ASSIGNMENT -4

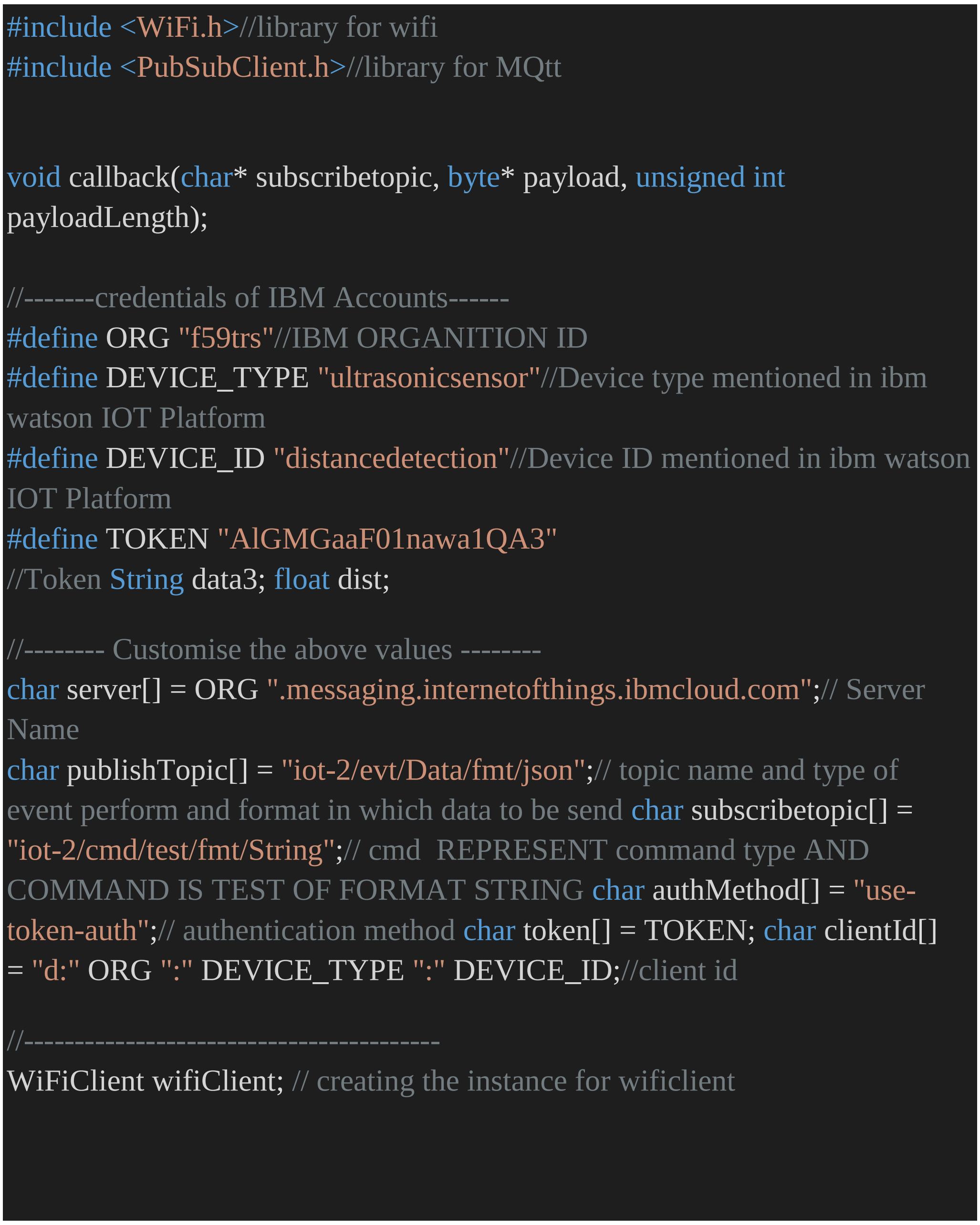
Distance Detection Using Ultrasonic Sensor

Assignment Date	19 October 2022
Student Name	PRASAD.M
Student Roll Number	1901140
Maximum Marks	2 Marks

Question-1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cms send "alert" to ibm cloud and display in device recent events.

