

## Lab – 3 Datasheet

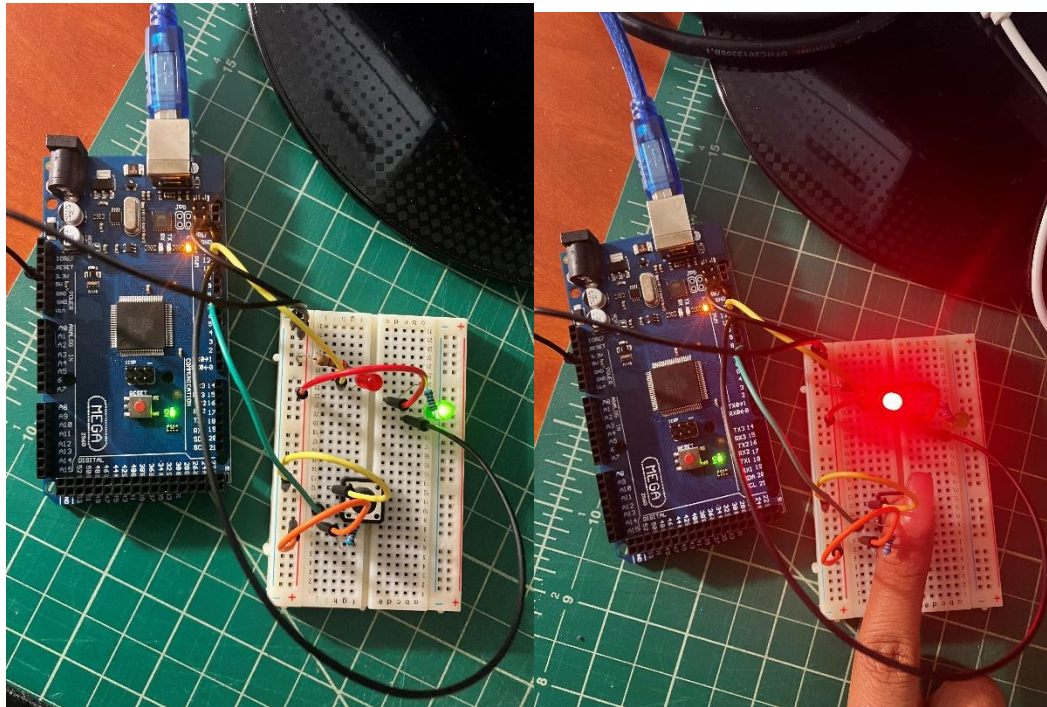
### CpE 4010: Sensors, Actuators and Integration

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#### From procedure 3:

Insert your picture of your modified circuit here:



#### From procedure 5:

Insert your screenshot of your IDE code window here:

This is the first part: pressing the button lights the red LED, whereas releasing it lights the green LED

### SensorsActuatorsLab3.ino

```
1  int redLedPin = 10;    // Red LED pin (was previously green)
2  int greenLedPin = 11;  // Green LED pin (was previously red)
3  int buttonPin = 7;     // Button pin
4  int buttonState;       // Variable to store button state
5
6  void setup() {
7      pinMode(redLedPin, OUTPUT); // Set red LED pin as output
8      pinMode(greenLedPin, OUTPUT); // Set green LED pin as output
9      pinMode(buttonPin, INPUT);   // Set button pin as input
10 }
11
12 void loop() {
13     buttonState = digitalRead(buttonPin); // Read the button state
14
15     if (buttonState == LOW) { // Button is pressed
16         digitalWrite(redLedPin, HIGH); // Turn on red LED
17         digitalWrite(greenLedPin, LOW); // Turn off green LED
18     } else { // Button is released
19         digitalWrite(redLedPin, LOW); // Turn off red LED
20         digitalWrite(greenLedPin, HIGH); // Turn on green LED
21     }
22 }
23
```

This is the second part: first press of the button lights the red LED for one second—releasing it lights the green LED for one second; the second press of the button lights the red LED for two seconds—releasing it lights the green LED for two seconds; and so on up to five presses and reset the cycle.

