

The IBM logo is displayed in white text on a blue arrow-shaped background, which is part of a larger blue horizontal bar. To the left of this bar is a thick, dark blue vertical bar. In the bottom-left corner, there are several thin, curved, light blue lines that resemble stylized grass or reeds.

# SPRINT 1 REPORT

SMARTFARMER – IOT ENABLED  
SMART FARMING APPLICATION

**TEAM ID – PNT2022TMID34458**

- **TEAM LEADER : MUGESHWARAN G**
- **TEAM MEMBER : ISRAVEL KEWIN CLINT P**
- **TEAM MEMBER : BLESSWIN.K.SAMUEL**
- **TEAM MEMBER : VIJAY S**

## Project Tracker

| <b>Sprint</b> | <b>Total Story Points</b> | <b>Duration</b> | <b>Sprint Start Date</b> | <b>Sprint End Date (Planned)</b> | <b>Story Points Completed (as on Planned End Date)</b> | <b>Sprint Release Date (Actual)</b> |
|---------------|---------------------------|-----------------|--------------------------|----------------------------------|--|-------------------------------------|
| Sprint-1      | 15                        | 5 Days          | 26 Oct 2022              | 30 Oct 2022                      | 15   | 30 Oct 2022                         |
| Sprint-2      | 15                        | 7 Days          | 31 Oct 2022              | 06 Nov 2022                      |  | 07 Nov 2022                         |
| Sprint-3      | 15                        | 6 Days          | 07 Nov 2022              | 12 Nov 2022                      |  | 13 Nov 2022                         |
| Sprint-4      | 15                        | 6 Days          | 13 Nov 2022              | 18 Nov 2022                      |  | 18 Nov 2022 – 19 Nov 2022           |

| <b>S.NO</b> | <b>Tools &amp; Technology Used</b> |
|-------------|------------------------------------|
| 1           | Wokwi Hardware Simulation          |
| 2           | Tinkercad Hardware Simulation      |
| 3           | IBM Watson IOT Platform            |
| 4           | IOT Monitor Board                  |
| 5           | Python Hardware Simulation         |
| 6           | Connecting Python with IBM Cloud   |
| 7           | Connecting Wokwi with IBM Cloud    |

# Wokwi Hardware Simulation

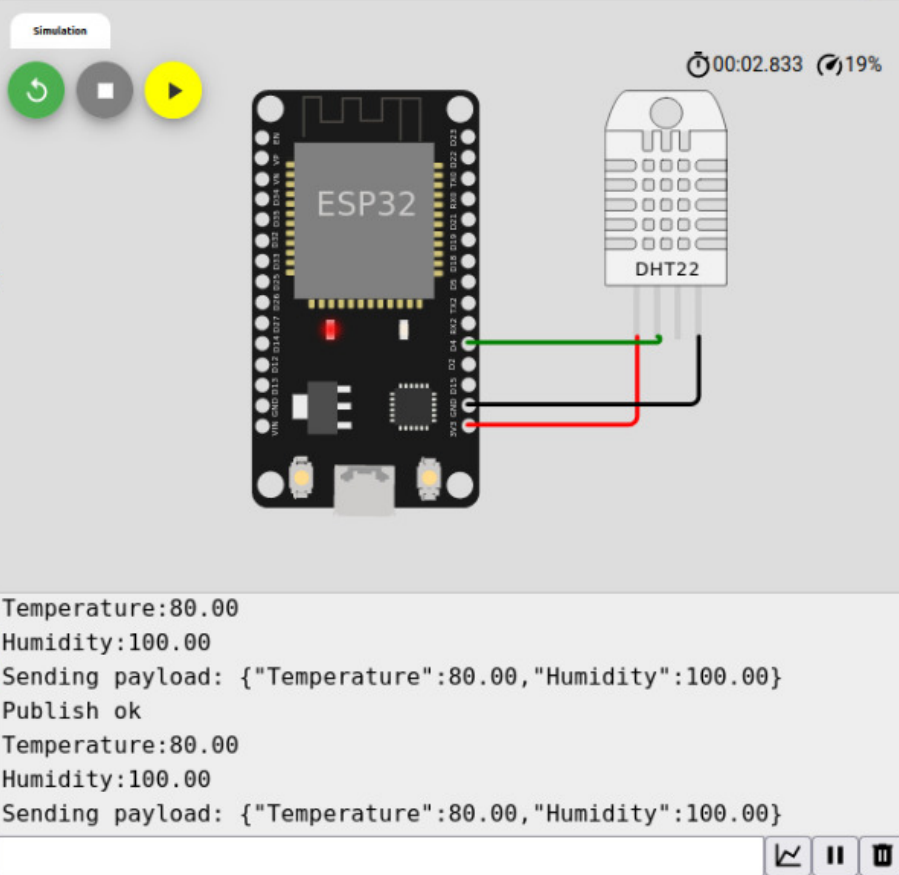
WOKWI SAVE SHARE esp32-dht22.ino copy Docs

