

TEAM ID: PNT2022TMID14625

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);
```

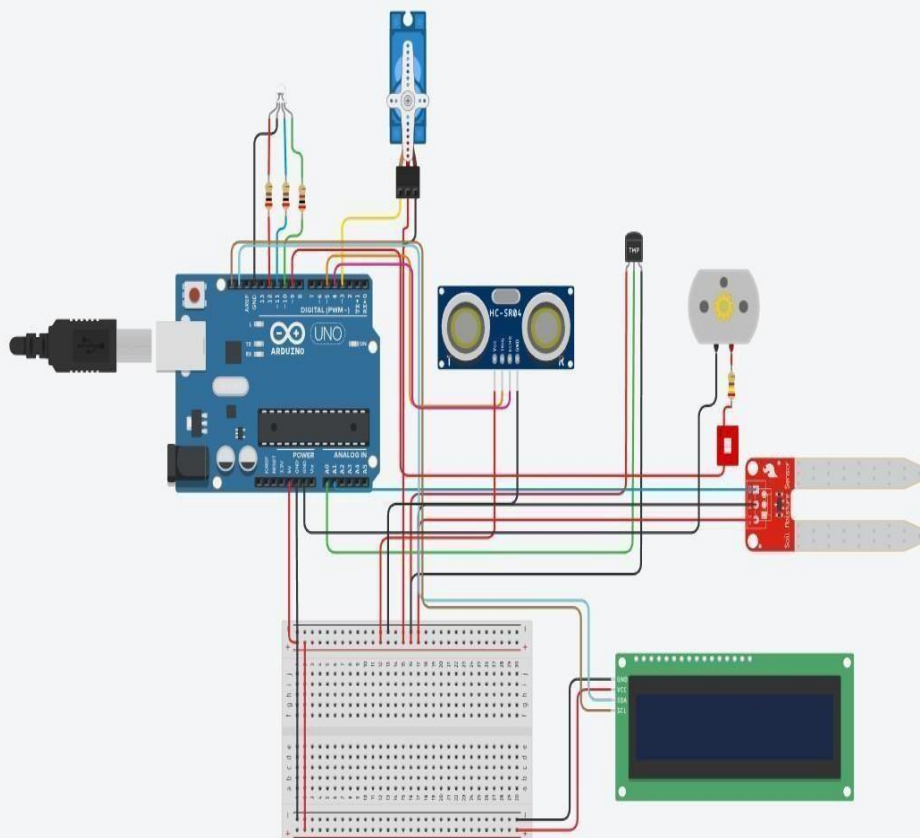
```
lcd.clear();
```

```
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 Ω Resistor
SENSMS	1	Soil Moisture Sensor
MSmall 6V DC Motor	1	DC Motor
RMotor Resistor	1	240 Ω 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