TEAM ID	**PNT2022TMID27944**
PROJECT NAME	**IoT Based Smart Crop Protection System for Agriculture**

Using Wokwi Platform

Source Code:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#include "DHT.h"// Library for dht11
#define DHTPIN 15
#define dhtpin 13     // what pin we're connected to
#define DHTTYPE DHT22   // define type of sensor DHT 11
#include <ESP32Servo.h>

const int servoPin = 18;
Servo servo;

DHT dht1 (DHTPIN, DHTTYPE);// creating the instance by passing pin and typr of dht
connected
DHT dht2 (dhtpin, DHTTYPE);
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-------credentials of IBM Accounts------

#define ORG "bx1po5"//IBM ORGANITION ID
#define DEVICE_TYPE "abcd"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "1234"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678"     //Token
String data3;

float h , t;
float m,T;
int f;
int pos;


//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and
format in which data to be send
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd  REPRESENT command type
AND COMMAND IS TEST OF FORMAT STRING
```

```
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
float dist,dur;
String data;
//-----------------------------------------
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient);  //calling the predefined client id by
passing parameter like server id,portand wificredential


void setup()// configureing the ESP32
{
  Serial.begin(115200);
  dht1.begin();
  dht2.begin();
  delay(10);
  Serial.println();
  servo.attach(servoPin, 500, 2400);
  wificonnect();
  mqttconnect();
}

void loop()// Recursive Function
{

  h = dht1.readHumidity();
  t = dht1.readTemperature();
  m = dht2.readHumidity();

  Serial.print("temp:");
  Serial.println(t);
  Serial.print("Humid:");
  Serial.println(h);
  Serial.print("moisture:");
  Serial.println(m);
  if(m<=50)
  {
    Serial.print("Low moisture , Motor ON");
    f=1;
    for (pos = 0; pos <= 180; pos += 1) {
    servo.write(pos);
    delay(15);
  }
  for (pos = 180; pos >= 0; pos -= 1) {
    servo.write(pos);
    delay(15);
```

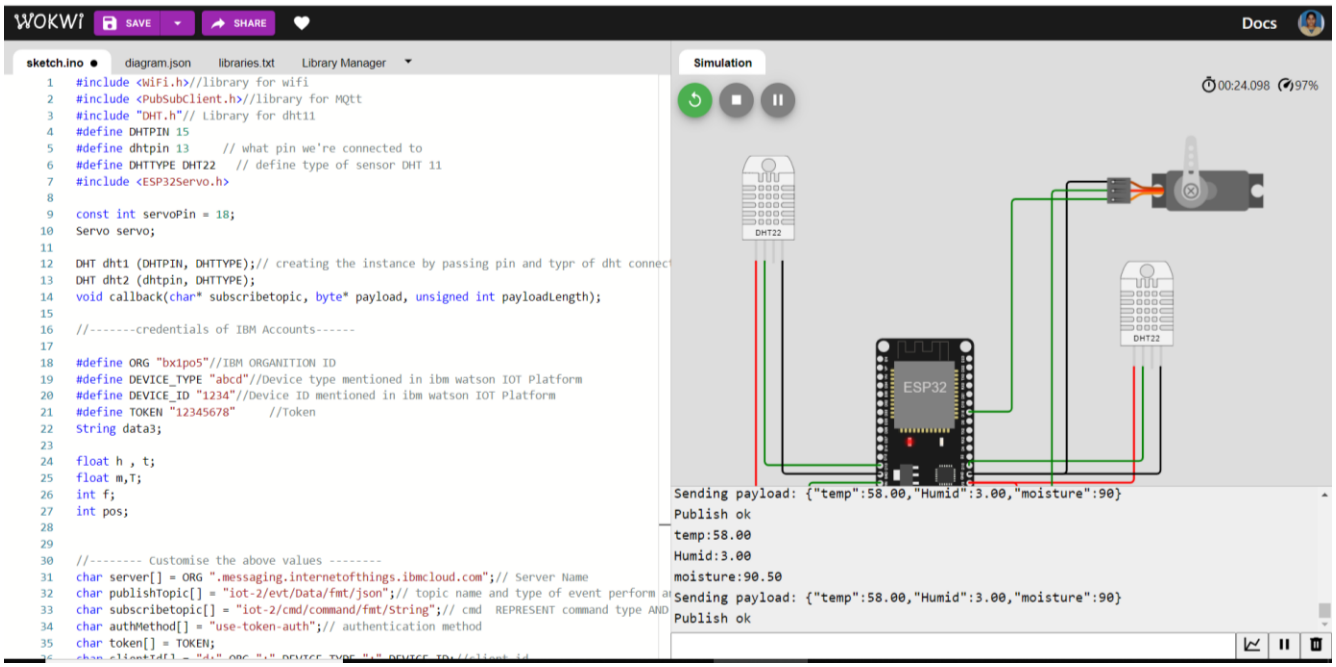
```
  }

  }


  PublishData(t,h,m);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}


/*.....................................retrieving to Cloud...............................*/

void PublishData(float temp, float Humid, int moisture) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"temp\":";
  payload += temp;
  payload += "," "\"Humid\":";
  payload += Humid;
  payload += "," "\"moisture\":";
  payload += moisture;
  payload += "}";


  Serial.print("Sending payload: ");
  Serial.println(payload);


  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print
publish ok in Serial monitor or else it will print publish failed
  } else {
    Serial.println("Publish failed");
  }

}

void PublishAlert() {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
```

```
  String payload = "{\"alert\":";
  payload += 10000;
  payload += "}";

  Serial.print("Sending payload: ");
  Serial.println(payload);


