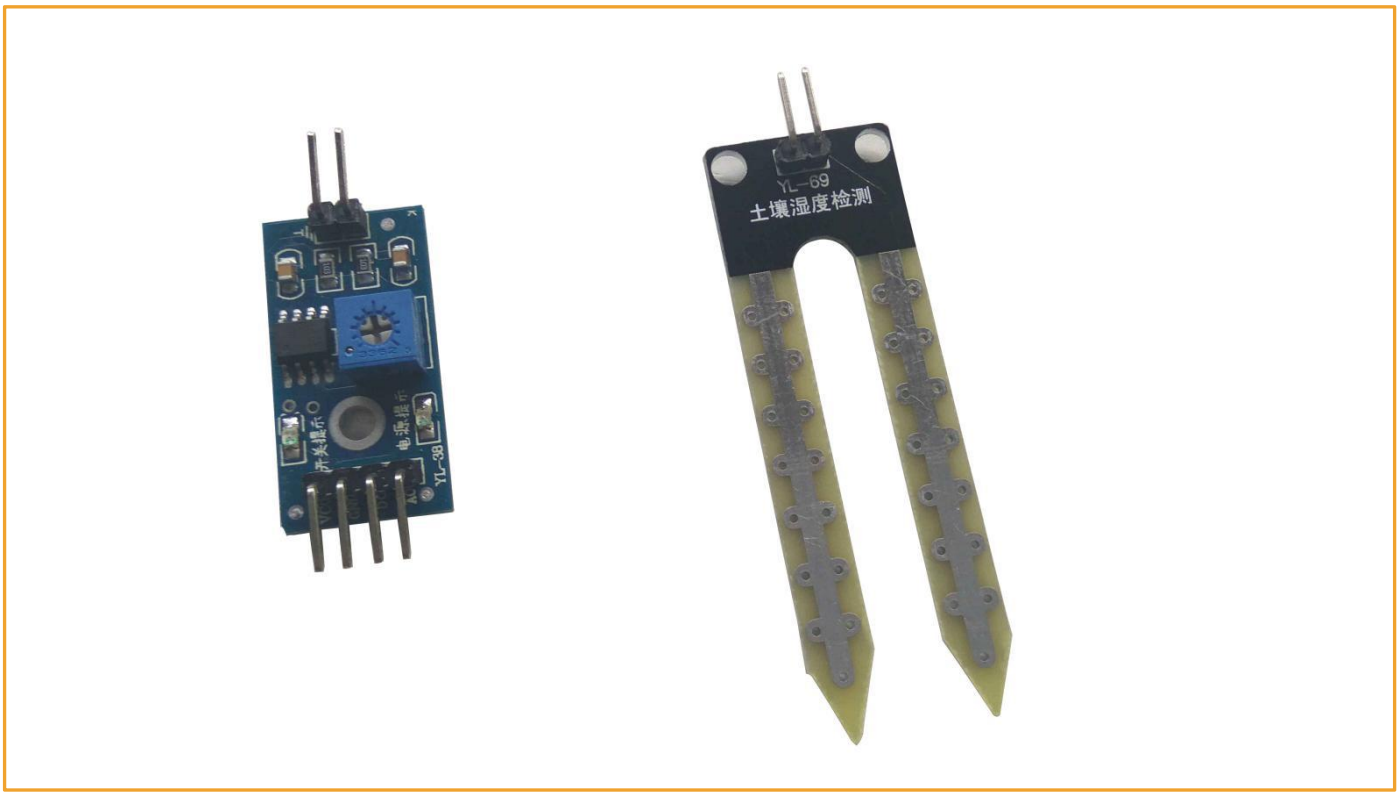
# Soil Moisture Sensor experiment

## Introduction to soil Moisture Sensor

The soil moisture sensor module has two copper bars as sensor probes.When they are inserted into the soil, they can detect moisture.The wetter the soil, the better its conductivity, the lower the resistance between them.Dry soil is less conductive, so the more resistance there is between them.It's an analog sensor, so we get the voltage value from the analog input.High and low levels can also be obtained through a digital interface, and the analog values obtained are typically used in the processes we use.Because soil moisture can be divided into several levels, when we use the soil moisture sensor to do an automatic watering system, it will be convenient to use.




1, The sensor is suitable for the soil moisture detection;

2, The blue potentiometer on the module is used to adjust soil moisture threshold, the controlled humidity is greater as adjusting clockwise, and smaller counterclockwise.

3, The digital output D0 can link directly to the microcontroller to detect the high and low level, therefore to detect soil moisture;

4, The analog output AO (0 ~ 1023) can link to AD modules, through the AD conversion, the soil moisture value can be obtained more accurately.

