SPRINT-4

PROJECT	INDUSTRY-SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM
TEAM ID	PNT2022TMDI12767

PROGRAM:

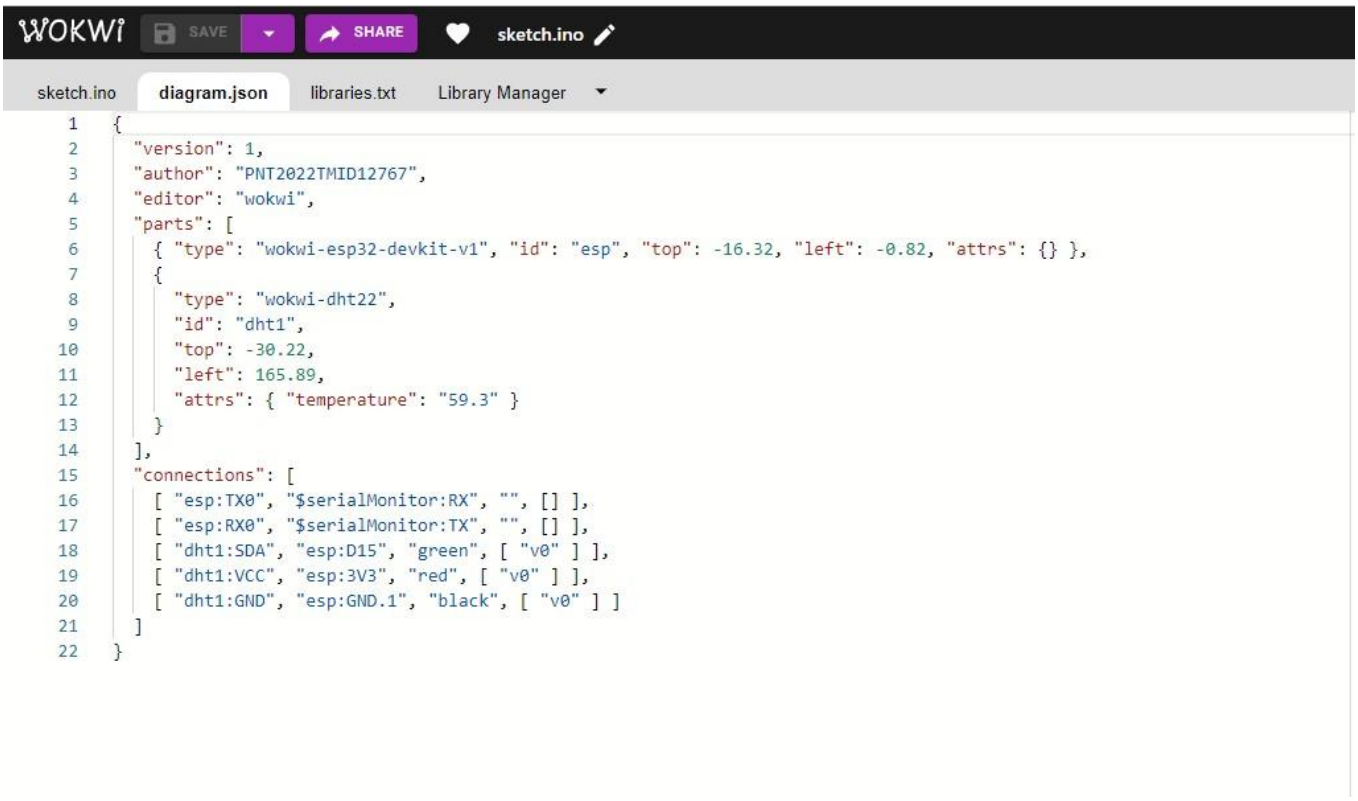
```
#include "DHTesp.h"
#include <cstdlib>
#include <time.h>

const int DHT_PIN = 15;

bool is_exhaust_fan_on = false;
bool is_sprinkler_on = false;

float temperature = 0;

int gas_ppm = 0;
int flame = 0;
int flow = 0;

String flame_status = "";
String accident_status = "";
String sprinkler_status = "";

DHTesp dhtSensor;


void setup() {
  Serial.begin(99900);

  /**** sensor pin setups ****/
  dhtSensor.setup(DHT_PIN, DHTesp::DHT22);
  //if real gas sensor is used make sure the senor is heated up for
acurate readings
  /*
    - Here random values for readings and stdout were used to show the
      working of the devices as physical or simulated devices are not
      available.
```

```
  */
}

void loop() {

  TempAndHumidity  data = dhtSensor.getTempAndHumidity();

  //setting a random seed
  srand(time(0));

  //initial variable activities like declaring , assigning
  temperature  = data.temperature;
  gas_ppm = rand()%1000;
  int flamereading = rand()%1024;
  flame = map(flamereading,0,1024,0,1024);
  int flamerange = map(flamereading,0,1024,0,3);
  int flow = ((rand()%100)>50?1:0);

  //set a flame status based on how close it is.....
  switch (flamerange) {
  case 2:    // A fire closer than 1.5 feet away.
    flame_status = "Close Fire";
    break;
  case 1:    // A fire between 1-3 feet away.
    flame_status = "Distant Fire";
    break;
  case 0:    // No fire detected.
    flame_status = "No Fire";
    break;
  }

  //toggle the fan according to gas in ppm in the room
  if(gas_ppm > 100){
    is_exhaust_fan_on = true;
  }
  else{
    is_exhaust_fan_on = false;
  }

  //find the accident status 'cause fake alert may be caused by some
mischief activities
```

```
  if(temperature < 40 && flamerange ==2){
    accident_status = "need auditing";
    is_sprinkler_on = false;
  }
  else if(temperature < 40 && flamerange ==0){
    accident_status = "nothing found";
    is_sprinkler_on = false;
  }
  else if(temperature > 50 && flamerange == 1){
    is_sprinkler_on = true;
    accident_status = "moderate";
  }
  else if(temperature > 55 && flamerange == 2){
    is_sprinkler_on = true;
    accident_status = "severe";
  }else{
    is_sprinkler_on = false;
    accident_status = "nil";
  }


  //send the sprinkler status
  if(is_sprinkler_on){
    if(flow){
      sprinkler_status = "working";
    }
    else{
      sprinkler_status = "not working";
    }
  }
  else if(is_sprinkler_on == false){
    sprinkler_status = "now it shouldn't";
  }
  else{
    sprinkler_status = "something's wrong";
  }

  //Obivously the output.It is like json format 'cause it will help us
for future sprints
  String out = "{\n\t\"senor_values\":{";
  out+="\n\t\t\"gas_ppm\":"+String(gas_ppm)+",";
```

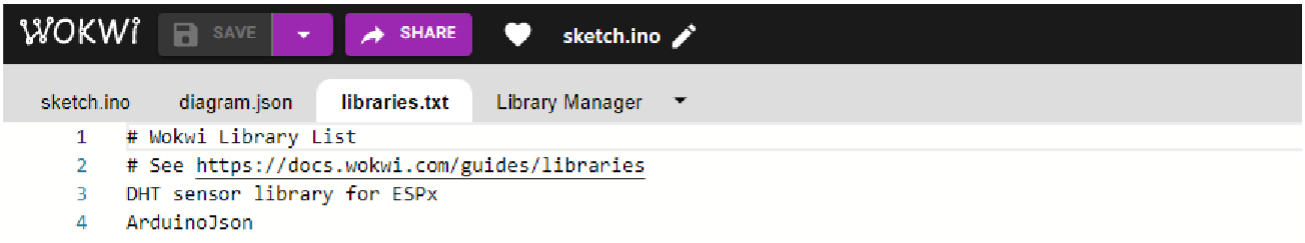
```
  out+="\n\t\t\"temperature\":"+String(temperature,2)+",";
  out+="\n\t\t\"flame\":"+String(flame)+",";
  out+="\n\t\t\"flow\":"+String(flow)+",\n\t}";
  out+="\n\t\"output\":{";

out+="\n\t\t\"is_exhaust_fan_on\":"+String((is_exhaust_fan_on)?"true":
"false")+",";

out+="\n\t\t\"is_sprinkler_on\":"+String((is_sprinkler_on)?"true":"fal
se")+",";
  out+="\n\t}";
  out+="\n\t\"messages\":{";
  out+="\n\t\t\"fire_status\":"+flame_status+",";
  out+="\n\t\t\"flow_status\":"+sprinkler_status+",";
  out+="\n\t\t\"accident_status\":"+accident_status+",";
  out+="\n\t}";
  out+="\n}";
  Serial.println(out);

  delay(1000);
}
```

