

PROJECT DEVELOPMENT PHASE

DELIVERY OF SPRINT-2

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|---------------------|---|
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| Project Name | Smart Farmer-IoT Enabled smart Farming Application |

Software- Create device In the IoTWatson Platform,
workflow for IOT Scenarios using Local Node

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); // Ultrasonic Trigger  
    pinMode(e, INPUT); // Ultrasonic 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

  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:

