# Assignment-4

# Distance Detection Using Ultrasonic Sensor

| | |
|---|---|
| Date | 26 October 2022 |
| Team ID | PNT2022MID48179 |
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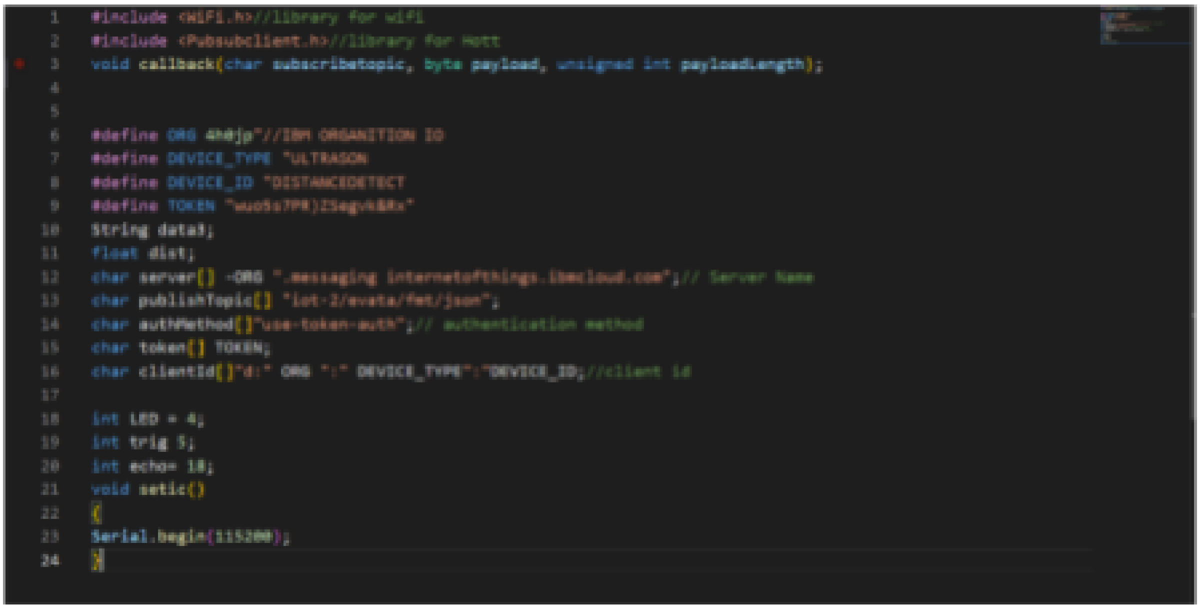
| Student Roll Number | 912619106008 |
| Maximum Marks | 2 Marks |

