

# TEMPERATURE SENSOR AND ALARM SYSTEM

Course :-Digital Logic Design-L02

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Lap Project



# STUDENTS

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# INTRODUCTION

In various environments such as homes, hospitals, and laboratories, monitoring temperature becomes essential to avoid risks associated with high temperatures.

Based on this need, the project aims to develop a simple system using an LM35 sensor and an Arduino board to alert users through LED lights when the temperature exceeds safe limits.

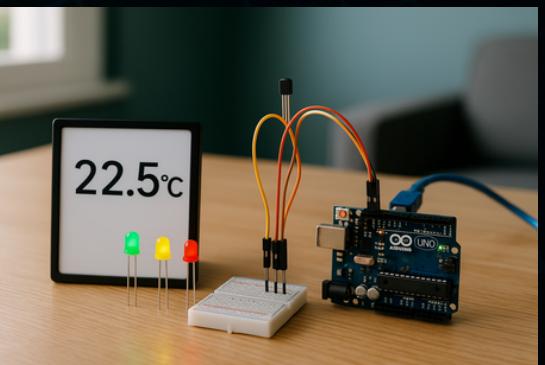
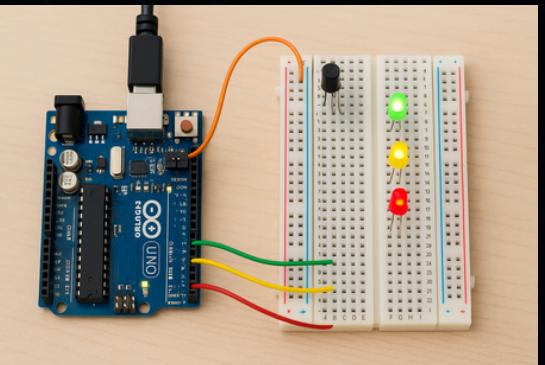


# MAIN CONCEPT

Continuous temperature monitoring and providing a visual alert (using LEDs) when it exceeds specific limits. The system also includes a push button to confirm triggering the red LED when the temperature is too high.