esp32-dht22.ino diagram.json libraries.txt Library Manager

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 #include "DHT.h" // Library for dht11
4 #define DHTPIN 4 // what pin we're connected to
5 #define DHTTYPE DHT22 // define type of sensor DHT 11
6 #define LED 5
7 DHT dht (DHTPIN, DHTTYPE); // creating the instance by passing pin and type of sensor
8
9 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength) {
10
11 //-----credentials of IBM Accounts-----
12
13 #define ORG "gstsmj"
14 #define DEVICE_TYPE "IOT_Device"
15 #define DEVICE_ID "Smart_Farming"
16 #define TOKEN "IOT_Device_12345"
17 String data3;
18 float h, t;
19
20 //----- Customise the above values -----
21
22 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
23 char publishTopic[] = "iot-2/evt/Data/fmt/json"; // topic name and type of event
24 char subscribetopic[] = "iot-2/cmd/test/fmt/String"; // cmd REPRESENT command
25 char authMethod[] = "use-token-auth"; // authentication method
26 char token[] = TOKEN;
27 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
28
29 //-----
30 WiFiClient wifiClient; // creating the instance for wifi client
```

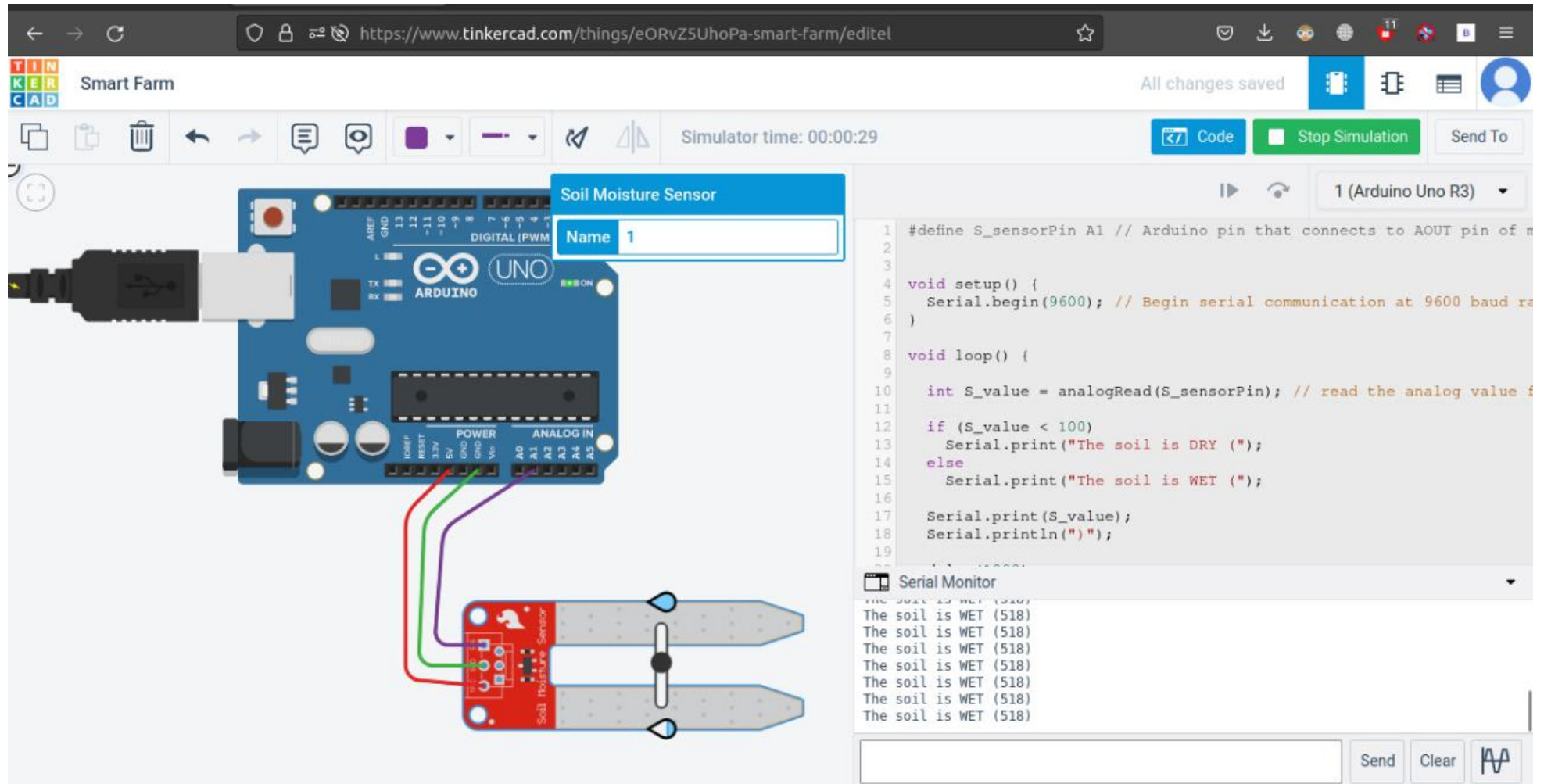
Simulation

00:02.833 19%



Temperature:80.00  
Humidity:100.00  
Sending payload: {"Temperature":80.00,"Humidity":100.00}  
Publish ok  
Temperature:80.00  
Humidity:100.00  
Sending payload: {"Temperature":80.00,"Humidity":100.00}