## Pin Description

1 VCC: connect to 3.3 V-5 V
2 GND: connect to GND
3 DO: digital output interface
4 AO: voltage analog output

## Experimental Principle

From the sensors above, we can see that the two big copper are sensor probes. When inserting them into the soil, they can detect the moisture. The moister the soil is, the better their electrical conductivity is, which reflects the lower resistance between them. It is a analog sensor, so we get the voltage value through the analog output. The drier the soil is, the greater the voltage value is, because the resistance between the probes is getting higher.

## Component List

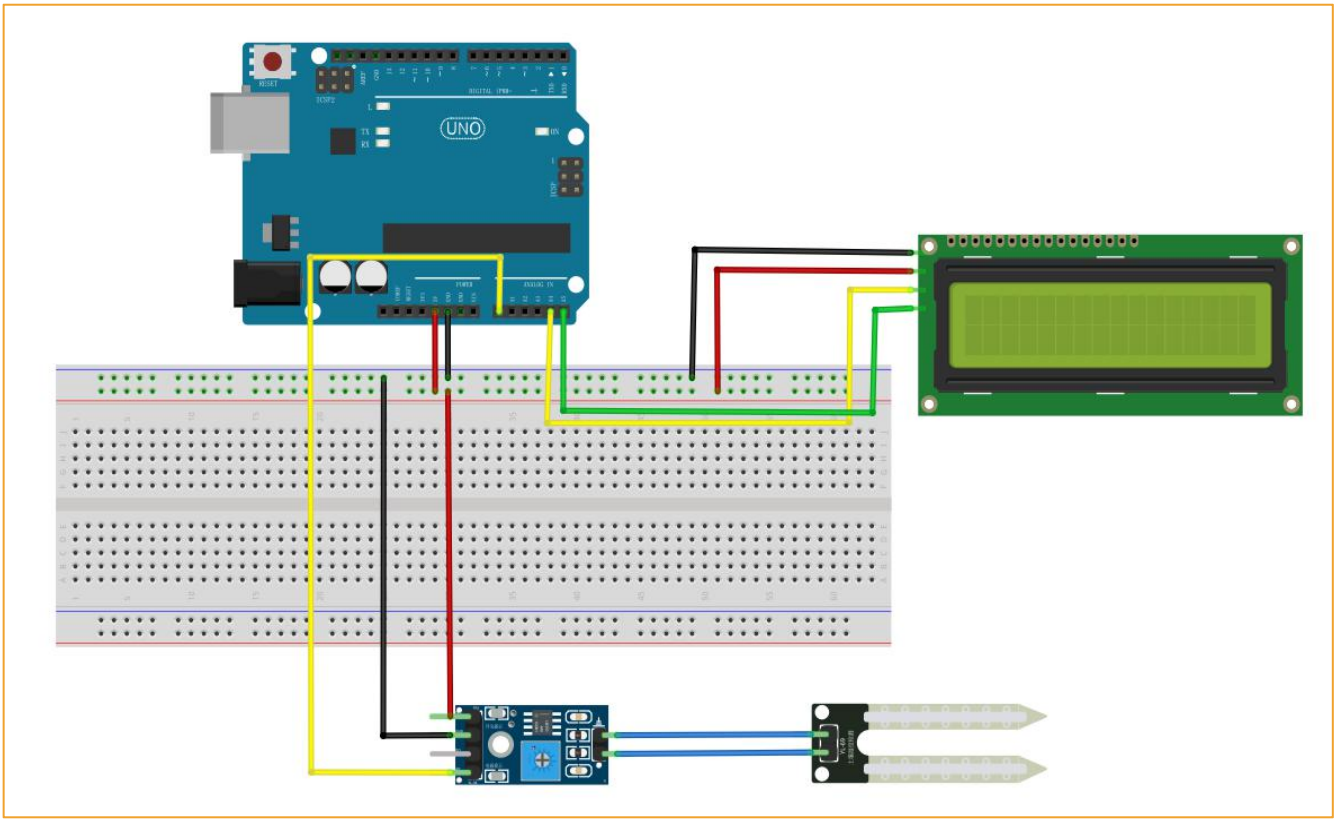
- Keywish Arduino UNO R3 Mainboard
- Breadboard
- USB cable
- LCD1602 * 1
- The soil moisture sensor * 1
- Potentiometer* 1
- Several Breadboard jumpers

## Wiring of Circuit

Definition of pin of soil moisture sensor adapter plate:
VCC: connect the positive pole of power supply (3-5v)
GND: connect the power negative pole
DO: digital signal output
AO: analog signal output

| LCD display | Arduino |
|---|---|
| GND | GND |
| VCC | 5V |
| SDA | A4 |
| SCL | A5 |

| Soil Moisture Sensor | Arduino |
|---|---|
| GND | GND |
| VCC | 5V |
| A0 | A0 |



