Assignment -4

Distance Detection Using Ultrasonic Sensor

Assignment Date	26 October 2022
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Maximum Marks	2 Marks

Question-1:

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

WOKWI LINK: https://wokwi.com/projects/346574219953308244

CODE:

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


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

//———credentials of IBM Accounts———

#define ORG "f59trs"//IBM ORGANITION ID
#define DEVICE_TYPE "ultrasonicsensor"//Device type mentioned inibm watson IOT
Platform
#define DEVICE_ID "distancedetection"//Device ID mentioned in ibmwatson IOT
Platform
#define TOKEN "AlGMGaaF01nawa1QA3"
                                                    //Toke
nString 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 andtype of event
performand 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 methodchar token[] =
TOKEN;char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//clientid


//                                                  -
WiFiClient wifiClient; // creating the instance for wificlient
```

```
PubSubClient client(server, 1883, callback ,wifiClient);
//calling the predefined client id by passing parameter likeserver 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
    connectingto ibm
     /*
          creating the String in in form JSon to update the data toibm 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 dataon the cloud then it
willprint publish ok in Serial monitor or else it will print publish failed
     } else {
        Serial.println("Publish failed");
     }

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

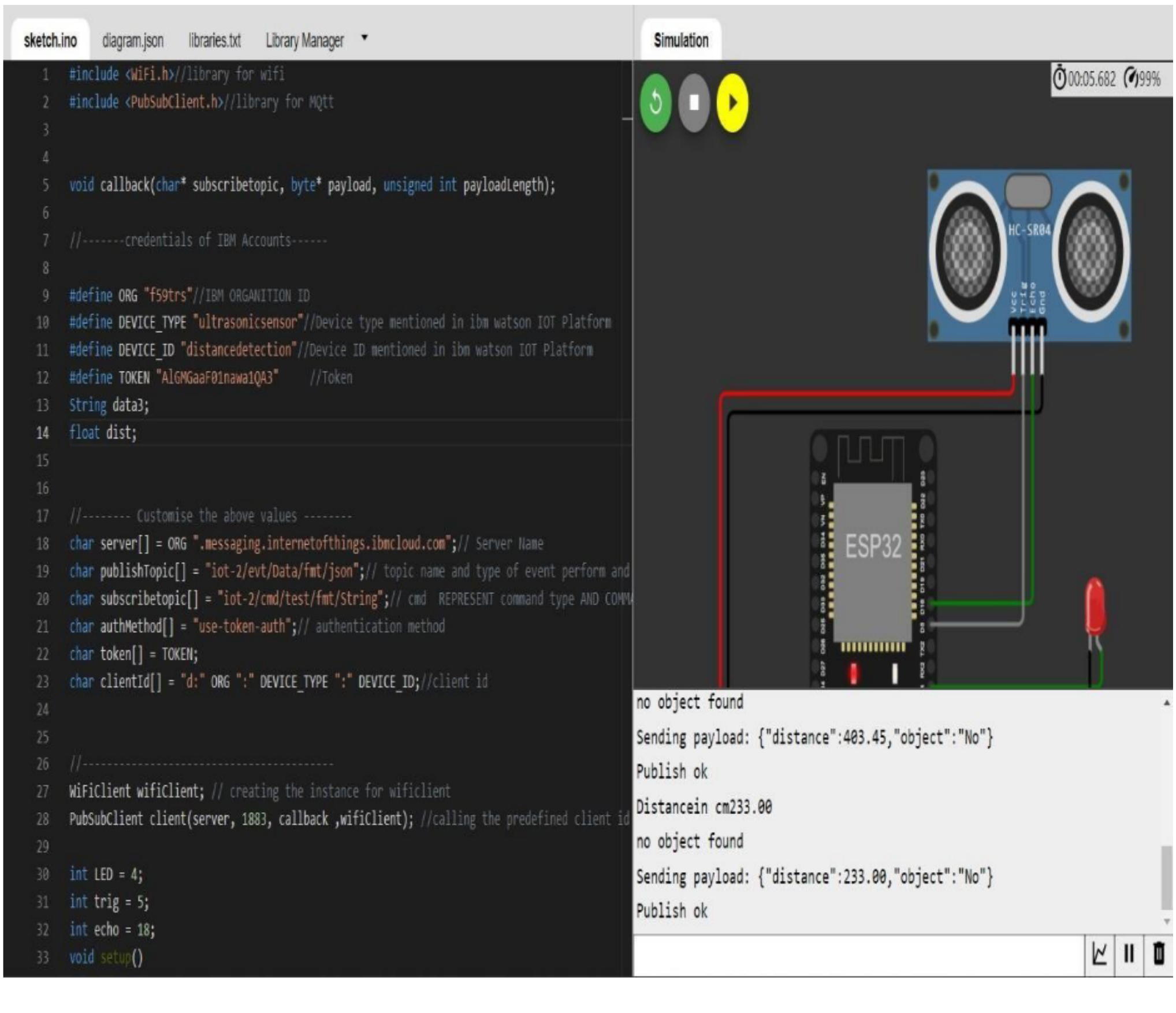
```
         initManagedDevice();
         Serial.println();
   }
}
```

```
void wificonnect() //function defination for wificonnect
{
    Serial.println();
    Serial.print("Connectingto ");

    WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentialsto 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 intpayloadLength)
{

    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);
```

