ASSIGNMENT 2

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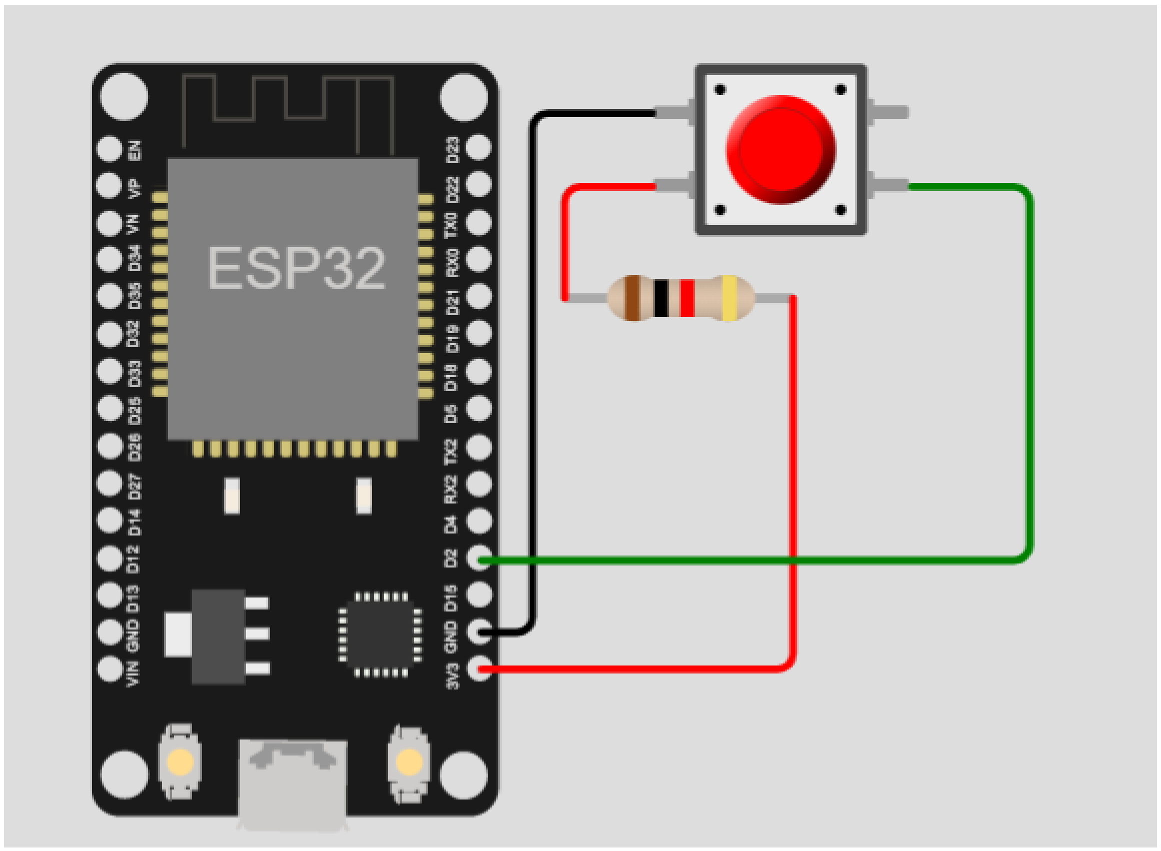
WOKWI AND IBM CLOUD

Aim: To construct a circuit with push button using WOKWI and send the data (1s and 0s) to IBM cloud

