



Arduino Lesson ()

Use of DS18B20 Temperature Sensor

Name: _____ () Class: _____ Date: _____

Objectives: At the end of this lesson, you would be able to

1. Connect a DS18B20 temperature sensor to the Arduino microcontroller
2. Write sketches to display temperature in degrees Celsius

Apparatus:

- 01 Arduino UNO microcontroller
- 01 USB cable
- 01 DS18B20 Temperature Sensor module kit digital sensor (waterproof version)
- 03 male-female jumper wires
- 03 male-male jumper wires
- 01 breadboard
- 01 4.7 k Ω (used as pull-up resistor)
- 01 mini screwdriver

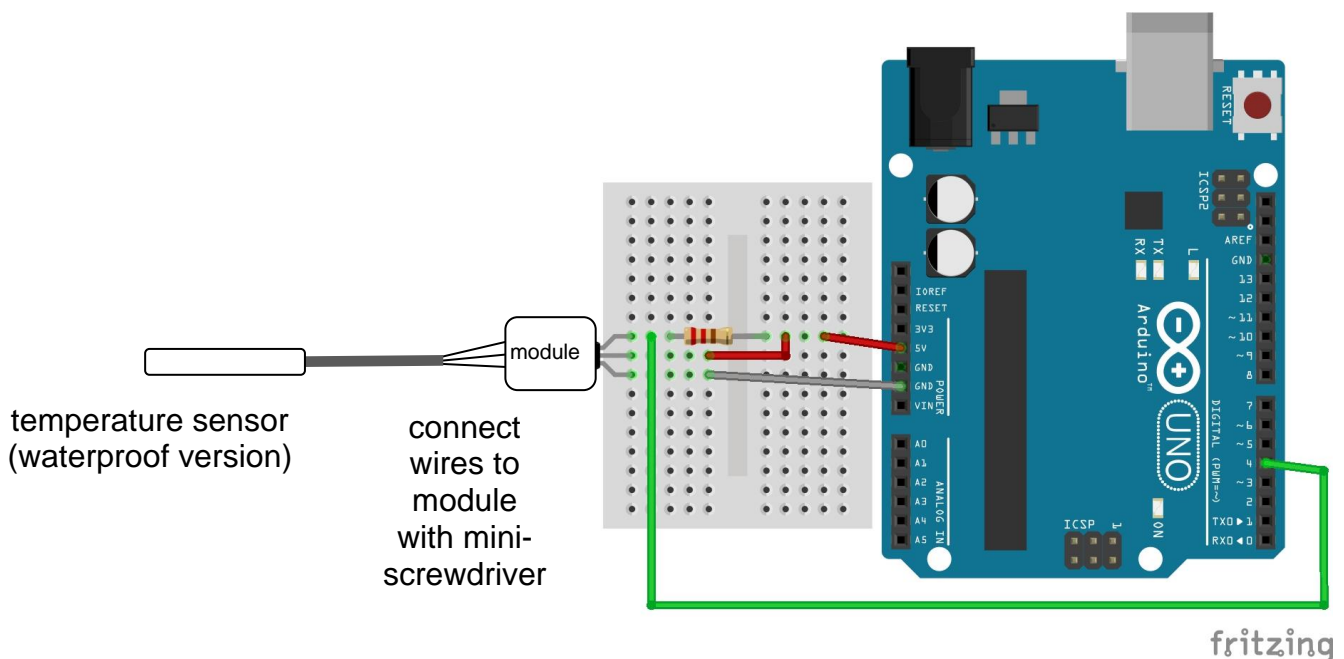
Specifications of DS18B20 temperature sensor:

- Communicates over one-wire bus communication
- Power supply range: 3.0V to 5.5V
- Operating temperature range: -55°C to +125°C
- Accuracy ± 0.5 °C (between the range -10°C to 85°C)



