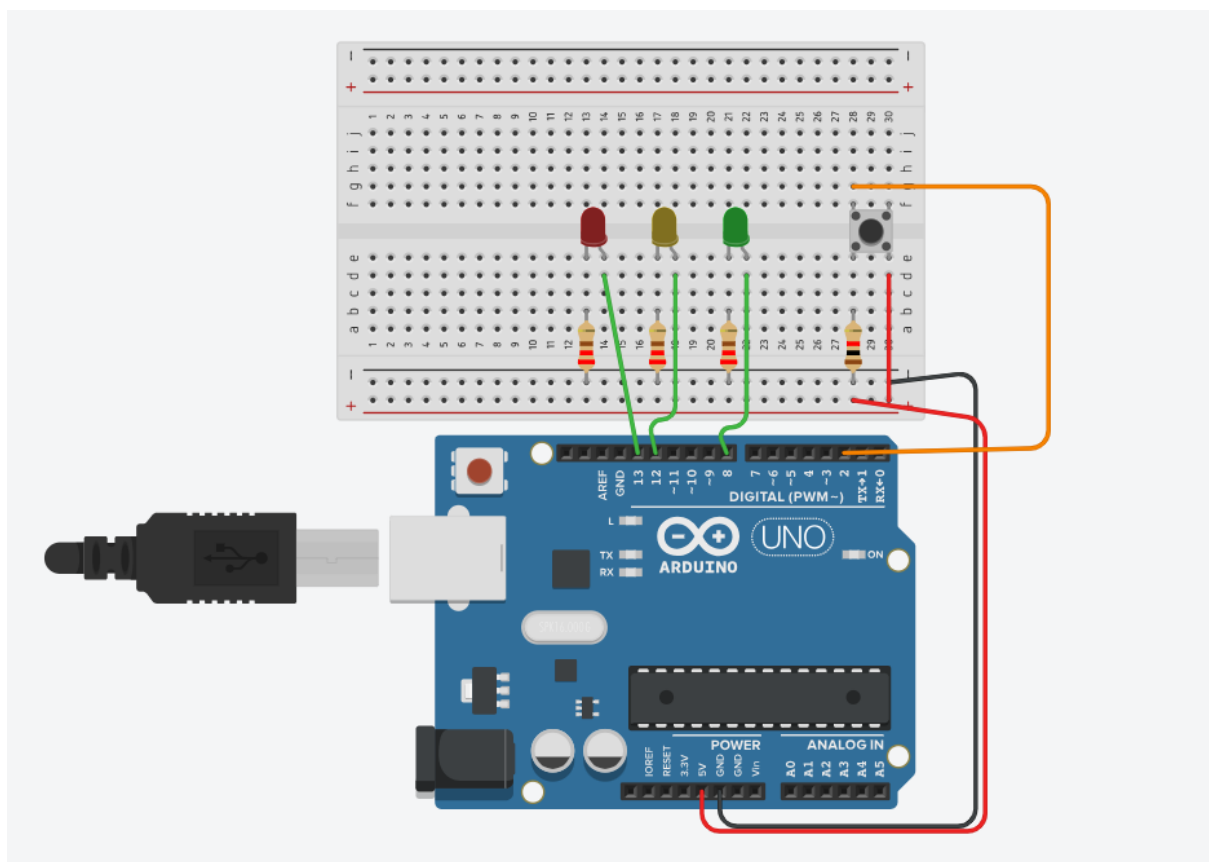
Project:

Fig19.1: Arduino Based Traffic System

Explanation:

The Arduino-based traffic light system operates by simulating a real-world traffic signal using LEDs and a push button. The system consists of three LEDs: red, yellow, and green, which indicate stop, get ready, and go, respectively. A button is used to trigger the sequence of light changes.

When the button is pressed, the system starts by turning on the red LED (connected to pin 13), signaling a stop. The red light stays on for 2 seconds before turning off. Then, after a brief 500ms delay, the yellow LED (connected to pin 12) turns on, indicating a transition phase. This light remains on for 2 seconds before switching off. Finally, after another 500ms delay, the green LED (connected to pin 8) lights up, signaling a go phase, which lasts for 2 seconds before turning off.

The system continuously checks the button state and only runs the sequence when the button is pressed. Additionally, status messages such as "Stop," "Get Ready," and "Bye" are printed to the Serial Monitor to provide feedback. The use of digitalWrite() controls the LED states, while delay() manages the timing of each phase. This project effectively demonstrates the basic principles of traffic light operation using Arduino and simple electronic components.