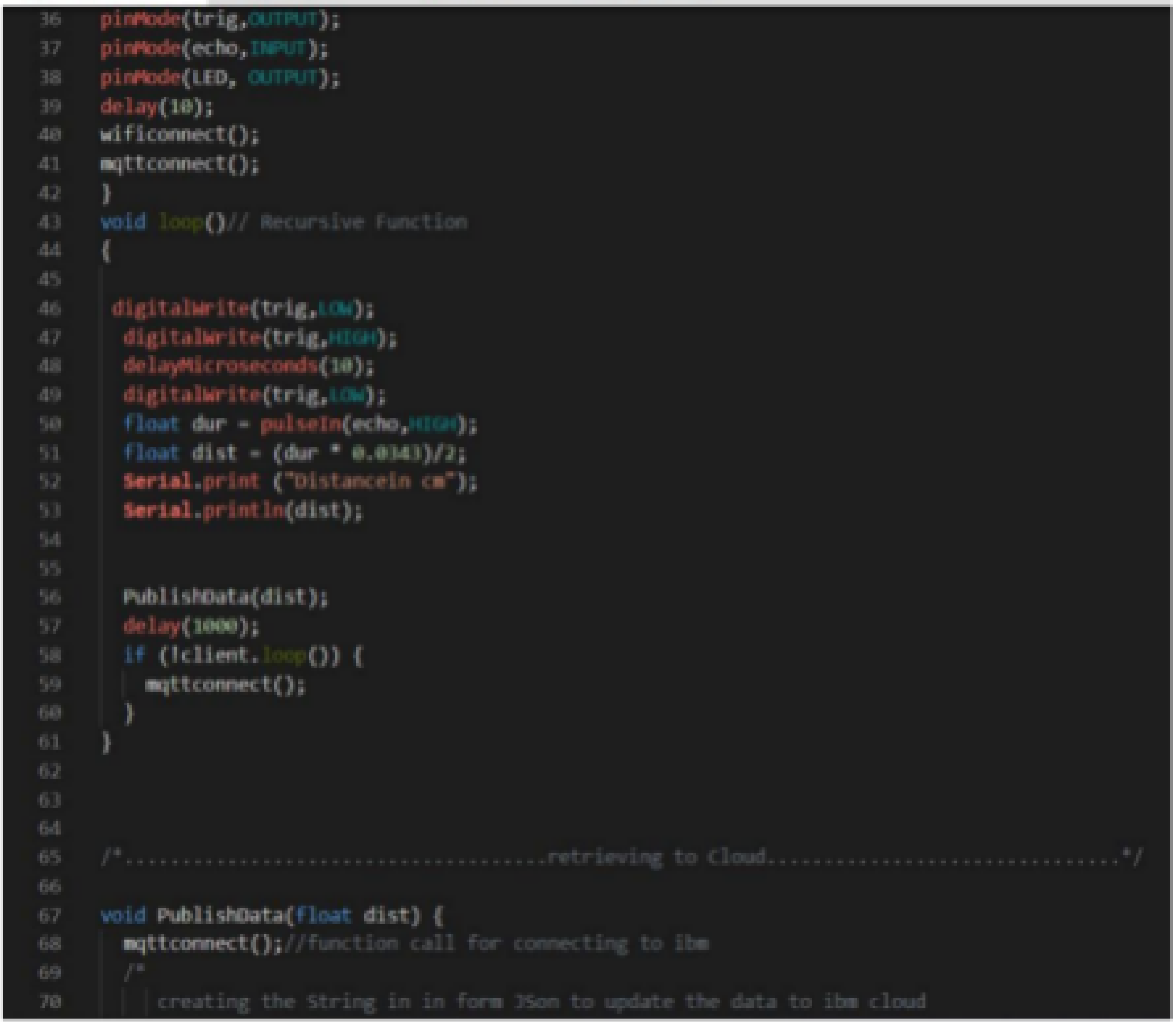
## Question 1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 centimeters it should send “alert” to IBM cloud and display in device recent events.

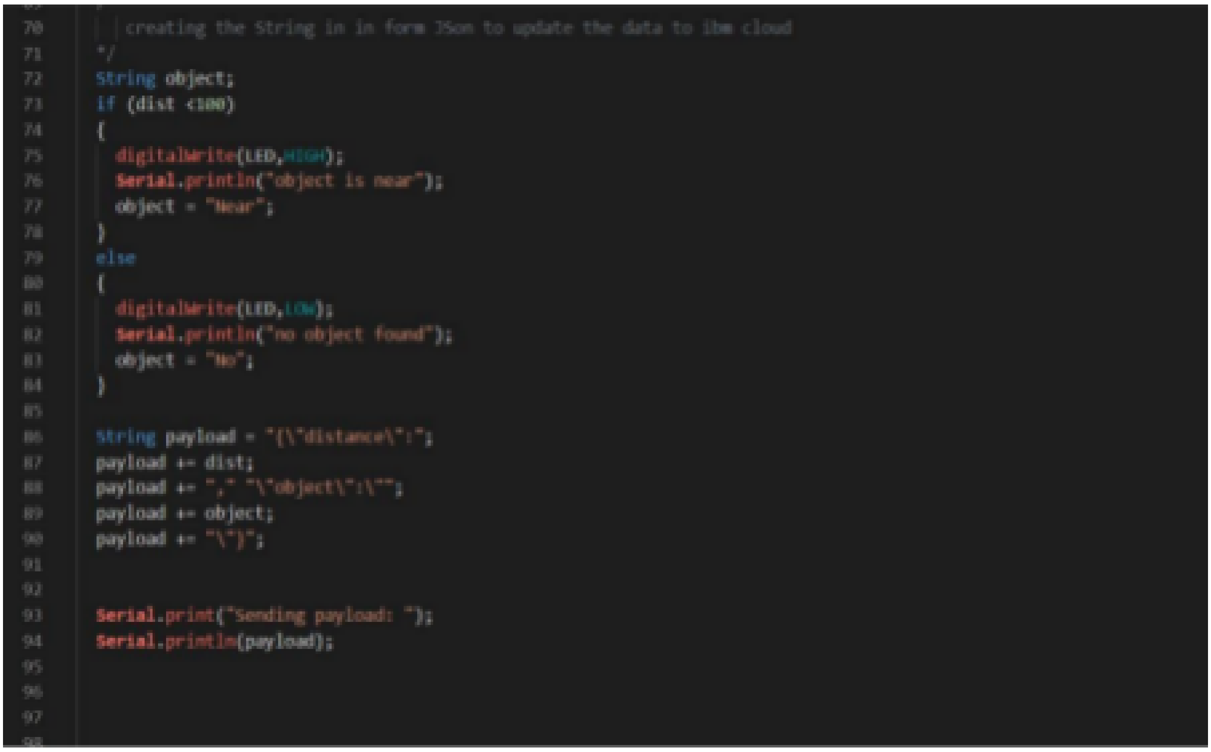
## Code:



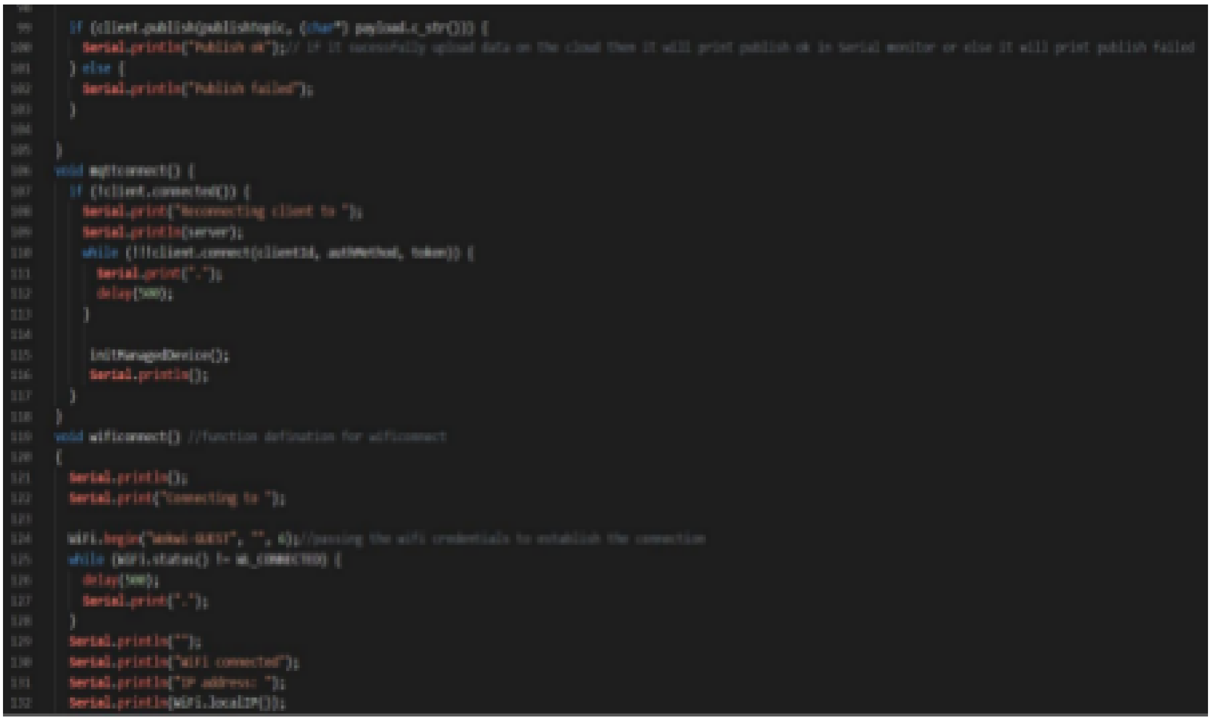
```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for mqtt
void callback(char subscribetopic, byte payload, unsigned int payloadLength);


#define ORG 4h0jp"//IBM ORGANITION ID
#define DEVICE_TYPE "ULTRASON
#define DEVICE_ID "DISTANCEDETECT
#define TOKEN "wuo5s7PR)ZSegvk&Rx"
String data3;
float dist;
char server[] =ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] "iot-2/evt/data/fmt/json";
char authMethod[]"use-token-auth";// authentication method
char token[] TOKEN;
char clientId[]"d:" ORG ":" DEVICE_TYPE":"DEVICE_ID;//client id

int LED = 4;
int trig 5;
int echo= 18;
void setic()
{
Serial.begin(115200);
}
```