## SensorsActuatorsLab3.ino

```
1 int redLedPin = 11; // Red LED pin
2 int greenLedPin = 10; // Green LED pin
3 int buttonPin = 7; // Button pin
4 int buttonState; // Variable to store button state
5 int lastButtonState = HIGH; // Variable to store the last state of the button
6 int pressCount = 0; // Variable to count button presses
7 unsigned long duration = 1000; // Initial duration of 1 second (in milliseconds)
8
9 void setup() {
10     pinMode(redLedPin, OUTPUT); // Set red LED pin as output
11     pinMode(greenLedPin, OUTPUT); // Set green LED pin as output
12     pinMode(buttonPin, INPUT); // Set button pin as input
13
14     Serial.begin(9600); // Initialize serial communication at 9600 bps
15 }
16
17 void loop() {
18     buttonState = digitalRead(buttonPin); // Read the button state
19
20     // Detect button press (LOW state)
21     if (buttonState == LOW && lastButtonState == HIGH) {
22         pressCount++; // Increment press count
23
24         // Reset the cycle after 5 presses
25         if (pressCount > 5) {
26             pressCount = 1;
27         }
28
29         // Calculate duration based on press count (1 to 5 seconds)
30         duration = pressCount * 1000;
31
32         // Log press count and duration to Serial Monitor
33         Serial.print("Button Pressed: ");
```

## SensorsActuatorsLab3.ino

```
29      // Calculate duration based on press count (1 to 5 seconds)
30      duration = pressCount * 1000;
31
32      // Log press count and duration to Serial Monitor
33      Serial.print("Button Pressed: ");
34      Serial.print(pressCount);
35      Serial.print(", Duration: ");
36      Serial.println(duration);
37
38      // Light the green LED for 'duration' milliseconds when the button is pressed
39      digitalWrite(greenLedPin, HIGH);
40      delay(duration);
41      digitalWrite(greenLedPin, LOW);
42  }
43
44  // Detect button release (HIGH state)
45  if (buttonState == HIGH && lastButtonState == LOW) {
46      // Light the red LED for 'duration' milliseconds when the button is released
47      digitalWrite(redLedPin, HIGH);
48      delay(duration);
49      digitalWrite(redLedPin, LOW);
50
51      // Log the red LED activity to Serial Monitor
52      Serial.print("Button Released: ");
53      Serial.print(pressCount);
54      Serial.print(", Duration: ");
55      Serial.println(duration);
56  }
57
58  // Save the current button state for the next loop
59  lastButtonState = buttonState;
60 }
61
```