To digital pin 4
To 5 V
To GND

module

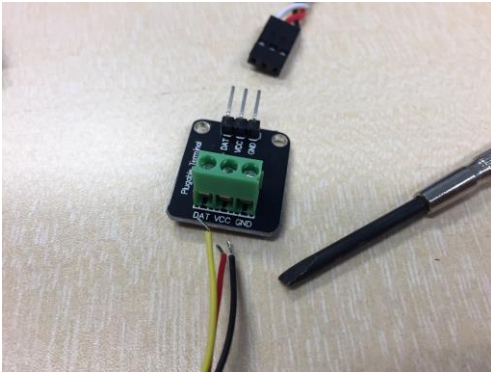


fritzing

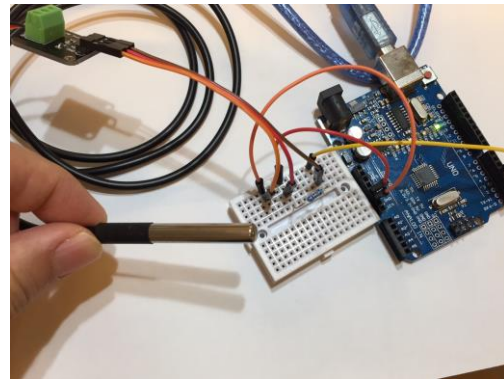
Above diagram created with fritzing.org software

References:

- <https://randomnerdtutorials.com/guide-for-ds18b20-temperature-sensor-with-arduino/>
- <https://datasheets.maximintegrated.com/en/ds/DS18B20.pdf>



Connection of wires



Set up of temperature sensor

Assignment: Set up a DS18B20 temperature sensor to measure temperature

1. Use the mini screwdriver to connect the wires to the DS18B20 temperature sensor module and connect it to the Arduino microcontroller using 3 jumper wires:

Temperature sensor	→	DS18B20 module	→	Arduino micro-controller
black wire	→	GND	→	GND
red wire	→	VCC	→	5V
yellow wire	→	DAT	→	digital pin 4
(with a 4.7 kΩ pull-up resistor)				

2. Connect the Arduino microcontroller to the laptop and check for connectivity:

Select **Tools** → **Board:** “Arduino/Genuino Uno” and **Port:** “COM#”

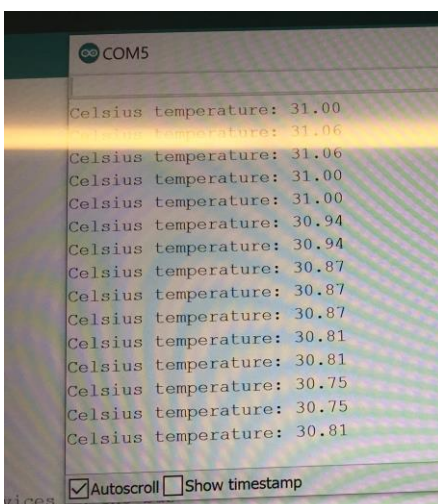
3. **Install two libraries** into Arduino IDE (Integrated Development Environment):

Sketch → *Include Library* → *Manage Libraries*

- Type “**OneWire**” in the search box and install the OneWire library by Paul Stoffregen.
- Search for “**Dallas**” and install the Dallas Temperature library by Miles Burton.

4. Copy, verify and upload the sketch given.

5. Activate the **serial monitor** to show temperature readings.



Serial monitor display of temperature readings

Sketch for Digital Temperature Sensor

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Rui Santos

Complete project details at <http://randomnerdtutorials.com>

Based on the Dallas Temperature Library example

******/*

#include <OneWire.h>

#include <DallasTemperature.h>

// Data wire is connctec to the Arduino digital pin 4

#define ONE_WIRE_BUS 4

// Setup a oneWire instance to communicate with any OneWire devices

OneWire oneWire(ONE_WIRE_BUS);

// Pass our oneWire reference to Dallas Temperature sensor

DallasTemperature sensors(&oneWire);

void setup(void)

{

// Start serial communication for debugging purposes

Serial.begin(9600); *// initialize the Serial Monitor at a baud rate of 9600*

// Start up the library

sensors.begin(); *// initialize the DS18B20 temperature sensor:*

}

void loop(void){

// Call sensors.requestTemperatures() to issue a global temperature and Requests to all devices on the bus

sensors.requestTemperatures();

Serial.print("Celsius temperature: ");

// Why "byIndex"? You can have more than one IC on the same bus. 0 refers to the first IC on the wire

Serial.println(sensors.getTempCByIndex(0)); *// get and print the temperature in degree Celsius*

delay(1000);

}