

## TEAM ID:PNT2022TMID50396

### **Program:**

```
#include <Adafruit_LiquidCrystal.h> //Includes the library for LCD Display
```

```
#include <Wire.h> //Includes the library for connections
```

```
#include <Servo.h> //Includes the library for Servo Motor
```

```
Servo s; int
```

```
e = 4; int t
```

```
= 5; int r =
```

```
12; int b =
```

```
11; int g =
```

```
10; int sec
```

```
= 0; int
```

```
Sensor = 0;
```

```
int soil = 0;
```

```
int
```

```
motorPin
```

```
= 9;
```

```
Adafruit_LiquidCrystal lcd(0);
```

```
void setup()
```

```
{
```

```
Wire.begin();
```

```
pinMode(A0, INPUT); // Temperature Sensor
```

```
pinMode(A1, INPUT); // Soil Moisture Sensor
```

```
pinMode(t, OUTPUT); // Ultra sonic Trigger
```

```

    pinMode(e, INPUT);           // Ultra sonic Echo
    pinMode(b, OUTPUT);          // GREEN light for LED
    pinMode(g, OUTPUT);          // BLUE light for LED
    pinMode(r, OUTPUT);          // RED light for LED
    pinMode(motorPin, OUTPUT);   // DC motor
    s.attach(3);                 // Servo Motor
    lcd.begin(16, 2);            // LCD 16x2 Display
    lcd.setBacklight(0);
    Serial.begin(9600);
}

```

```

float readDistanceCM()
{
    digitalWrite(t, LOW);
    delayMicroseconds(2);    digitalWrite(t,
    HIGH); delayMicroseconds(10);

    digitalWrite(t, LOW);    int
    duration = pulseIn(e, HIGH);
    return duration * 0.034 / 2;
}

```

```

void loop()
{
    // Soil Moisture:

    Sensor = analogRead(A1);    //
    Reads data from Soil Moisture sensor
    soil = map(Sensor, 0, 1023, 0, 117);
}

```

// Low analog value indicates HIGH moisture level and High analog value indicates LOW moisture level

// data = map(analogValue,fromLOW,fromHIGH,toLOW,toHIGH)

**Serial.print("Soil Moisture value:");**

**Serial.println(soil);**

//'data = 0' indicates total wetness and 'data = 100' indicates total dryness

**// Temperature: double a = analogRead(A0);** // Reads data from  
Temperature sensor **double t = (((a / 1024) \* 5) - 0.5) \* 100;**

**Serial.print("Temperature value:");** //Temperature value in Celsius  
**Serial.println(t);**

**// Ultrasonic sensor: float distance = readDistanceCM();** //Reads  
data from Ultrasonic sensor

**Serial.print("Measured distance: ");**  
**Serial.println(readDistanceCM());**

**// LCD Display: lcd.setBacklight(1);** //ON the  
background light in LCD **lcd.clear();**

**// Conditions:**

**/\*If the temperature is Greater than 20 and less than 35 and also the moisture of soil is less than 60 then the GREEN light will be turned ON indicating the Normal condition \*/ if (t >= 20 && t < 35 && soil >= 40 && soil < 50)**

**{**

**digitalWrite(b, 0);**

**digitalWrite(g, 1);**

**digitalWrite(r, 0); s.write(90);**

```

digitalWrite(motorPin, HIGH);
lcd.setCursor(3, 0);
lcd.print("ON MOTOR");
delay(1000);    lcd.clear();
    Serial.println("Water Partially Flows");
}

```

/\*If the temperature is Greater than 35 and less than 45, then the BLUE light will be turned ON indicating the Intermediate risk condition due to slightly warm weather \*/

```

    else if (t >= 35 && t < 45)
    {
        digitalWrite(b, 1);
digitalWrite(g, 0);
digitalWrite(r, 0);    s.write(90);
digitalWrite(motorPin, HIGH);
lcd.setCursor(3, 0);
lcd.print("ON MOTOR");
delay(1000);    lcd.clear();
        Serial.println("Water Partially Flows");
    }

```

/\*If the temperature is Greater than 45 or the moisture of soil is less than 30, then the RED light will be turned ON indicating the Critical condition due to highly warm weather or the low moisture content in soil \*/ **else if (t >= 45 || soil < 30)**

```

{

```

```

    digitalWrite(b, 0);
digitalWrite(g, 0);
digitalWrite(r, 1);    s.write(180);
    digitalWrite(motorPin, HIGH);
Serial.println("Water Fully Flows");
lcd.setCursor(2, 0);    lcd.print("ON
MOTOR!!!");
    lcd.setCursor(3, 1);
    lcd.print("Low Water");
delay(1000);    lcd.clear();
}

```

/\*If the level of water is MORE in the field it will be indicated by distance sensor for less than 10cm and also the moisture of soil is greater than 80, then the

YELLOW light will be turned ON indicating the high water level \*/

```

else if (distance<10 && soil> 80)

```

```

{
    digitalWrite(b, 0);
digitalWrite(g, 1);
digitalWrite(r, 1);    s.write(0);
    digitalWrite(motorPin, LOW);
Serial.println("Water Does Not Flow");
lcd.clear();    lcd.setCursor(3, 0);
lcd.print("OFF MOTOR");
delay(1000);    lcd.clear();
lcd.setCursor(1, 0);    lcd.print("DRAIN
WATER!!!");    delay(1000);
lcd.clear();

