# Project Development phase

**Delivery of Sprint-2**

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|---|---|
| **TEAM ID** | PNT2022TMI04391 |
| **PROJECT NAME** | Smart Waste Management for Metropolitan Cities |
| **TEAM MEMBERS** | ROHITH VIGNESH<br>HARI PRASATH P<br>HARSHIT<br>R<br>MOHAMED<br>ROSHAN M |

**CODE FOR DATA TRANSFERS FROM SENSORS WITH WOKWI IMPLEMENETATION:**

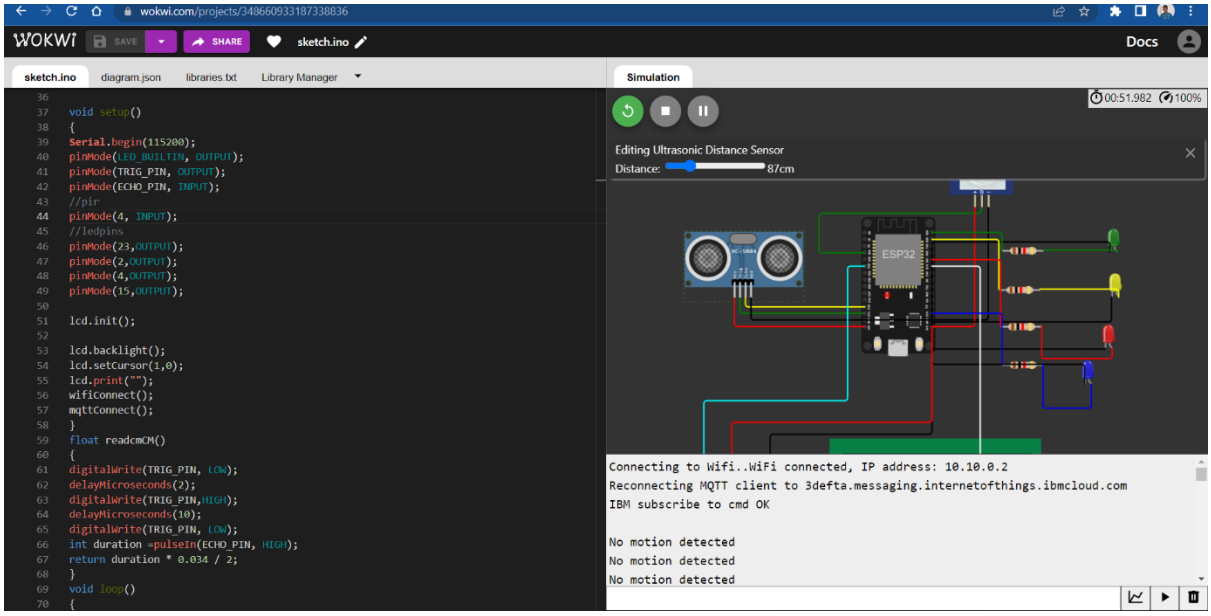
```
#include <WiFi.h> //library for wifi
#include <PubSubClient.h> //library for MQTT
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27, 20, 4);
// credentials of IBM Accounts -
#define ORG "3defta" //IBM organisation id
#define DEVICE_TYPE "hariprasath" // Device type mentioned in ibm watson iot platform
#define DEVICE_ID "12345" // Device ID mentioned in ibm watson iot platform
#define TOKEN "CpL-H1C-Pt4i9iM-F5" // 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
pinMode(4, INPUT);
//ledpins
pinMode(23,OUTPUT);
pinMode(2,OUTPUT);
pinMode(4,OUTPUT);
pinMode(15,OUTPUT);
```

