Lesson 31 Soil Moisture Sensor Module

Introduction

In this lesson, you to understand how you can use the soil moisture sensor in your projects with Arduino.

In this example, you'll read the analog sensor output values using the Arduino and print those readings in the Arduino IDE serial monitor.

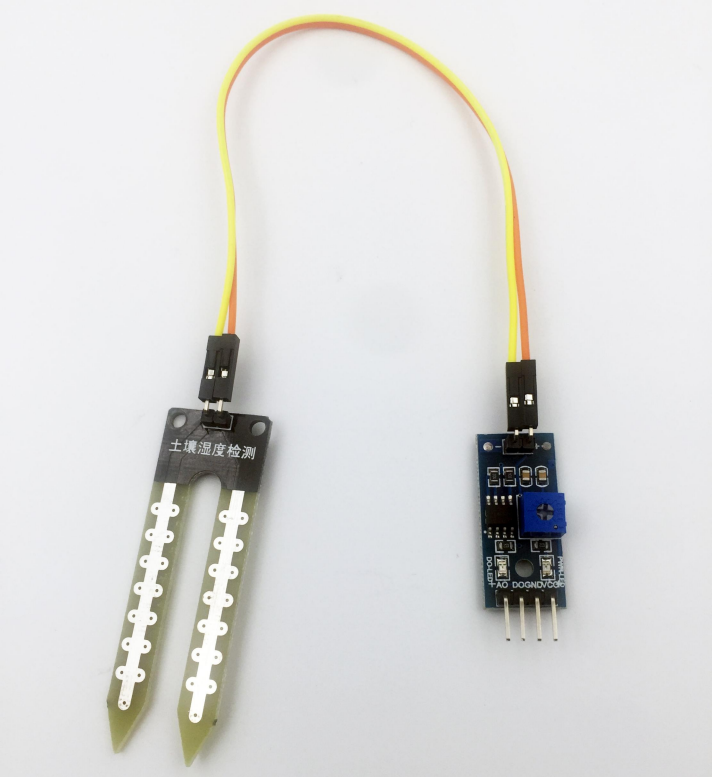
Hardware Required

- ✓ 1 * RexQualis UNO R3
- ✓ 1 * 830 tie-points breadboard
- ✓ 1 * Soil Moisture Sensor Module
- ✓ 1 * 5mm Green LED
- ✓ 1 * 5mm Red LED
- ✓ 2 * 220R Resistor
- ✓ 3 * M-M Jumper Wire
- ✓ 3 * M-F Jumper Wire