DIAGRAM.JSON:



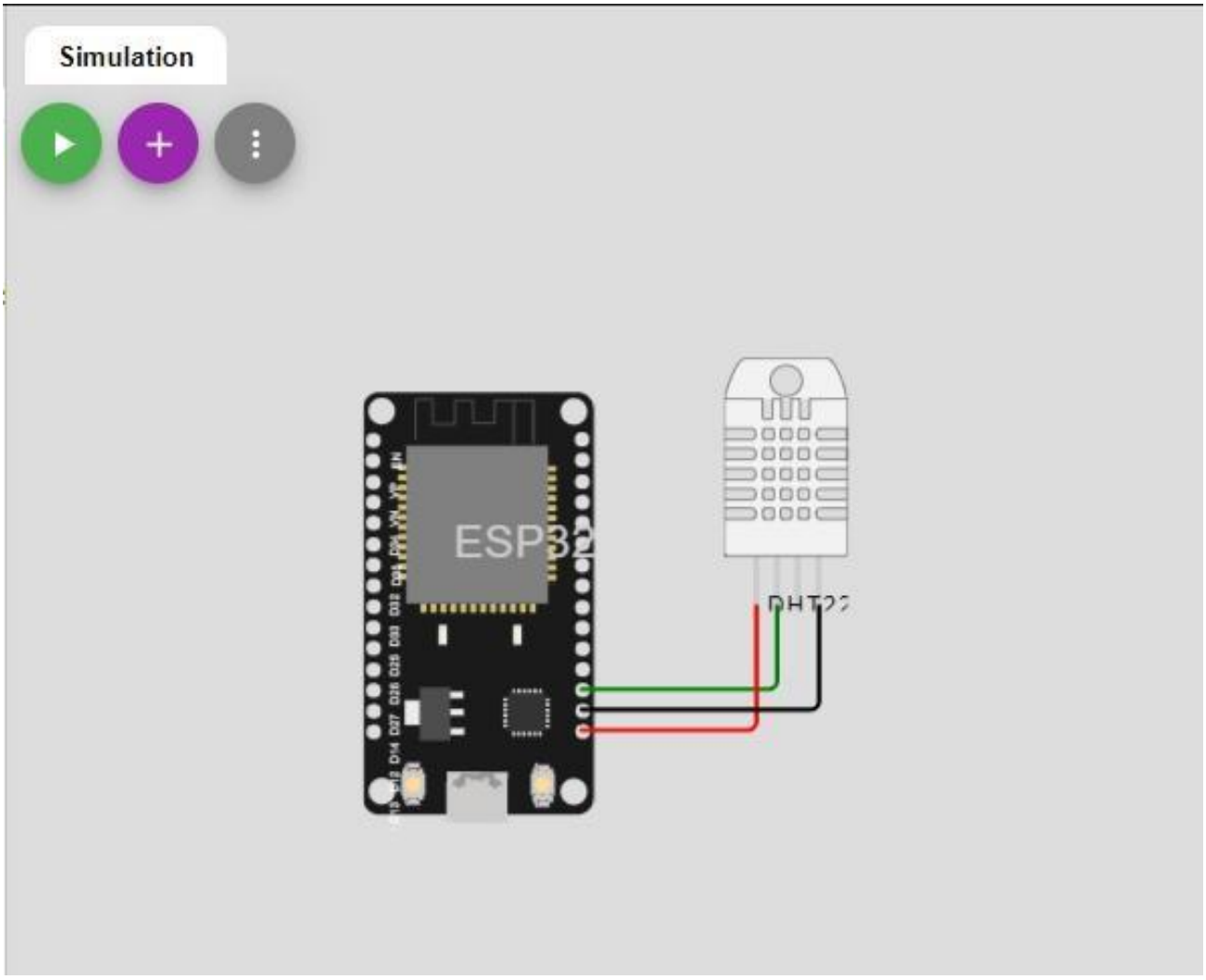

```
{
  "version": 1,
  "author": "PNT2022TMID12767",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -16.32, "left": -0.82, "attrs": {} },
    {
      "type": "wokwi-dht22",
      "id": "dht1",
      "top": -30.22,
      "left": 165.89,
      "attrs": { "temperature": "59.3" }
    }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "dht1:SDA", "esp:D15", "green", [ "v0" ] ],
    [ "dht1:VCC", "esp:3V3", "red", [ "v0" ] ],
    [ "dht1:GND", "esp:GND.1", "black", [ "v0" ] ]
  ]
}
```

LIBRARIES TEXT:




```
# Wokwi Library List
# See https://docs.wokwi.com/guides/libraries
DHT sensor library for ESPx
ArduinoJson
```

CIRCUIT:



OUTPUT:

WOKWI_LINK:

https://wokwi.com/projects/348466469273600595

TESTCASES & OUTPUT

SL.NO	INPUT	OUTPUT	RESULT
01.	Gas:933 Temperature:59.30 Flame:207	Exhaust fan on:TRUE Sprinklers:OFF	Passed
02.	Gas:437 Temperature:59.30 Flame:693	Exhaust fan on:TRUE Sprinklers:OFF	Passed
03.	Gas:218 Temperature:59.30 Flame:369	Exhaust fan on:TRUE Sprinklers:ON	Passed
04.	Gas:2503 Temperature:59.30Fla me:531	Exhaust fan on:TRUE Sprinklers:ON	Passed
05.	Gas:437 Temperature:59.30 Flame:693	Exhaust fan on:TRUE Sprinklers:ON	Passed
06.	Gas:722 Temperature:59.30 Flame:855	Exhaust fan on:TRUE Sprinklers:ON	Passed
07.	Gas:7 Temperature:59.30 Flame:1017	Exhaust fan on:FALSE Sprinklers:ON	Passed
08.	Gas:941 Temperature:59.30 Flame:155	Exhaust fan on:TRUE Sprinklers:OFF	Passed
09.	Gas:226 Temperature: 59.30 Flame:317	Exhaust fan on:TRUE Sprinklers:OFF	Passed
10.	Gas:511 Temperature:59.30 Flame:479	Exhaust fan on:TRUE Sprinklers:ON	Passed
11.	Gas:444 Temperature:59.30 Flame:641	Exhaust fan on:TRUE Sprinklers:ON	Passed

ibm.py - C:/Python/Python3.11/ibm.py (3.11.0)

File Edit Format Run Options Window Help

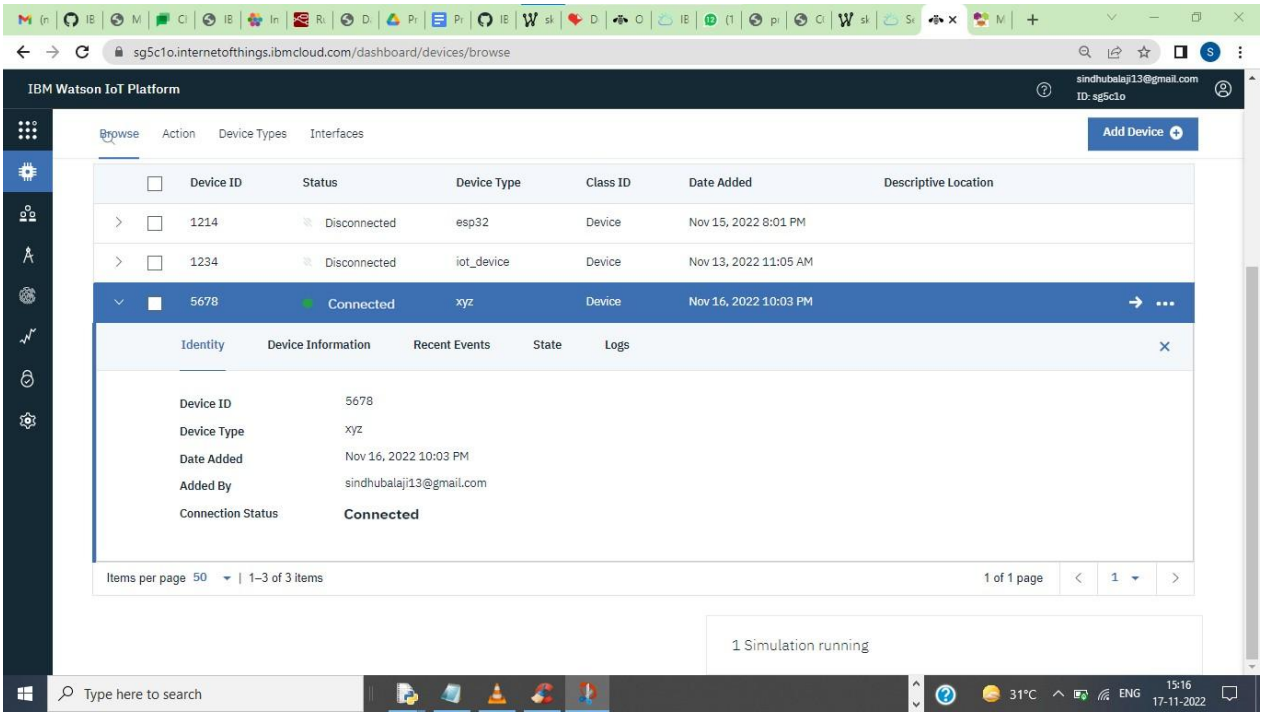
```
#IBM Watson IOT platform
import wiotp.sdk.device
import time
import random
myConfig={
    "identity": {
        "orgId":"sg5c1o",
        "typeId":"xyz",
        "deviceId":"5678"
        },
    "auth": {
        "token":"567891011"
        }
    }
def myCommandCallback(cmd):
    print("Message received from IBM IOT Platform: %s" % cmd.data['command'])
    m=cmd.data['command']
    client=wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=none)
    client.connect()
    while True:
        temp=random.randint(-20,125)
        hum=random.randint(0,100)
        myData={'temperature':temp,'humidity':hum}
        client.publishEvent(eventId="status",msgFormat="json",data=myData,qos=0,onPublish=None)
        print("Published data Successfully: %s", mydata)
        client.commandCallback=myCommandCallback
        time.sleep(2)
        client.disconnect()
```