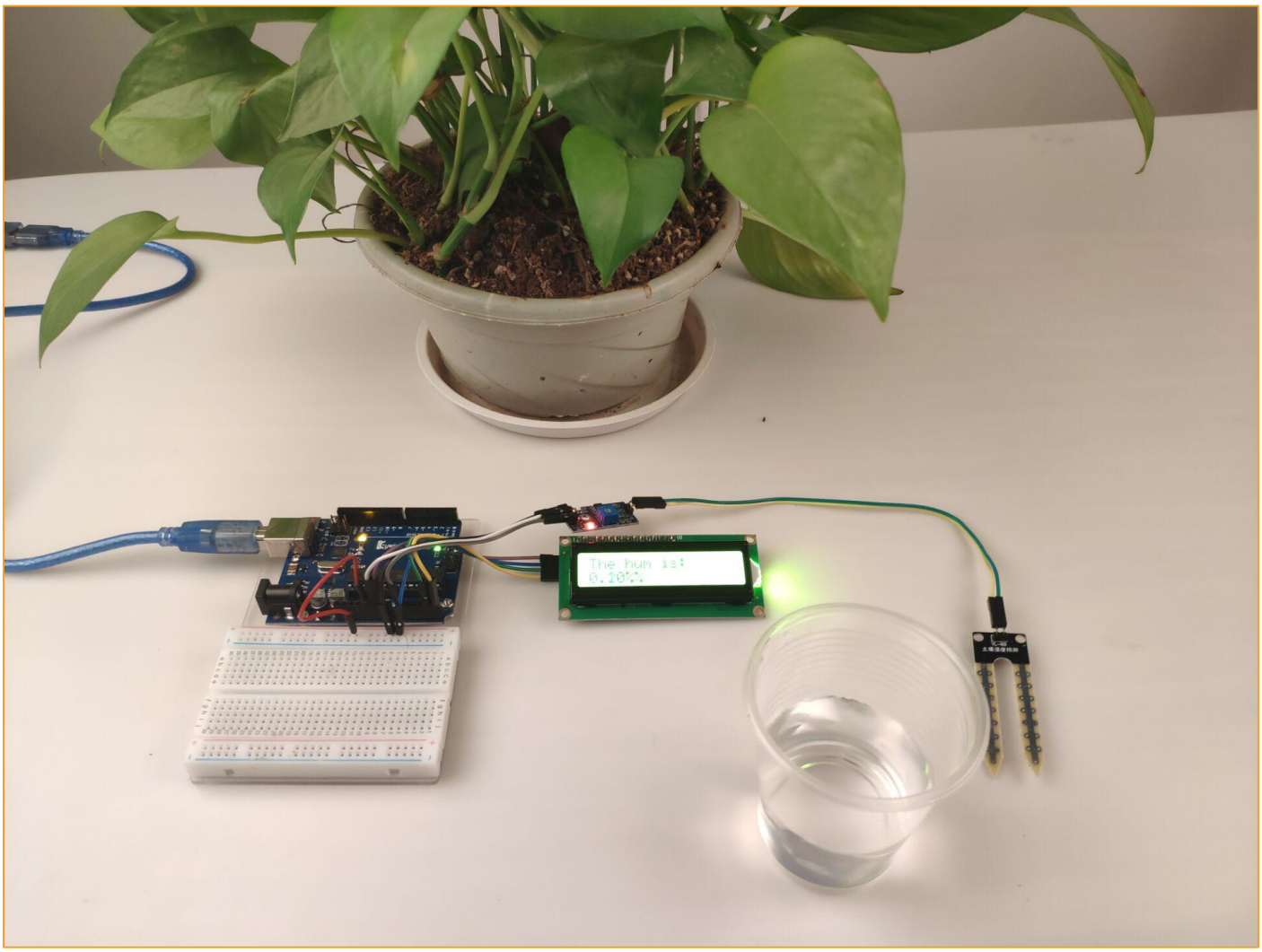
## CODE

```
#include <Wire.h>
#include "LiquidCrystal_I2C.h"
int analogPin=A0;
float i=0;
float j=0;
 LiquidCrystal_I2C lcd(0x27, 16, 2);// 0x27 is the I2C bus address for an unmodified backpack
void setup()
{
  lcd.init();
  lcd.backlight();
  pinMode(analogPin, INPUT);
  Serial.begin(9600);
}

void loop() {
```