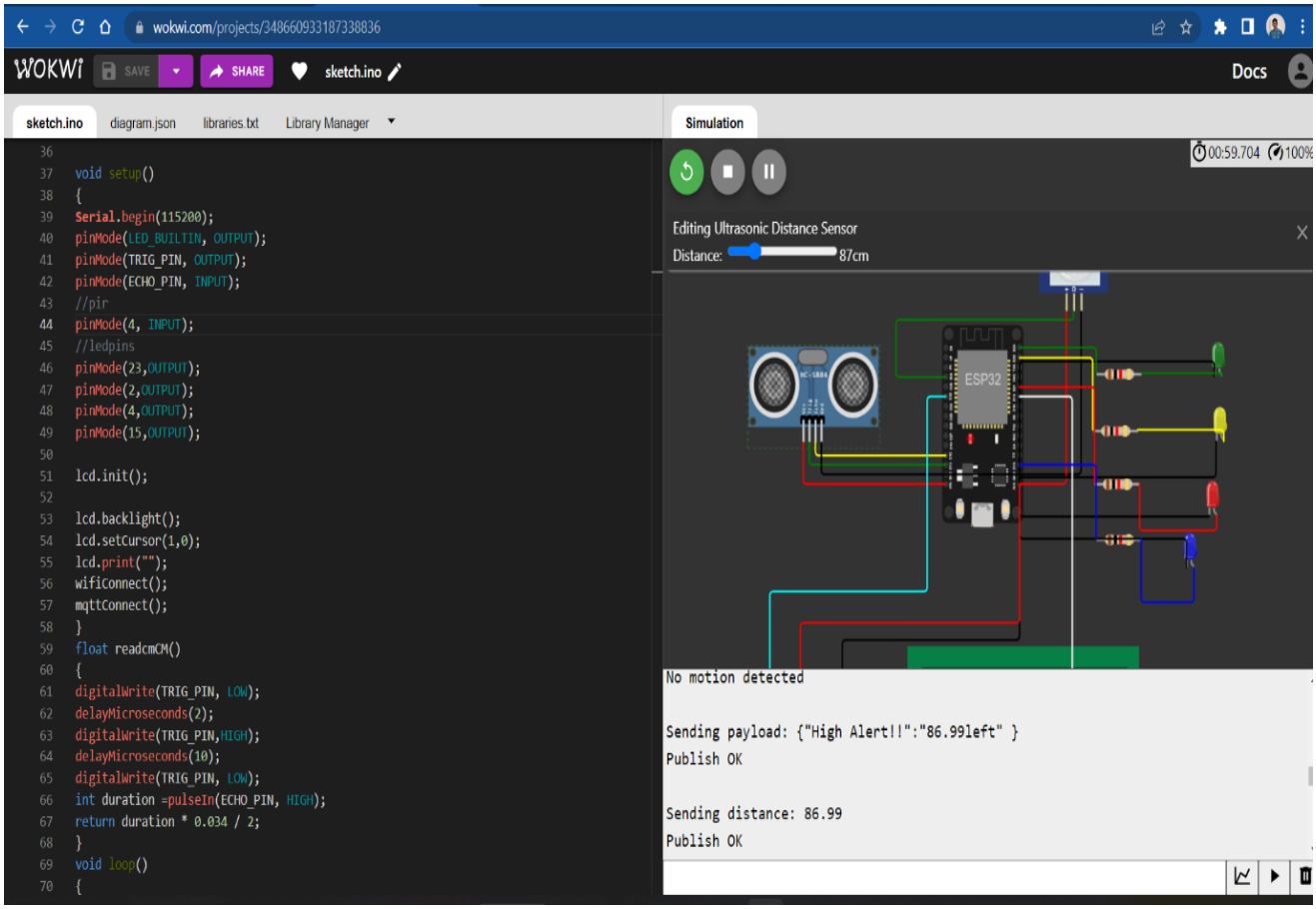
```
lcd.init();

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();
}
}
```

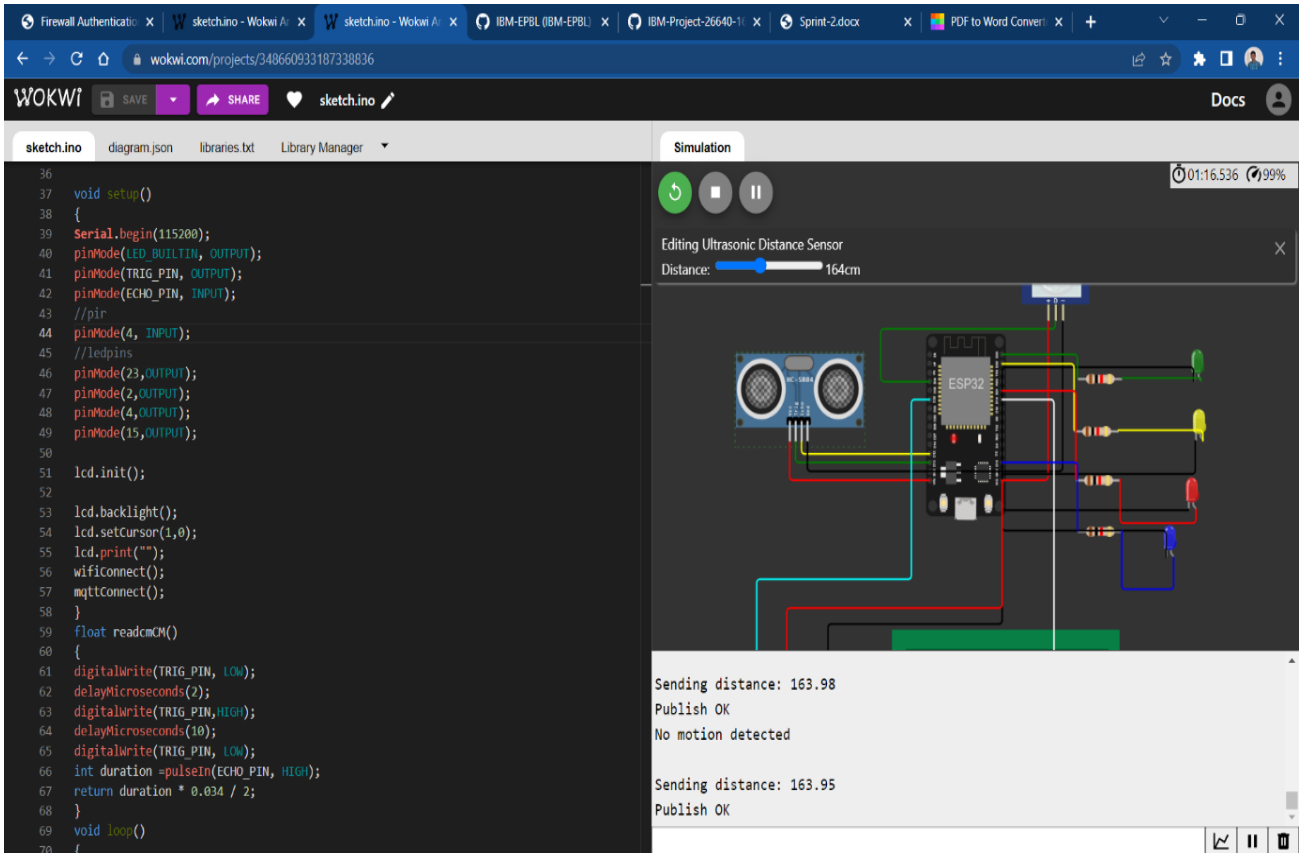
```
void initManagedDevice()
{

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
{
```