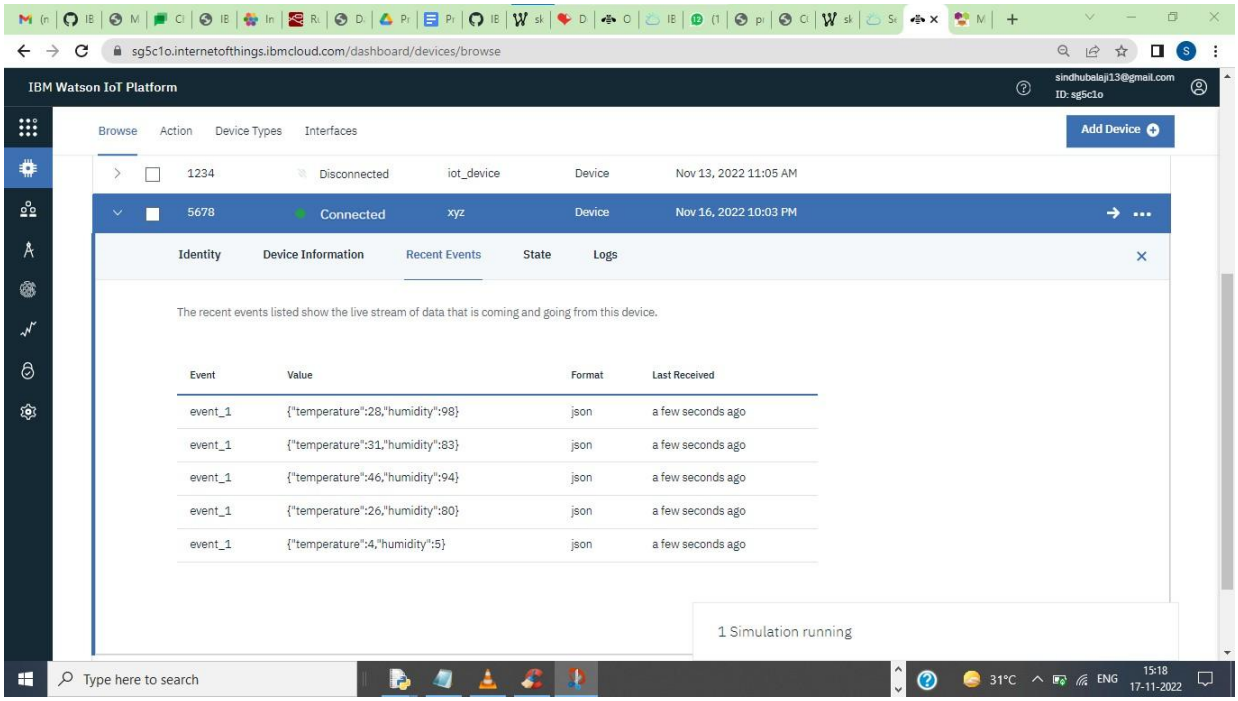
Ln: 12 Col: 27

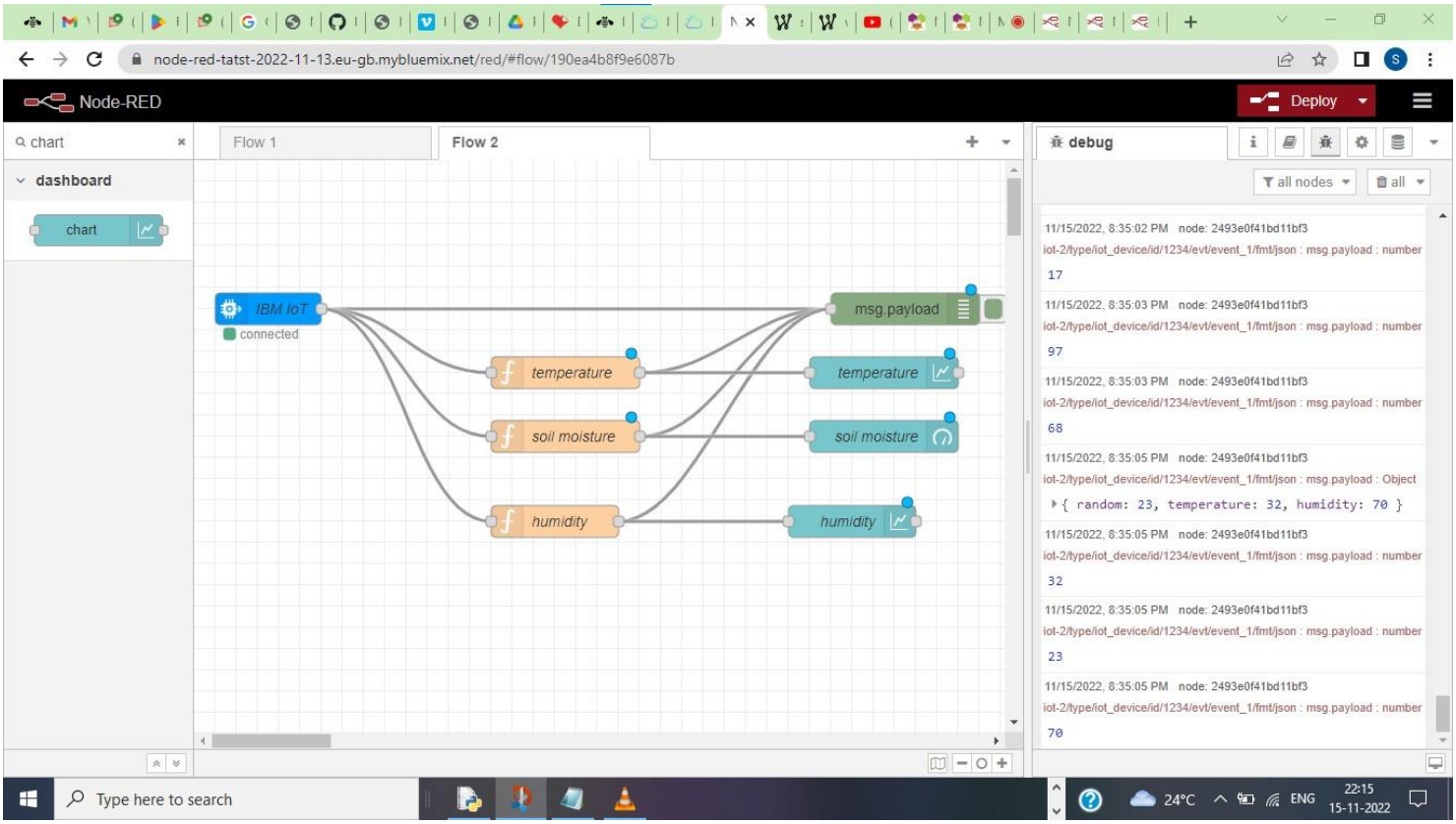
IDLE Shell 3.11.0

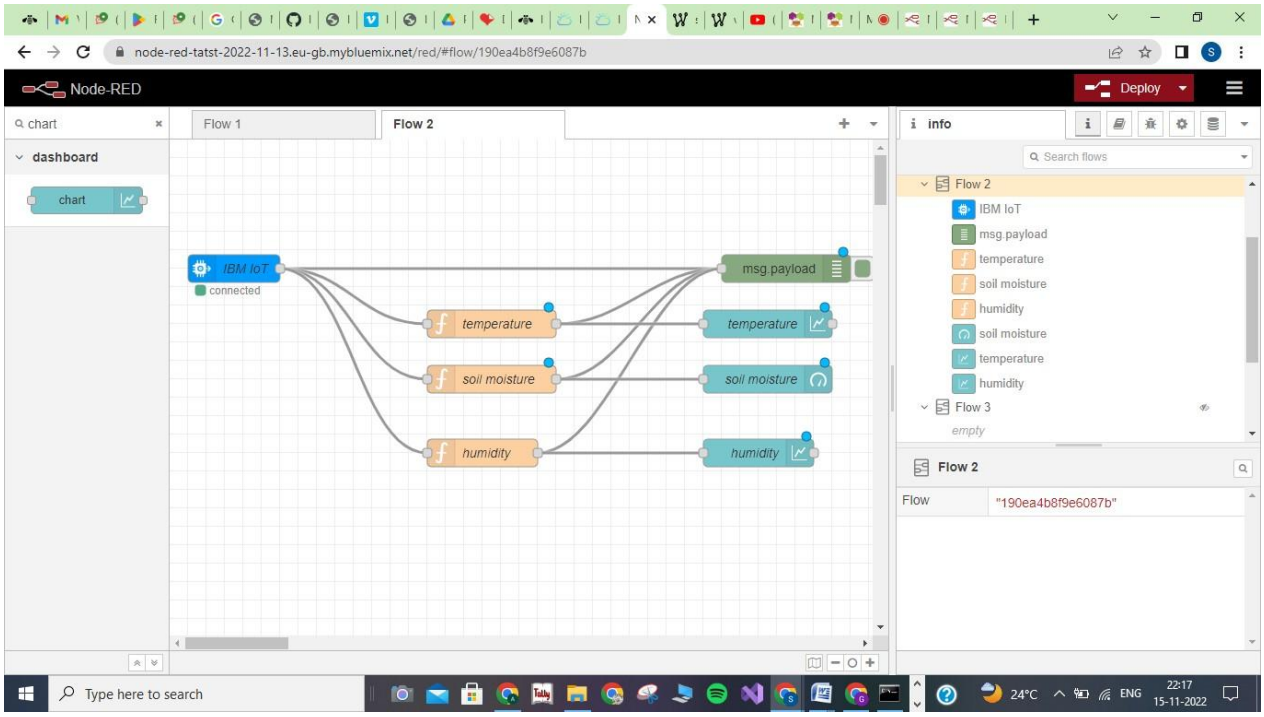
File Edit Shell Debug Options Window Help

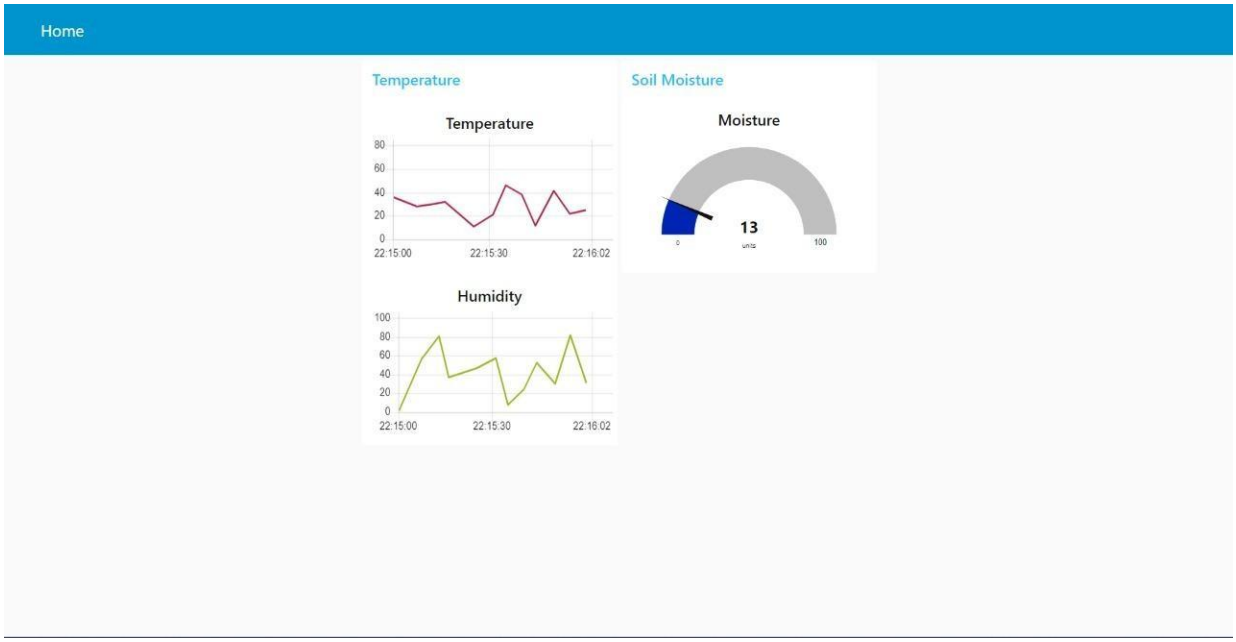
```
Python 3.11.0 (main, Oct 24 2022, 18:26:48) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:/Python/Python311/2.py ==========
2022-11-15 18:27:44,495   wiotp.sdk.device.client.DeviceClient  INFO
  successfully: d:s8ovlq:abcd:12345Published data Successfully: %s
 {'temperature': 54, 'humidity': 51}
Published data Successfully: %s {'temperature': 34, 'humidity': 53}
Published data Successfully: %s {'temperature': 29, 'humidity': 53}
Published data Successfully: %s {'temperature': 102, 'humidity': 54}
Published data Successfully: %s {'temperature': -3, 'humidity': 62}
Published data Successfully: %s {'temperature': 85, 'humidity': 92}
Published data Successfully: %s {'temperature': 33, 'humidity': 7}
Published data Successfully: %s {'temperature': 20, 'humidity': 74}
Published data Successfully: %s {'temperature': -5, 'humidity': 5}
Published data Successfully: %s {'temperature': 112, 'humidity': 81}
Published data Successfully: %s {'temperature': 58, 'humidity': 5}
Published data Successfully: %s {'temperature': 53, 'humidity': 99}
Published data Successfully: %s {'temperature': 48, 'humidity': 40}
>>>
```