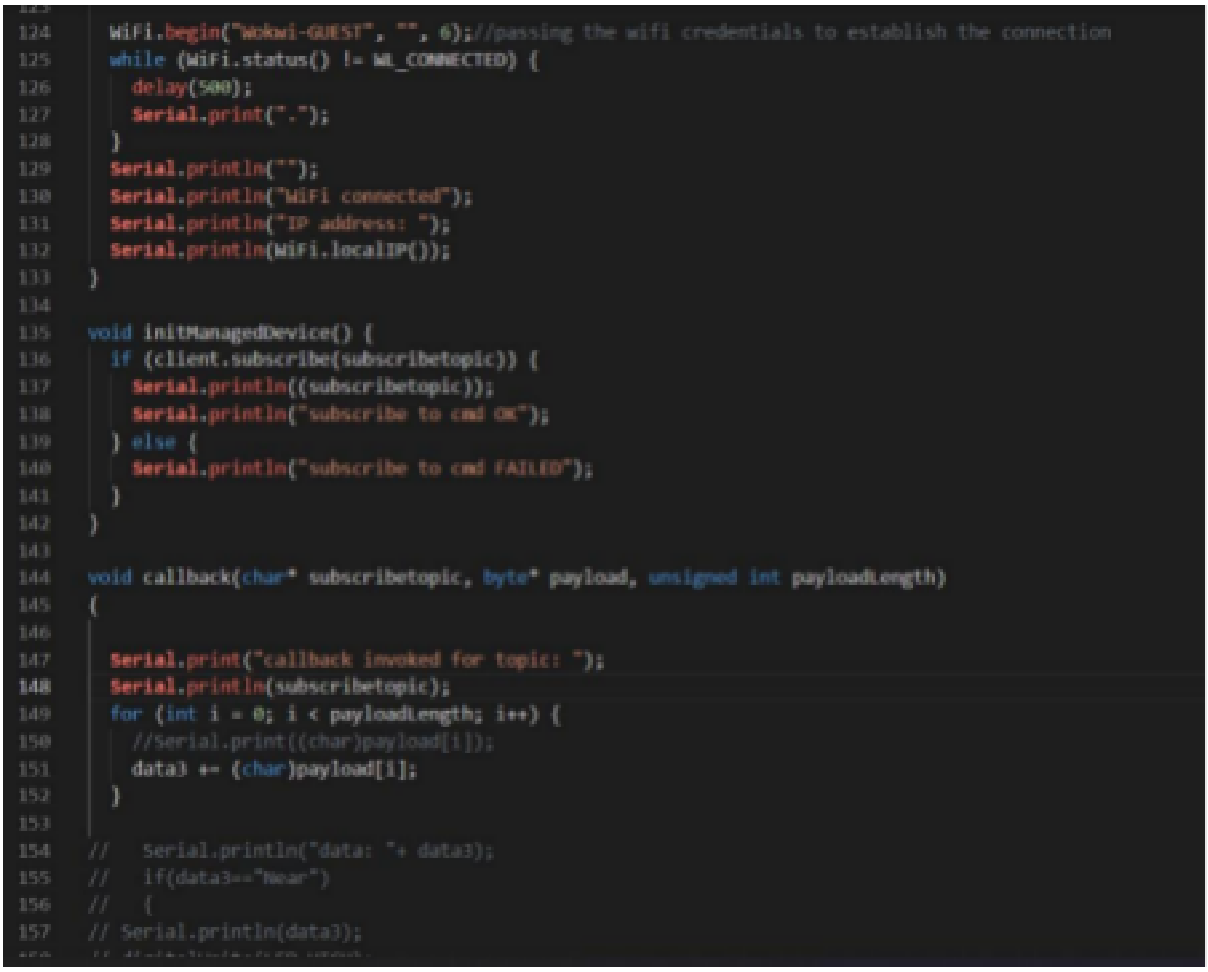
```
pinMode(trig,OUTPUT);
pinMode(echo,INPUT);
pinMode(LED, OUTPUT);
delay(10);
wificonnect();
mqttconnect();
}
void loop()// Recursive Function
{

 digitalWrite(trig,LOW);
  digitalWrite(trig,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig,LOW);
  float dur = pulseIn(echo,HIGH);
  float dist = (dur * 0.0343)/2;
  Serial.print ("Distancein cm");
  Serial.println(dist);


  PublishData(dist);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}



/*......................................retrieving to Cloud...............................*/

void PublishData(float dist) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
```



```
     creating the String in in form JSon to update the data to ibm cloud
  */
  String object;
  if (dist <100)
  {
    digitalWrite(LED,HIGH);
    Serial.println("object is near");
    object = "Near";
  }
  else
  {
    digitalWrite(LED,LOW);
    Serial.println("no object found");
    object = "No";
  }

  String payload = "{\"distance\":";
  payload += dist;
  payload += "," "\"object\":\"";
  payload += object;
  payload += "\"}";


  Serial.print("Sending payload: ");
  Serial.println(payload);
```

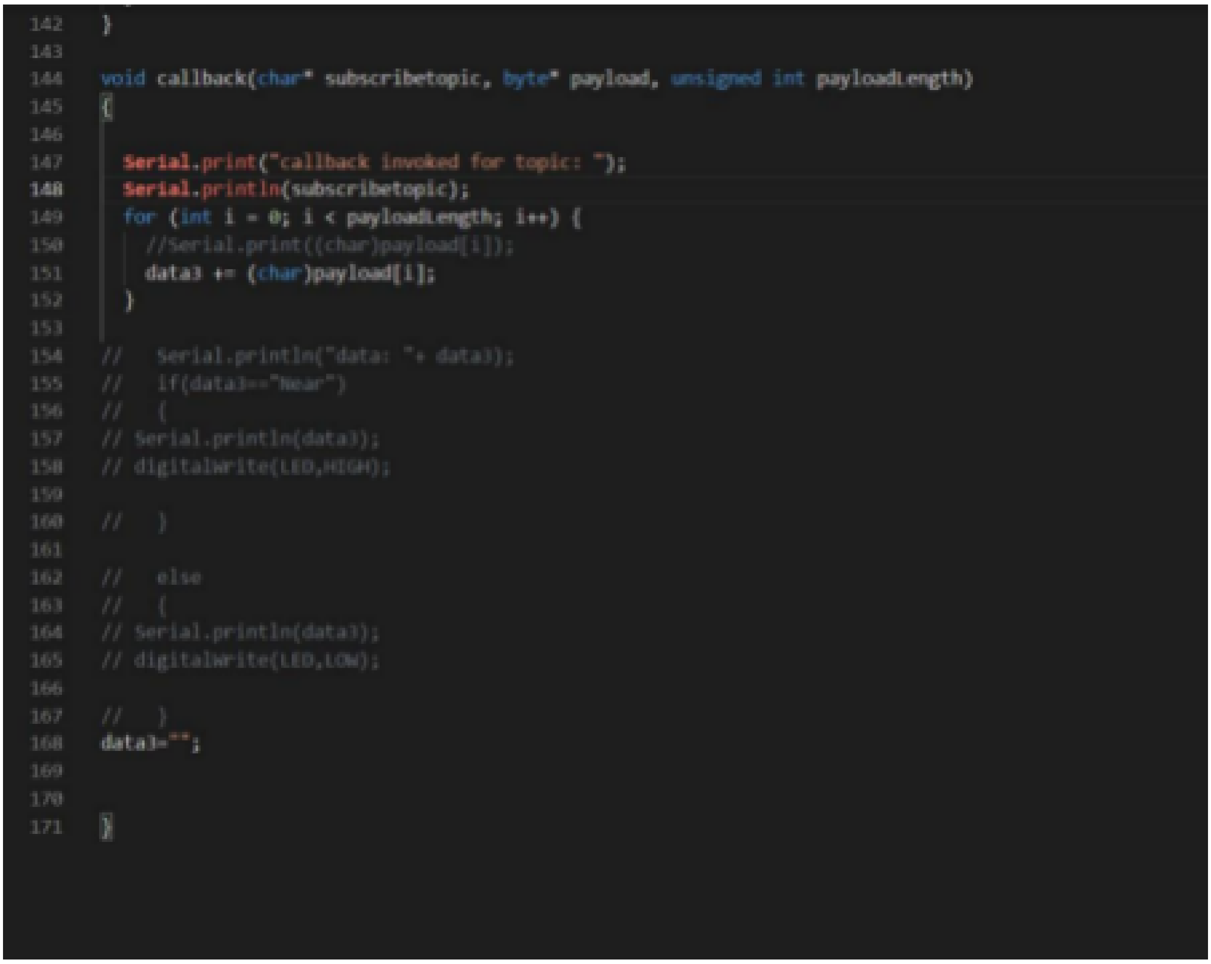


```
  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it successfully upload data on the cloud then it will print publish ok in serial monitor or else it will print publish failed
  } else {
    Serial.println("Publish failed");
  }

}
void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!!!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }

     initManagedDevice();
     Serial.println();
  }
}
void wificonnect() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
```