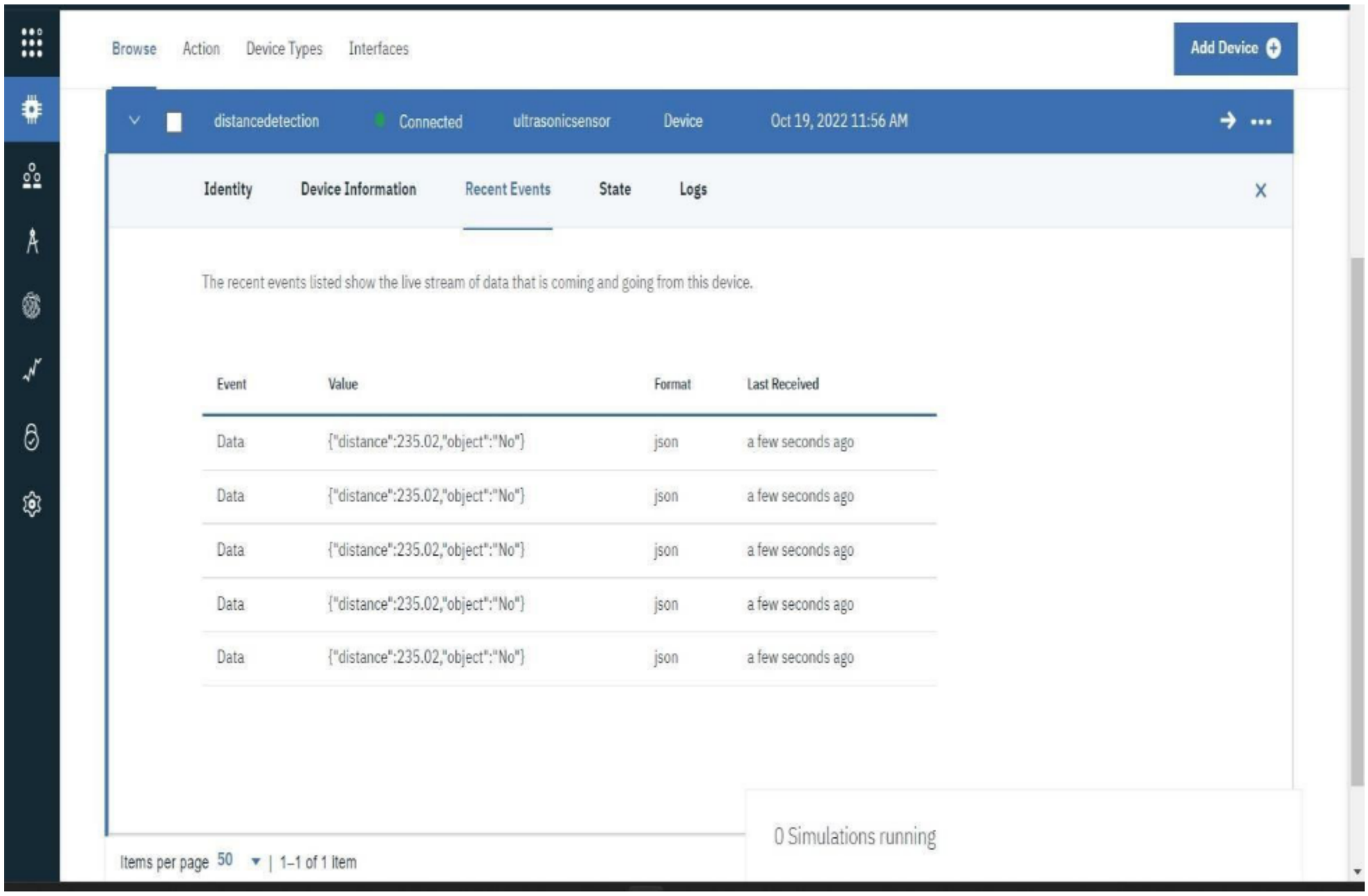
```
// digitalWrite(LED,LOW);

//       }
data3="";


}
```