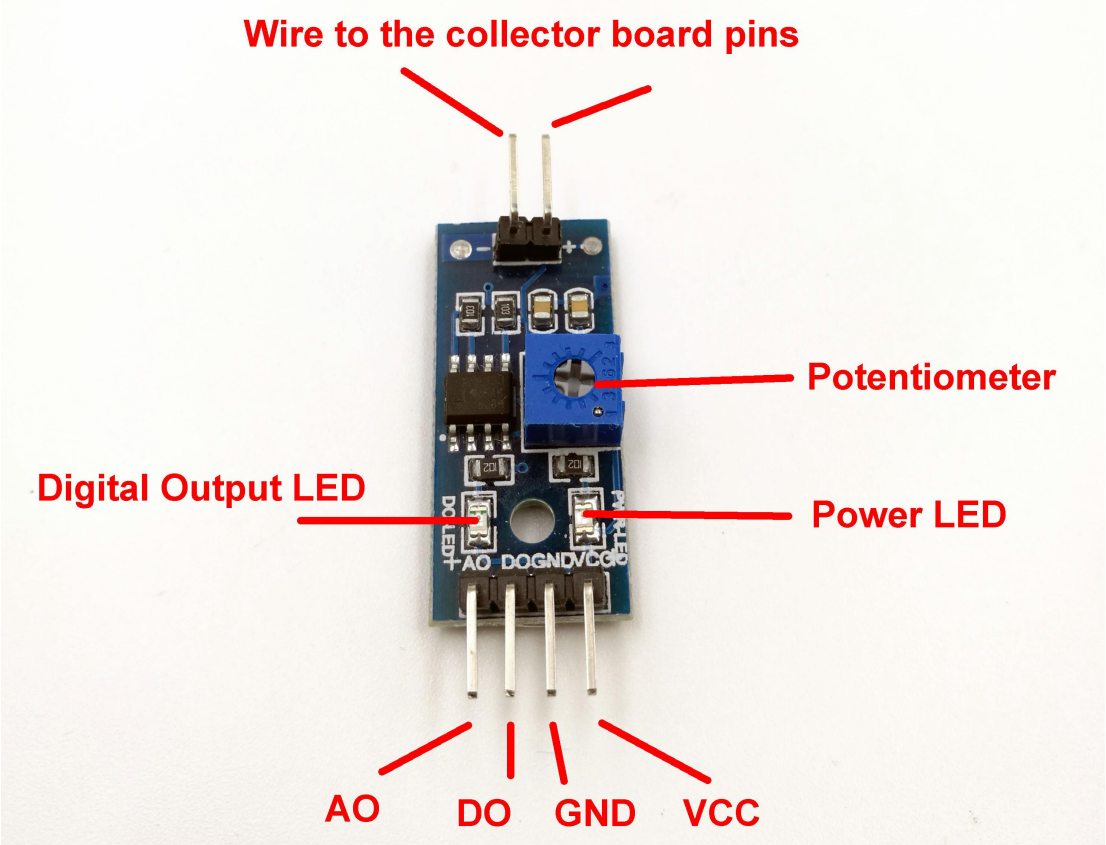
Principle

The soil moisture sensor or the hygrometer is usually used to detect the humidity of the soil. So, it is perfect to build an automatic watering system or to monitor the soil moisture of your plants.

The sensor is set up by two pieces: the electronic board (at the right), and the probe with two pads, that detects the water content (at the left).



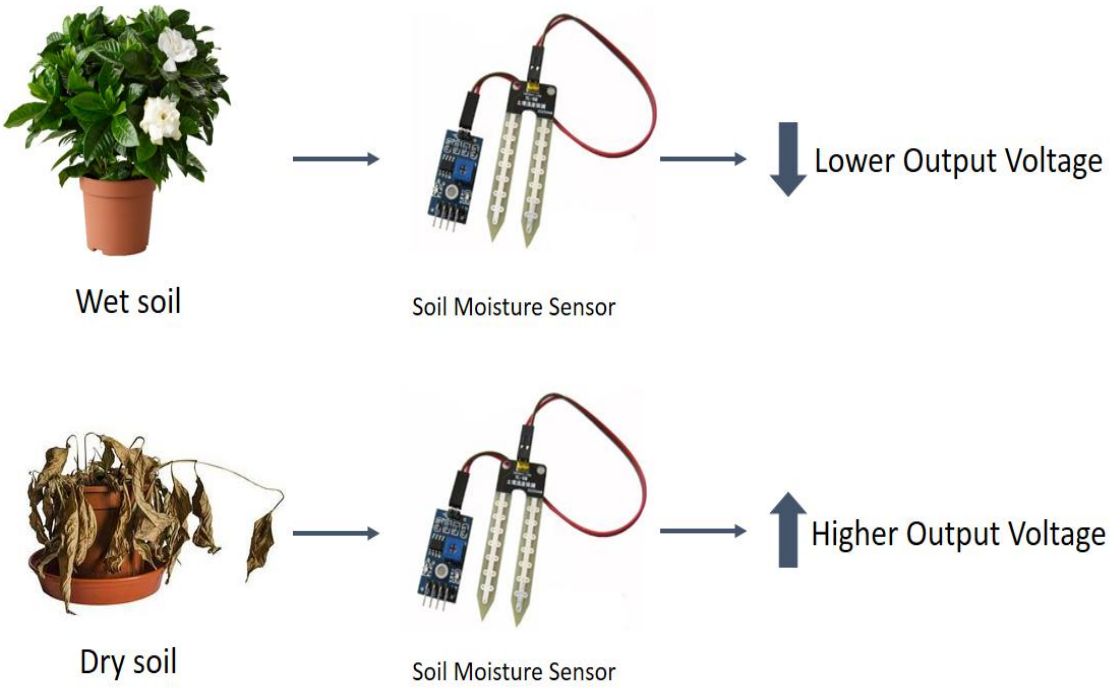
The sensor has a built-in potentiometer for sensitivity adjustment of the digital output (D0), a power LED and a digital output LED, as you can see in the following figure.



How does it work?

The voltage that the sensor outputs changes accordingly to the water content in the soil.When the soil is:

- Wet: the output voltage decreases
- Dry: the output voltage increases



The output can be a digital signal (D0) LOW or HIGH, depending on the water content. If the soil humidity exceeds a certain predefined threshold value, the modules outputs LOW, otherwise it outputs HIGH. The threshold value for the digital signal can be adjusted using the potentiomete

The output can be a analog signal and so you'll get a value between 0 and 1023.

