

Daniel Delgado Acosta
Professor Duck Chung
CSE 5410
October 5th, 2022

Lab 6: Digital Temperature Sensor

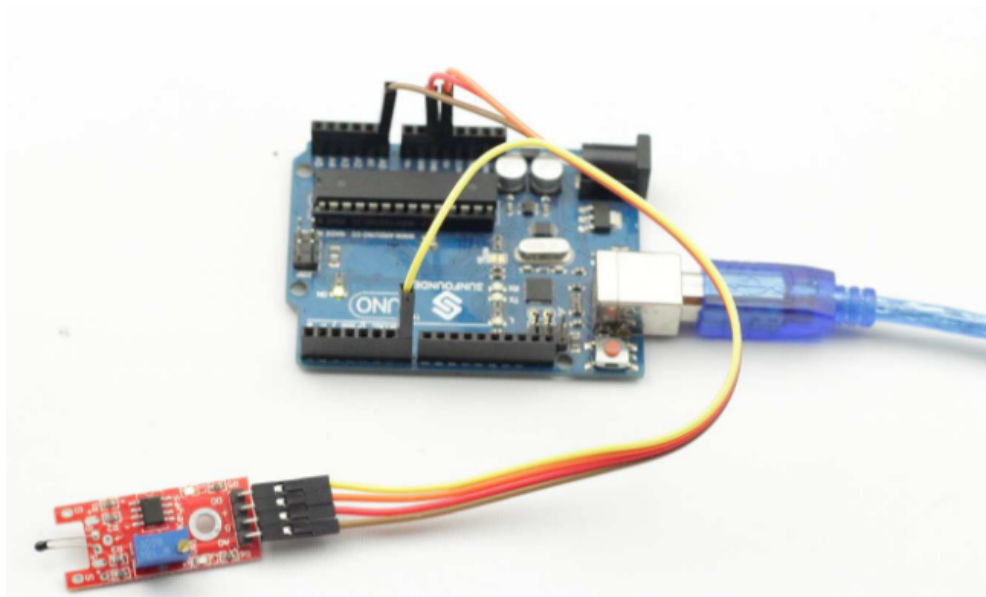
Introduction

A digital temperature sensor only adds a digital output. You can adjust the threshold by the potentiometer onside. When the output is higher than the threshold, the sensor will output high level; when it is lower than the threshold, the sensor will output low level. In this experiment, we will use a Digital-temperature Sensor module and an LED attached to pin 13 of SunFounder to build a simple circuit to make a temperature light. With the LED attached to pin 13, connect the pin DO to D7 of SunFounder Uno. When the Digital Temperature Sensor detects that the ambient temperature is higher than a certain value (threshold), the LED will be on. Otherwise, it will be off. You can adjust the threshold by adjusting the potentiometer.

Components list: Arduino uno board, usb cable, digital temperature sensor module, and jumper wires.

Experiment

By connecting the components as shown in the picture diagram below we can begin uploading code to the arduino and test the digital temperature sensor.