  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print
publish ok in Serial monitor or else it will print publish failed
  } else {
    Serial.println("Publish failed");
  }

}


void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!!!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }

     initManagedDevice();
     Serial.println();
  }
}
void wificonnect() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}
```

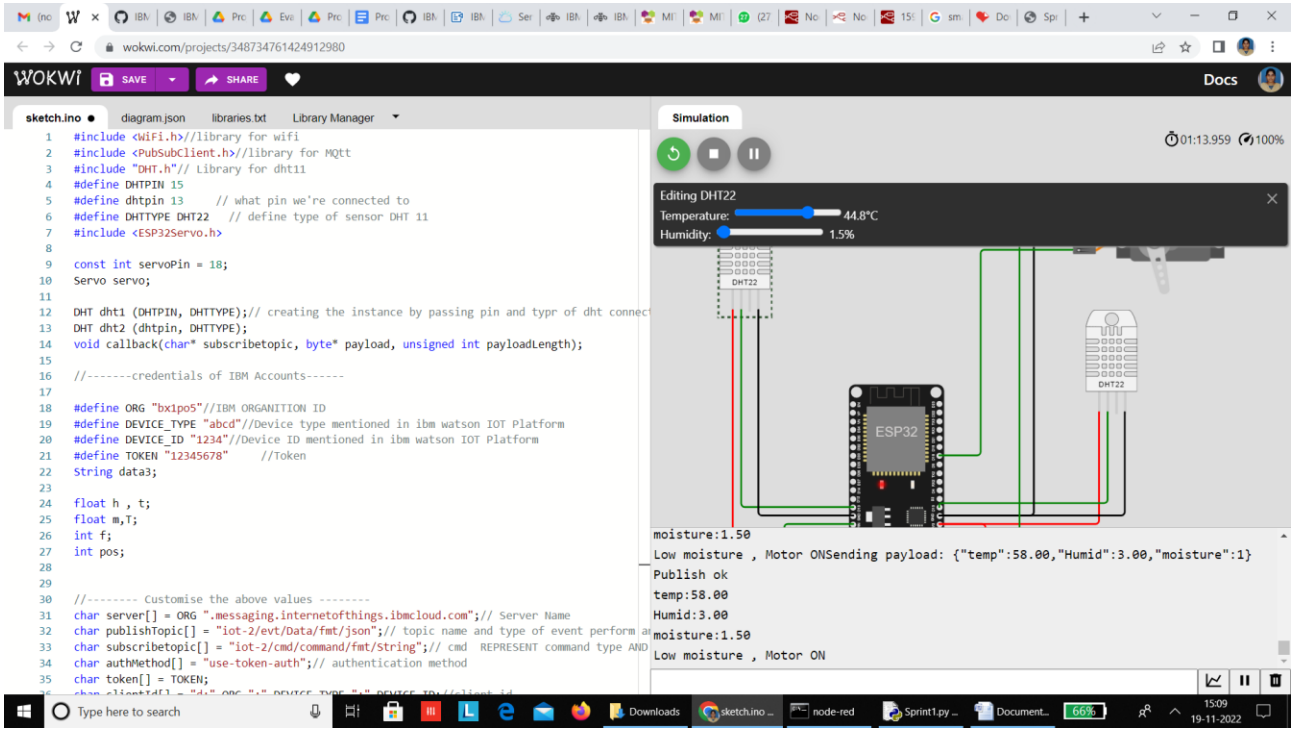
```
void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println((subscribetopic));
    Serial.println("subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd FAILED");
  }
}