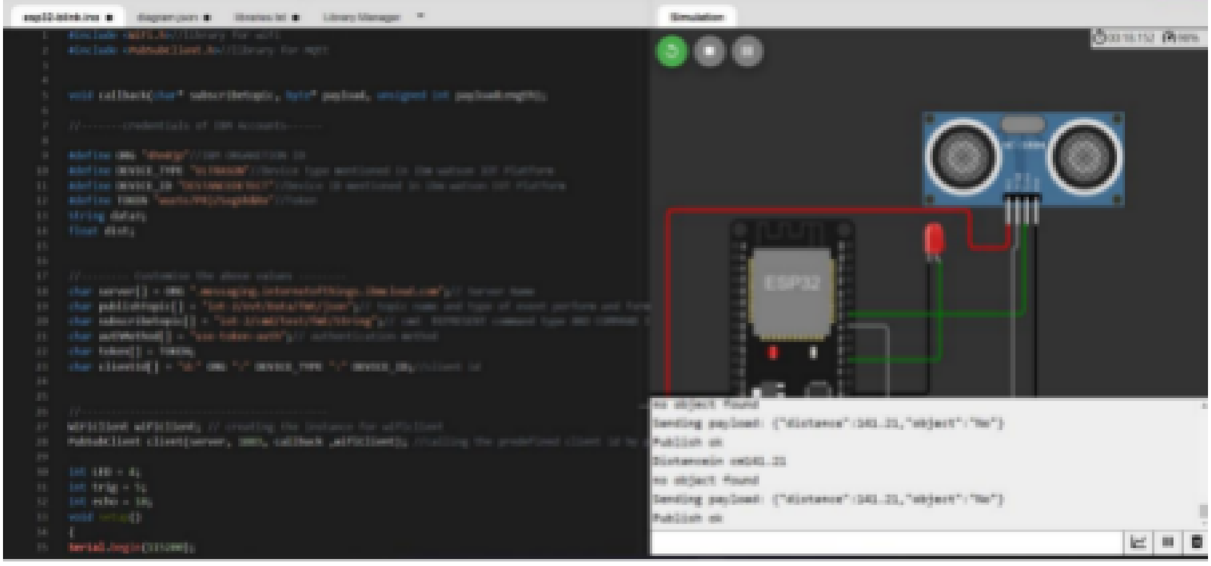


```
  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
```

```
}

void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println((subscribetopic));
    Serial.println("subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd 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++) {
    //Serial.print((char)payload[i]);
    data3 += (char)payload[i];
  }

//   Serial.println("data: "+ data3);
//   if(data3=="Near")
//   {
// Serial.println(data3);
```



