Smart Farm
Soil Moisture Sensor

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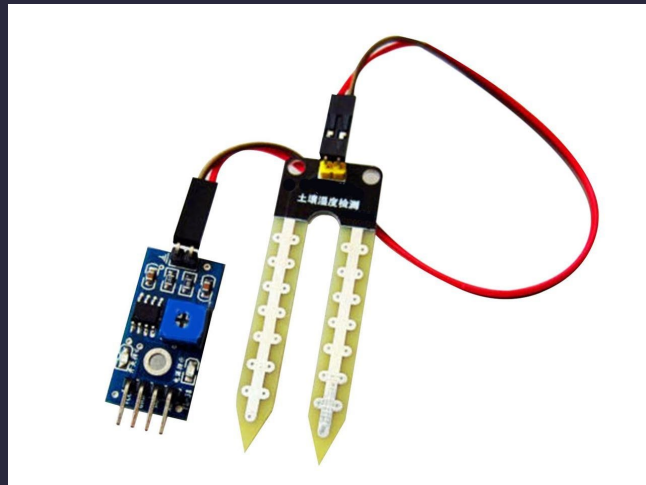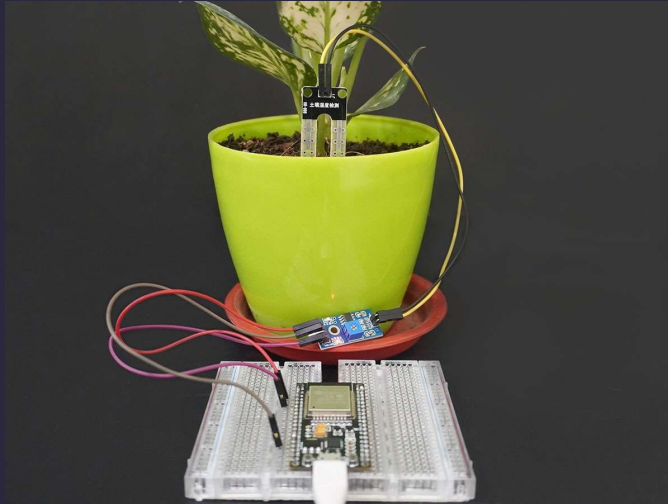
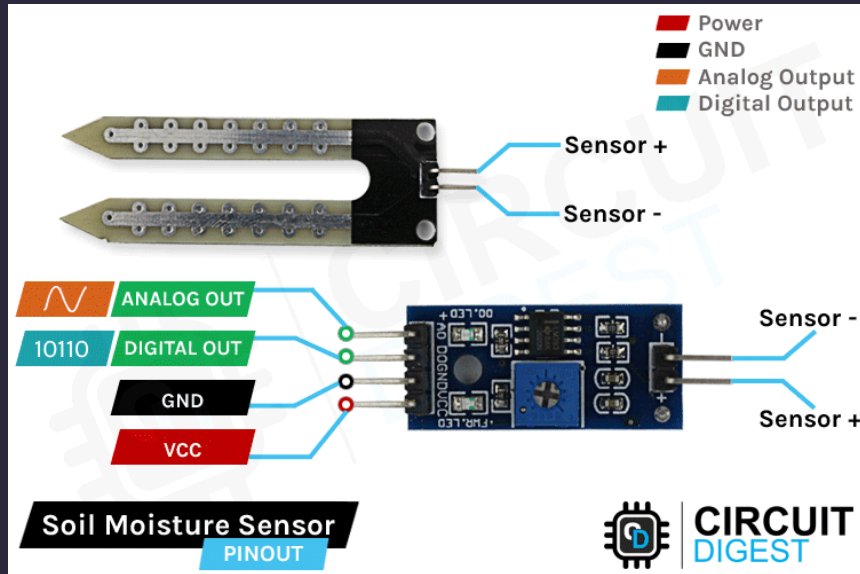# /01

/Soil Moisture Sensor

Soil Moisture Sensor

Soil moisture is the amount of water present in the soil. It can be measured using a soil moisture sensor, which consists of two conducting probes that act as sensors. Soil moisture is determined by changes in resistance between these two probes.

$$AnalogOutput = \frac{ADCValue}{4095}$$

Moisture in percentage = 100 – (Analog output * 100)