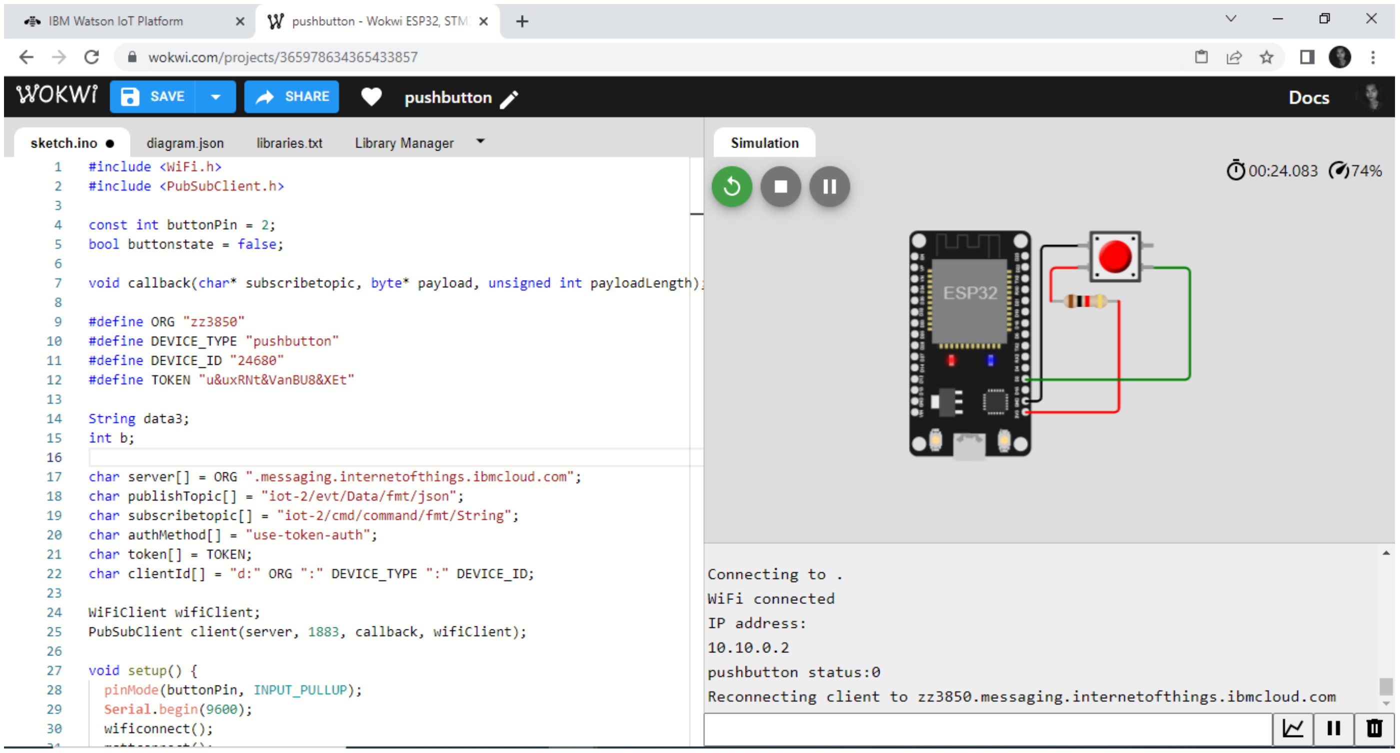
Software required: WOKWI , IBM WATSON IoT

Components Required: ESP32, 1K Resistor, Push button, Connecting wires

Circuit Diagram:

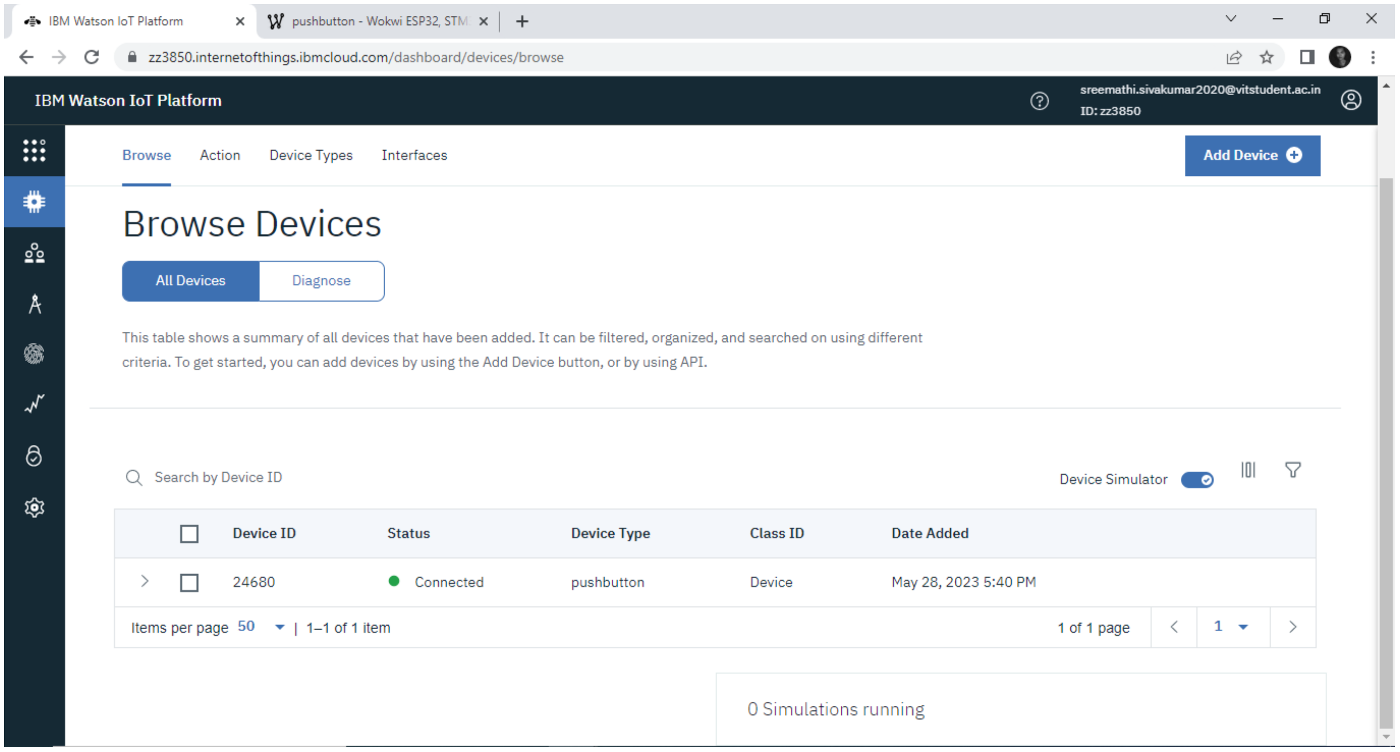


Simulation:



```
#include <WiFi.h>
#include <PubSubClient.h>

const int buttonPin = 2;
bool buttonstate = false;

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

#define ORG "zz3850"
#define DEVICE_TYPE "pushbutton"
#define DEVICE_ID "24680"
#define TOKEN "u&uxRNt&VanBU8&XEt"

String data3;
int b;

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/command/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

WiFiClient wifiClient;
PubSubClient client(server, 1883, callback, wifiClient);

void setup() {
  pinMode(buttonPin, INPUT_PULLUP);
  Serial.begin(9600);
  wificonnect();
```

```
Connecting to .
WiFi connected
IP address:
10.10.0.2
pushbutton status:0
Reconnecting client to zz3850.messaging.internetofthings.ibmcloud.com
```



Browse Devices

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Device ID	Status	Device Type	Class ID	Date Added
24680	● Connected	pushbutton	Device	May 28, 2023 5:40 PM

Items per page 50 | 1–1 of 1 item   1 of 1 page   1

0 Simulations running

Procedure:

1. Place the "ESP32 Devkit" board component on the breadboard.
2. Place the push button component on the breadboard.
3. Connect the push button's left pin to one leg of the 1K resistor.
4. Connect the other leg of the resistor to the ESP32's 3V3 pin.
5. Connect the push button's left pin to the ESP32's GND pin.
6. Connect the push button's right pin to the ESP32's D2 pin.
7. Write the necessary code
8. Create a new device in IBM IoT and give the device details in the code
9. Run the simulation

Code :

```
#include <WiFi.h>
#include <PubSubClient.h>

const int buttonPin = 2;
bool buttonstate = false;

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

#define ORG "zz3850"
#define DEVICE_TYPE "pushbutton"
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#define TOKEN "u&uxRNt&VanBU8&XEt"

String data3;
int b;

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/command/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

WiFiClient wifiClient;
PubSubClient client(server, 1883, callback, wifiClient);

void setup() {
  pinMode(buttonPin, INPUT_PULLUP);
  Serial.begin(9600);
  wificonnect();
  mqttconnect();
}

void loop() {
  buttonstate = digitalRead(buttonPin);
  if (buttonstate == LOW) {
    b = 1;
  } else {
    b = 0;
  }

  wificonnect();

  Serial.print("pushbutton status:");
  Serial.println(b);

  PublishData(b);
  delay(1000);

  if (!client.loop()) {
    mqttconnect();
  }
}

void PublishData(int button) {
  mqttconnect();

  String payload = "{\"pushbutton status\":" + String(button) + "}";

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

  if (client.publish(publishTopic, (char*)payload.c_str())) {
    Serial.println("Publish ok");
  } else {
    Serial.println("Publish failed");
  }
}

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength) {
  String data3;
  for (int i = 0; i < payloadLength; i++) {
    data3 += (char)payload[i];
  }

  int startIndex = data3.indexOf(":") + 1;
  int endIndex = data3.length() - 1;
  String valueString = data3.substring(startIndex, endIndex);
  int value = valueString.toInt();

  Serial.print("Received value: ");
  Serial.println(value);
}

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() {

  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);

  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");
  }
}
```
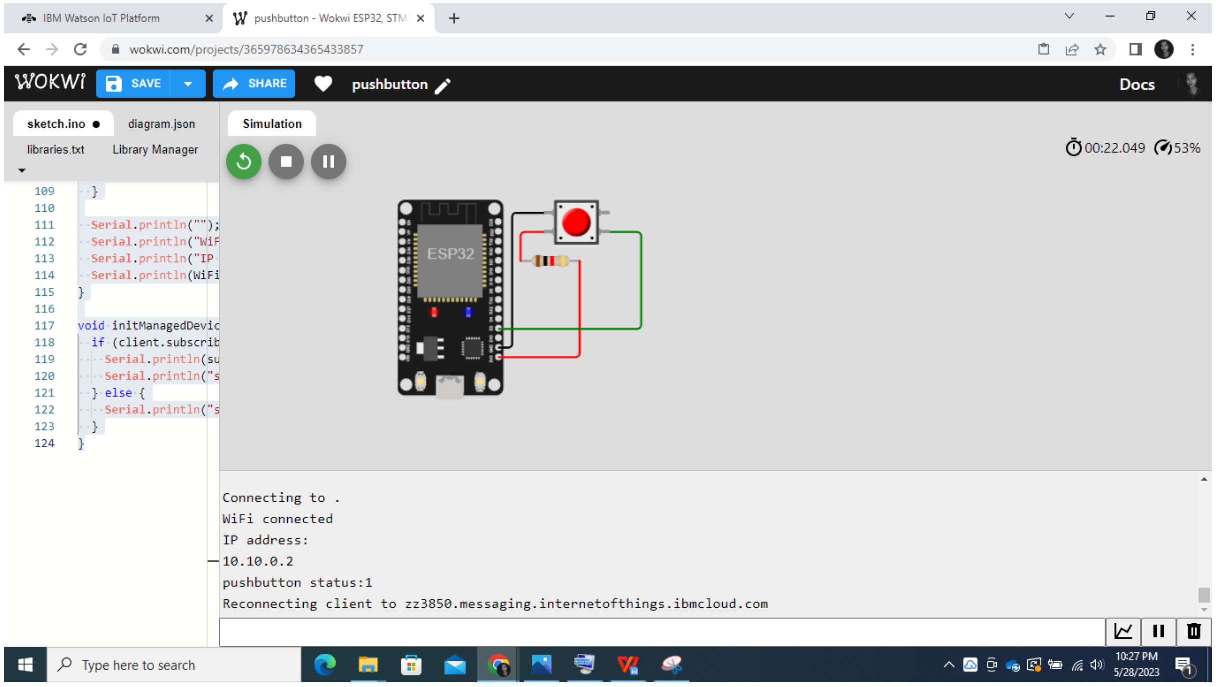

Outputs :

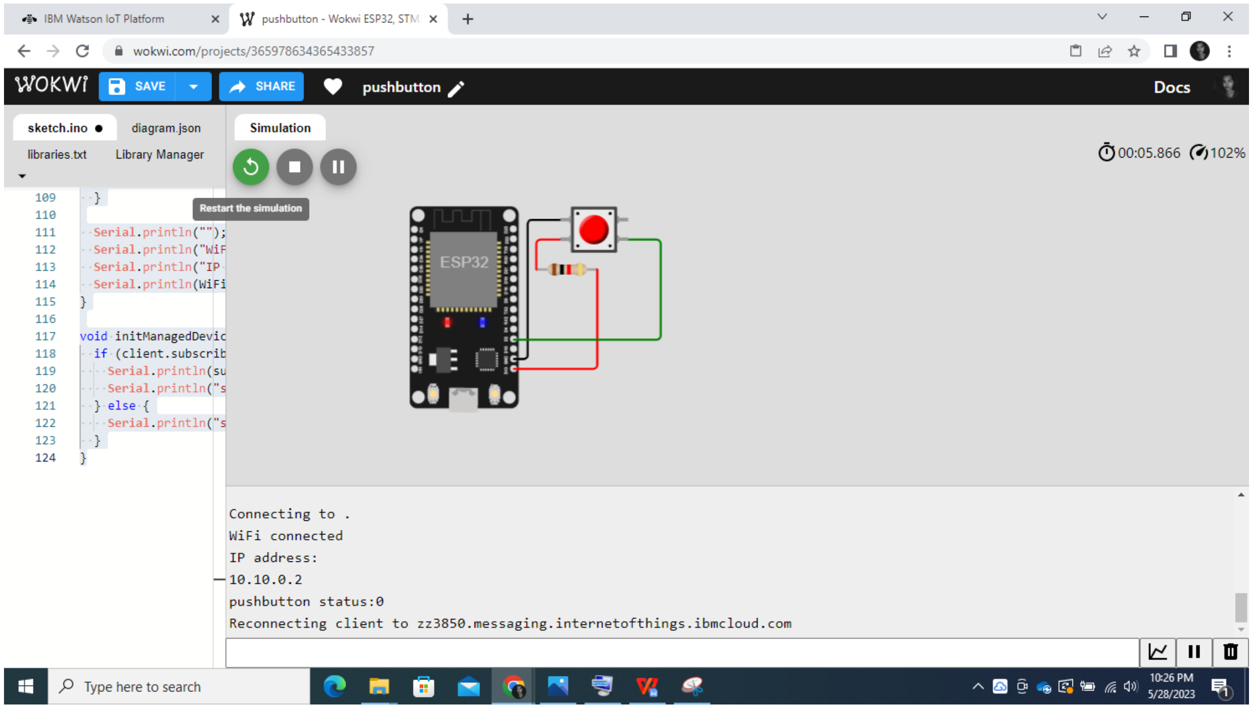
When Button not pushed = 0



```
109      }
110
111      Serial.println("");
112      Serial.println("WiF
113      Serial.println("IP
114      Serial.println(WiFi
115    }
116
117    void initManagedDevic
118      if (client.subscrib
119        Serial.println(su
120        Serial.println("s
121      } else {
122        Serial.println("s
123      }
124    }
```