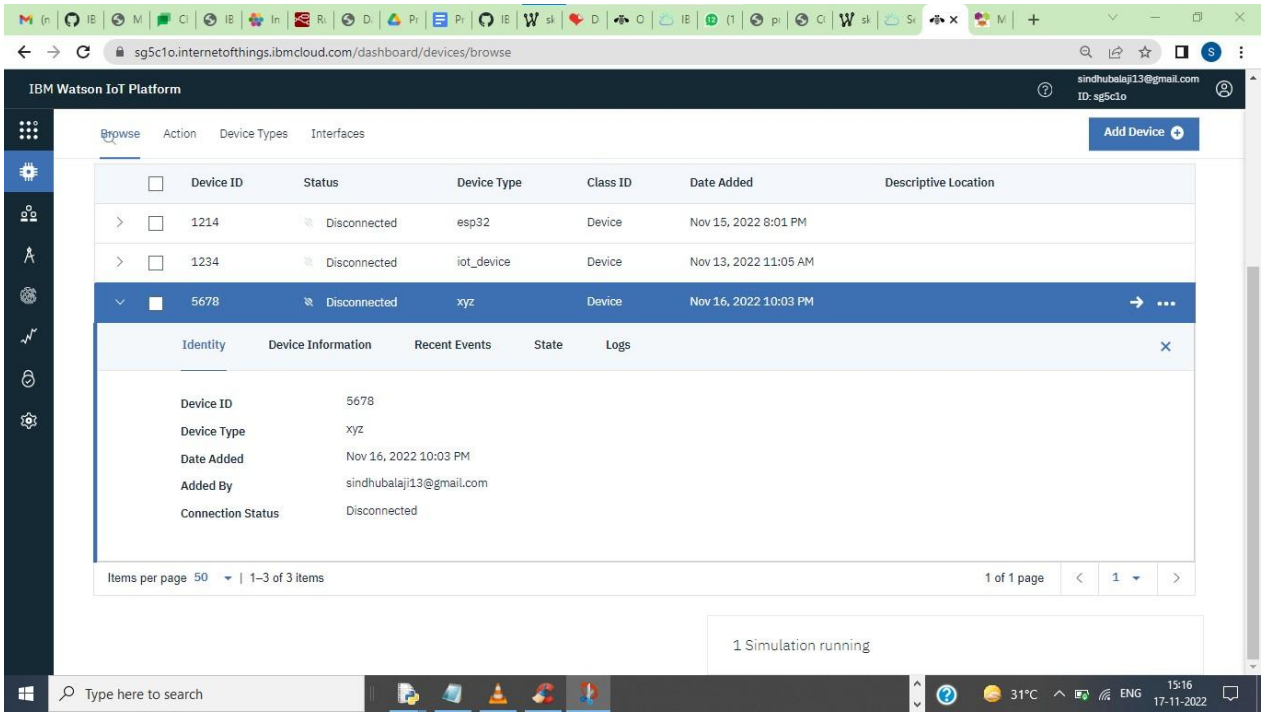

sg5c1o.internetofthings.ibmcloud.com/dashboard/devices/browse
IBM Watson IoT Platform
sindhubalaji13@gmail.com
ID: sg5c1o
Browse
Action
Device Types
Interfaces
Add Device
Device ID
Status
Device Type
Class ID
Date Added
Descriptive Location
1214
Disconnected
esp32
Device
Nov 15, 2022 8:01 PM
1234
Disconnected
iot_device
Device
Nov 13, 2022 11:05 AM
5678
Connected
xyz
Device
Nov 16, 2022 10:03 PM
Identity
Device Information
Recent Events
State
Logs
Device ID
5678
Device Type
xyz
Date Added
Nov 16, 2022 10:03 PM
Added By
sindhubalaji13@gmail.com
Connection Status
Connected
Items per page 50
1–3 of 3 items
1 of 1 page
1
1 Simulation running
Type here to search
31°C
ENG
15:16
17-11-2022

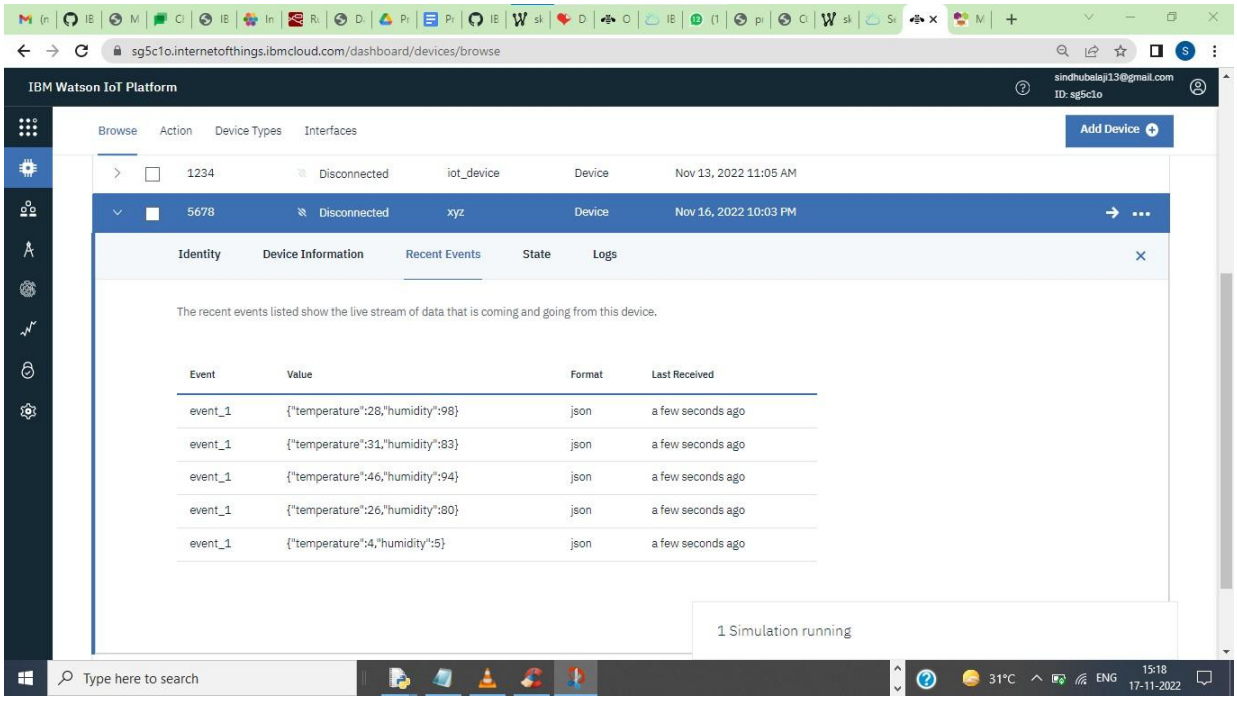

sg5c1o.internetofthings.ibmcloud.com/dashboard/devices/browse
IBM Watson IoT Platform
sindhubalaji13@gmail.com
ID: sg5c1o
Browse
Action
Device Types
Interfaces
Add Device
1234
Disconnected
iot_device
Device
Nov 13, 2022 11:05 AM
5678
Connected
xyz
Device
Nov 16, 2022 10:03 PM
Identity
Device Information
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
event_1
{"temperature":28,"humidity":98}
json
a few seconds ago
event_1
{"temperature":31,"humidity":83}
json
a few seconds ago
event_1
{"temperature":46,"humidity":94}
json
a few seconds ago
event_1
{"temperature":26,"humidity":80}
json
a few seconds ago
event_1
{"temperature":4,"humidity":5}
json
a few seconds ago
1 Simulation running
Type here to search
31°C
ENG
15:18
17-11-2022


node-red-tatst-2022-11-13.eu-gb.mybluemix.net/red/#flow/190ea4b8f9e6087b
Node-RED
Deploy
chart
dashboard
chart
Flow 1
Flow 2
IBM IoT
connected
temperature
soil moisture
humidity
msg.payload
temperature
soil moisture
humidity
debug
all nodes
all
11/15/2022, 8:35:02 PM node: 2493e0f41bd11bf3
iot-2/type/iot_device/id/1234/evt/event_1/fmt/json : msg.payload : number
17
11/15/2022, 8:35:03 PM node: 2493e0f41bd11bf3
iot-2/type/iot_device/id/1234/evt/event_1/fmt/json : msg.payload : number
97
11/15/2022, 8:35:03 PM node: 2493e0f41bd11bf3
iot-2/type/iot_device/id/1234/evt/event_1/fmt/json : msg.payload : number
68
11/15/2022, 8:35:05 PM node: 2493e0f41bd11bf3
iot-2/type/iot_device/id/1234/evt/event_1/fmt/json : msg.payload : Object
{ random: 23, temperature: 32, humidity: 70 }
11/15/2022, 8:35:05 PM node: 2493e0f41bd11bf3
iot-2/type/iot_device/id/1234/evt/event_1/fmt/json : msg.payload : number
32
11/15/2022, 8:35:05 PM node: 2493e0f41bd11bf3
iot-2/type/iot_device/id/1234/evt/event_1/fmt/json : msg.payload : number
23
11/15/2022, 8:35:05 PM node: 2493e0f41bd11bf3
iot-2/type/iot_device/id/1234/evt/event_1/fmt/json : msg.payload : number
70
Type here to search
24°C
ENG
22:15
15-11-2022


node-red-tatst-2022-11-13.eu-gb.mybluemix.net/red/#flow/190ea4b8f9e6087b
Node-RED
Deploy
chart
dashboard
chart
Flow 1
Flow 2
info
Search flows
Flow 2
IBM IoT
msg.payload
temperature
soil moisture
humidity
soil moisture
temperature
humidity
Flow 3
empty
IBM IoT
connected
temperature
soil moisture
humidity
msg.payload
temperature
soil moisture
humidity
Flow 2
Flow
"190ea4b8f9e6087b"
Type here to search
24°C
ENG
22:17
15-11-2022