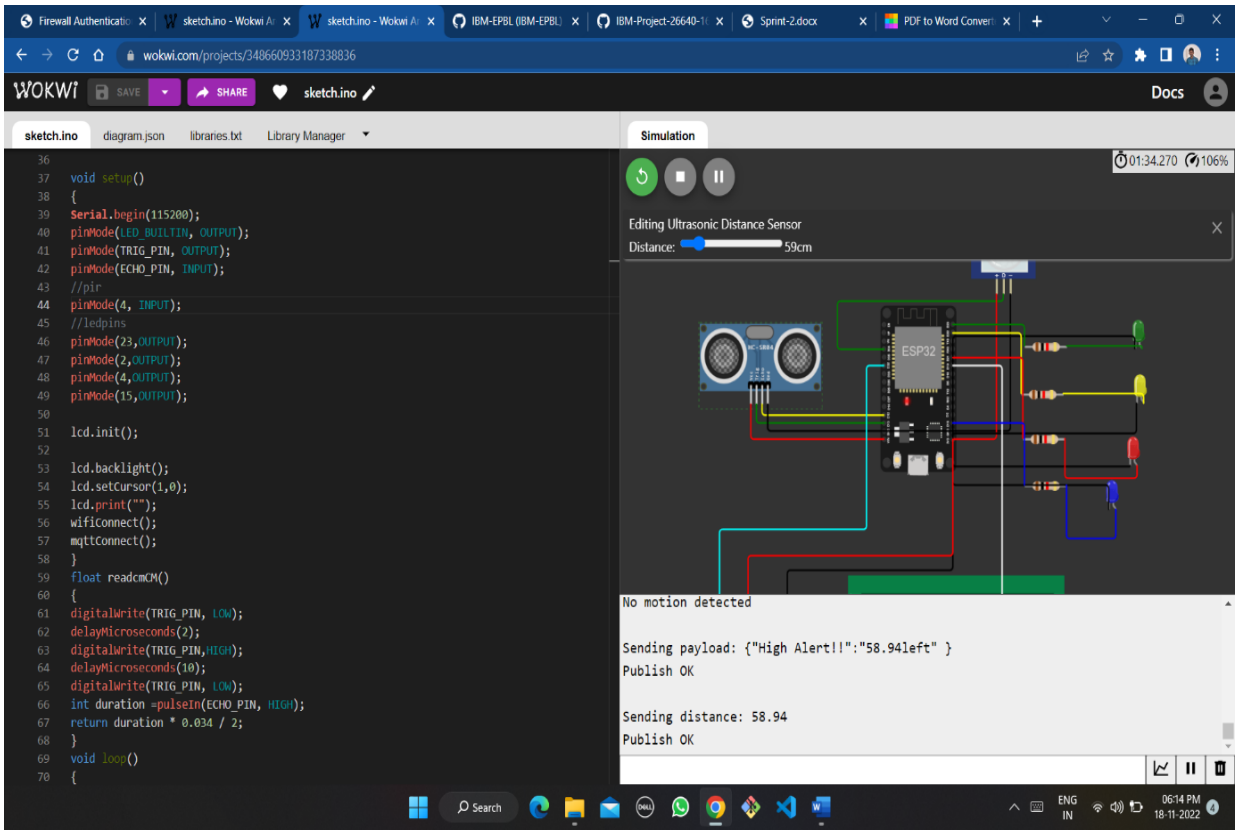
```
Serial.println("No motion detected");
}
if(cm <= 100)

{
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();
}
```

