

SPRINT 3

SMART WASTE MANAGEMENT SYSTEM

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ESP32

```
#include <WiFi.h>                // library for wifi
#include <PubSubClient.h>         // library for MQTT
#include <LiquidCrystal_I2C.h>
#include <mjson.h>

LiquidCrystal_I2C lcd(0x27, 20, 4);

//----- credentials of IBM Accounts -----

#define ORG "6qx44q"             // IBM organisation id
#define DEVICE_TYPE "abcd"       // Device type mentioned in ibm watson iot platform
#define DEVICE_ID "1234"         // Device ID mentioned in ibm watson iot platform
#define TOKEN "12345678"        // Token

//----- customise above values -----

char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // server name
char publishTopic[] = "iot-2/evt/data/fmt/json"; // topic name and type of event
perform and format in which data to be send

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;
String data3;
bool SealBin = true;
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();           // 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);

        if(digitalRead(34)== true)
        {
            if(cm <= 60)                //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 > 60 && cm < 120)

```

```
{  
  digitalWrite(4, HIGH);  
  Serial.println("Warning!!,Trash is 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())) // if data is uploaded to cloud
        successfully,prints publish ok else prints publish failed
    {
        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 if(cm > 120)
{
  digitalWrite(23,HIGH);
  String payload = "{";
  payload += cm;
  payload += " ";
  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 else prints publish failed
  {
    Serial.println("Publish OK");
  }

}

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();  
}
```