

## **Experiment 5: Write an Arduino program to read the moisture level of soil and perform actions such as turning on an LED or buzzer based on the moisture level by using Soil Moisture Sensor**

**Aim:** The objective of this experiment is to interface the HW-080 Soil Moisture Sensor with an Arduino Uno (ATmega328P). This experiment will demonstrate how to read the moisture level of soil and perform actions such as turning on an LED or buzzer based on the moisture level

### **1. COMPONENTS REQUIRED**

- a) Arduino UNO
- b) Breadboard
- c) Jumper wires
- d) Soil Moisture Sensor

#### **a. ARDUINO UNO:**

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.



Figure 1.0 - Arduino UNO

#### **b. BREADBOARD:**

Breadboards are one of the most fundamental pieces when learning how to build circuits. Breadboards are commonly utilized while prototyping temporary circuits. It is useful to designers because it allows components to be removed and replaced easily.

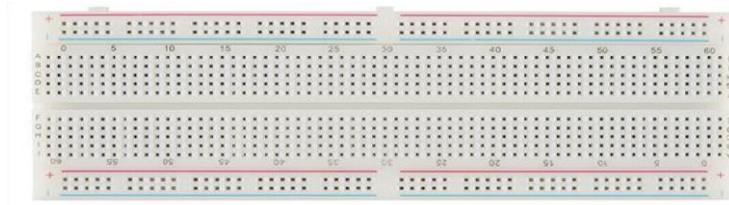
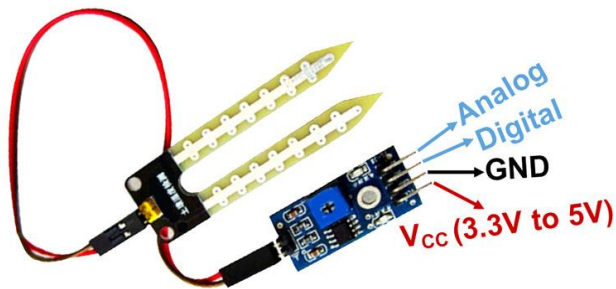


Figure 1.1 – Breadboard

### Soil Moisture Sensor:

A **Soil Moisture Sensor** is a device that measures the water content in the soil. It helps in monitoring soil conditions for agricultural, gardening, environmental, and research applications. These sensors provide real-time data, allowing for efficient irrigation management and better plant health.



## 2.SOFTWARE

Software is a generic term to refer to the scripts and programs that run on a microprocessor or microcontroller and execute specific tasks.

### 2.1 GET START WITH ARDUINO IDE

Follow the steps to install Arduino IDE:

Step 1: Browse for the URL - ' <https://www.arduino.cc/en/software> '

Step 2: In DOWNLOAD OPTIONS, choose Windows/Linux/Mac OS accordingly.

Step 3: Select - JUST DOWNLOAD. The download will start!

Step 4: Run the downloaded setup file.

## 3. PROGRAM

```
#define AOUT_PIN A1 // A1 pin
#define LED 9
int value;
void Soil_Moisture_Sensor();

void setup()
```

```

{
  Serial.begin(9600);
  pinMode(LED,OUTPUT);
}

void loop()
{
  Soil_Moisture_Sensor();
}

void Soil_Moisture_Sensor()
{
  value = analogRead(AOUT_PIN); // read the analog value from sensor
  Serial.print("Moisture value: ");
  Serial.println(value);
  if(value<=600)
  {
    digitalWrite(LED,LOW);
    Serial.println("WET");
  }
  else
  {
    digitalWrite(LED,HIGH);
    Serial.println("DRY");
  }
  delay(500);
}

```

**Result :** an Arduino program to read the moisture level of soil and performing actions such as turning on an LED or buzzer based on the moisture level by using Soil Moisture Sensor is implemented successfully