Home
Temperature
Temperature
80
60
40
20
0
22:15:00
22:15:30
22:16:02
Humidity
100
80
60
40
20
0
22:15:00
22:15:30
22:16:02
Soil Moisture
Moisture
13
0
100


sg5c1o.internetofthings.ibmcloud.com/dashboard/devices/browse
IBM Watson IoT Platform
sindhubalaji13@gmail.com
ID: sg5c1o
Browse
Action
Device Types
Interfaces
Add Device
Device ID
Status
Device Type
Class ID
Date Added
Descriptive Location
1214
Disconnected
esp32
Device
Nov 15, 2022 8:01 PM
1234
Disconnected
iot_device
Device
Nov 13, 2022 11:05 AM
5678
Disconnected
xyz
Device
Nov 16, 2022 10:03 PM
Identity
Device Information
Recent Events
State
Logs
Device ID
5678
Device Type
xyz
Date Added
Nov 16, 2022 10:03 PM
Added By
sindhubalaji13@gmail.com
Connection Status
Disconnected
Items per page 50
1–3 of 3 items
1 of 1 page
1
1 Simulation running
Type here to search
31°C
ENG
15:16
17-11-2022


sg5c1o.internetofthings.ibmcloud.com/dashboard/devices/browse
IBM Watson IoT Platform
sindhubalaji13@gmail.com
ID: sg5c1o
Browse
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1234
Disconnected
iot_device
Device
Nov 13, 2022 11:05 AM
5678
Disconnected
xyz
Device
Nov 16, 2022 10:03 PM
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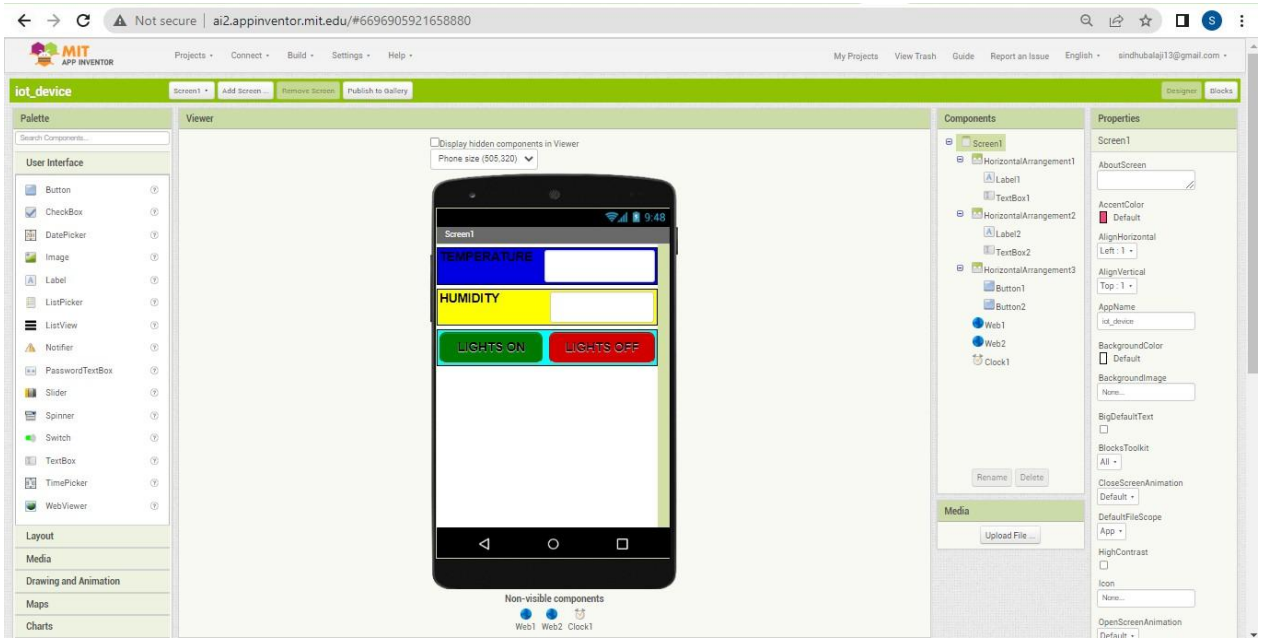
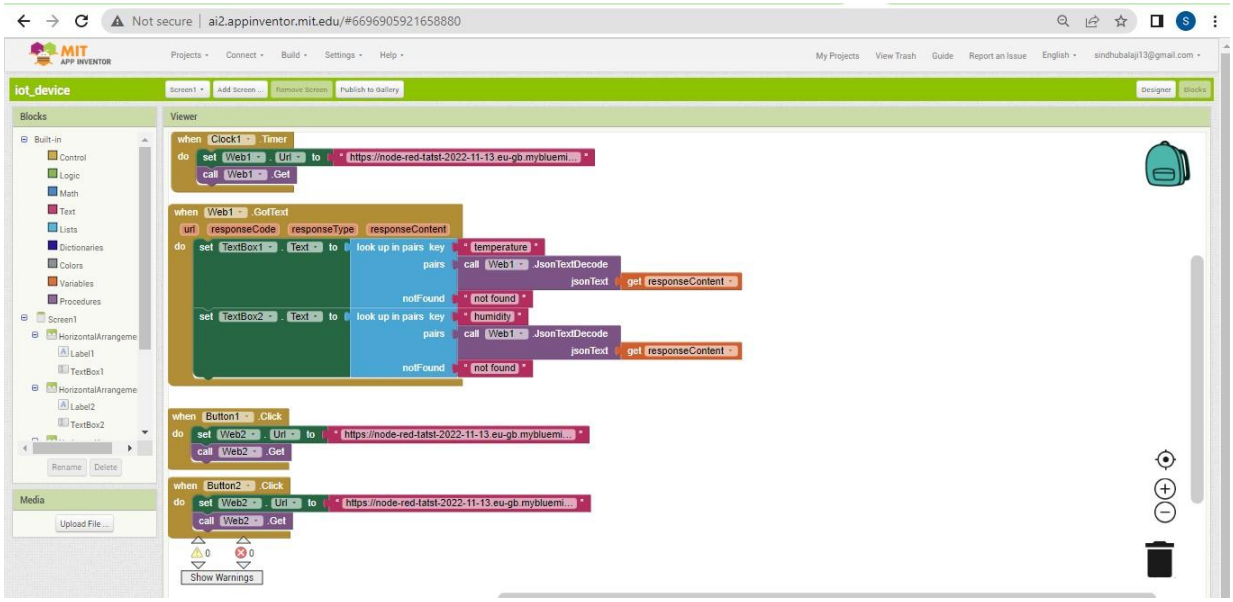
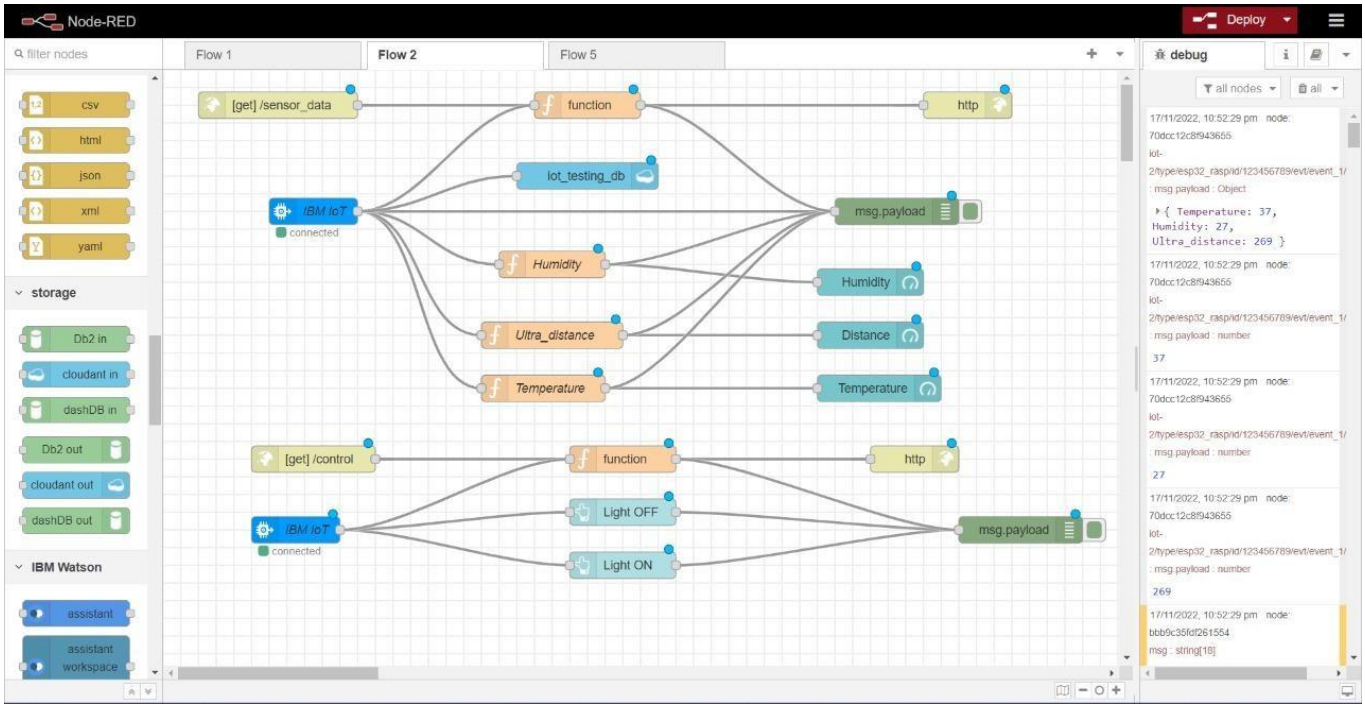
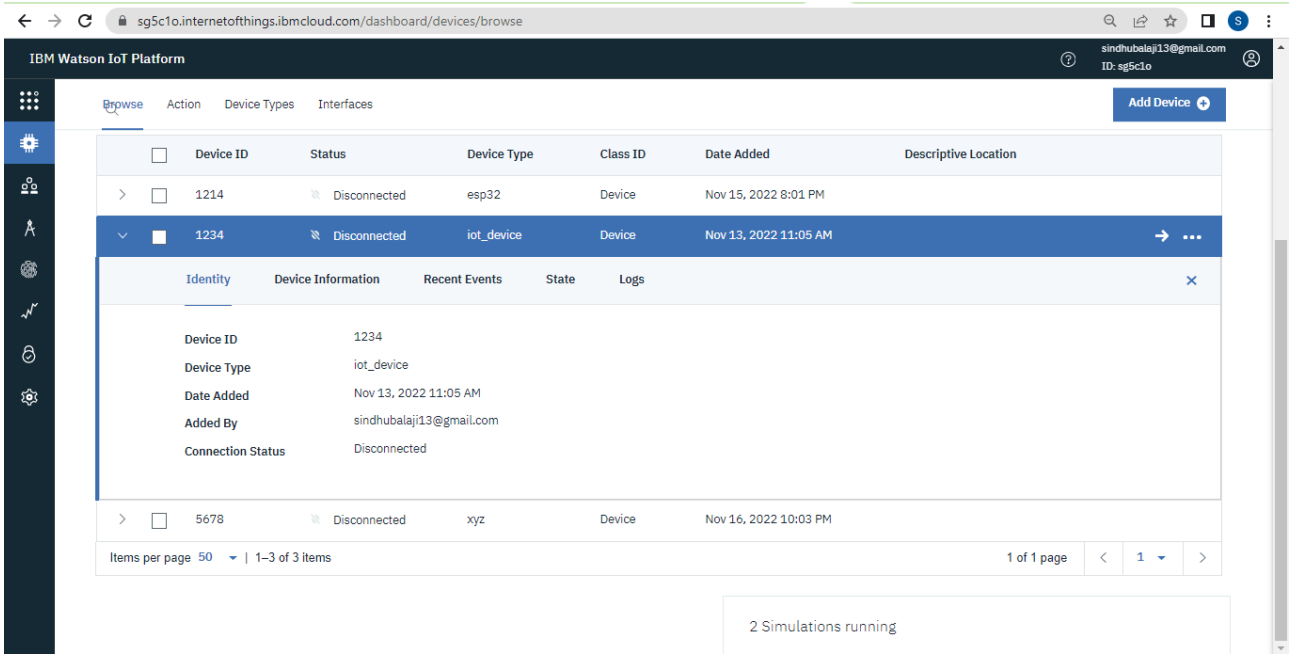
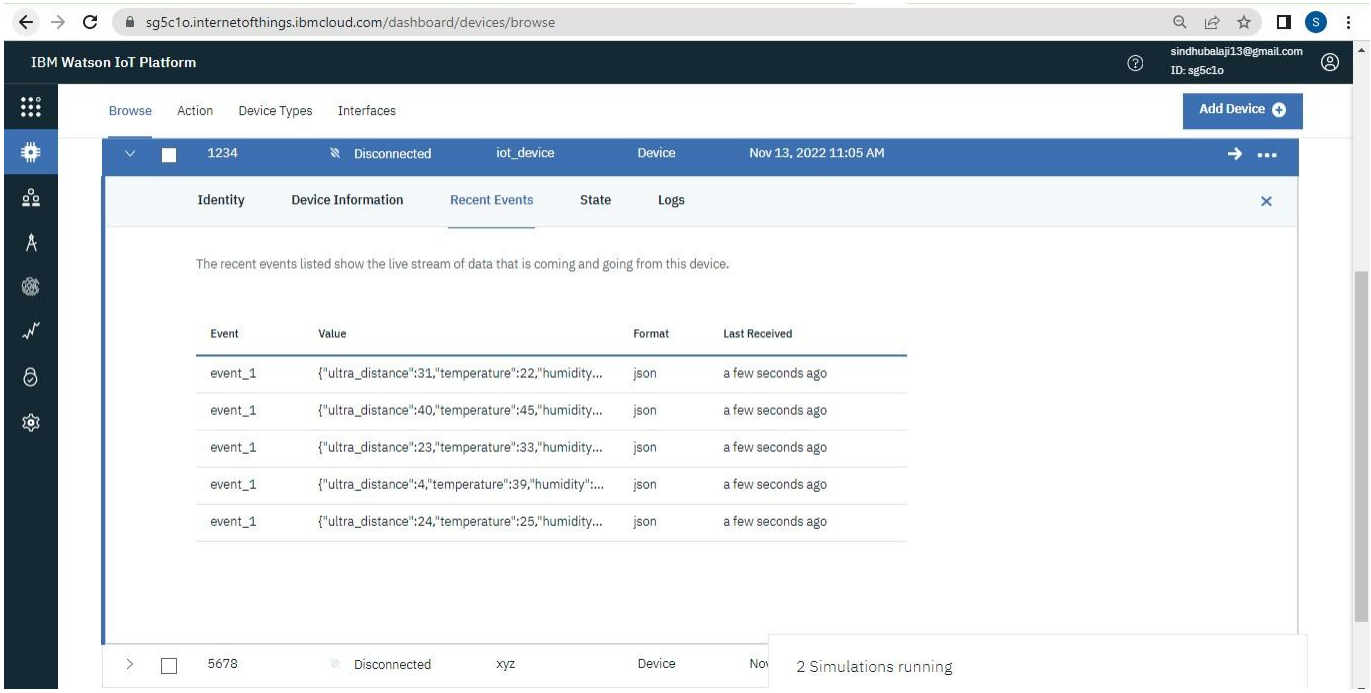
json
a few seconds ago
event_1
{"temperature":31,"humidity":83}
json
a few seconds ago
event_1
{"temperature":46,"humidity":94}
json
a few seconds ago
event_1
{"temperature":26,"humidity":80}
json
a few seconds ago
event_1
{"temperature":4,"humidity":5}
json
a few seconds ago
1 Simulation running
Type here to search
31°C
ENG
15:18
17-11-2022

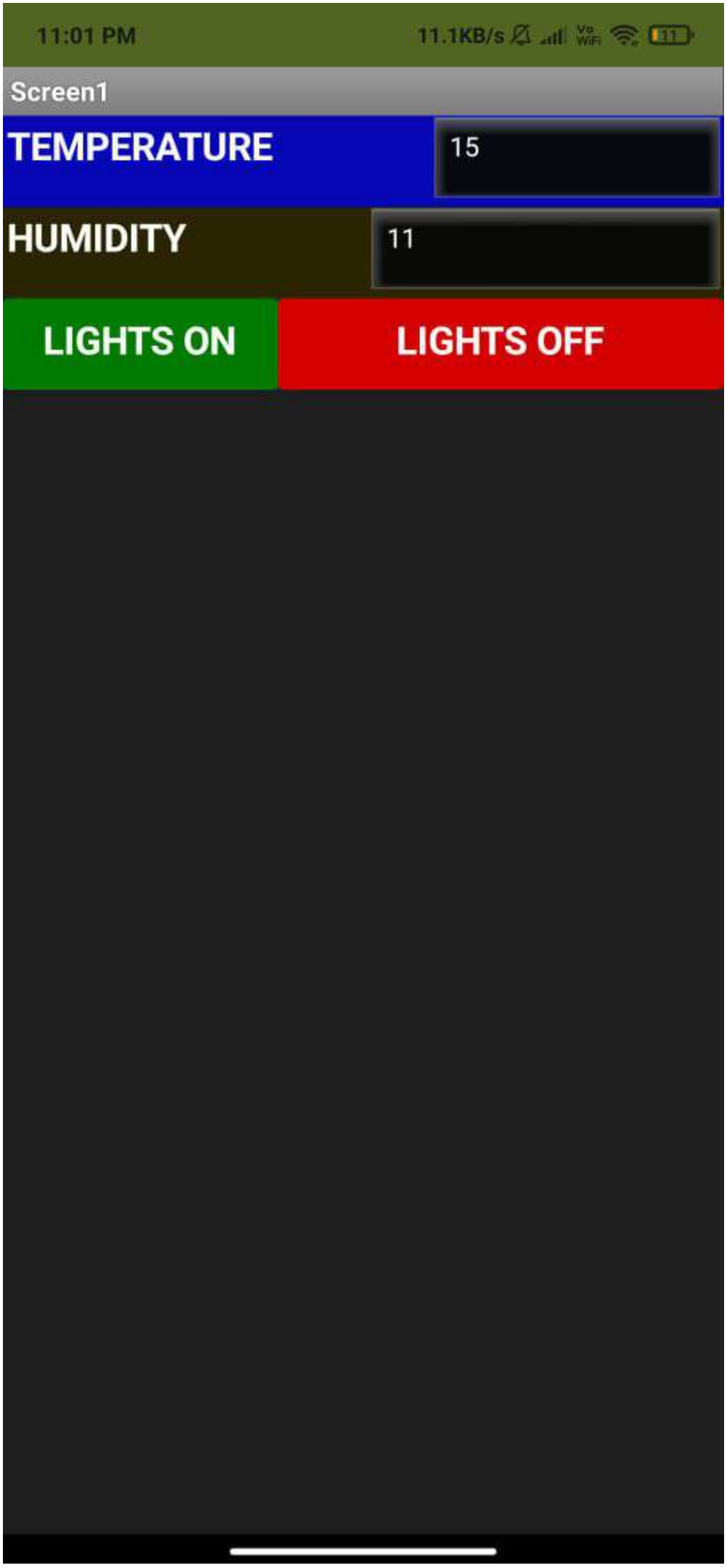

Not secure | ai2.appinventor.mit.edu/#6696905921658880
MIT APP INVENTOR
Projects
Connect
Build
Settings
Help
My Projects
View Trash
Guide
Report an Issue
English
sindhubalaji13@gmail.com
iot_device
Screen1
Add Screen ...
Remove Screen
Publish to Gallery
Designer
Blocks
Palette
Search Components...
User Interface
Button
CheckBox
DatePicker
Image
Label
ListPicker
ListView
Notifier
PasswordTextBox
Slider
Spinner
Switch
TextBox
TimePicker
WebViewer
Layout
Media
Drawing and Animation
Maps
Charts
Viewer
Display hidden components in Viewer
Phone size (505,320)
9:48
Screen1
TEMPERATURE
HUMIDITY
LIGHTS ON
LIGHTS OFF
Non-visible components
Web1
Web2
Clock1
Components
Screen1
HorizontalArrangement1
Label1
TextBox1
HorizontalArrangement2
Label2
TextBox2
HorizontalArrangement3
Button1
Button2
Web1
Web2
Clock1
Rename
Delete
Media
Upload File ...
Properties
Screen1
AboutScreen
AccentColor
Default
AlignHorizontal
Left : 1
AlignVertical
Top : 1
AppName
iot_device
BackgroundColor
Default
BackgroundImage
None...
BigDefaultText
BlocksToolkit
All
CloseScreenAnimation
Default
DefaultFileScope
App
HighContrast
Icon
None...
OpenScreenAnimation
Default


Not secure | ai2.appinventor.mit.edu/#6696905921658880
MIT APP INVENTOR
Projects
Connect
Build
Settings
Help
My Projects
View Trash
Guide
Report an Issue
English
sindhubalaji13@gmail.com
iot_device
Screen1
Add Screen ...
Remove Screen
Publish to Gallery
Designer
Blocks
Blocks
Built-in
Control
Logic
Math
Text
Lists
Dictionaries
Colors
Variables
Procedures
Screen1
HorizontalArrangeme
Label1
TextBox1
HorizontalArrangeme
Label2
TextBox2
Rename
Delete
Media
Upload File ...
Viewer
when Clock1 .Timer
do set Web1 . Url to https://node-red-tatst-2022-11-13.eu-gb.mybluemi...
call Web1 .Get
when Web1 .GotText
url responseCode responseType responseContent
do set TextBox1 . Text to look up in pairs key temperature
pairs call Web1 .JsonTextDecode
jsonText get responseContent
notFound not found
set TextBox2 . Text to look up in pairs key humidity
pairs call Web1 .JsonTextDecode
jsonText get responseContent
notFound not found
when Button1 .Click
do set Web2 . Url to https://node-red-tatst-2022-11-13.eu-gb.mybluemi...
call Web2 .Get
when Button2 .Click
do set Web2 . Url to https://node-red-tatst-2022-11-13.eu-gb.mybluemi...
call Web2 .Get
0
0
Show Warnings


Node-RED
Deploy
filter nodes
Flow 1
Flow 2
Flow 5
debug
all nodes
csv
html
json
xml
yaml
storage
Db2 in
cloudant in
dashDB in
Db2 out
cloudant out
dashDB out
IBM Watson
assistant
assistant workspace
[get] /sensor_data
function
http
iot_testing_db
IBM IoT
connected
msg.payload
Humidity
Ultra_distance
Distance
Temperature
[get] /control
Light OFF
Light ON
{ Temperature: 37,
Humidity: 27,
Ultra_distance: 269 }


sg5c1o.internetofthings.ibmcloud.com/dashboard/devices/browse
IBM Watson IoT Platform
sindhubalaji13@gmail.com
ID: sg5c1o
Browse
Action
Device Types
Interfaces
Add Device
Device ID
Status
Device Type
Class ID
Date Added
Descriptive Location
1214
Disconnected
esp32
Device
Nov 15, 2022 8:01 PM
1234
Disconnected
iot_device
Device
Nov 13, 2022 11:05 AM
Identity
Device Information
Recent Events
State
Logs
Device ID
1234
Device Type
iot_device
Date Added
Nov 13, 2022 11:05 AM
Added By
sindhubalaji13@gmail.com
Connection Status
Disconnected
5678
Disconnected
xyz
Device
Nov 16, 2022 10:03 PM
Items per page 50
1–3 of 3 items
1 of 1 page
2 Simulations running


sg5c1o.internetofthings.ibmcloud.com/dashboard/devices/browse
IBM Watson IoT Platform
sindhubalaji13@gmail.com
ID: sg5c1o
Browse
Action
Device Types
Interfaces
Add Device
1234
Disconnected
iot_device
Device
Nov 13, 2022 11:05 AM
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
event_1
{"ultra_distance":31,"temperature":22,"humidity...
json
a few seconds ago
event_1
{"ultra_distance":40,"temperature":45,"humidity...
json
a few seconds ago
event_1
{"ultra_distance":23,"temperature":33,"humidity...
json
a few seconds ago
event_1
{"ultra_distance":4,"temperature":39,"humidity":...
json
a few seconds ago
event_1
{"ultra_distance":24,"temperature":25,"humidity...
json
a few seconds ago
5678
Disconnected
xyz
Device
2 Simulations running


11:01 PM
11.1KB/s
Screen1
TEMPERATURE
15
HUMIDITY
11
LIGHTS ON
LIGHTS OFF