WOKWI LINK :
https://wokwi.com/projects/345964118720643668 **C ODE:**



```
#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 "f59trs"//IBM ORGANITION ID
#define DEVICE_TYPE "ultrasonicsensor"//Device type mentioned in ibm
watson IOT Platform
#define DEVICE_ID "distancedetection"//Device ID mentioned in ibm watson
IOT Platform
#define TOKEN "AlGMGaaF01nawa1QA3"
//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 format in which data to be send char subscribetopic[] =
"iot-2/cmd/test/fmt/String";// cmd  REPRESENT command type AND
COMMAND IS TEST OF FORMAT STRING 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 passing parameter like server id,portand
wificredential
 int LED = 4; int
trig = 5; int echo
= 18; void
setup()
{
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
  */
  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 sucessfully 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());
}  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);
// digitalWrite(LED,HIGH);

//   }

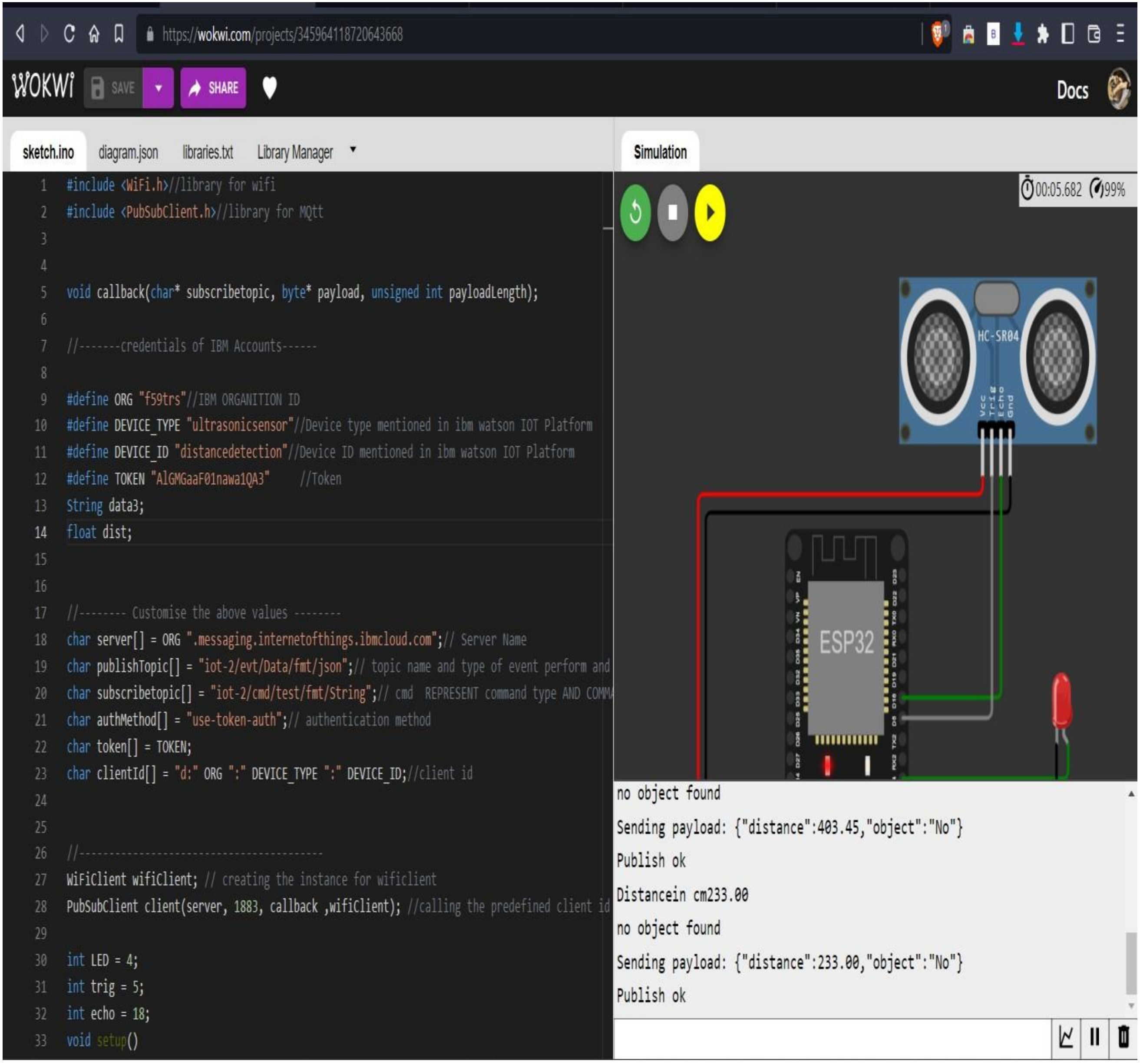
//   else
//   {
// Serial.println(data3);
// digitalWrite(LED,LOW);

//    }
data3="";


}
```

OUTPUT :