# Tinkercad Hardware Simulation



# Ibm Watson IOT Platform

The screenshot displays the IBM Watson IoT Platform interface. The main dashboard shows a list of devices under the 'Smart\_Farming' group, all with a status of 'Disconnected'. The 'Recent Events' tab is selected, showing a stream of events for 'event\_1' with various sensor data (Temperature, Humidity, Soil\_Moisture, Motor\_Pump) in JSON format.

On the right, a configuration window for 'Smart\_Farming' is open, showing the 'Events' section. It displays the event type 'event\_1' with a frequency of '20 \* Every Minute'. The payload is configured to send random values for Temperature, Humidity, and Soil\_Moisture, and 'OFF' for Motor\_Pump.

**Device List:**

| Device ID     | Status       | Device Type |
|---------------|--------------|-------------|
| IOT_Device_1  | Disconnected | IOT_Device  |
| Smart_Farming | Disconnected | IOT_Device  |

**Recent Events:**

| Event   | Value  | Format |
|---------|--|--------|
| event_1 | {"Temperature":19,"Humidity":11,"Soil_Moisture":3,"Motor_Pump":"OFF"}  | json   |
| event_1 | {"Temperature":41,"Humidity":68,"Soil_Moisture":86,"Motor_Pump":"OFF"} | json   |
| event_1 | {"Temperature":35,"Humidity":23,"Soil_Moisture":61,"Motor_Pump":"OFF"} | json   |
| event_1 | {"Temperature":34,"Humidity":64,"Soil_Moisture":50,"Motor_Pump":"OFF"} | json   |
| event_1 | {"Temperature":42,"Humidity":37,"Soil_Moisture":80,"Motor_Pump":"OFF"} | json   |

**Event Configuration (Smart\_Farming):**

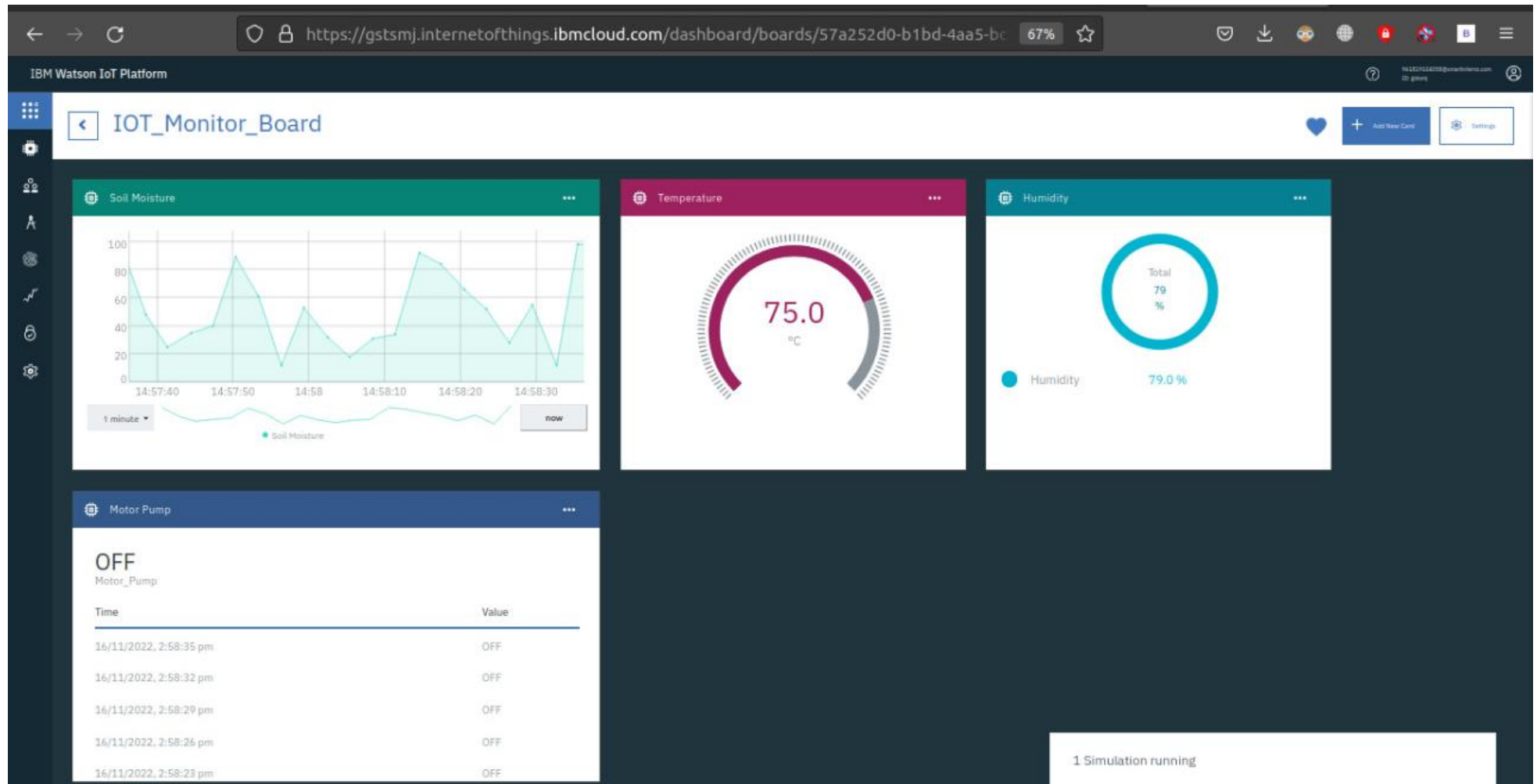
Event type name: event\_1  
Frequency: 20 \* Every Minute  
Send button

**Payload:**