```

```
}
```

```
else
```

```
{
```

```
    digitalWrite(b, 1);
```

```
digitalWrite(g, 1);
```

```
digitalWrite(r, 0);    s.write(0);
```

```
    digitalWrite(motorPin, LOW);
```

```
lcd.setCursor(3, 0);
```

```
lcd.print("OFF MOTOR");
```

```
delay(1000);    lcd.clear();
```

```
    Serial.println("Water Does Not Flow");
```

```
}
```

```
    lcd.setCursor(0, 0);
```

```
lcd.print("Temp:");
```

```
lcd.print(t);
```

```
lcd.print("degree");
```

```
lcd.setCursor(0, 1);
```

```
lcd.print("SoilWetness:");
```

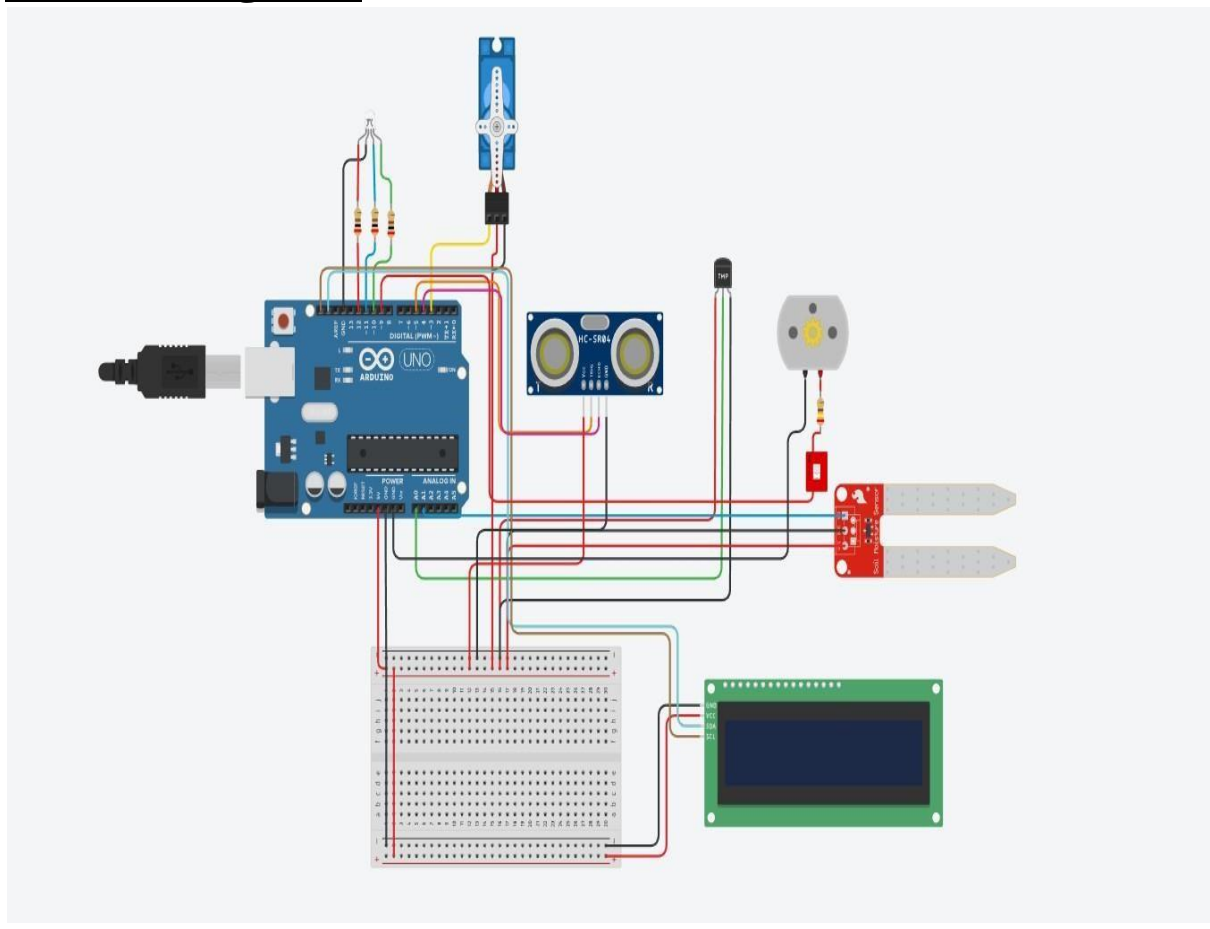
```
lcd.print(soil);    lcd.print("%");
```

```
    Serial.println("-----");
```

```
delay(1000);
```

```
}
```

## Circuit Diagram:



## Component Used:

Name	Quantity	Component
UAU	1	Arduino Uno R3
SERVOMS	1	Positional Micro Servo
DLED	1	LED RGB
RGreen LED Resistor RRed LED Resistor RBlue LED Resistor	3	200 $\Omega$ Resistor
SENSMS	1	Soil Moisture Sensor
MSmall 6V DC Motor	1	DC Motor
RMotor Resistor	1	240 $\Omega$ Resistor
UTS	1	Temperature Sensor [TMP36]
DISTUltrasonic Distance Sensor	1	Ultrasonic Distance Sensor
U3	1	MCP23008-based, 32 LCD 16 x 2 (I2C)
SWDPST Switch	1	DIP Switch DPST