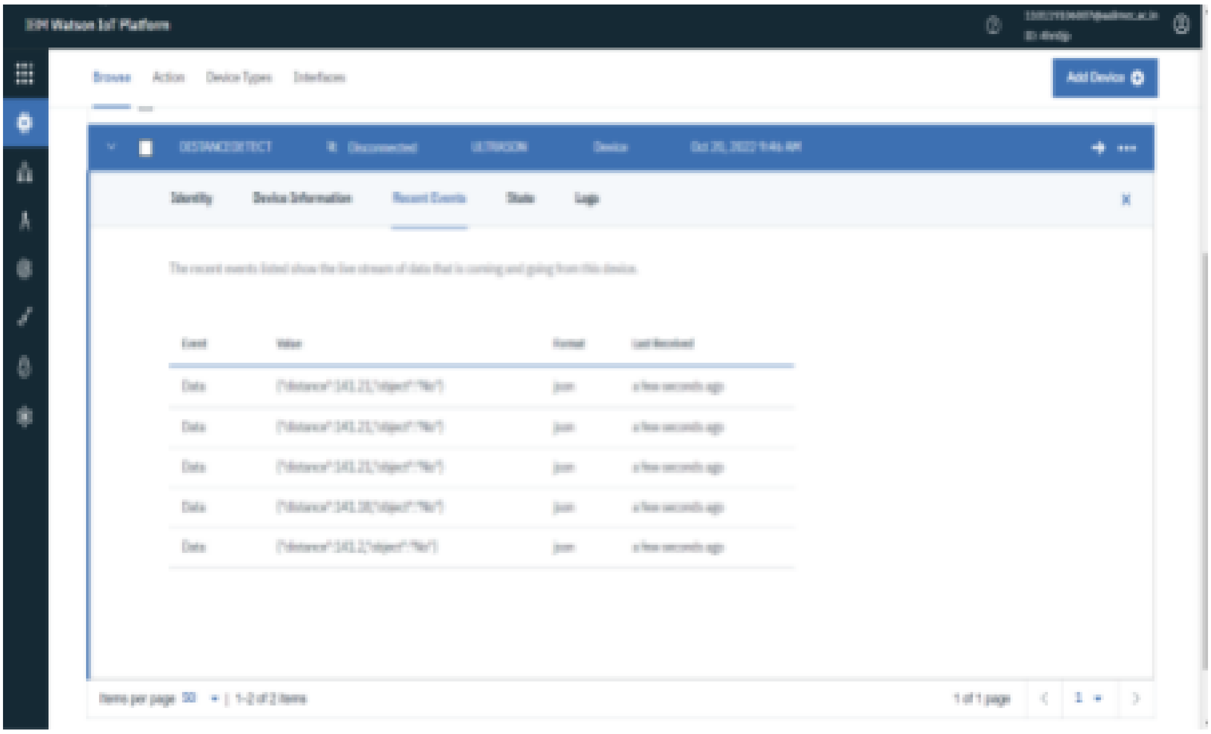
```
}

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++) {
    //Serial.print((char)payload[i]);
    data3 += (char)payload[i];
  }

//   Serial.println("data: "+ data3);
//   if(data3=="Near")
//   {
// Serial.println(data3);
// digitalWrite(LED,HIGH);

//   }

//   else
//   {
// Serial.println(data3);
// digitalWrite(LED,LOW);

//   }
data3="";


}
```



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


void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

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

#define ORG "[illegible]"//IBM ORGANITION ID
#define DEVICE_TYPE "[illegible]"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "[illegible]"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "[illegible]"//Token
String data3;
float dist;


//-------- Customise the 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 form
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd  REPRESENT command type AND COMMAND I
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id


//-----------------------------------
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client id by p

int LED = 4;
int trig = 5;
int echo = 18;
void setup()
{
Serial.begin(115200);
```

```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```

Data send to the IBM cloud service when the object is far



DISTANCEDETECT Disconnected ULTRASON Device Oct 20, 2022 9:46 AM

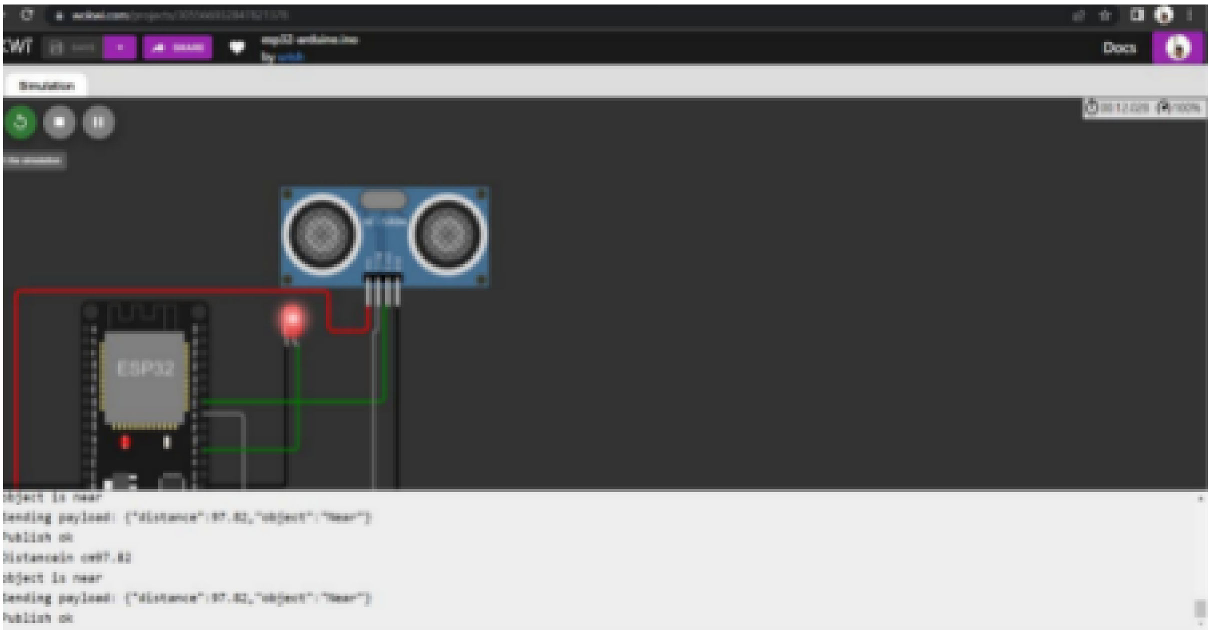
The recent events listed show the live stream of data that is coming and going from this device.