```
0 {  
1   "Temperature": random(0, 100),  
2   "Humidity": random(0, 100),  
3   "Soil_Moisture": random(0, 100),  
4   "Motor_Pump": "OFF"  
5 }  
6
```

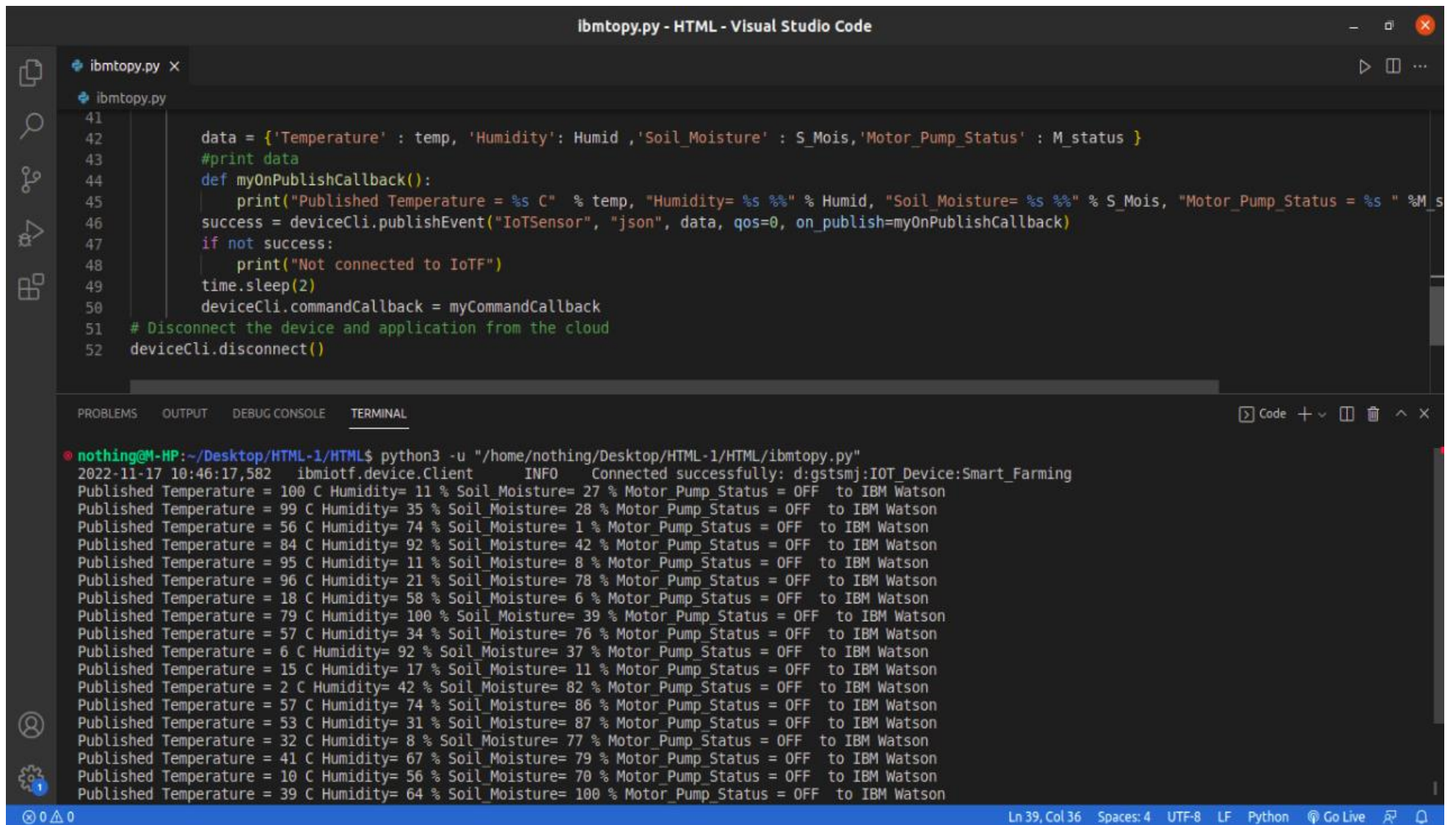
What functions can I apply?

# IOT Monitor Board





# Python Hardware Simulation



The image shows a Visual Studio Code editor window titled "ibmtopy.py - HTML - Visual Studio Code". The editor displays a Python script named "ibmtopy.py" with the following code:

```
41
42     data = {'Temperature' : temp, 'Humidity': Humid, 'Soil_Moisture' : S_Mois, 'Motor_Pump_Status' : M_status }
43     #print data
44     def myOnPublishCallback():
45         print("Published Temperature = %s C" % temp, "Humidity= %s %" % Humid, "Soil Moisture= %s %" % S_Mois, "Motor_Pump_Status = %s " % M_status)
46     success = deviceCli.publishEvent("IoTSensor", "json", data, qos=0, on_publish=myOnPublishCallback)
47     if not success:
48         print("Not connected to IoT")
49     time.sleep(2)
50     deviceCli.commandCallback = myCommandCallback
51 # Disconnect the device and application from the cloud
52 deviceCli.disconnect()
```

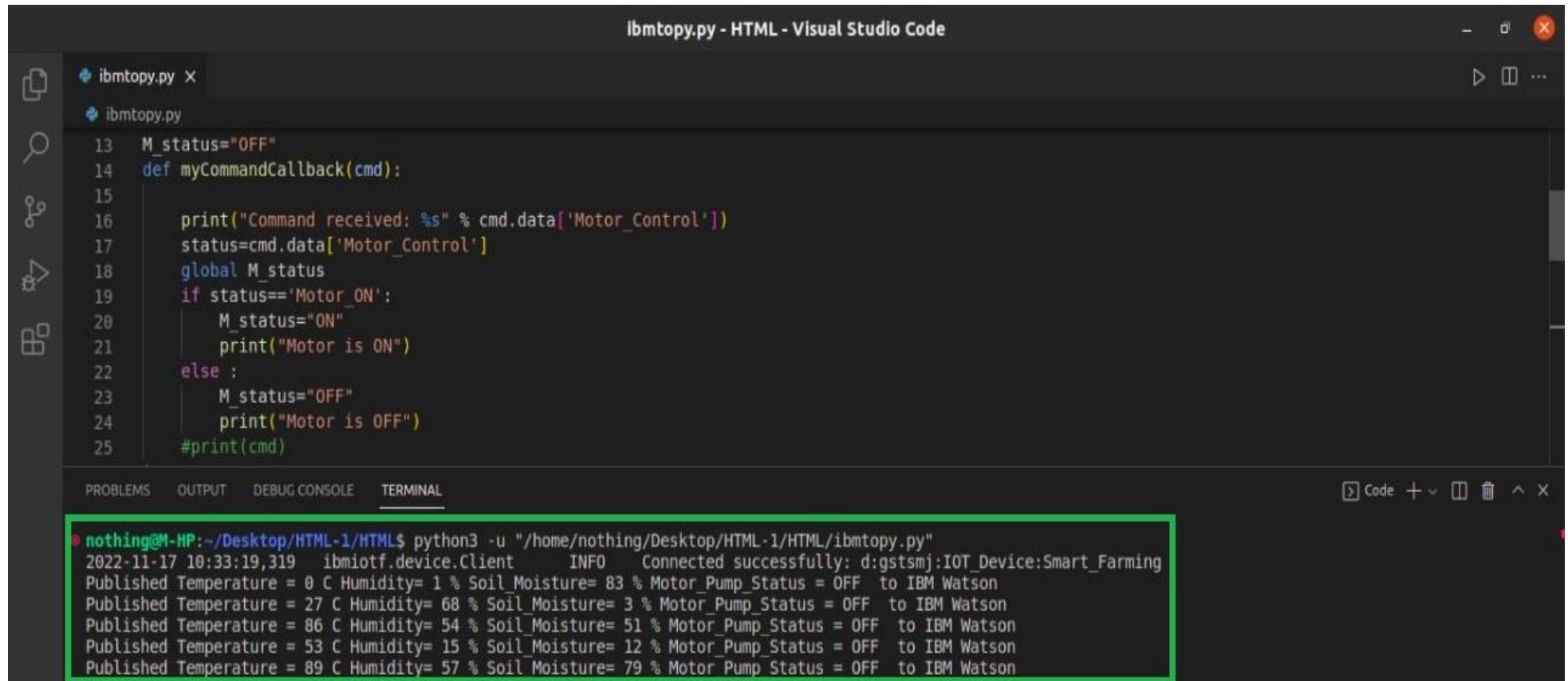
The terminal window at the bottom shows the execution of the script. The command executed is `python3 -u "/home/nothing/Desktop/HTML-1/HTML/ibmtopy.py"`. The output shows a successful connection to the IoT device and a series of published data points:

```
2022-11-17 10:46:17,582 ibmiotf.device.Client INFO Connected successfully: d:gtsmj:IOT_Device:Smart_Farming
Published Temperature = 100 C Humidity= 11 % Soil_Moisture= 27 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 99 C Humidity= 35 % Soil_Moisture= 28 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 56 C Humidity= 74 % Soil_Moisture= 1 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 84 C Humidity= 92 % Soil_Moisture= 42 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 95 C Humidity= 11 % Soil_Moisture= 8 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 96 C Humidity= 21 % Soil_Moisture= 78 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 18 C Humidity= 58 % Soil_Moisture= 6 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 79 C Humidity= 100 % Soil_Moisture= 39 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 57 C Humidity= 34 % Soil_Moisture= 76 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 6 C Humidity= 92 % Soil_Moisture= 37 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 15 C Humidity= 17 % Soil_Moisture= 11 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 2 C Humidity= 42 % Soil_Moisture= 82 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 57 C Humidity= 74 % Soil_Moisture= 86 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 53 C Humidity= 31 % Soil_Moisture= 87 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 32 C Humidity= 8 % Soil_Moisture= 77 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 41 C Humidity= 67 % Soil_Moisture= 79 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 10 C Humidity= 56 % Soil_Moisture= 70 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 39 C Humidity= 64 % Soil_Moisture= 100 % Motor_Pump_Status = OFF to IBM Watson
```

The status bar at the bottom indicates the current position is Line 39, Column 36, with 4 spaces, UTF-8 encoding, LF line endings, and the Python interpreter is selected.



# Connecting Python with IBM Cloud



The image shows a Visual Studio Code window titled "ibmtopy.py - HTML - Visual Studio Code". The editor displays a Python script named "ibmtopy.py" with the following code:

```
13 M_status="OFF"
14 def myCommandCallback(cmd):
15
16     print("Command received: %s" % cmd.data['Motor_Control'])
17     status=cmd.data['Motor_Control']
18     global M_status
19     if status=='Motor_ON':
20         M_status="ON"
21         print("Motor is ON")
22     else :
23         M_status="OFF"
24         print("Motor is OFF")
25     #print(cmd)
```

The bottom panel shows the TERMINAL output, which is highlighted with a green border. The output shows the command being executed and the resulting data published to IBM Watson:

```
nothing@M-HP:~/Desktop/HTML-1/HTML$ python3 -u "/home/nothing/Desktop/HTML-1/HTML/ibmtopy.py"
2022-11-17 10:33:19,319 ibmiotf.device.Client INFO Connected successfully: d:gstsmj:IOT_Device:Smart_Farming
Published Temperature = 0 C Humidity= 1 % Soil_Moisture= 83 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 27 C Humidity= 68 % Soil_Moisture= 3 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 86 C Humidity= 54 % Soil_Moisture= 51 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 53 C Humidity= 15 % Soil_Moisture= 12 % Motor_Pump_Status = OFF to IBM Watson
Published Temperature = 89 C Humidity= 57 % Soil_Moisture= 79 % Motor_Pump_Status = OFF to IBM Watson
```

← → ↺

https://gtsmj.internetofthings.ibmcloud.com/dashboard/devices/browse

☆

🔒 🌐 🔔

👤

IBM Watson IoT Platform

961819104058@smartinernz.com  
ID: gtsmj

🔍

👤

🔧

📶

📡

⚙️

🔍 Search by Device ID

Device Simulator ☒ 📶 🔍

📦

Device ID

Status

Device Type

Class ID

Date Added

> 📦

IOT\_Device\_1

Disconnected

IOT\_Device

Device

Nov 16, 2022 2:51 PM

📁

Smart\_Farming

Connected

IOT\_Device

Device

Nov 7, 2022 8:33 PM

➔ ...

Identity

Device Information

Recent Events

State

Logs

The recent events listed show the live stream of data that is coming and going from this device.

| Event     | Value   | Format | Last Received     |
|-----------|---|--------|-------------------|
| IoTSensor | {"Temperature":89,"Humidity":57,"Soil_Moisture":79,"Motor_Pump_Status":"OFF"} | json   | a few seconds ago |
| IoTSensor | {"Temperature":53,"Humidity":15,"Soil_Moisture":12,"Motor_Pump_Status":"OFF"} | json   | a few seconds ago |
| IoTSensor | {"Temperature":86,"Humidity":54,"Soil_Moisture":51,"Motor_Pump_Status":"OFF"} | json   | a few seconds ago |
| IoTSensor | {"Temperature":27,"Humidity":68,"Soil_Moisture":3,"Motor_Pump_Status":"OFF"}  | json   | a few seconds ago |
| IoTSensor | {"Temperature":0,"Humidity":1,"Soil_Moisture":83,"Motor_Pump_Status":"OFF"}   | json   | a few seconds ago |

> 📦

iot\_device\_1

Disconnected

iot\_device

0 Simulations running

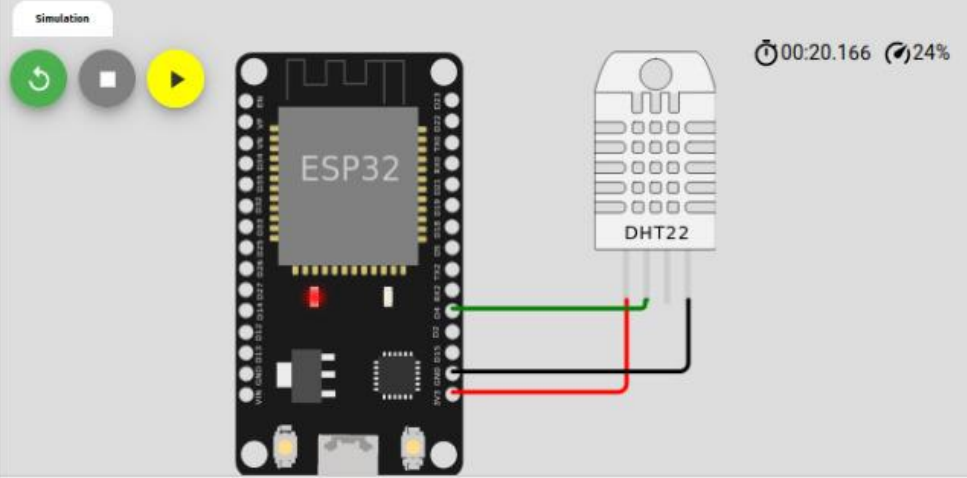
# Connecting Wokwi with IBM Cloud

WOKWI SAVE SHARE esp32-dht22.ino copy Docs

esp32-dht22.ino diagram.json libraries.txt Library Manager