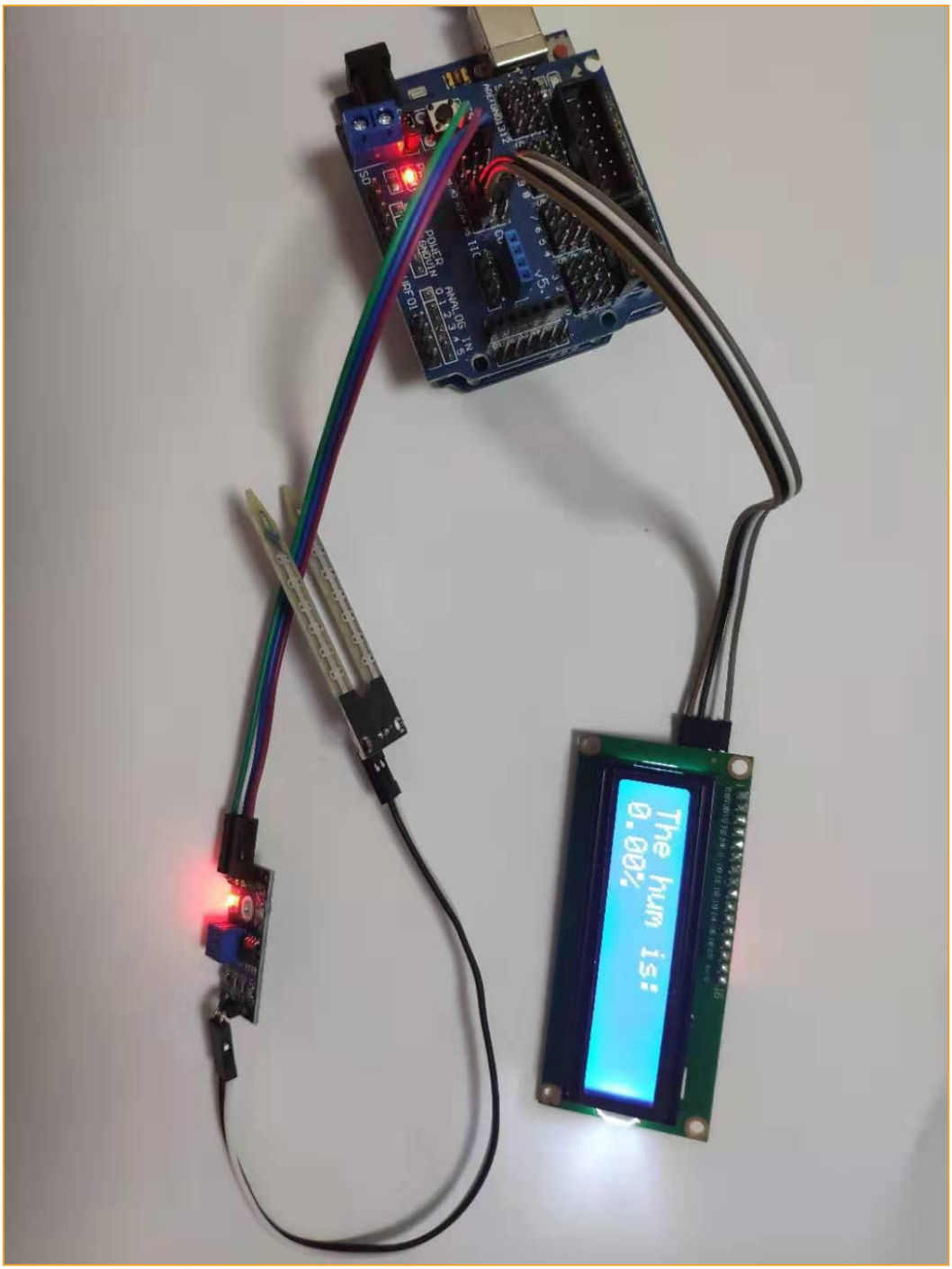
```
    float data=analogRead(analogPin);
    Serial.println(data);
    i=data/1023;
    j=(1-i)*100;
    lcd.setCursor(0, 0);
    lcd.print("The hum is: ");
    lcd.setCursor(0, 1);
    lcd.print((float)j, 2);
    lcd.print("%");
    delay(200);
}
```

## Experiment Result



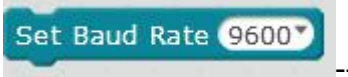

If you have a sensor V5.0 expansion pad in your kit, you can connect it as shown in the

figure below for more convenience and speed.




## MBlock graphical programming program

The main building blocks used by mBlock to write soil moisture program are:

- 

--Set the serial port baud rate

- 

--LCD1602 display screen initialization
- 

--Read the value of the simulated pin
- 

--Set the display to display content
- 

--Set display position
- 

--Assign a value to the new variable

The soil moisture program prepared by mBlock is shown in the figure below: