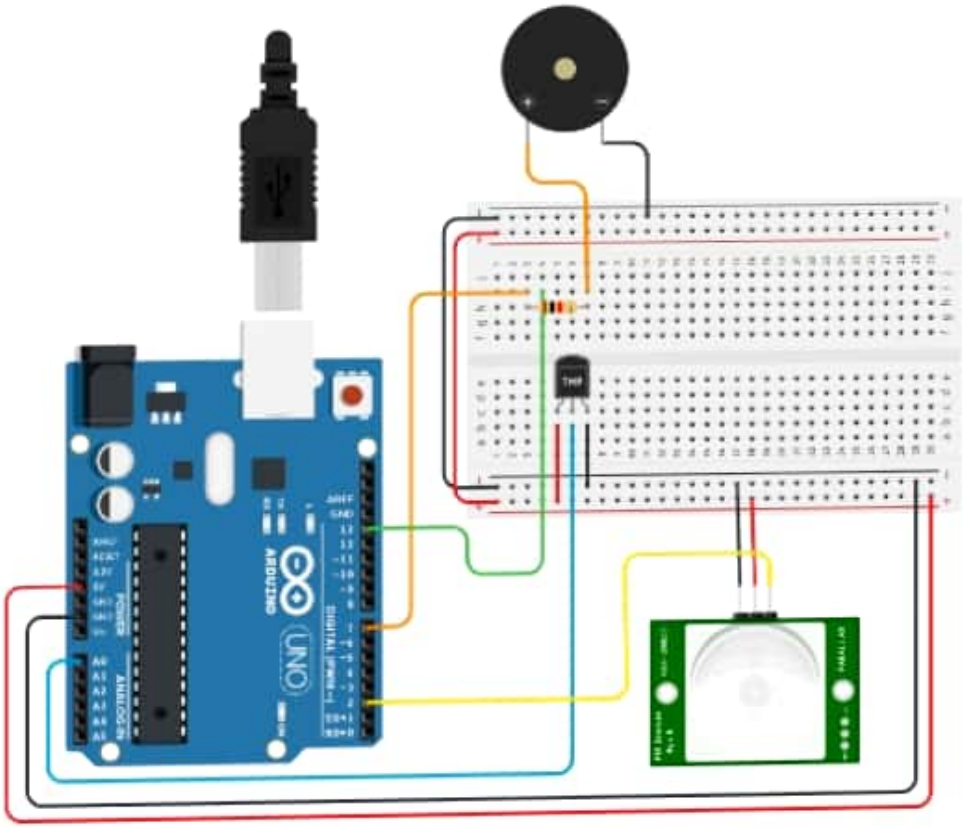


PROGRAM

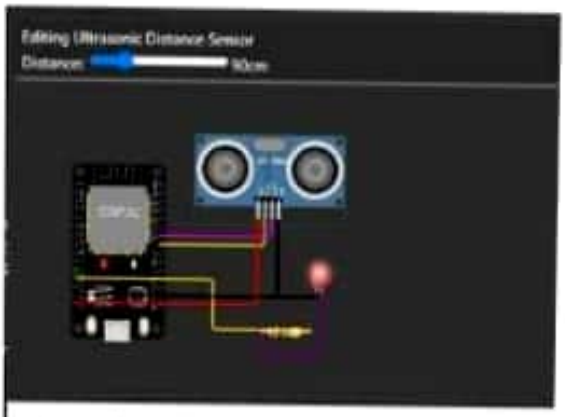
Smart Waste Management System for Metropolitan Cities
ASSIGNMENT 4:
Write code and connections in wokwi for ultrasonic sensors.
Whenever distance is less than 100 cms send "alert" to ibm cloud and display in device recent events.
Upload document with wokwi share link and images of ibm cloud

CODE:

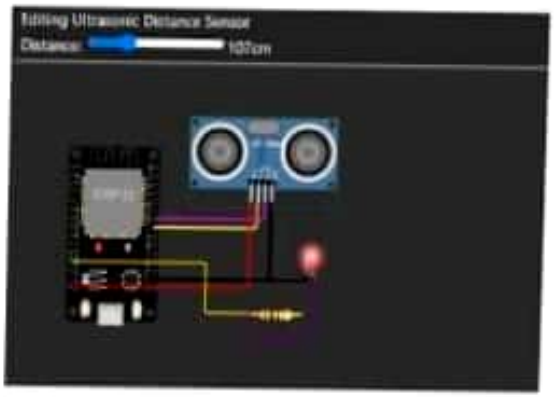
```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "4yi0vc"
#define DEVICE_TYPE "nodeMcu"
#define DEVICE_ID "Assignment4"
#define TOKEN "123456789"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
void publishData();
const int trigpin=5;
const int echopin=18;
String command;
String data="";
long duration;
float dist;
void setup()
{
  Serial.begin(115200);
  pinMode(led, OUTPUT);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect();
  mqttConnect();
}
 void loop() {
  bool isNearby = dist < 100;
  digitalWrite(led, isNearby);

  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(client.subscribe(topic));
  Serial.println("IBM subscribe to cmd OK");
 } else {
  Serial.println("subscribe to cmd FAILED");
 }
}
void publishData()
{
 digitalWrite(trigpin,LOW);
 digitalWrite(trigpin,HIGH);
 delayMicroseconds(10);
 digitalWrite(trigpin,LOW);
 duration=pulseIn(echopin,HIGH);
 dist=duration*speed/2;
 if(dist<100){
  String payload = "{\"Normal Distance\":";
  payload += dist;
  payload += "}";

  Serial.print("\n");
  Serial.print("Sending payload: ");
  Serial.println(payload);
  if (client.publish(publishTopic, (char*) payload.c_str())) {
   Serial.println("Publish OK");
  }

 }
  if(dist>101 && dist<111){
  String payload = "{\"Alert distance\":";
  payload += dist;
  payload += "}";

  Serial.print("\n");
  Serial.print("Sending payload: ");
  Serial.println(payload);
   if(client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Warning crosses 110cm -- it automaticaly of the loop");
    digitalWrite(led,HIGH);
   }else {
    Serial.println("Publish FAILED");
   }

 }


 }
 void callback(char* subscribeTopic, byte* payload, unsigned int payloadLength){
 Serial.print("callback invoked for topic:");
 Serial.println(subscribeTopic);
 for(int i=0; i<payloadLength; i++){
  dist += (char)payload[i];
 }
 Serial.println("data:"+ data3);
 if(data3=="lighton"){
  Serial.println(data3);
  digitalWrite(led,HIGH);
 }
 data3="";
}
```

Output




```
Sending payload: {"Normal Distance":89.95}
Publish OK

Sending payload: {"Normal Distance":89.95}
Publish OK

Sending payload: {"Normal Distance":89.95}
Publish OK

Sending payload: {"Normal Distance":89.98}
Publish OK

Sending payload: {"Normal Distance":89.95}
Publish OK

Sending payload: {"Normal Distance":89.95}
Publish OK
```




```
Sending payload: {"Alert distance":106.98}
Warning crosses 110cm -- it automaticaly of the loop

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Warning crosses 110cm -- it automaticaly of the loop
```

1) when distance under 100 cm
it wil show normal distance

2) when distance cross 100 cm
it wil show ALERT with warning message distance

```
Sending payload: {"Alert distance":106.98}
Warning crosses 110cm -- it automaticaly of the loop

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```

when it cross above 110 cm it totaly move to iff state once it reduce to 110 it on again

IBM CLOUD OUPUT