```
29
30 //-----
31 WiFiClient wificlient; // creating the instance for wificlient
32 PubSubClient client(server, 1883, callback ,wificlient); //calling the
33 void setup()// configuring the ESP32
34 {
35   Serial.begin(115200);
36   dht.begin();
37   pinMode(LED,OUTPUT);
38   delay(10);
39   Serial.println();
40   wificlient.connect();
41   mqttconnect();
42 }
43
44 void loop()// Recursive Function
45 {
46
47   h = dht.readHumidity();
48   t = dht.readTemperature();
49   Serial.print("Temperature:");
50   Serial.println(t);
51   Serial.print("Humidity:");
52   Serial.println(h);
53
54   PublishData(t, h);
55   delay(1000);
56   if (!client.loop()) {
57     mqttconnect();
58   }
59 }
```

Simulation



Humidity:61.50  
Sending payload: {"Temperature":3.10,"Humidity":61.50}  
Publish ok  
Temperature:3.10  
Humidity:61.50  
Sending payload: {"Temperature":3.10,"Humidity":61.50}  
Publish ok  
Temperature:61.30  
Humidity:92.50  
Sending payload: {"Temperature":61.30,"Humidity":92.50}

← → ↻

🔒 https://gstsmj.internetofthings.ibmcloud.com/dashboard/devices/browse

☆

📧 🌐 📶 🚀 📱 ☰

IBM Watson IoT Platform

🔍 961819104058@smartinternz.com ID: gstsmj 👤

🔧

Browse

Action

Device Types

Interfaces

Add Device ➕

🔍 Search by Device ID

Device Simulator ☒ 📶 🔍

| <input type="checkbox"/>              | Device ID     | Status         | Device Type | Class ID | Date Added           |       |
|---------------------------------------|---------------|----------------|-------------|----------|----------------------|-------|
| > <input type="checkbox"/>            | IOT_Device_1  | 🔴 Disconnected | IOT_Device  | Device   | Nov 16, 2022 2:51 PM |       |
| ✓ <input checked="" type="checkbox"/> | Smart_Farming | 🟢 Connected    | IOT_Device  | Device   | Nov 7, 2022 8:33 PM  | ➔ ... |

Identity

Device Information

Recent Events

State

Logs

✕

The recent events listed show the live stream of data that is coming and going from this device.

| Event | Value                                | Format | Last Received     |
|-------|--------------------------------------|--------|-------------------|
| Data  | {"Temperature":61.3,"Humidity":92.5} | json   | a few seconds ago |
| Data  | {"Temperature":3.1,"Humidity":61.5}  | json   | a few seconds ago |
| Data  | {"Temperature":3.1,"Humidity":61.5}  | json   | a few seconds ago |
| Data  | {"Temperature":3.1,"Humidity":61.5}  | json   | a minute ago      |
| Data  | {"Temperature":3.1,"Humidity":61.5}  | json   | a minute ago      |

0 Simulations running

> ☐ iot\_device\_1 🔴 Disconnected iot\_device