#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 "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"; // 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 <= 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 > 100 && cm < 180)

{

digitalWrite(4, HIGH);

**Serial**.println("Warning!!,Trash is about to cross 50% of bin level"); digitalWrite(2, LOW);

digitalWrite(23, LOW);

}

else if(cm > 180)

{

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 <= 100)

{

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");

}

{

**Serial**.println("Publish FAILED");

}

}

else if(cm > 180)

{

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

}

else if(cm <= 180)

{

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()))

{

**Serial**.println("Publish OK");

}

else

{

Serial.println9”Publish FAILED”);

}

{

**Serial**.println("Publish FAILED");

}

}

else if(cm > 180)

{

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

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();

}