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{

}
```

Output:

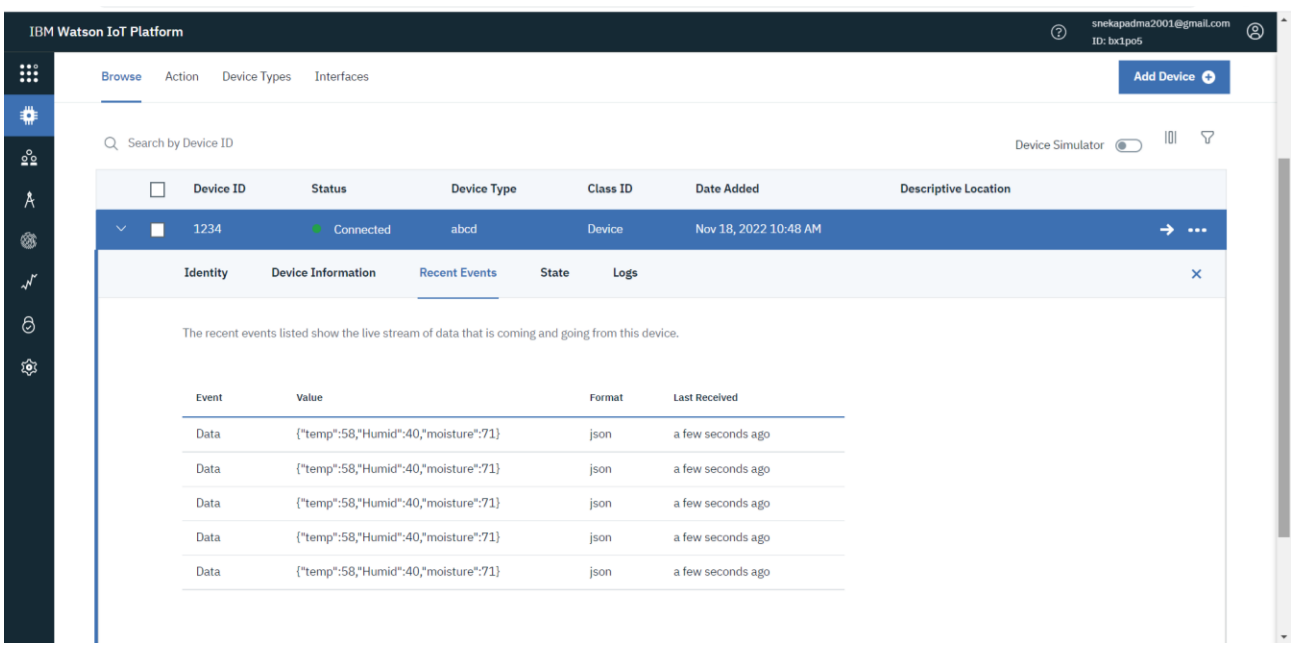
When Moisture is High – Motor OFF



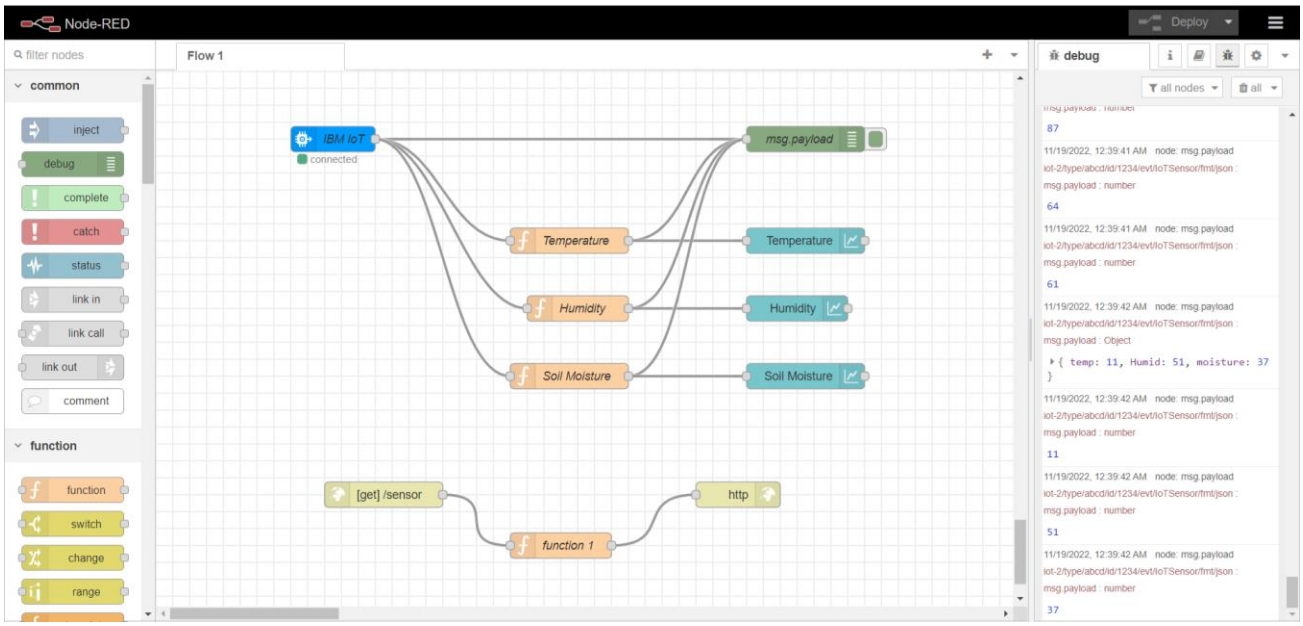
When Moisture is Low – Motor ON:



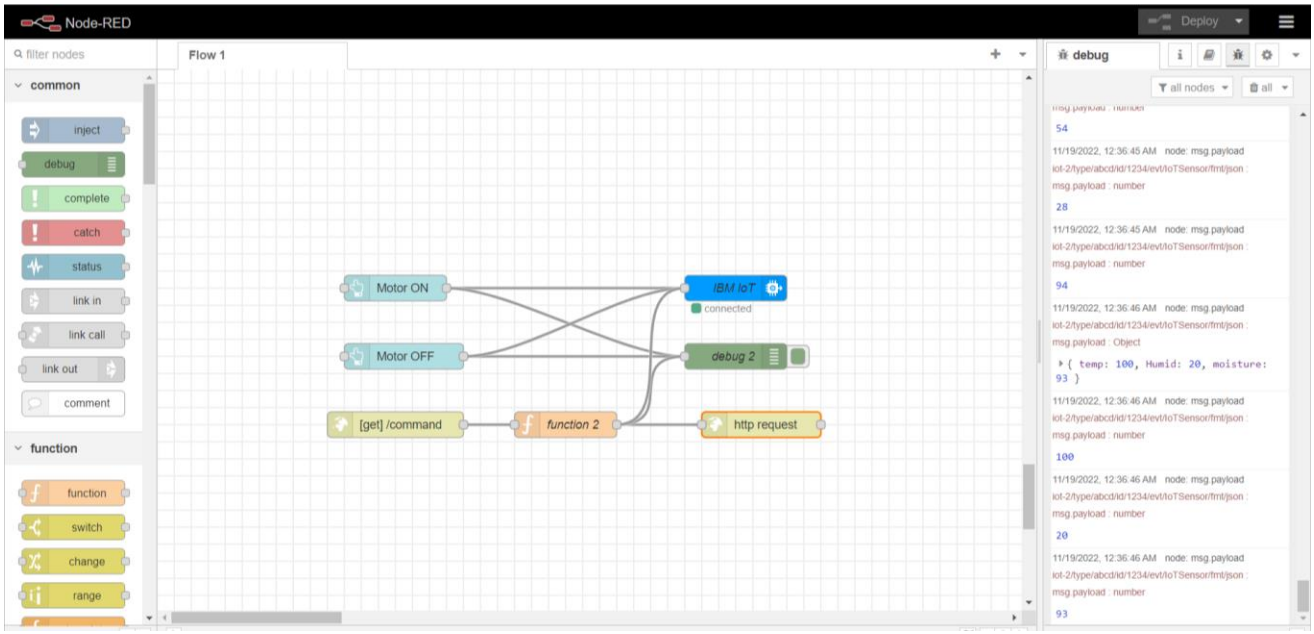
<u>Wokwi to IBM Watson IoT Platform:</u>



Node-Red Flow Diagram for Sensor:



Node-Red Flow Diagram to configure with Button:



Source Code:

```
msg.payload = { "temp": global.get("t"),
                "Humid": global.get("h"),
                "moisture": global.get("m")}
return msg;
```

For Temperature:

```
msg.payload = msg.payload.temp
global.set("t",msg.payload)
return msg;
```

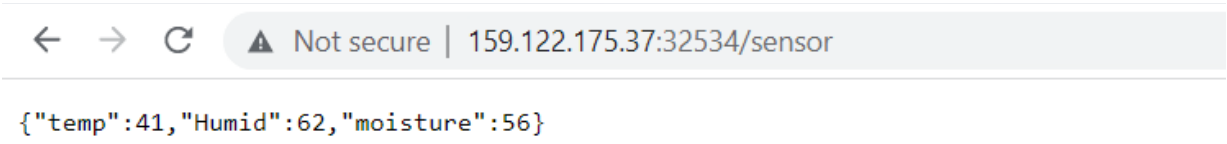
For Humidity:

```
msg.payload = msg.payload.Humid
global.set("h", msg.payload)
return msg;
```

For Moisture:

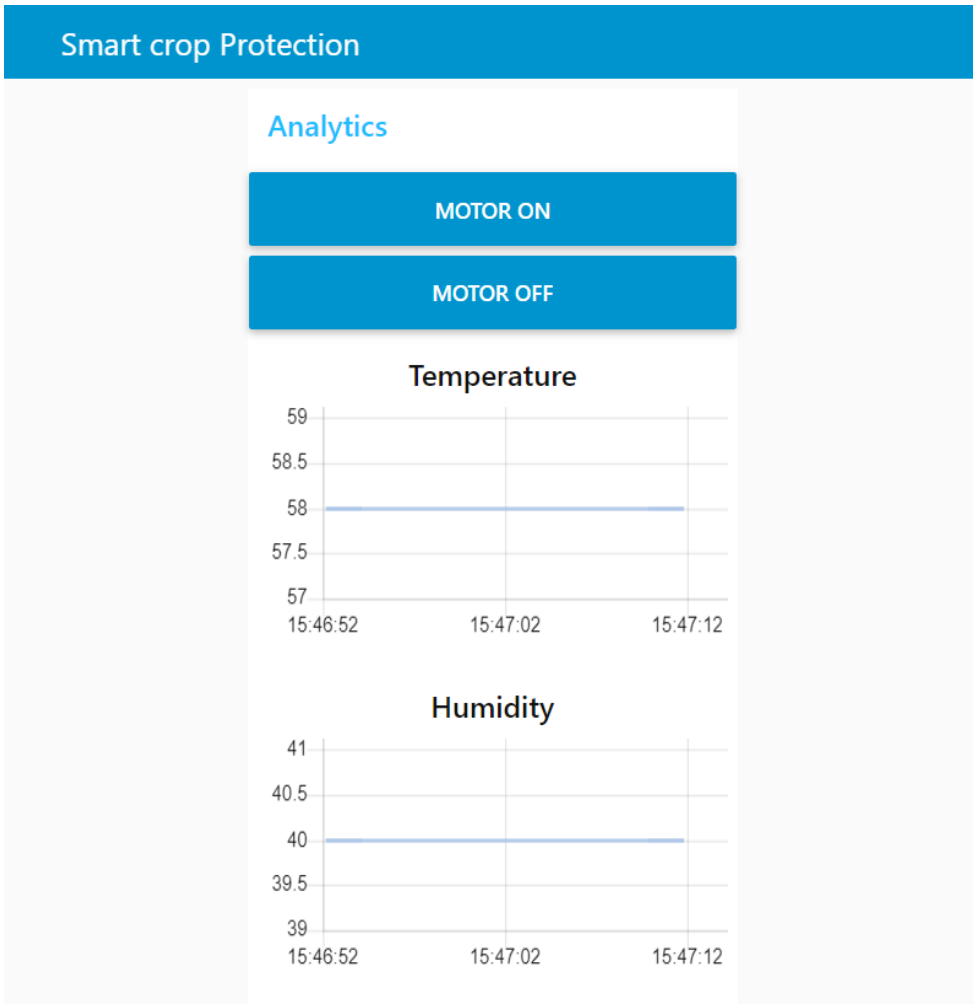
```
msg.payload = msg.payload.moisture
global.set("m", msg.payload)
return msg;
```

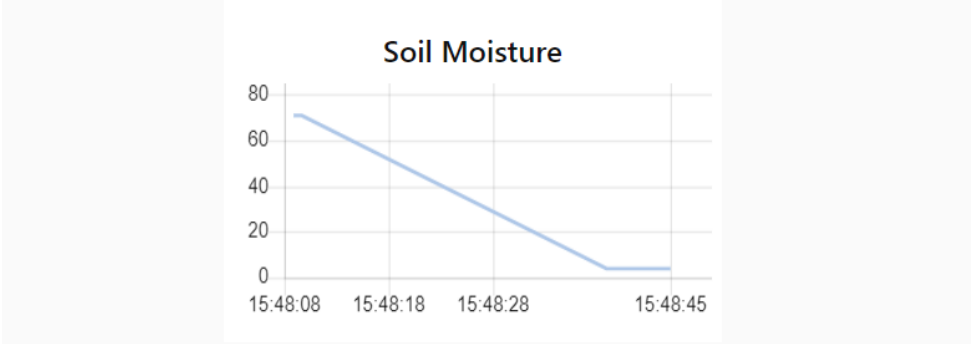
