SPRINT -3

DATE	16November 2022
TEAM ID	PNT2022TMID08778
PROJECT NAME	SMART WASTE MANAGEMENT FOR METROPOLITAN CITIES

```cpp
#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();
```

```cpp
    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 ");
```

```cpp
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();
```

```cpp
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();
}
```

sketch.ino | diagram.json | libraries.txt | Library Manager

Simulation

```
Serial.println("Lid closed");
}
else
{
Serial.println("No motion detected");
}

if(cm <= 100)
{

digitalWrite(25, 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 output:
```
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
	Waste	Disconnected	Esp32	Device	Nov 27, 2023 4:28 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	{"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!":"179.95left"}	json	a few seconds ago
data	{"Warning!":"179.95left"}	json	a few seconds ago

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