## WHY IS A TEMPERATURE SENSOR AND ALARM SYSTEM IMPORTANT?

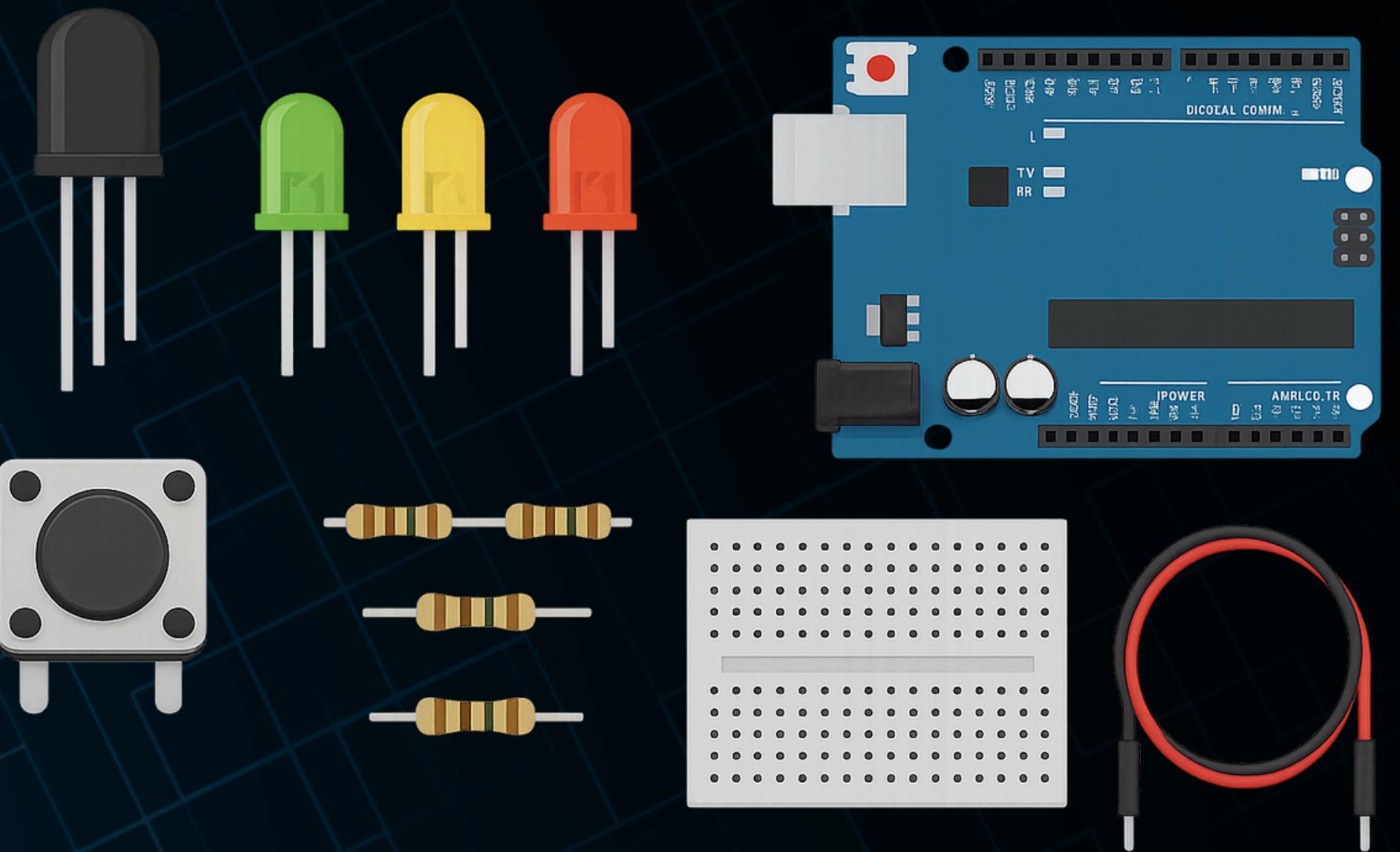
- To alert users when the temperature exceeds a safe threshold.
- To provide a simple and effective solution for temperature monitoring in different environments.
- To allow manual confirmation before triggering The alarm in high-temperature situations



# CIRCUIT COMPONENTS

## Electronic Parts Used:

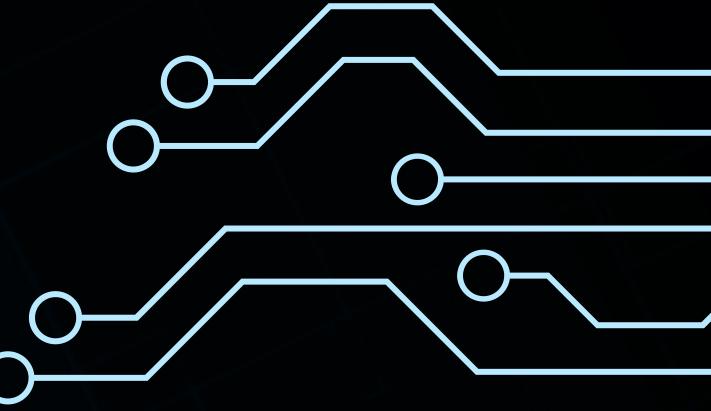
- Arduino Uno
- LM35 Temperature Sensor
- LEDs (Green, Yellow, Red)
- Resistors
- Breadboard
- Jumper Wires
- Push Button

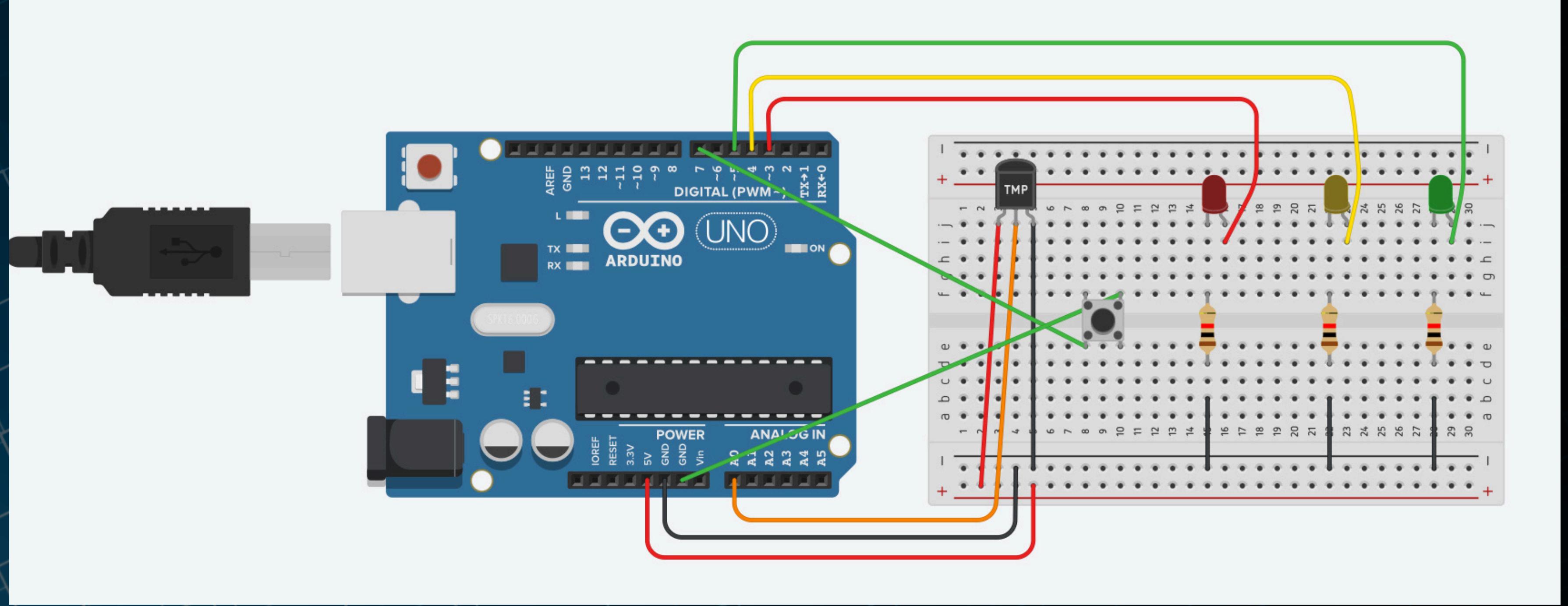


# HOW THE CIRCUIT WORKS?

1. The Arduino reads the temperature data from the LM35 sensor.
2. It calculates the temperature based on the sensor's voltage output.
3. Depending on the temperature:
  - Green LED turns ON if the temperature is  $\leq 25^{\circ}\text{C}$ .
  - Yellow LED turns ON if the temperature is between  $26^{\circ}\text{C}$  and  $50^{\circ}\text{C}$ .
  - Red LED turns ON only if the temperature exceeds  $50^{\circ}\text{C}$  **and** the user presses the push button.
4. The temperature readings are also displayed on the Serial Monitor.

