SPRINT -3

| | |
|---|---|
| **DATE** | **16November 2022** |
| **TEAM ID** | **PNT2022TMID08724** |
| **PROJECT NAME** | **SMART WASTE MANAGEMENT FOR METROPOLITAN CITIES** |

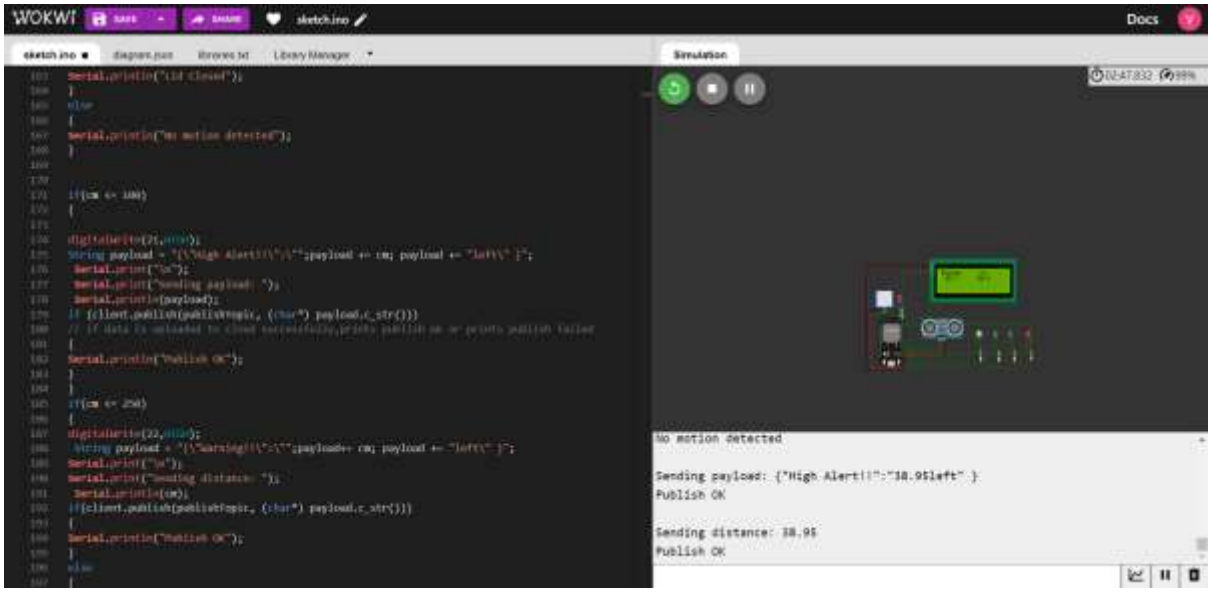
```
#include <LiquidCrystal_I2C.h>
#include <WiFi.h>
#include <PubSubClient.h>
#include<WiFiClient.h>
LiquidCrystal_I2C lcd(0x27, 20, 4); // I2C address 0x3F, 16 column and 2 rows

int trigPin = 2;    // TRIG pin
int echoPin = 15;    // ECHO pin

#define ORG "qippa4"
#define DEVICE_TYPE "Esp32"
#define DEVICE_ID "Waste"
#define TOKEN "C72(GeQy)UPSVtHdUw"
char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // server name
char publishTopic[] = "iot-2/evt/data/fmt/json";
char topic[] = "iot-2/cmd/led/fmt/String"; // cmd Represent type and command
is test format of strings
char authMethod[] = "use-token-auth"; // authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //Client id

WiFiClient wifiClient; // creating instance for wifi
PubSubClient client(server, 1883, wifiClient);

void setup() {
  lcd.init();                  // initialize the lcd
  lcd.backlight();
  pinMode(5,OUTPUT);
  pinMode(18,OUTPUT);
  pinMode(19,OUTPUT);
  pinMode(23,OUTPUT);
  pinMode(34,INPUT);
  pinMode(14,OUTPUT);
  // open the backlight
  pinMode(trigPin, OUTPUT); // config trigger pin to output mode
  pinMode(echoPin, INPUT);
  Serial.begin(115200);
  wifiConnect();
```

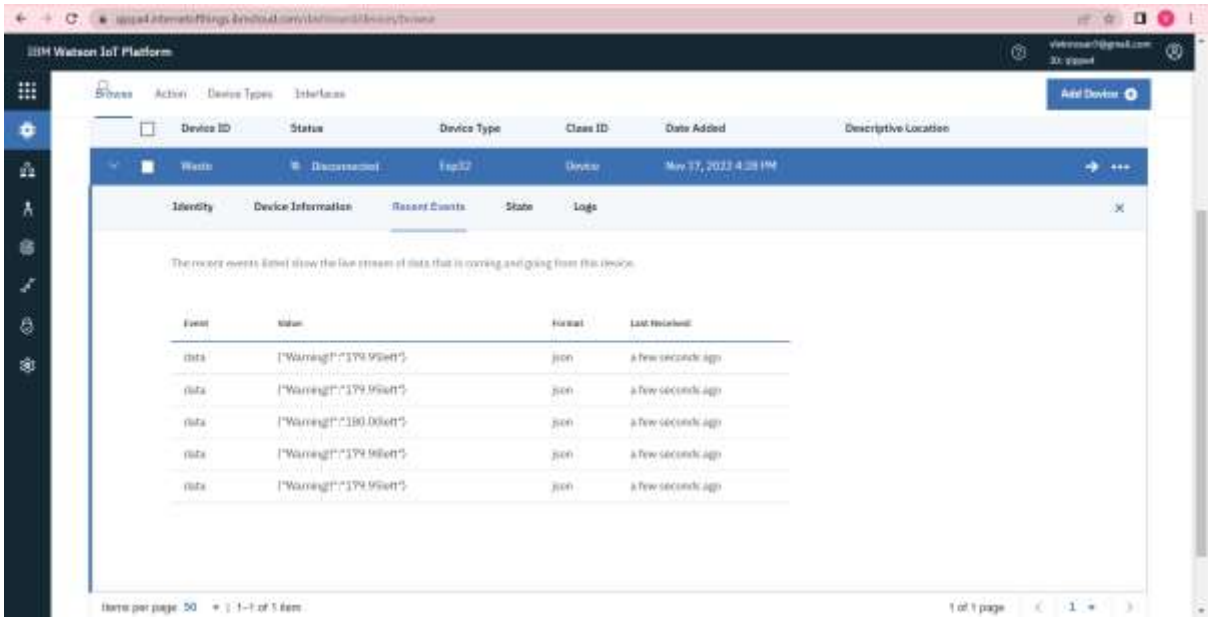
```
  mqttConnect();
 // config echo pin to input mode
}

float readcmCM()
{
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
int duration = pulseIn(echoPin, HIGH);
return duration * 0.034 / 2;
}

void loop()
{

lcd.clear();

publishData();
delay(500);
if (!client.loop())
{
mqttConnect();  // function call to connect to IBM
}
}

/*  -retrieving to cloud  */

void wifiConnect()
{
Serial.print("Connecting to "); Serial.print("Wifi");

WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() != WL_CONNECTED)
{
delay(500);
Serial.print(".");
}
Serial.print("WiFi connected, IP address: ");
Serial.println(WiFi.localIP());
}
void mqttConnect()
{
if (!client.connected())
{
Serial.print("Reconnecting MQTT client to ");
```

```
Serial.println(server);
while (!client.connect(clientId, authMethod, token))
{
Serial.print(".");
delay(500);
}
initManagedDevice();
Serial.println();
}
}
void initManagedDevice()
{
if (client.subscribe(topic))
{
Serial.println("IBM subscribe to cmd OK");
}
else
{
Serial.println("subscribe to cmd FAILED");
}
}
void publishData()
{
float cm = readcmCM();

if(digitalRead(34))
{
Serial.println("Motion Detected"); Serial.println("Lid Opened");
digitalWrite(14, HIGH);

}
else
{
digitalWrite(14, LOW);
} //PIR motion detection



if(digitalRead(34))
{
if(cm <= 100)
//Bin level detection
{
digitalWrite(23, HIGH);
Serial.println("High Alert!!!,Trash bin is about to be full");
Serial.println("Lid Closed");
lcd.print("Full! Don't use");
delay(2000);
lcd.clear();
```

```
digitalWrite(18,LOW);
digitalWrite(19,LOW);
digitalWrite(5,LOW);
}
else if(cm > 100 && cm < 200)
{
digitalWrite(5, HIGH);
Serial.println("Warning!!,Trash is about to cross 75% of bin level");
digitalWrite(18,LOW);
digitalWrite(19,LOW);
digitalWrite(23,LOW);
}
else if(cm > 200 && cm < 300)
{
digitalWrite(18, HIGH);
Serial.println("Warning!!,Trash is about to cross 50% of bin level");
digitalWrite(5,LOW);
digitalWrite(19,LOW);
digitalWrite(23,LOW);
}
else if(cm > 300 && cm <=400)
{
digitalWrite(19, HIGH);
Serial.println("Bin is available");
digitalWrite(5,LOW);
digitalWrite(18,LOW);
digitalWrite(23,LOW);
}
delay(10000);
Serial.println("Lid Closed");
}
else
{
Serial.println("No motion detected");
}


if(cm <= 100)
{

digitalWrite(21,HIGH);
String payload = "{\"High Alert!!\":\"";payload += cm; payload += "left\" }";
 Serial.print("\n");
 Serial.print("Sending payload: ");
 Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str()))
// if data is uploaded to cloud successfully,prints publish ok or prints
publish failed
{
```

```
Serial.println("Publish OK");
}
}
if(cm <= 250)
{
digitalWrite(22,HIGH);
 String payload = "{\"Warning!!\":\"";payload+= cm; payload += "left\" }";
Serial.print("\n");
Serial.print("Sending distance: ");
 Serial.println(cm);
if(client.publish(publishTopic, (char*) payload.c_str()))
{
Serial.println("Publish OK");
}
else
{
Serial.println("Publish FAILED");
}
}

float inches = (cm / 2.54); //print on LCD
lcd.setCursor(0,0);
lcd.print("Inches");
 lcd.setCursor(4,0);
lcd.setCursor(12,0);
lcd.print("cm"); lcd.setCursor(1,1);
 lcd.print(inches, 1);
lcd.setCursor(11,1);
lcd.print(cm,1);
lcd.setCursor(14,1);
delay(1000);
 lcd.clear();
}
```


WOKWI
SAVE
SHARE
sketch.ino
Docs
Simulation
No motion detected
Sending payload: {"High Alert!!":"38.95left" }
Publish OK
Sending distance: 38.95
Publish OK


IBM Watson IoT Platform
Browse
Action
Device Types
Interfaces
Add Device
Device ID
Status
Device Type
Class ID
Date Added
Descriptive Location
Identity
Device Information
Recent Events
State
Logs
Event
Value
Format
Last Received
data
{"Warning!":"179.95left"}
json
a few seconds ago
data
{"Warning!":"179.95left"}
json
a few seconds ago
data
{"Warning!":"180.00left"}
json
a few seconds ago
data
{"Warning!":"179.98left"}
json
a few seconds ago
data
{"Warning!":"179.95left"}
json
a few seconds ago