## Output Serial Monitor ✕

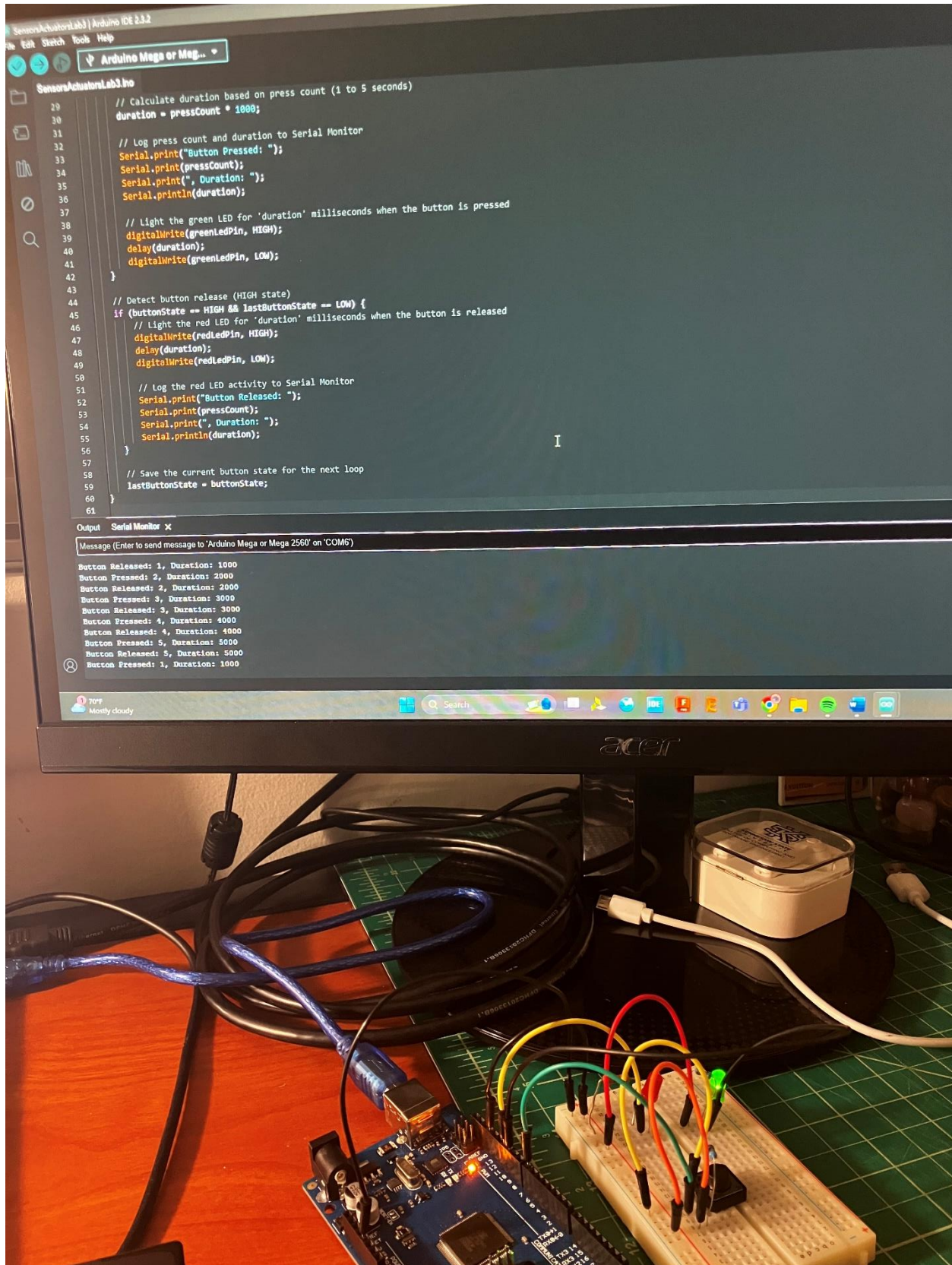
Message (Enter to send message to 'Arduino Mega or Mega 2560' on 'COM6')

```
Button Released: 1, Duration: 1000
Button Pressed: 2, Duration: 2000
Button Released: 2, Duration: 2000
Button Pressed: 3, Duration: 3000
Button Released: 3, Duration: 3000
Button Pressed: 4, Duration: 4000
Button Released: 4, Duration: 4000
Button Pressed: 5, Duration: 5000
Button Released: 5, Duration: 5000
Button Pressed: 1, Duration: 1000
```



## From procedure 6:

Insert your picture of your running circuit with green LED illuminated here:



### **Conclusions:**

**It was a bit tricky to get the LEDs in the order they needed to be in but overall, an easy fix. I didn't realize just how long a second really is from how long it was during the 5<sup>th</sup> iteration of the code. In conclusion, this was a really simple lab with multiple parts to it. It's good that it builds up from the previous lab.**

**Reading the objectives of the lab I get why it's sensors and actuators better (at least I can see it visually now). Button click represents a sensed input while the LED is the actuated output.**