HTTP Request using Node-Red:



{"temp":41,"Humid":62,"moisture":56}

Generate the output for recent event:

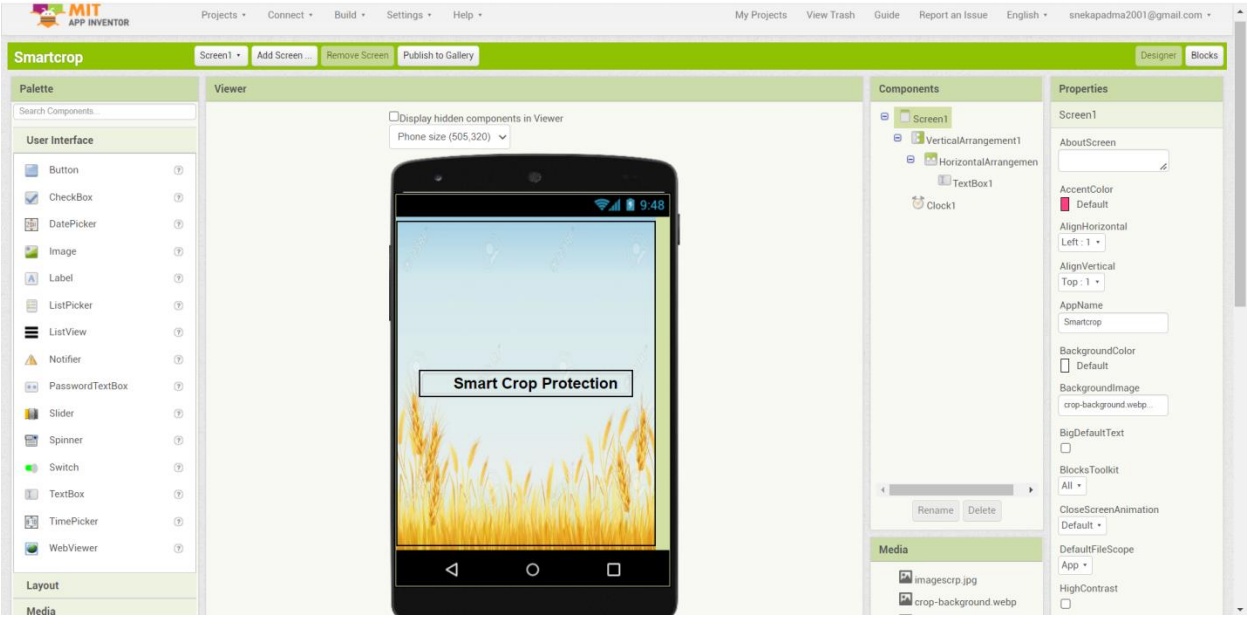




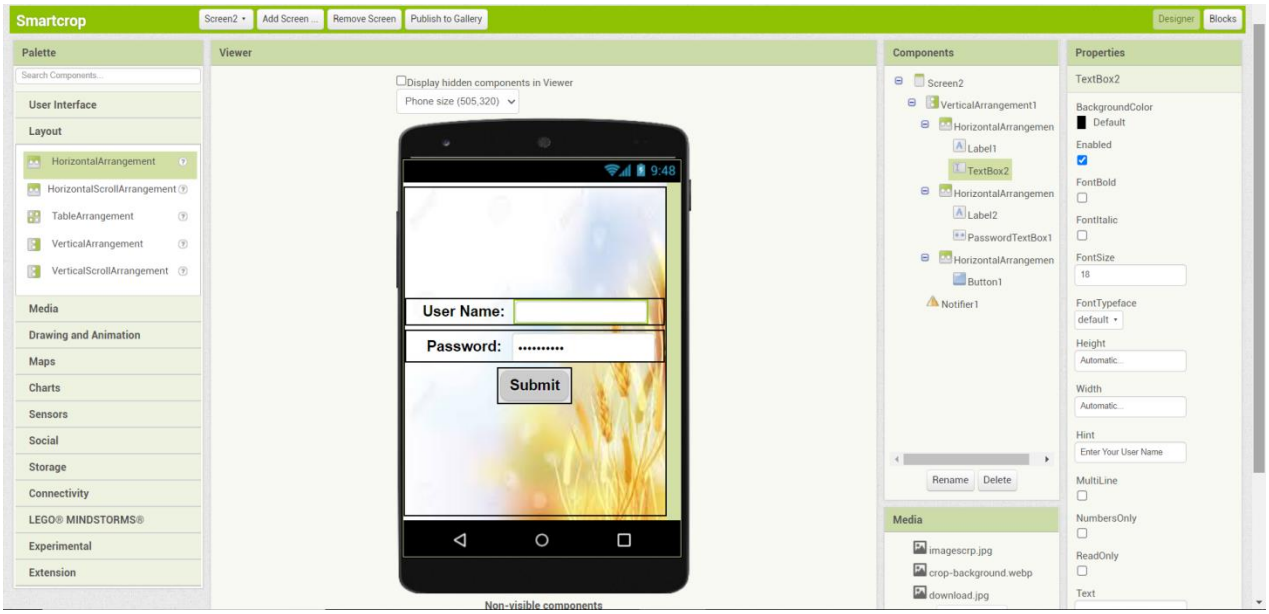
Mit Application Designer:

(FRONTEND)

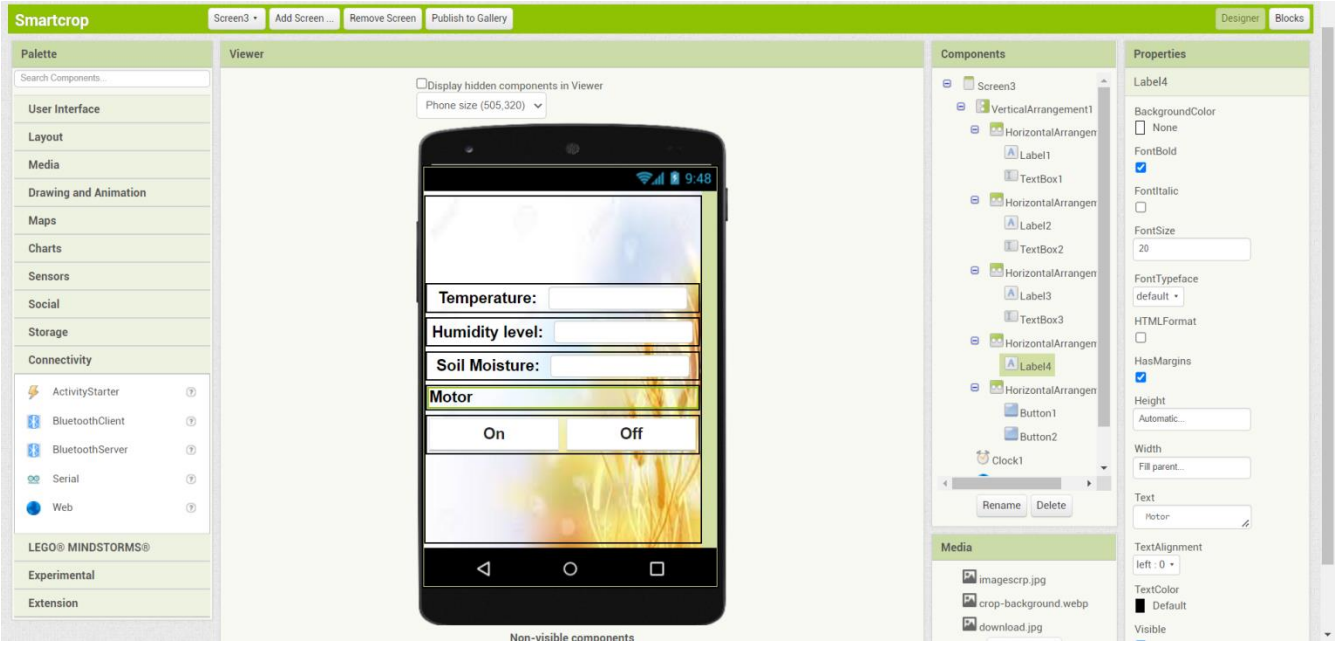
Screen-1:



Screen-2:



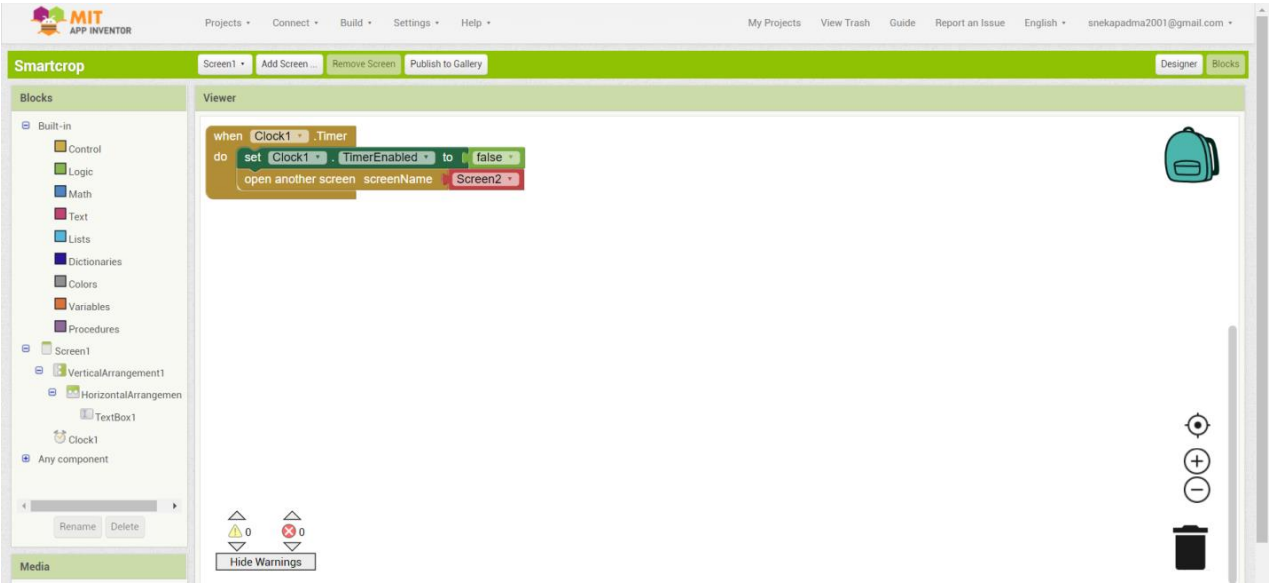
Screen-3:



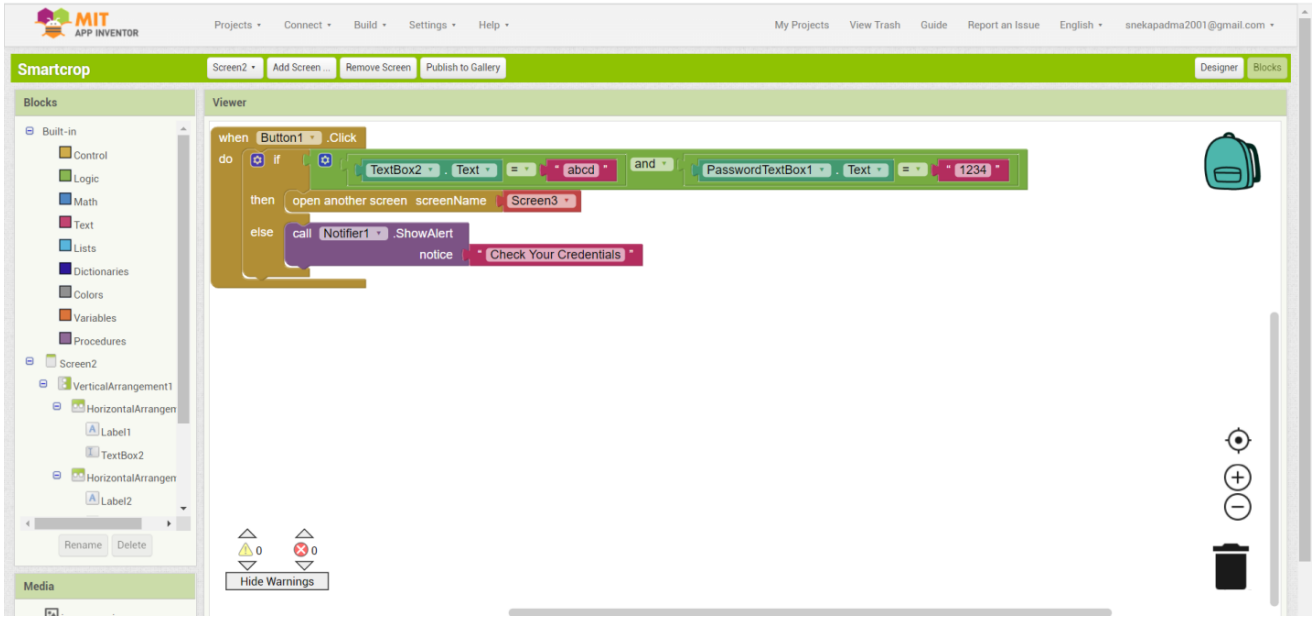
Customize the APP interface to display the values:

Blocks(BACKEND)

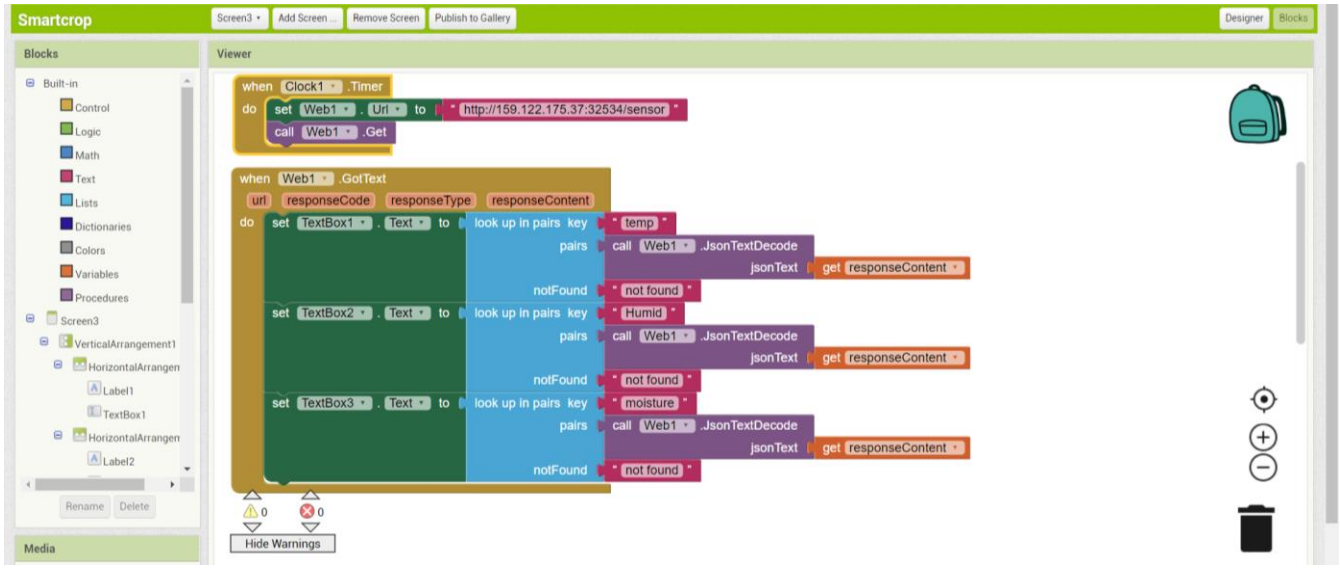
Screen-1:



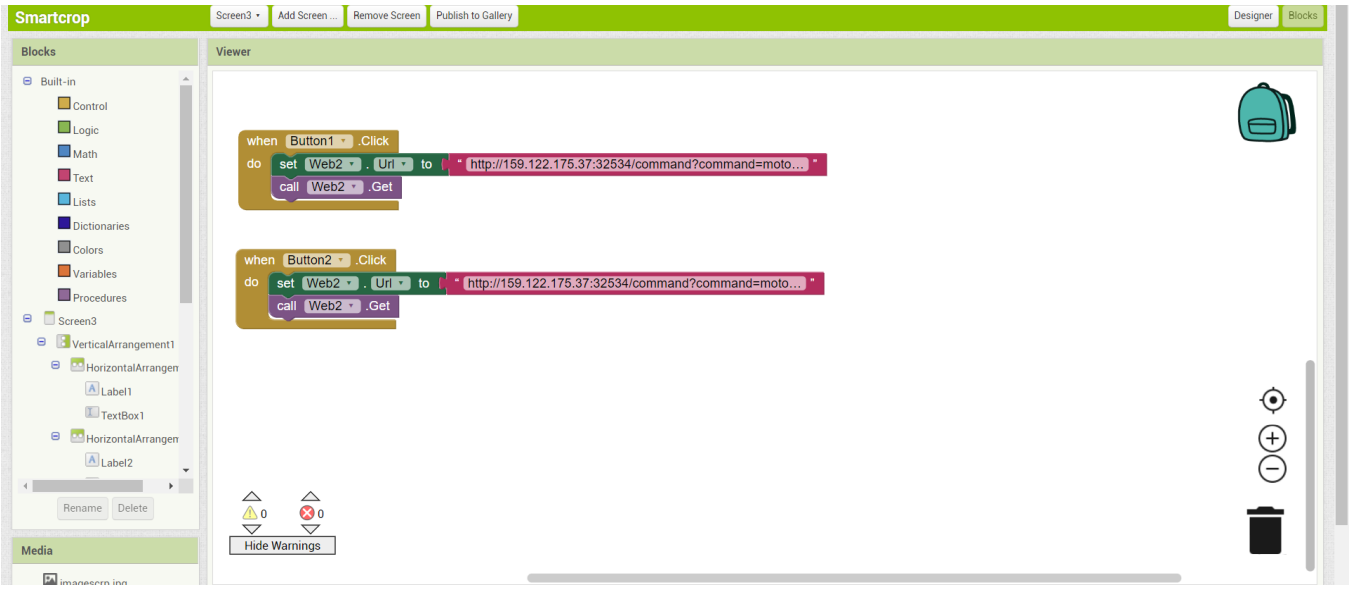
Screen-2:



Screen-3 :

