

Lab 1 Report

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Introduction

In this lab, we implement a traffic light system that toggles the RED/GREEN LEDs (lights) with a press of a button (in this lab, we use a switch), and we also apply concepts of debouncing and pull-down resistors.

Components Used

- Red LED (Pin 8).
- Green LED (Pin 9).
- Switch (Pin 2).
- 3 Resistors (2 to ground LEDs, 1 Pull-down for the switch).

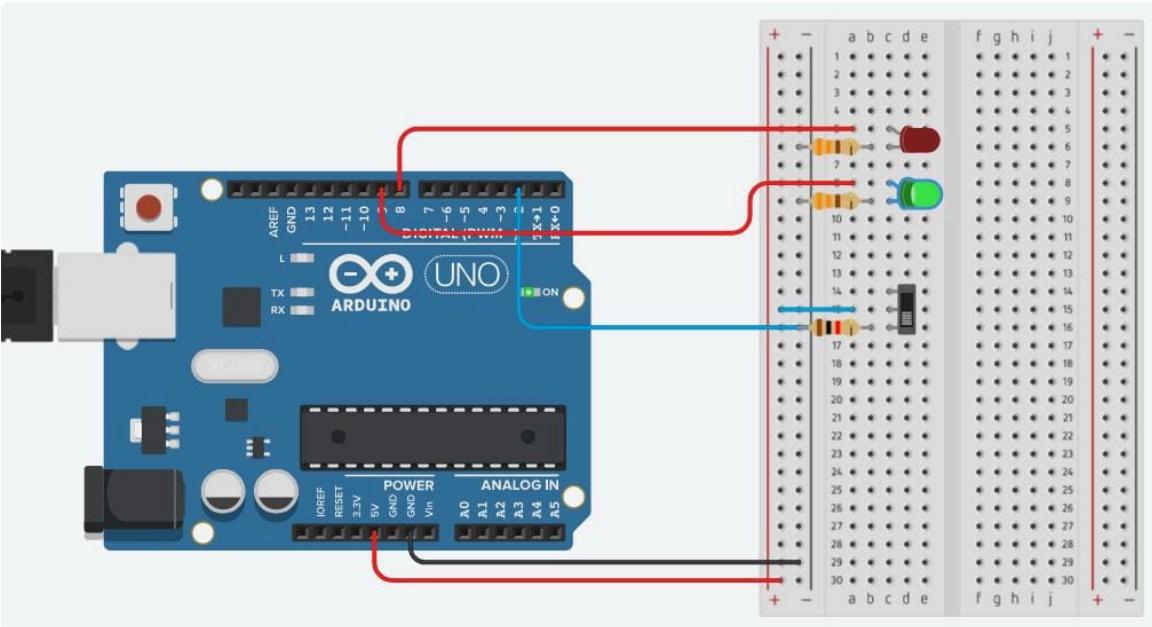
Implementation Details

- The code persists the last previously committed value of the switch.
- When the value of the switch changes, the code first validates the reading using debouncing.
- When the value is committed (read 10 times consistently), the LEDs swap.
- Off → Red LED on, On → Green LED on.