Soil Moisture Sensor
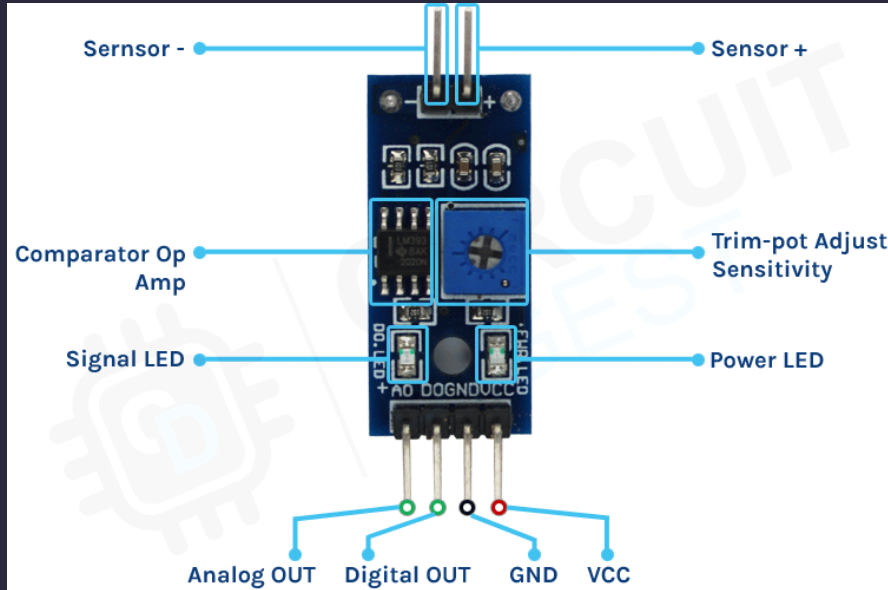

Soil Moisture Sensor Pinout

VCC is the power supply pin of the soil moisture sensor that can be connected to 3.3V or 5V of the supply. But do note that the analog output will vary depending upon the provided supply voltage.

GND is the ground pin of the board and it should be connected to the ground pin of the Arduino

DOUT is the Digital output pin of the board, output low indicates soil moisture is appropriate, and high indicates soil moisture is low.

AOUT is the Analog output pin of the board that will give us an analog signal in between vcc and ground.
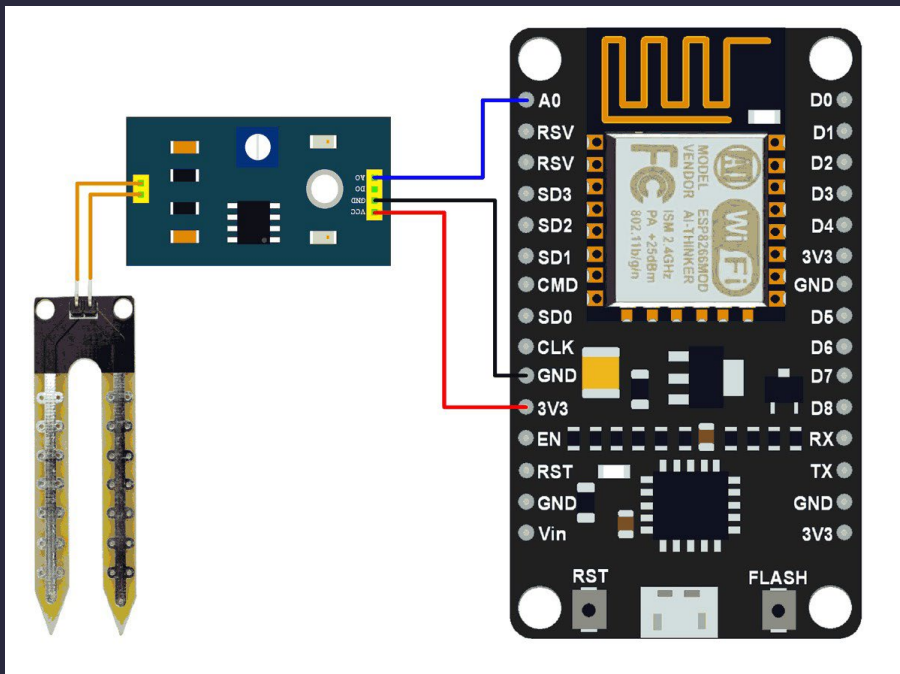
Soil Moisture Sensor

Soil Moisture Sensor – Parts

The entire soil moisture sensor consists of two parts: the first one is the soil moisture sensor probe and the second one is an electronic module. The module processes the incoming data from the probe and that gets processed by a microcontroller like Arduino and we get the final output.

The Soil Moisture Sensor Probe:

As we have said earlier, the sensor contains a fork-shaped probe with two big exposed conductive pads. The probe acts like a variable potentiometer, the value of which can be read by a microcontroller like Arduino.