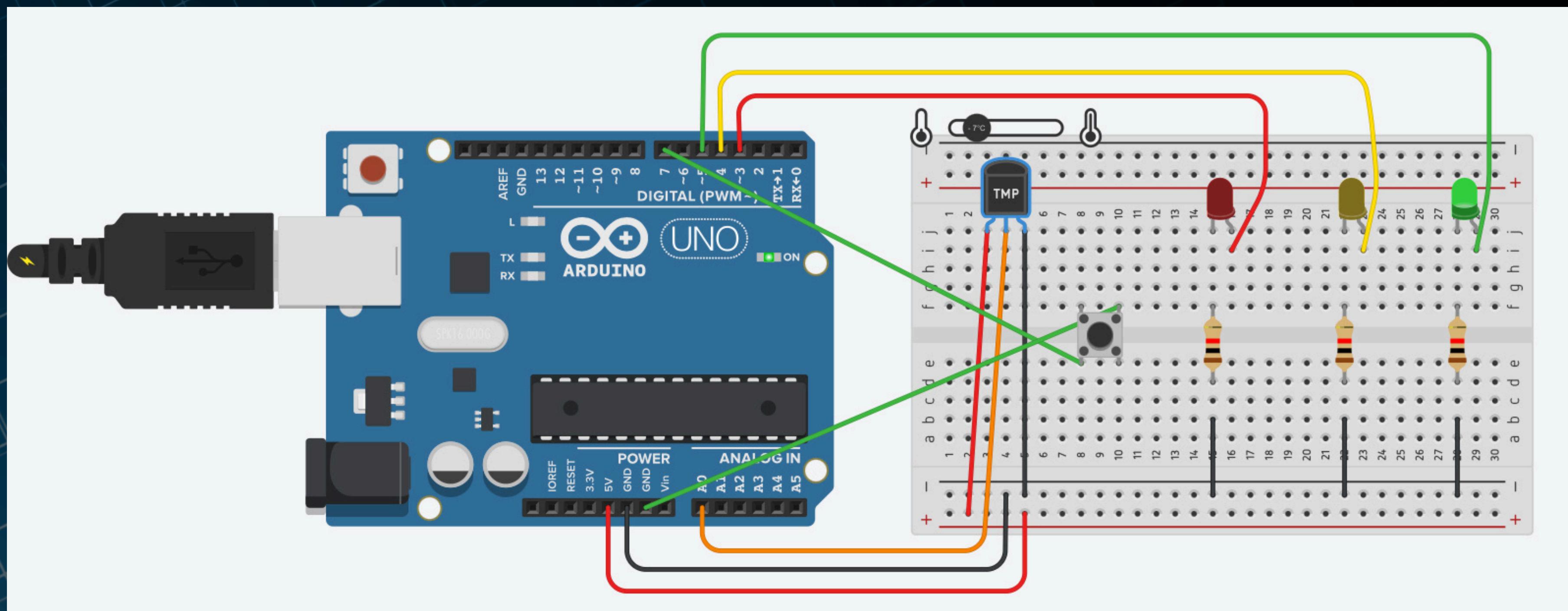
# CIRCUIT DIAGRAM



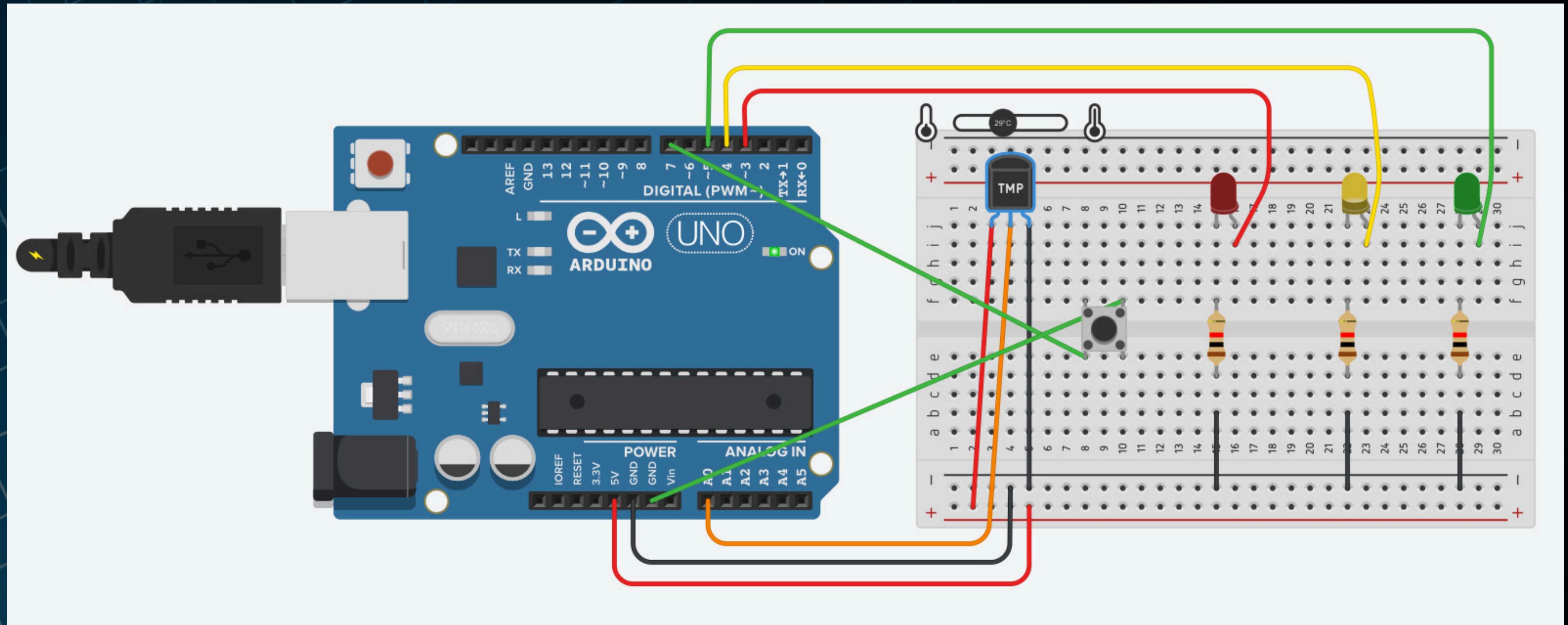


# CIRCUIT BEHAVIOR AT DIFFERENT