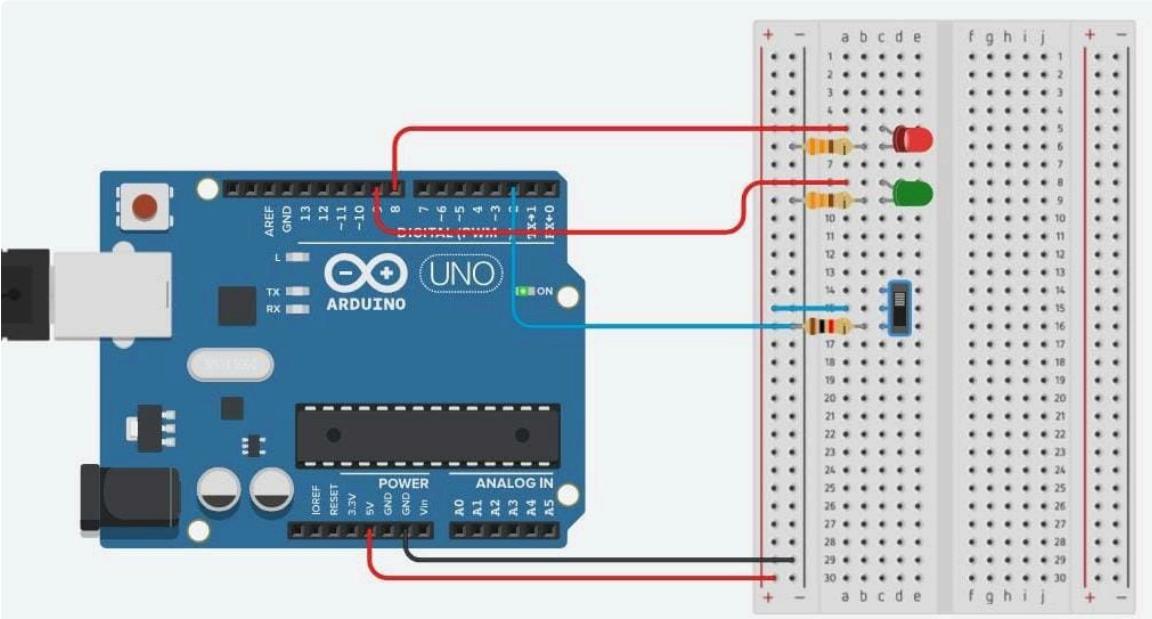
Assumptions

- A switch is used instead of a button.
- Debouncing based on multiple reads (rather than delay-based) is used.

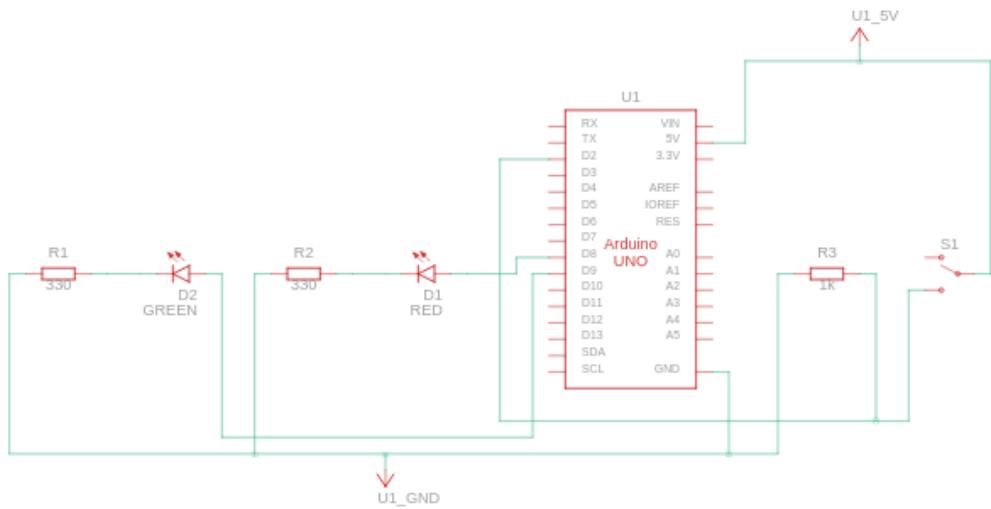
Simulation



Green LED On



Red LED On



Circuit Diagram

Done using TinkerCad

Script

```

1 const int BUTTON_PIN = 2;
2 const int LED1_PIN    = 8;
3 const int LED2_PIN    = 9;
4
5 int ledState = HIGH;
6 int currentButtonState = LOW;
7 int lastButtonReading = LOW;
8
9 void setup() {
10   Serial.begin(9600);
11   pinMode(BUTTON_PIN, INPUT);
12   pinMode(LED1_PIN, OUTPUT);
13   pinMode(LED2_PIN, OUTPUT);
14
15   digitalWrite(LED1_PIN, ledState);
16   digitalWrite(LED2_PIN, !ledState);
17 }
18
19 void loop() {
20   int rawReading = digitalRead(BUTTON_PIN);
21

```

```
22 if (rawReading != currentButtonState) {  
23  
24     int confidenceCounter = 0;  
25     for (int i = 0; i < 10; i++) {  
26         if (digitalRead(BUTTON_PIN) == rawReading) {  
27             confidenceCounter++;  
28         }  
29         delay(5);  
30     }  
31  
32     if (confidenceCounter == 10) {  
33         currentButtonState = rawReading;  
34  
35         ledState = !ledState;  
36         digitalWrite(LED1_PIN, ledState);  
37         digitalWrite(LED2_PIN, !ledState);  
38  
39         Serial.print("State changed to: ");  
40         Serial.println(currentButtonState == HIGH ? "PRESSED" : "RELEASED");  
41     }  
42 }  
43 }
```



Written in Arduino Web Editor