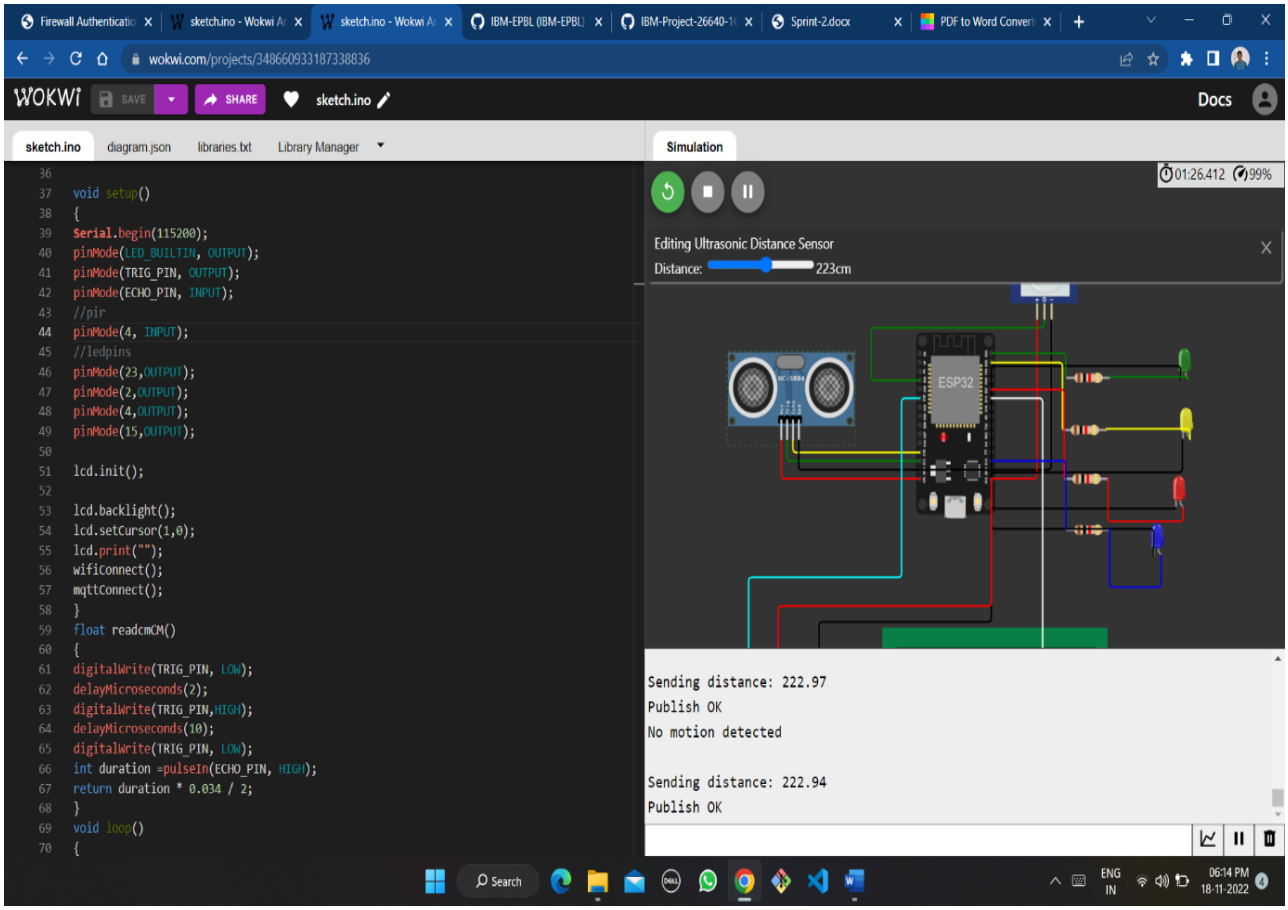
**OUTPUT:**


wokwi.com/projects/348660933187338836
WOKWI
SAVE
SHARE
sketch.ino
Docs
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:51.982
100%
Editing Ultrasonic Distance Sensor
Distance:
87cm
ESP32
Connecting to Wifi..WiFi connected, IP address: 10.10.0.2
Reconnecting MQTT client to 3defta.messaging.internetofthings.ibmcloud.com
IBM subscribe to cmd OK
No motion detected
No motion detected
No motion detected


wokwi.com/projects/348660933187338836
WOKWI
SAVE
SHARE
sketch.ino
Docs
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:59.704
100%
Editing Ultrasonic Distance Sensor
Distance:
87cm
ESP32
No motion detected
Sending payload: {"High Alert!!":"86.99left" }
Publish OK
Sending distance: 86.99
Publish OK


wokwi.com/projects/348660933187338836
WOKWI
SAVE
SHARE
sketch.ino
Docs
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
01:16.536
99%
Editing Ultrasonic Distance Sensor
Distance:
164cm
ESP32
Sending distance: 163.98
Publish OK
No motion detected
Sending distance: 163.95
Publish OK


wokwi.com/projects/348660933187338836
WOKWI
SAVE
SHARE
sketch.ino
Docs
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
01:34.270
106%
Editing Ultrasonic Distance Sensor
Distance:
59cm
ESP32
No motion detected
Sending payload: {"High Alert!!":"58.94left" }
Publish OK
Sending distance: 58.94
Publish OK
Search
ENG
IN
06:14 PM
18-11-2022




```
36
37  void setup()
38  {
39  Serial.begin(115200);
40  pinMode(LED_BUILTIN, OUTPUT);
41  pinMode(TRIG_PIN, OUTPUT);
42  pinMode(ECHO_PIN, INPUT);
43  //pir
44  pinMode(4, INPUT);
45  //ledpins
46  pinMode(23,OUTPUT);
47  pinMode(2,OUTPUT);
48  pinMode(4,OUTPUT);
49  pinMode(15,OUTPUT);
50
51  lcd.init();
52
53  lcd.backlight();
54  lcd.setCursor(1,0);
55  lcd.print("");
56  wificonnect();
57  mqttConnect();
58  }
59  float readcmCM()
60  {
61  digitalWrite(TRIG_PIN, LOW);
62  delayMicroseconds(2);
63  digitalWrite(TRIG_PIN,HIGH);
64  delayMicroseconds(10);
65  digitalWrite(TRIG_PIN, LOW);
66  int duration =pulseIn(ECHO_PIN, HIGH);
67  return duration * 0.034 / 2;
68  }
69  void loop()
70  {
```