

## SPRINT -2

Date	8 November 2022
Team ID	PNT2022TMID42807
Project Name	Project - Smart waste management system for metropolitan cities

### Python code:

```
#include <WiFi.h>
#include <PubSubClient.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 20, 4);

#define ORG "kvnnui"
#define DEVICE_TYPE "smart"
#define DEVICE_ID "project"
#define TOKEN "a1b2c3d4e5f6g7h8"

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

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

#define ECHO_PIN 12
#define TRIG_PIN 13
float dist;

void setup()
{
  Serial.begin(115200);
  pinMode(LED_BUILTIN, OUTPUT);
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);
  ///pir pin///
  pinMode(34, INPUT);
```

```

/////ledpins/////
pinMode(23, OUTPUT);
pinMode(2, OUTPUT);
pinMode(4, OUTPUT);
pinMode(15, OUTPUT);

lcd.init();
lcd.backlight();
lcd.setCursor(1, 0);
lcd.print("");
wifiConnect();
mqttConnect();
}

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

void loop()
{
    lcd.clear();

    publishData();
    delay(500);
    if (!client.loop())
    {
        mqttConnect();
    }
}

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(15, HIGH);
    }
}

```

```

if(digitalRead(34)== true)
{
  if(cm <= 60)
  {
    digitalWrite(2, HIGH);
    Serial.println("High Alert!!!,garbage bin is about to be full");
    Serial.println("Lid Closed");
    lcd.print("Full! Don't use");
    delay(2000);
    lcd.clear();
    digitalWrite(4, LOW);
    digitalWrite(23, LOW);
  }
  else if(cm > 60 && cm < 120)
  {
    digitalWrite(4, HIGH);
    Serial.println("Warning!!!,Tis about to cross 50% of bin level");
    digitalWrite(2, LOW);
    digitalWrite(23, LOW);

  }
  else if(cm > 120)
  {
    digitalWrite(23, HIGH);
    Serial.println("Bin is available");
    digitalWrite(2,LOW);
    digitalWrite(4, LOW);

  }
  delay(10000);
  Serial.println("Lid Closed");
}
else
{
  Serial.println("No motion detected");
  digitalWrite(2, LOW);
  digitalWrite(15, LOW);
  digitalWrite(4, LOW);
  digitalWrite(23, LOW);
}

```

```

}
else
{
    digitalWrite(15, LOW);
}

    if(cm <= 60)
    {
        digitalWrite(21,HIGH);
        String payload = "{\"High_Alert\":\"";
        payload += cm;
        payload += " }";
        Serial.print("\n");
        Serial.print("Sending payload: ");
        Serial.println(payload);

        if (client.publish(publishTopic, (char*) payload.c_str()))
        {
            Serial.println("Publish OK");
        }
    }
    else if(cm <= 120)
    {
        digitalWrite(22,HIGH);
        String payload = "{\"Warning\":\"";
        payload += cm ;
        payload += " }";
        Serial.print("\n");
        Serial.print("Sending payload: ");
        Serial.println(payload);
        if(client.publish(publishTopic, (char*) payload.c_str()))
        {
            Serial.println("Publish OK");
        }
    }
    else
    {
        Serial.println("Publish FAILED");
    }
}
else
{
    Serial.println("");
}

```

```

float inches = (cm / 2.54);
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 LINK:**

<https://wokwi.com/projects/347729377580024403>

**SIMULATION OUTPUT:**

The screenshot shows the IBM Watson IoT Platform interface. The main heading is 'Browse Devices'. Below it, there are tabs for 'All Devices' and 'Diagnose'. A message states: '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.'

Below the message is a search bar labeled 'Search by Device ID'. To the right, there is a 'Device Simulator' toggle switch which is turned on. Below this is a table with the following columns: Device ID, Status, Device Type, Class ID, Date Added, Descriptive Location, and Added By.

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location	Added By
DCBA	Disconnected	ABCD	Device	Oct 27, 2022 7:08 AM		711619106701@smartinternz.com
project	Connected	smart	Device	Nov 7, 2022 11:31 PM		711619106701@smartinternz.com

At the bottom of the table, it says 'Items per page: 50 | 1-2 of 2 items'. On the right, it says '1 of 1 page' with navigation arrows. At the very bottom of the dashboard, a status bar indicates '1 Simulation running'.



WOKWI

sketch.ino diagram.json libraries.txt Library Manager

```

142 }
143 else if(cm > 60 && cm < 120)
144 {
145   digitalWrite(4, HIGH);
146   Serial.println("Warning!! Trash is about to cross 50% of bin");
147   digitalWrite(2, LOW);
148   digitalWrite(23, LOW);
149 }
150 }
151 else if(cm > 120)
152 {
153   digitalWrite(23, HIGH);
154   Serial.println("Bin is available");
155   digitalWrite(2, LOW);
156   digitalWrite(4, LOW);
157 }
158 }
159 delay(10000);
160 Serial.println("Lid Closed");
161 }
162 else
163 {
164   Serial.println("No motion detected");
165   digitalWrite(2, LOW);
166   digitalWrite(15, LOW);
167   digitalWrite(4, LOW);
168   digitalWrite(23, LOW);
169 }
170 }
171 }
172 }

```

Simulation

01:22:563 86%

Publish OK

Sending payload: {"Warning":61.97 }  
Publish OK

Sending payload: {"Warning":62.02 }  
Publish OK

30°C Cloudy ENG 23:38

WOKWI

sketch.ino diagram.json libraries.txt Library Manager

```

142 }
143 else if(cm > 60 && cm < 120)
144 {
145   digitalWrite(4, HIGH);
146   Serial.println("Warning!! Trash is about to cross 50% of bin");
147   digitalWrite(2, LOW);
148   digitalWrite(23, LOW);
149 }
150 }
151 else if(cm > 120)
152 {
153   digitalWrite(23, HIGH);
154   Serial.println("Bin is available");
155   digitalWrite(2, LOW);
156   digitalWrite(4, LOW);
157 }
158 }
159 delay(10000);
160 Serial.println("Lid Closed");
161 }
162 else
163 {
164   Serial.println("No motion detected");
165   digitalWrite(2, LOW);
166   digitalWrite(15, LOW);
167   digitalWrite(4, LOW);
168   digitalWrite(23, LOW);
169 }
170 }
171 }
172 }

```

Simulation

07:06.845 18%

Editing Ultrasonic Distance Sensor  
Distance: 196cm

Sending payload: {"High\_Alert":12.95 }  
Publish OK

Sending payload: {"High\_Alert":12.95 }  
Publish OK

Sending payload: {"Warning":110.96 }  
Publish OK

30°C Cloudy ENG 23:48



WOKWI

sketch.ino

```

156 digitalWrite(4, LOW);
157
158 }
159 delay(10000);
160 Serial.println("Lid Closed");
161
162 else
163 {
164   Serial.println("No motion detected");
165   digitalWrite(2, LOW);
166   digitalWrite(15, LOW);
167   digitalWrite(4, LOW);
168   digitalWrite(23, LOW);
169 }
170
171 }
172
173 else
174 {
175   digitalWrite(15, LOW);
176 }
177
178
179 if(cm <= 60)
180 {
181   digitalWrite(21, HIGH);
182   String payload = "{\"High_Alert\": ";
183   payload += cm;
184   payload += " }";
185   Serial.print("\n");
186   Serial.print("Sending payload: ");

```

Simulation

PIR Motion Sensor

Simulate motion

Motion Detected  
Lid Opened  
Bin is available

## Connection:

