

SPRINT-2

SMART WASTE MANAGEMENT SYSTEM IN METROPOLITAN CITIES

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CODE:

```
#include <WiFi.h>                                // library for wifi
#include <PubSubClient.h>                        // library for MQTT
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 20, 4);

// credentials of IBM Accounts -
#define ORG "9gbe4w"                            // IBM organisation id
#define DEVICE_TYPE "SWMSMC"                   // Device type mentioned in ibm watson iot platform
#define DEVICE_ID "ibmproject"                 // Device ID mentioned in ibm watson iot platform
#define TOKEN "sUNA41tG6-Pq)0rk5X"           // Token

// customise above values -
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 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(4, 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();          // 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)) //PIR motion detection
{
Serial.println("Motion Detected");
Serial.println("Lid Opened");
digitalWrite(15, HIGH);
}
else
{
digitalWrite(15, LOW);
}
}

```

```

}

if(digitalRead(34)== true)
{
  if(cm <= 100)                                //Bin level detection
  {
    digitalWrite(2, 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(4, LOW);
    digitalWrite(23, LOW);
  }
  else if(cm > 150 && cm < 250)
  {
    digitalWrite(4, HIGH);
    Serial.println("Warning!!,Trash is about to cross 50% of bin level");
    digitalWrite(2, LOW);
    digitalWrite(23, LOW);
  }
  else if(cm > 250 && cm <=400)
  {
    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");
}

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 += dist;
  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();  
}
```