When object is not near to the ultrasonic sensor



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

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#define DEVICE_ID "distancedetection"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "AlGMGaaF01nawa1QA3"     //Token
String data3;
float dist;



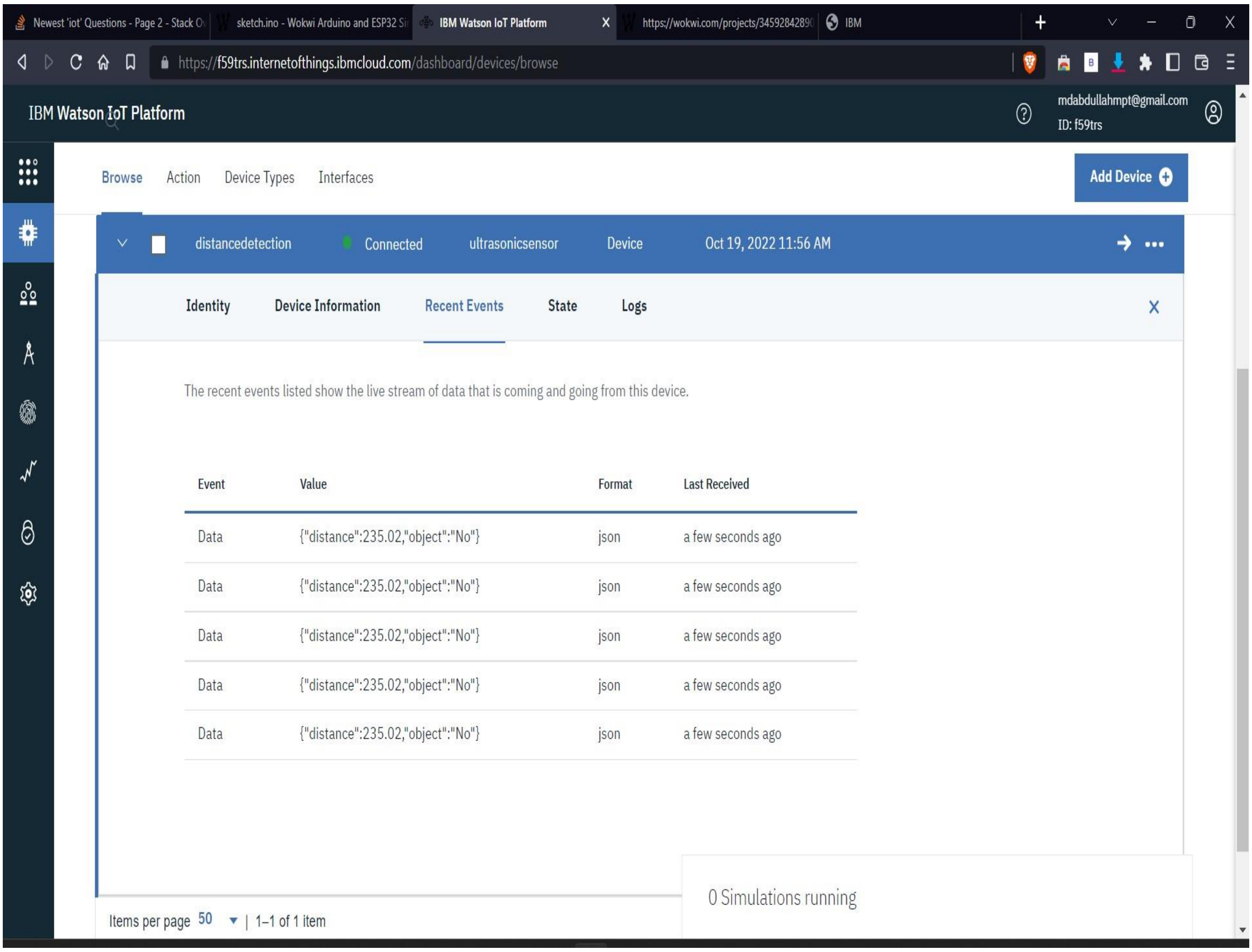
//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd  REPRESENT command type AND COMM
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

