Programming For Engineers

Reading a Temperature Sensor from Arduino UNO

by
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Chapter's Information

- Purpose
  - The purpose of this writing is to guide students to read a LM35 temperature sensor using ADUINO UNO.

- Required materials

  We require the following materials in order to perform this project:

  a) ARDUINO UNO board
  b) ARDUINO USB to PC cable
  c) LM35 temperature sensor
  d) Prototype breadboard
  e) Necessary jumper cable

Project Background

- Below are the picture and the pin description of the LM35.

1) 4-20V
2) OUT
3) GND

https://upload.wikimedia.org/wikipedia/commons/3/35/LM35_temperature_sensor_semiconductor_thermometer_1480374_5_6_HDR_enhancer.jpg

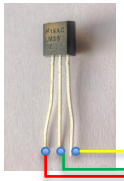
- Here are what the pins are for:
  a. Pin 1 is the supply voltage. We use 5V from ARDUINO.
  b. Pin 2 is the voltage output. We connect this pin to ARDUINO analog pin A0. This is the voltage corresponding to the temperature.
  c. Pin 3 is the ground pin.

Step-by-step Actions

(1) Create Electrical Connection.

(2) We write program to read sensor voltage. We convert that voltage into temperature in Celsius.

```
int sensorValue;
float temperature;
void setup() {
     Serial.begin(9600); }
void loop() {
     sensorValue = analogRead(A0);
     temperature = (sensorValue*5.0*100.0)
     /1023.0;
     Serial.println(temperature);
     delay(100); }
```



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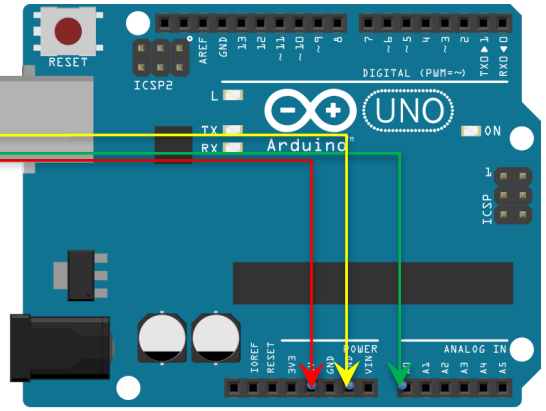
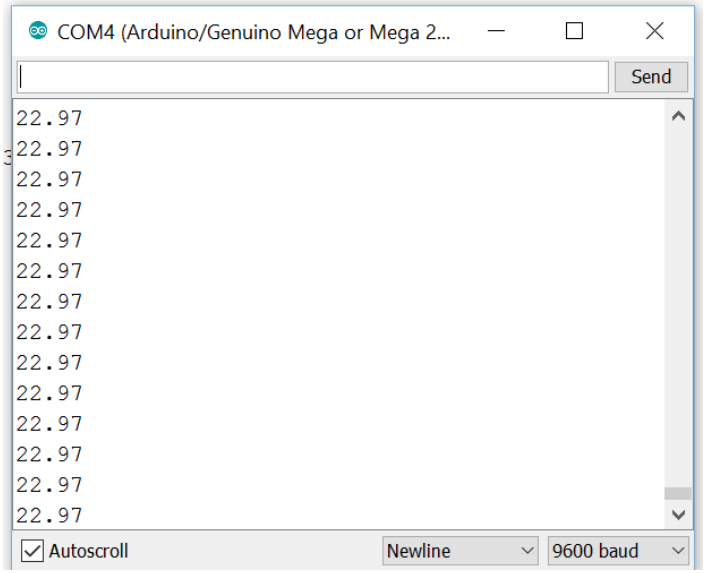


https://upload.wikimedia.org/wikipedia/commons/f/f1/Blik%C3%A1n%C3%AD_vestav%C4%9Bnou_LED_diodou_zapojen%C3%AD.png

(3) Upload the code to ARDUINO program. Open the monitor to read the temperature.

Exploration



- Why don't we perform the followings?
  i. Put your hand on the LM35. Did the temperature rise? But please take extra careful. If your connection is false, maybe the temperature rise without control. Please double check your connection before execute the code.

Reflections

- We have learn how to:
  - Program and download program using ARDUINO UNO.
  - Use analog pin to read voltage.
  - Use LM35 to measure temperature.
  - Program the ARDUINO to read analog voltage.