| Event | Value | Format | Last Received |
|---|---|---|---|
| Data | {"distance":141.21,"object":"No"} | json | a few seconds ago |
| Data | {"distance":141.21,"object":"No"} | json | a few seconds ago |
| Data | {"distance":141.21,"object":"No"} | json | a few seconds ago |
| Data | {"distance":141.18,"object":"No"} | json | a few seconds ago |
| Data | {"distance":141.2,"object":"No"} | json | a few seconds ago |

Items per page 50 | 1-2 of 2 items

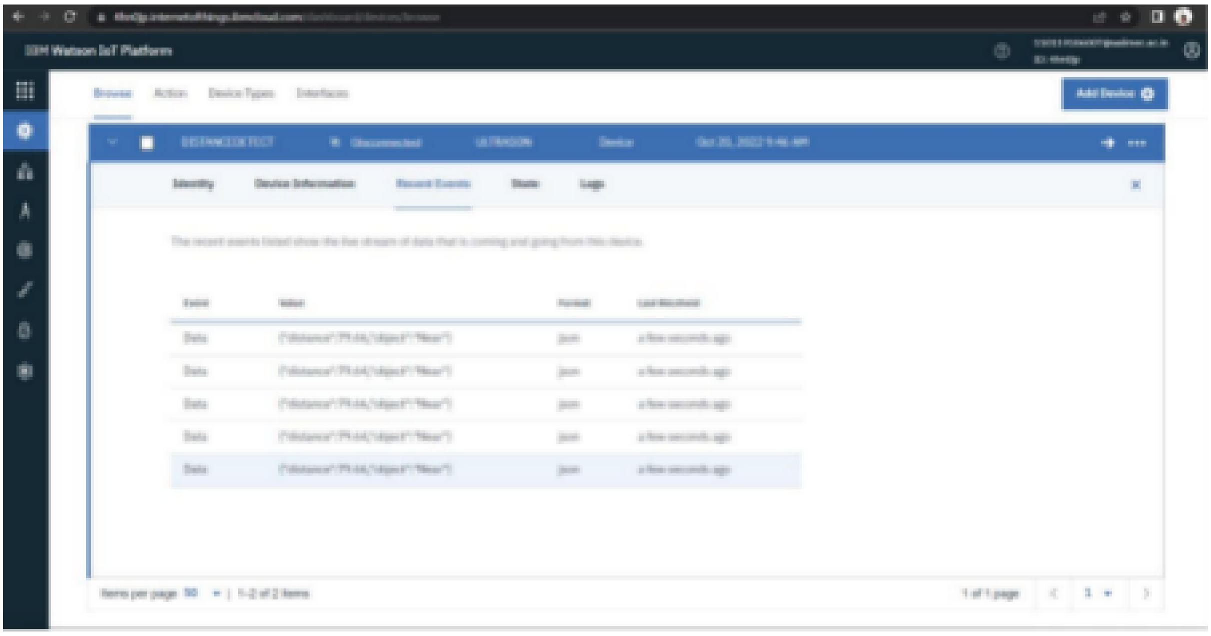
1 of 1 page

When object is near to the ultrasonic sensor



```
bject is near
ending payload: {"distance":97.82,"object":"Near"}
Publish ok
Distancein cm97.82
bject is near
ending payload: {"distance":97.82,"object":"Near"}
Publish ok
```

Data sent to the IBM Cloud Device when the objects is near



The recent events listed show the live stream of data that is coming and going from this device.

| Event | Value | Format | Last Received |
|---|---|---|---|
| Data | {"distance":79.66,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":79.66,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":79.66,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":79.66,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":79.66,"object":"Near"} | json | a few seconds ago |