TEMPERATURES

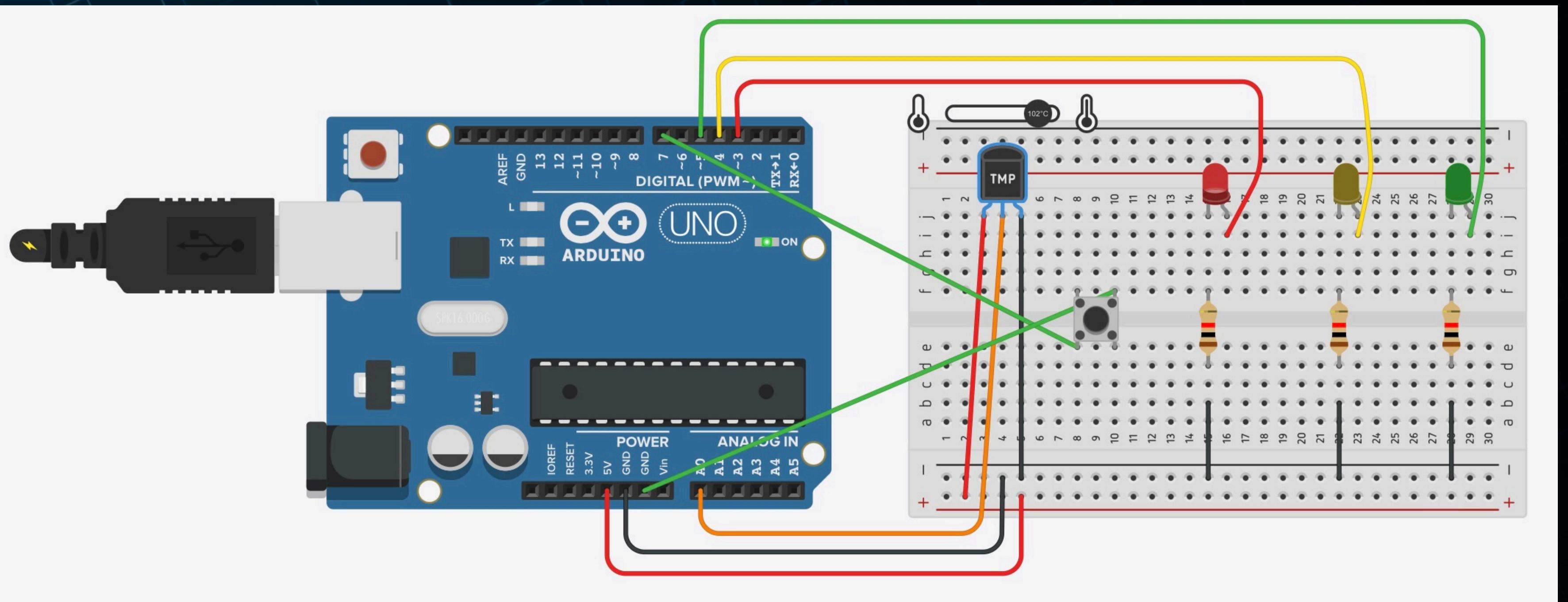
Temperature is within the safe range ( $\leq 25^{\circ}\text{C}$ ) — Green LED is ON.