Wiring

Soil Moisture Sensor	Node MCU ESP8266
+	3.3V
-	ENG
AO	A0

Coding

```
1    int sensorPin = A0;   // sensor input pin
2    int moisture =0;      // variable to store the value coming from the sensor
3
4    void setup() {
5      Serial.begin(9600);
6    }
7
8    void loop() {
9      // read the value from the sensor
10     int moisture = analogRead(sensorPin);
11     Serial.print("Soil Moisture = ");
12     Serial.println(moisture);
13
14     if(analogRead(sensorPin)>1000){
15       Serial.println("Sensor in Air");
16     }
17     if(analogRead(sensorPin)>800 && analogRead(sensorPin) <1000){
18       Serial.println("Sensor in dry soil");
19     }
20     if(analogRead(sensorPin)>300 && analogRead(sensorPin) <800){
21       Serial.println("Sensor in humid soil");
22     }
23     if(analogRead(sensorPin)<300){
24       Serial.println("Sensor in humid water");
25     }
26     delay(500);
27   }
```
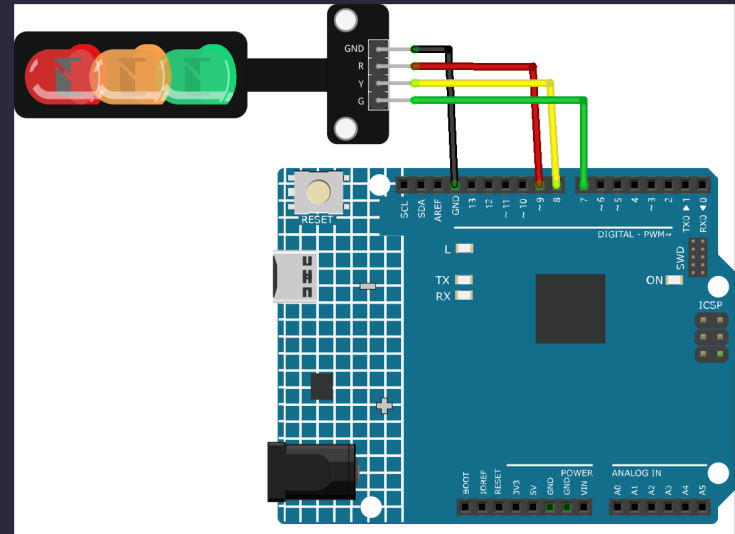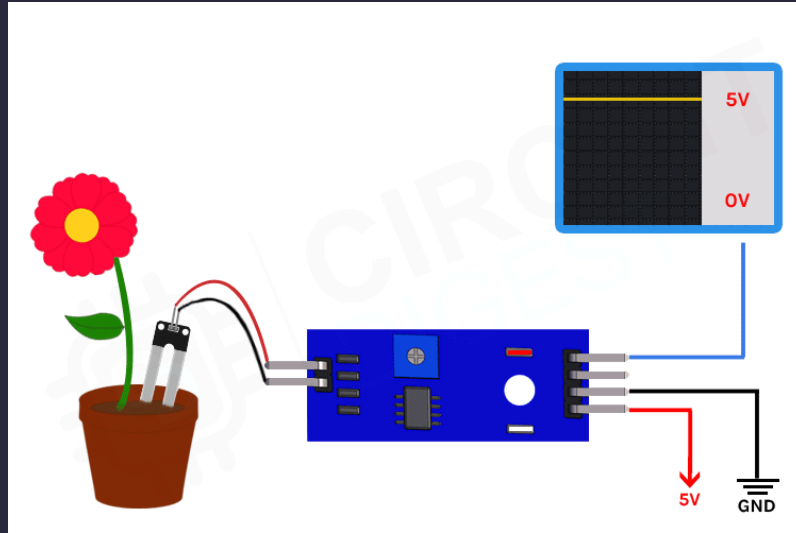
Test

```
16:11:59.302 -> Sensor in humid soil
16:11:59.774 -> Soil Moisture = 316
16:11:59.806 -> Sensor in humid soil
16:12:00.286 -> Soil Moisture = 327
16:12:00.330 -> Sensor in humid soil
16:12:00.779 -> Soil Moisture = 715
16:12:00.811 -> Sensor in humid soil
16:12:01.289 -> Soil Moisture = 1024
16:12:01.333 -> Sensor in Air
16:12:01.782 -> Soil Moisture = 1024
16:12:01.827 -> Sensor in Air
16:12:02.276 -> Soil Moisture = 1024
16:12:02.308 -> Sensor in Air
16:12:02.784 -> Soil Moisture = 1024
16:12:02.829 -> Sensor in Air
```

LAB:

1. Soil sensors with LED
2. Soil sensors with OLED

Wiring

Q/A