Pin Wiring

Wiring your sensor to the Arduino is pretty simple:

Pin	Wiring to Arduino Uno
A0	Analog Pins
D0	Digital Pins
GND	GND
VCC	5V

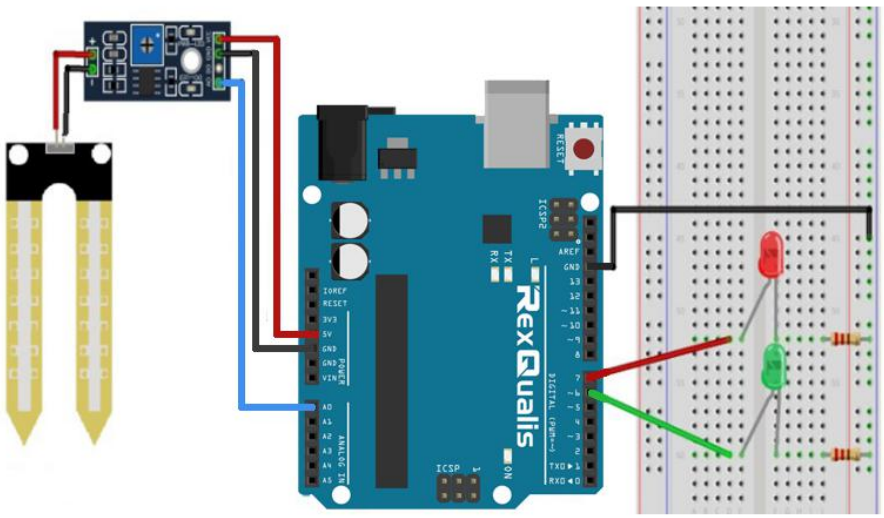
Code interpretation

```
int rainPin = A0;

int greenLED = 6;

int redLED = 7;

// you can adjust the threshold value

int thresholdValue = 950;

void setup(){

  pinMode(rainPin, INPUT);

  pinMode(greenLED, OUTPUT);

  pinMode(redLED, OUTPUT);

  digitalWrite(greenLED, LOW);

  digitalWrite(redLED, LOW);

  Serial.begin(9600);

}

void loop() {

  // read the input on analog pin 0:

  int sensorValue = analogRead(rainPin);
```

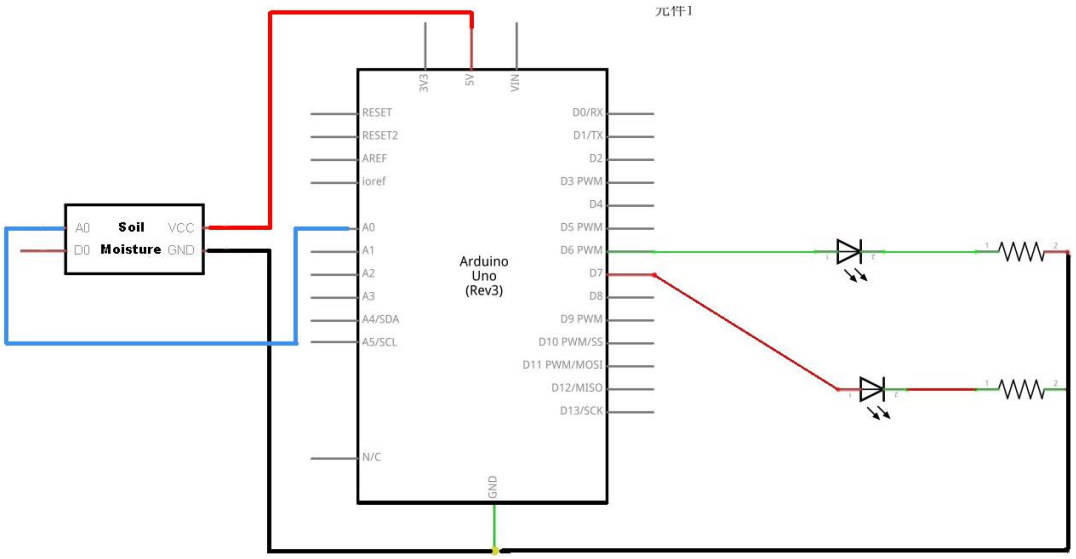
```
    Serial.print(sensorValue);
    if(sensorValue < thresholdValue){
        Serial.println(" - Doesn't need watering");
        digitalWrite(redLED, LOW);
        digitalWrite(greenLED, HIGH);
    }
    else {
        Serial.println(" - Time to water your plant");
        digitalWrite(redLED, HIGH);
        digitalWrite(greenLED, LOW);
    }
    delay(500);
}
```

Experimental Procedures

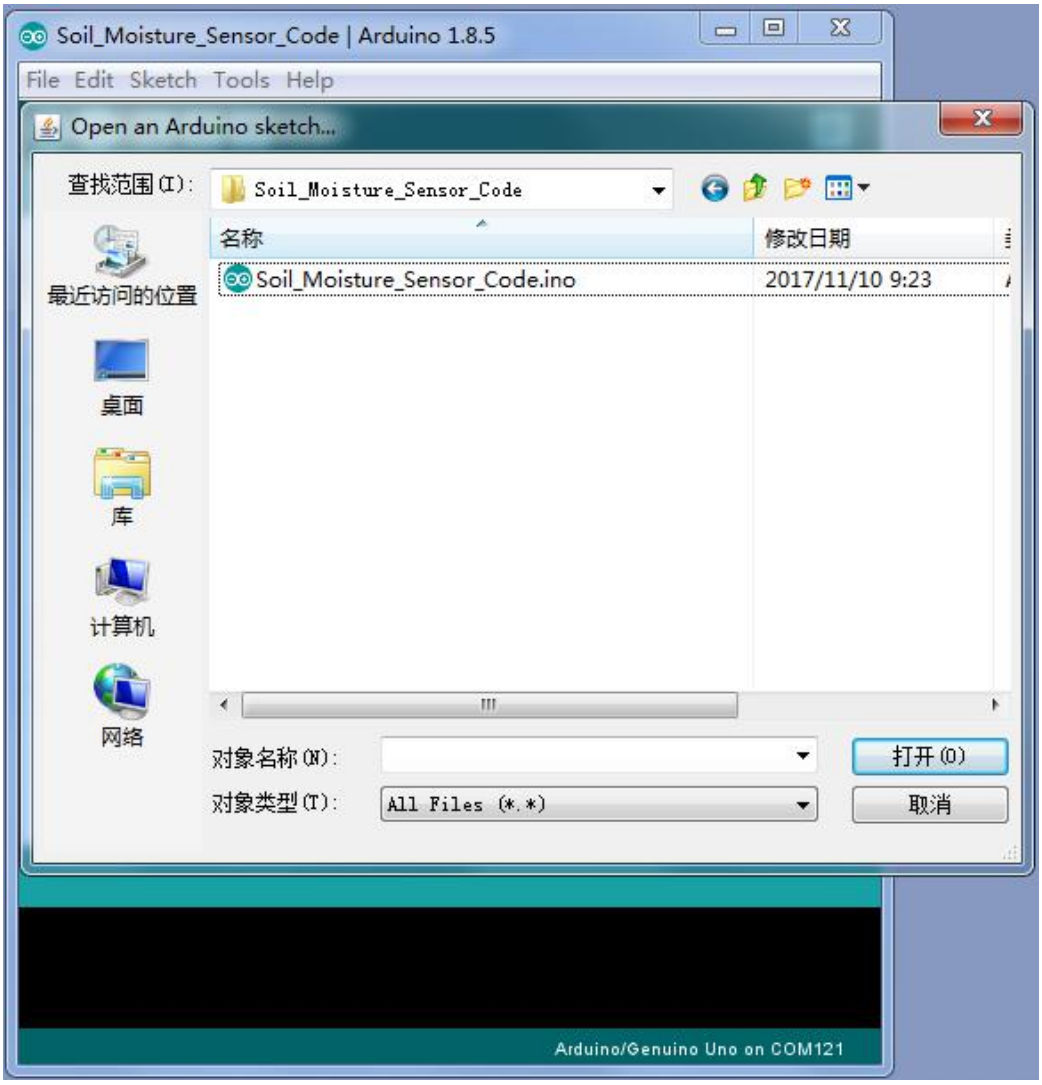
Step 1:Build the circuit



Schematic Diagram



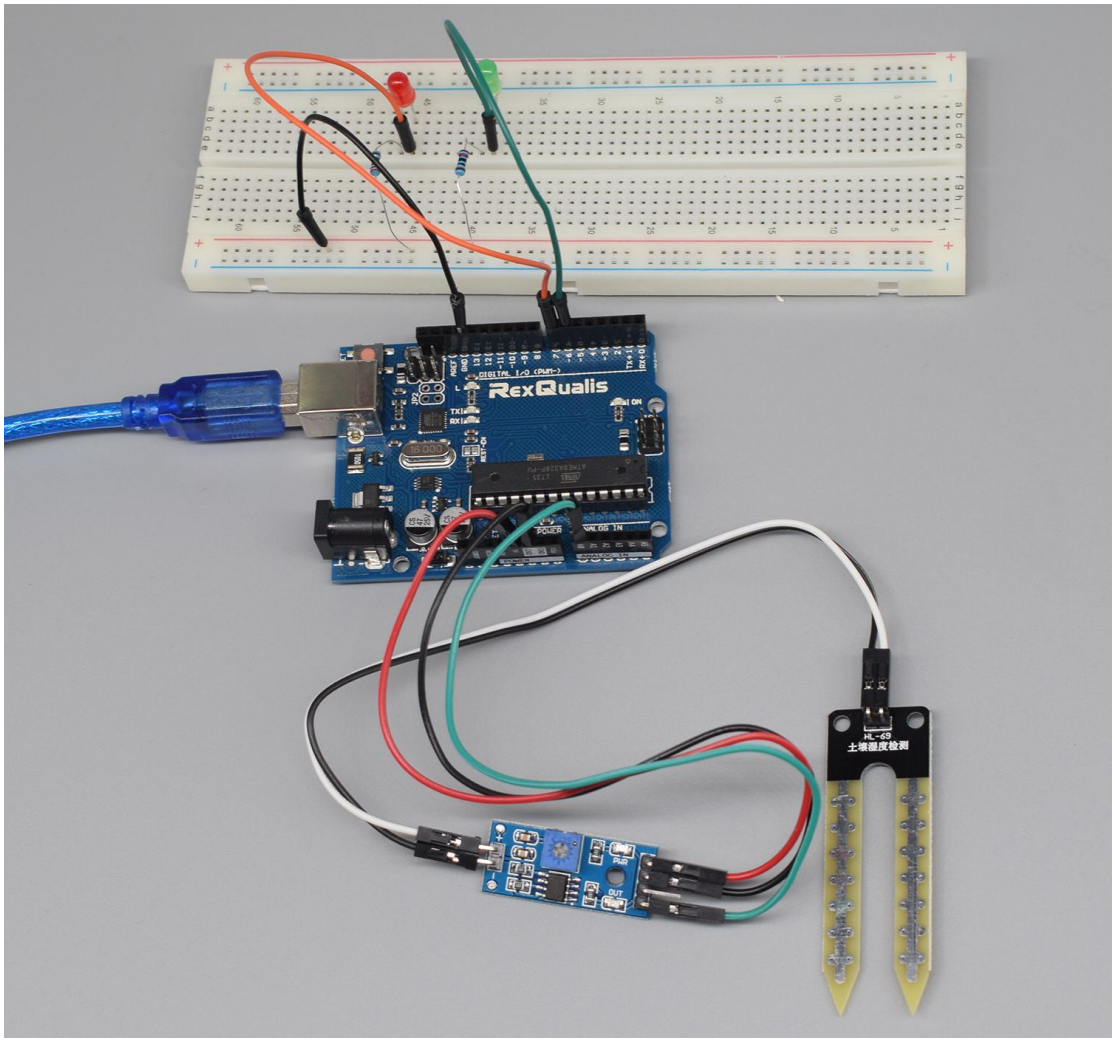
Step 2: Open the code:Soil_Moisture_Sensor_Code



Step 3: Attach Arduino UNO R3 board to your computer via USB cable and check that the 'Board Type' and 'Serial Port' are set correctly.

Step 4: Upload the code to the RexQualis UNO R3 board.

Then,When the analog value goes above a certain threshold, a red LED will turn on (indicates that the plant needs watering), and when the value goes below a certain threshold, a green LED will turn on (indicates that the plant is ok).



You can also Open the Serial Monitor to see the data changes when the plant add water.

(How to use the Serial Monitor is introduced in details in Lesson 0 Preface)

If it isn’t working, make sure you have assembled the circuit correctly, verified and uploaded the code to your board. For how to upload the code and install the library, check Lesson 0 Preface.