Temperature is moderate ( $26^{\circ}\text{C} - 50^{\circ}\text{C}$ ) — Yellow LED is ON.



**Temperature is high ( $> 50^{\circ}\text{C}$ ) — Red LED is ON**  
**With the button pressed .**



```
1 float temp = 0;
2 void setup() {
3     pinMode(A0, INPUT); //Set A0 as input for the LM35 sensor
4     Serial.begin(9600); // Start serial communication
5
6     pinMode(5, OUTPUT); //Green LED
7     pinMode(4, OUTPUT); //Yellow LED
8     pinMode(3, OUTPUT); //Red LED
9     pinMode(7, INPUT_PULLUP );
10 }
11
12 void loop() {
13     int sensorValue = analogRead(A0); //Read sensor value
14     float voltage = sensorValue * (5.0 / 1023.0); //Convert to voltage
15     temp = (voltage - 0.5) * 100.0; //Calculate temperature
16     int buttonState = digitalRead(7);
17     Serial.print("Voltage: ");
18     Serial.println(voltage);
19     Serial.print("Temperature: ");
20     Serial.println(temp);
21
22     // Green LED - temp <= 25°C
23     if (temp <= 25) {
24         digitalWrite(5, HIGH);
25         digitalWrite(4, LOW);
26         digitalWrite(3, LOW);
27     }
28
29
30     // Yellow LED - 25°C < temp <= 50°C
31     else if (temp > 25 && temp <= 50) {
32         digitalWrite(5, LOW);
33         digitalWrite(4, HIGH);
34         digitalWrite(3, LOW);
35     }
36
37     else if (temp > 50 && buttonState == LOW ) {
38         digitalWrite(5, LOW);
39         digitalWrite(4, LOW);
40         digitalWrite(3, HIGH);
41     }
42     // Red LED - temp > 50°C
43     else {
44         digitalWrite(5, LOW);
45         digitalWrite(4, LOW);
46         digitalWrite(3, LOW);
47     }
48 }
49
50 delay(500);
51 }
```

ARDUINO  
CODE

# CONCLUSION

This project offers a simple and effective temperature monitoring system with visual alerts for temperature-sensitive environments.

- Uses LM35 sensor and Arduino Uno for accurate temperature readings.
- LEDs (Green, Yellow, Red) indicate temperature status.
- A push button is used to manually confirm triggering the red LED when the temperature exceeds safe levels.
- Cost-effective solution for homes, hospitals, and laboratories.
- Real-time temperature data shown on the Serial Monitor.

THANK YOU