int LED = 4;
int trig = 5;
int echo = 18;
void setup()
```

```
no object found
Sending payload: {"distance":403.45,"object":"No"}
Publish ok
Distancein cm233.00
no object found
Sending payload: {"distance":233.00,"object":"No"}
Publish ok
```

Data sent to the IBM cloud device when the object is far



Newest 'iot' Questions - Page 2 - Stack O
sketch.ino - Wokwi Arduino and ESP32 Si
IBM Watson IoT Platform
https://wokwi.com/projects/34592842890
IBM
https://f59trs.internetofthings.ibmcloud.com/dashboard/devices/browse
IBM Watson IoT Platform
mdabdullahmpt@gmail.com
ID: f59trs
Browse
Action
Device Types
Interfaces
Add Device

distancedetection | Connected | ultrasonicsensor | Device | Oct 19, 2022 11:56 AM

Identity
Device Information
Recent Events
State
Logs

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":235.02,"object":"No"}	json	a few seconds ago
Data	{"distance":235.02,"object":"No"}	json	a few seconds ago
Data	{"distance":235.02,"object":"No"}	json	a few seconds ago
Data	{"distance":235.02,"object":"No"}	json	a few seconds ago
Data	{"distance":235.02,"object":"No"}	json	a few seconds ago

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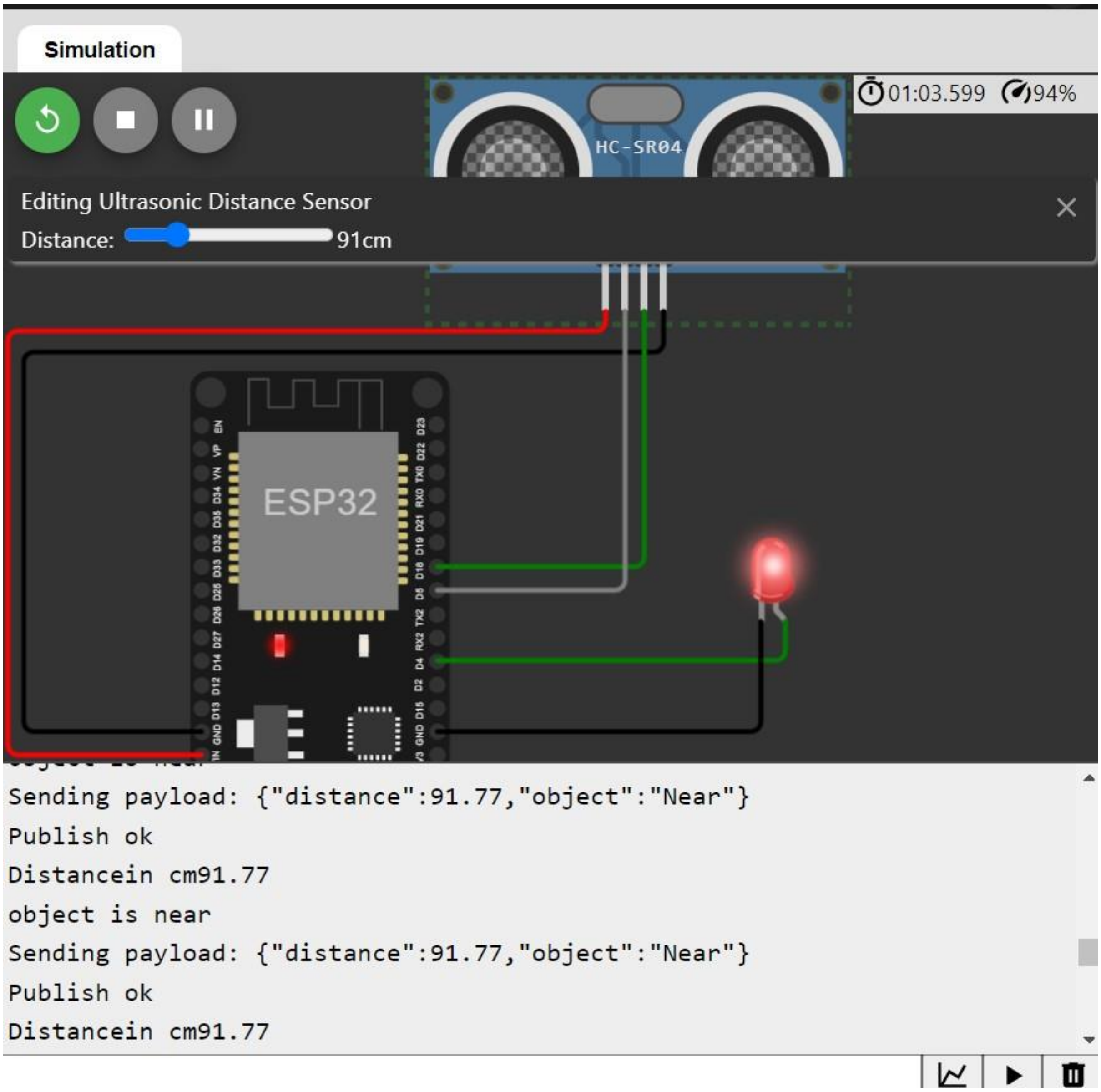
0 Simulations running

When object is nearer to the ultrasonic sensor

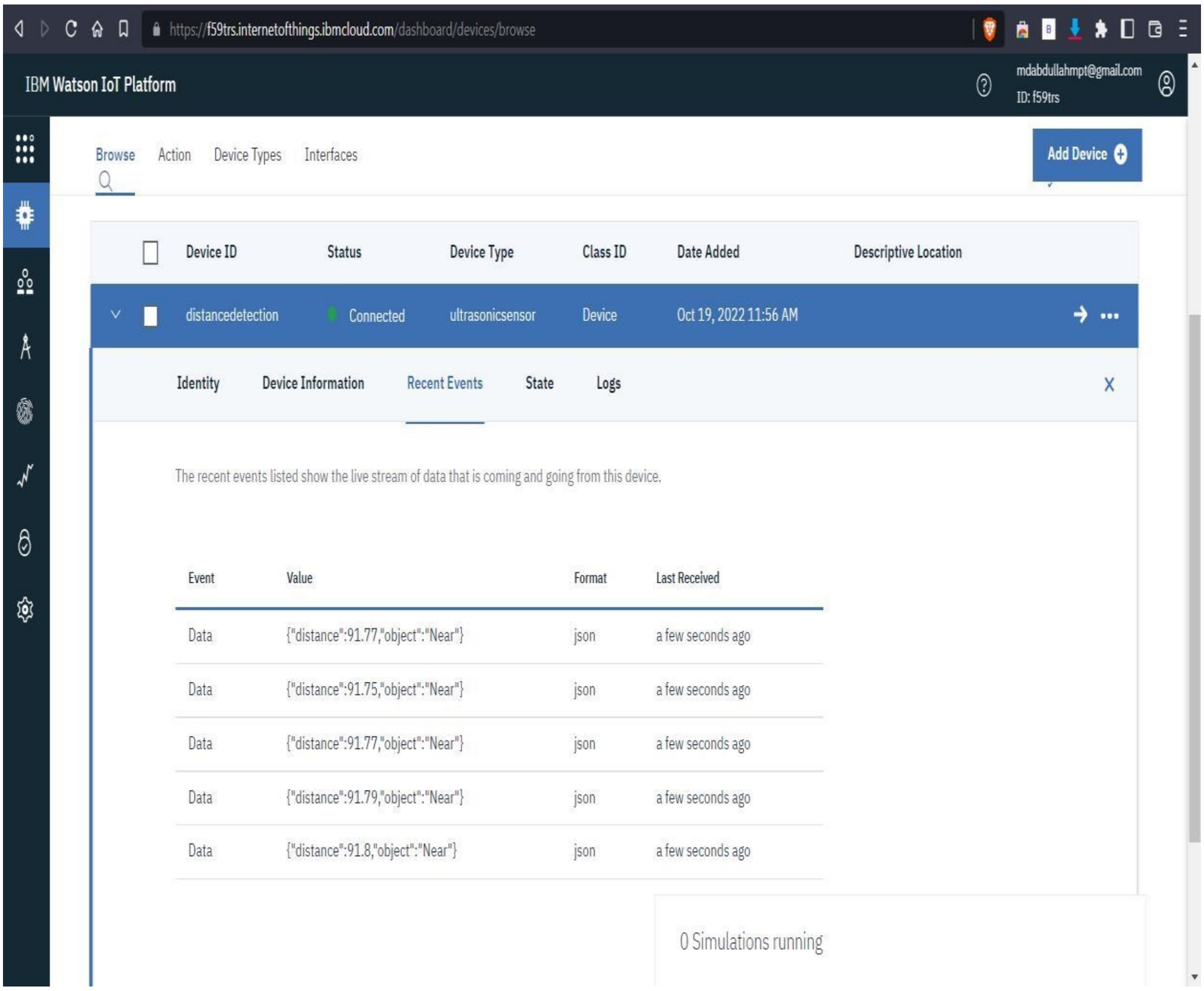


Editing Ultrasonic Distance Sensor

Distance: 91cm

```
object is near
Sending payload: {"distance":91.77,"object":"Near"}
Publish ok
Distancein cm91.77
object is near
Sending payload: {"distance":91.77,"object":"Near"}
Publish ok
Distancein cm91.77
```

Data sent to the IBM cloud device when the object is near



Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
distancedetection	Connected	ultrasonicsensor	Device	Oct 19, 2022 11:56 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":91.77,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.75,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.77,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.79,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.8,"object":"Near"}	json	a few seconds ago

0 Simulations running

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