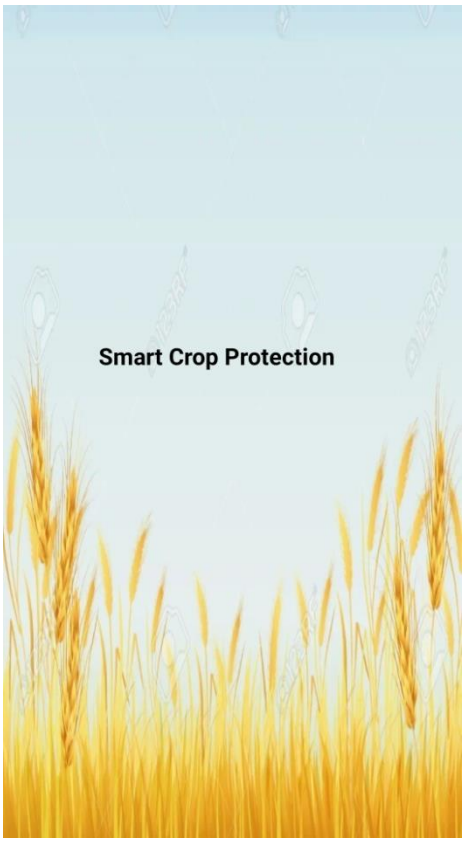


Screen-3 Blocks with Button:



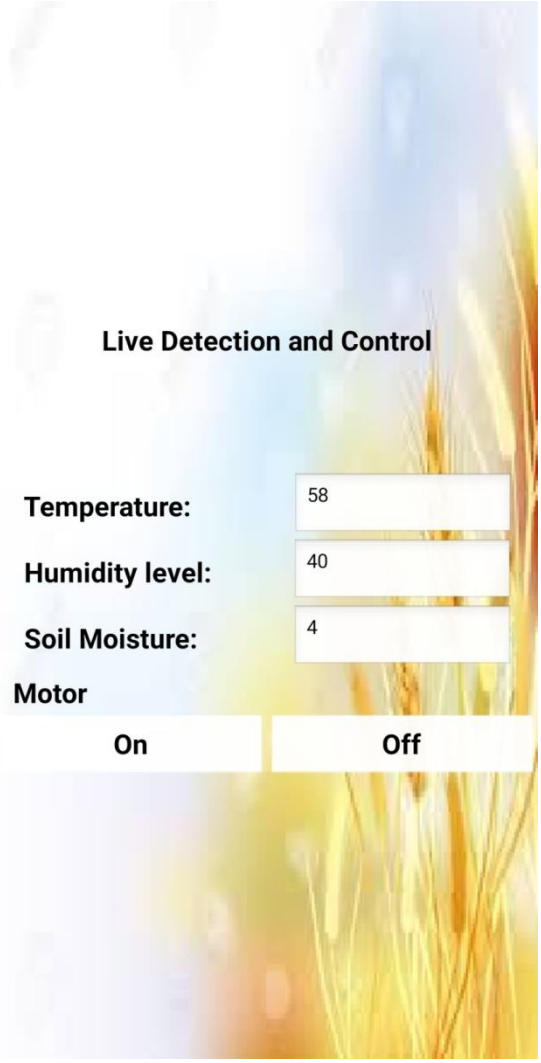
MIT App Invertor Output-Mobile Phone:

Screen-1:



Screen-2:

Screen-3:


Live Detection and Control
Temperature:
58
Humidity level:
40
Soil Moisture:
4
Motor
On
Off