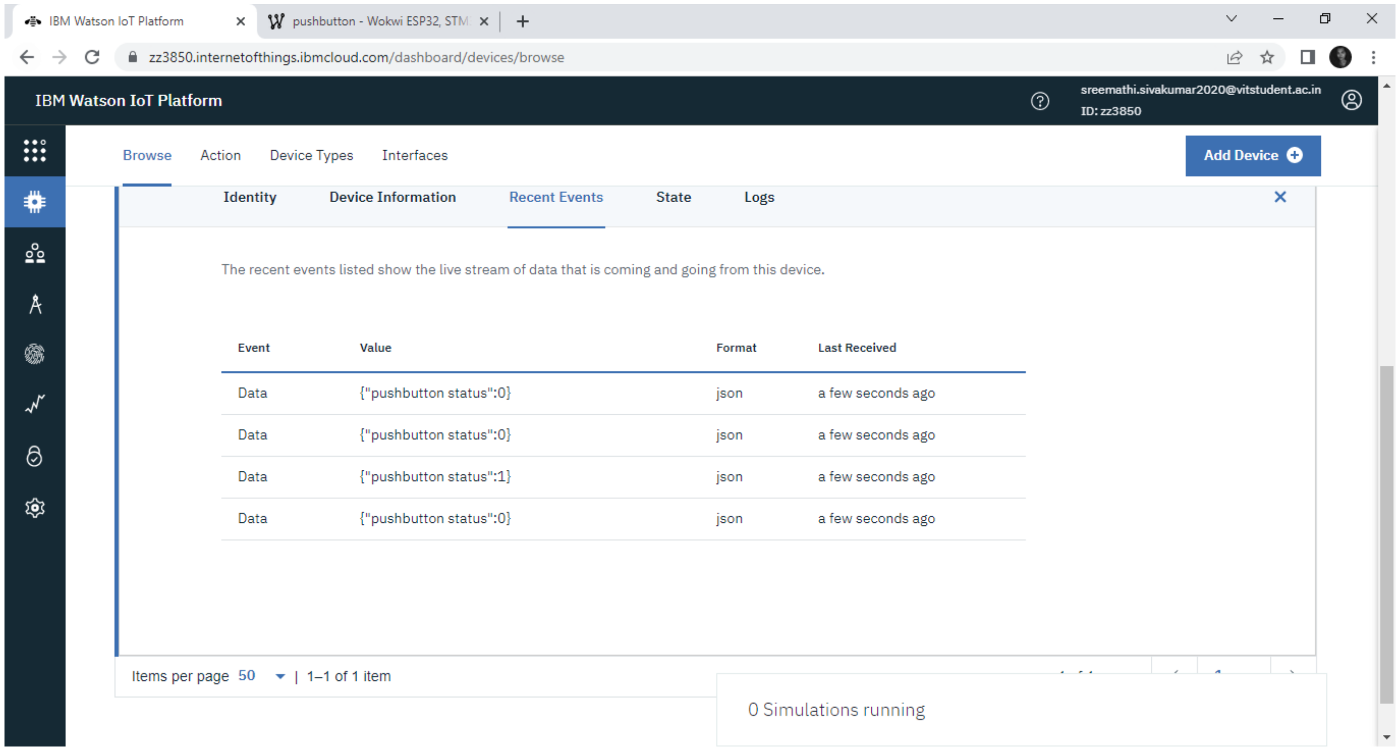
```
Connecting to .
WiFi connected
IP address:
10.10.0.2
pushbutton status:1
Reconnecting client to zz3850.messaging.internetofthings.ibmcloud.com
```

When Button pushed = 1



```
109      }
110
111      Serial.println("");
112      Serial.println("WiF
113      Serial.println("IP
114      Serial.println(WiFi
115    }
116
117    void initManagedDevic
118      if (client.subscrib
119        Serial.println(su
120        Serial.println("s
121      } else {
122        Serial.println("s
123      }
124    }
```

```
Connecting to .
WiFi connected
IP address:
10.10.0.2
pushbutton status:0
Reconnecting client to zz3850.messaging.internetofthings.ibmcloud.com
```


IBM Watson IoT Platform

zz3850.internetofthings.ibmcloud.com/dashboard/devices/browse

sreemathi.sivakumar2020@vitstudent.ac.in
ID: zz3850

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

Event	Value	Format	Last Received
Data	{"pushbutton status":0}	json	a few seconds ago
Data	{"pushbutton status":0}	json	a few seconds ago
Data	{"pushbutton status":1}	json	a few seconds ago
Data	{"pushbutton status":0}	json	a few seconds ago

The circuit has been constructed in WOKWI and the status of the push buttons have been uploaded on IBM IoT Cloud as 1s and 0s.

Result:

Thus, the values from WOKWI has been uploaded to IBM cloud using wifi module of ESP32 successfully and outputs are verified.