Test

Using the code below, The pin 13 led lights up and the serial monitor displays the temperature reading.

```
#define analogPin A0 //the thermistor attach to
#define beta 3950 //the beta of the thermistor
#define resistance 10 //the value of the pull-down resistor

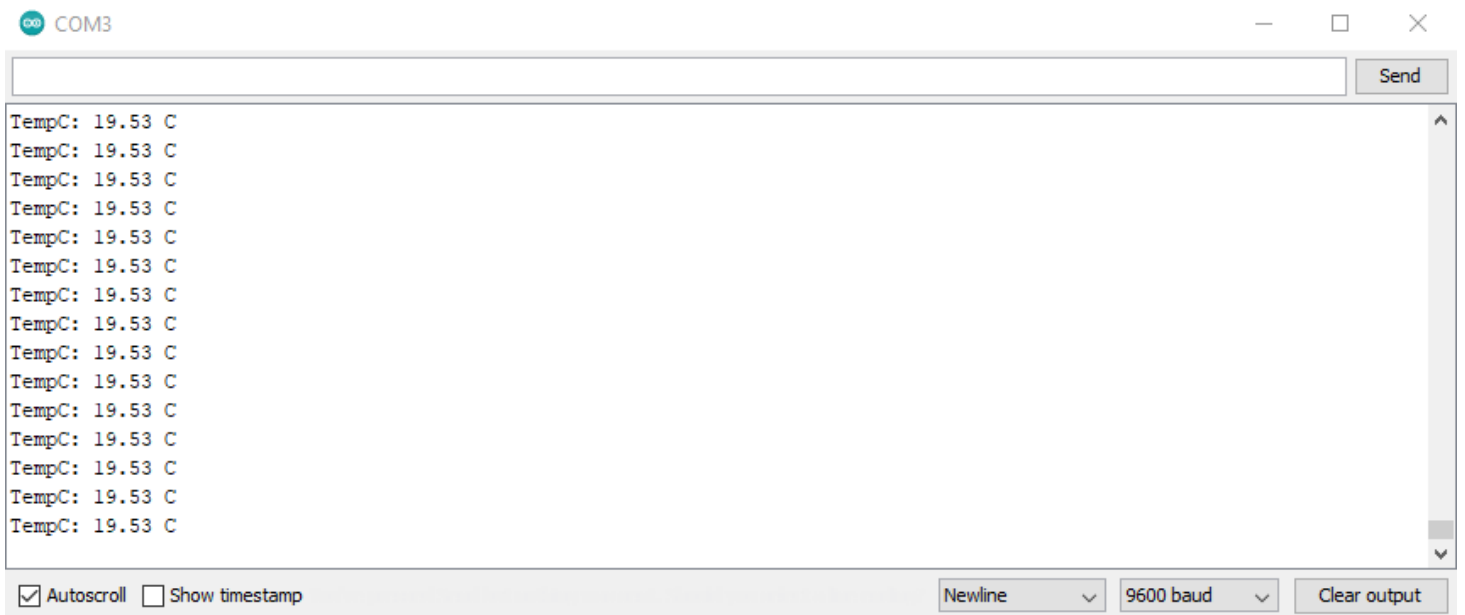
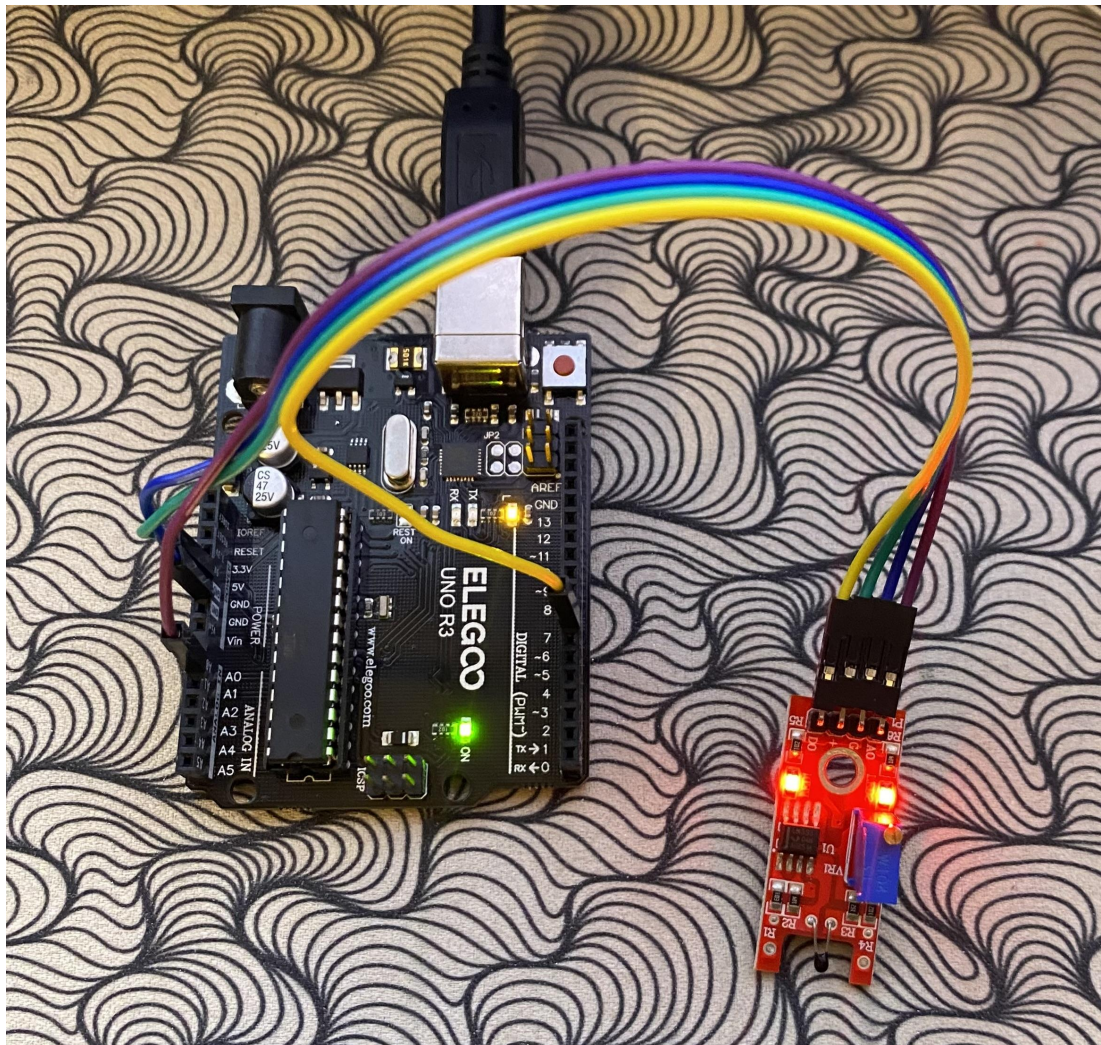
const int buttonPin = 7; // the number of the pushbutton pin
const int ledPin = 13; // the number of the LED pin
// variables will change:
int buttonState = 0; // variable for reading the pushbutton status

void setup()
{
  // initialize the LED pin as an output:
  pinMode(ledPin, OUTPUT);
  // initialize the pushbutton pin as an input:
  pinMode(buttonPin, INPUT);
  Serial.begin(9600);
}
void loop()
{
  // read the state of the pushbutton value:
  buttonState = digitalRead(buttonPin);
  int val = analogRead(0);
  // check if the pushbutton is pressed.
  // if it is, the buttonState is HIGH:
  if (buttonState == HIGH) {
    // turn LED on:
    digitalWrite(ledPin, HIGH);
  }
  else {
    // turn LED off:
    digitalWrite(ledPin, LOW);
  }

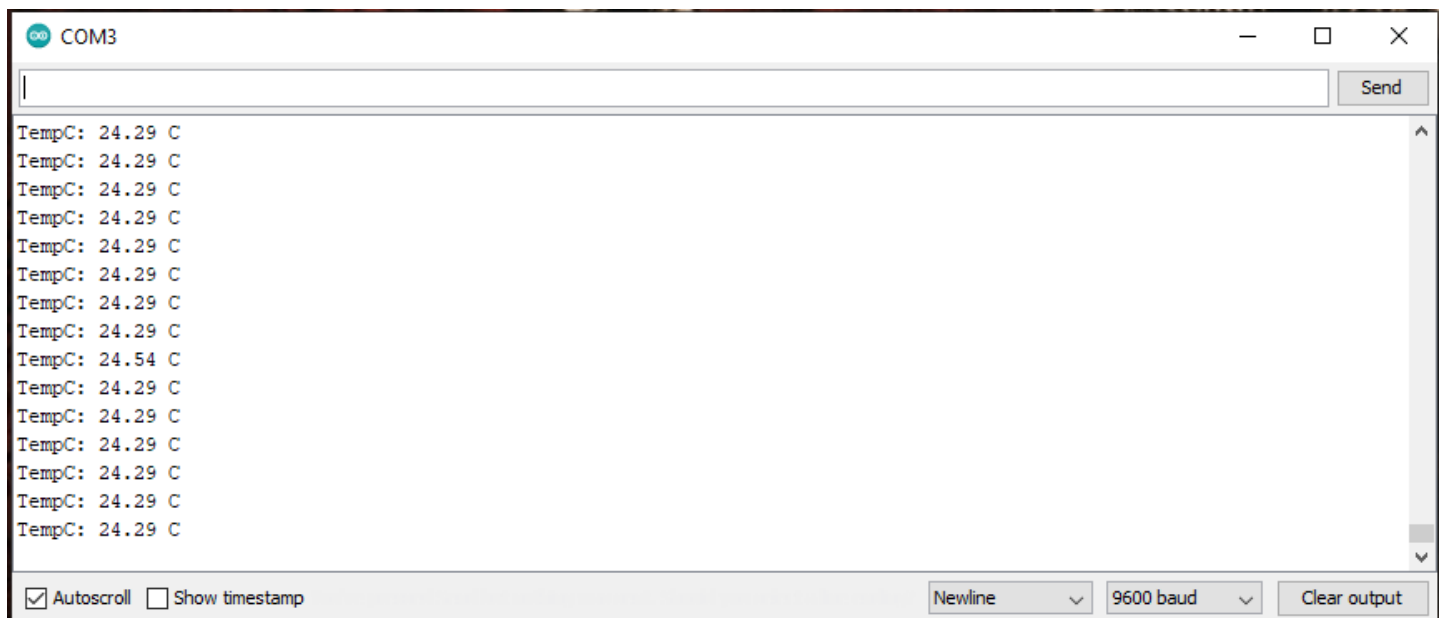
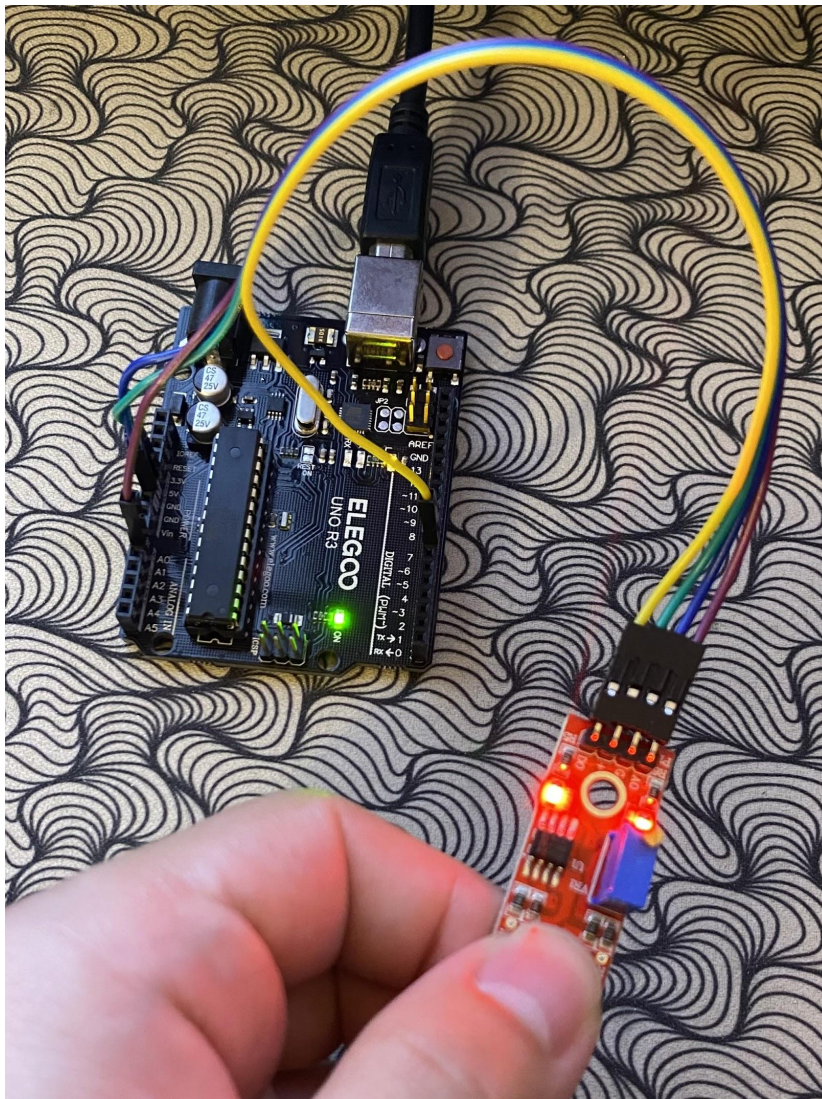
  //read thermistor value
  long a = analogRead(analogPin);
  //the calculating formula of temperature
  float tempC = beta /(log((1025.0 * 1 * a - 10) / 100) + beta / 2980.0) - 418.0;
  //float tempF = 1.8*tempC + 32.0;//convert centigrade to Fahrenheit
```

```
Serial.print("TempC: "); //print "TempC: "
Serial.print(tempC); //print Celsius temperature
Serial.print(" C"); //print the unit
Serial.println();
//Serial.print("TempF: ");
// Serial.print(tempF);
// Serial.print(" F");
delay(200); //wait for 200 milliseconds}
}
```

Room Temperature



Body Temperature



Conclusion

In this lab, I learned about how digital temperature sensors are used to measure temperature. Using the arduino IDE, we can make a code that displays the measure of temperature taken from the digital temperature sensor onto the serial monitor.