OUTPUT:

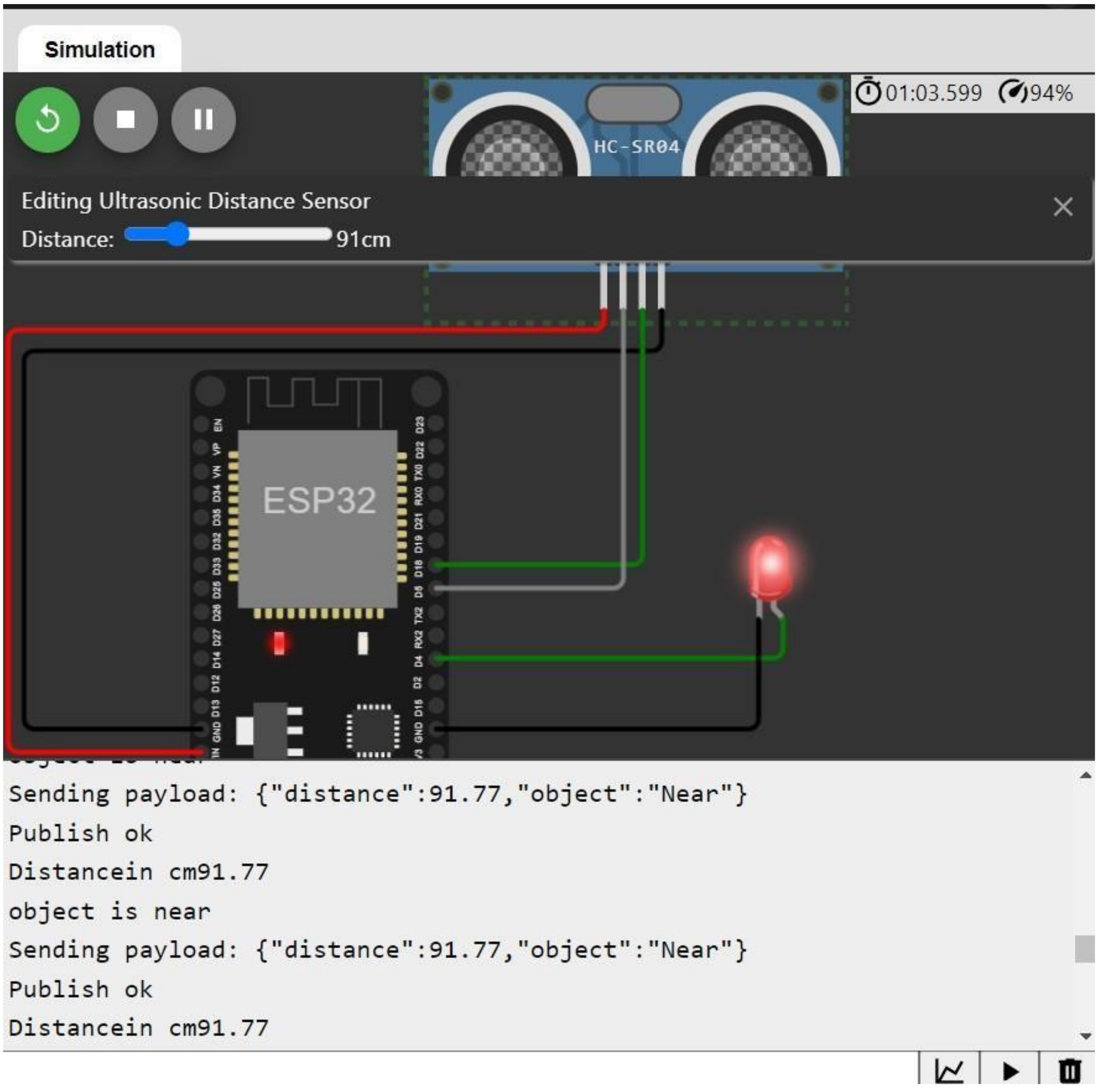
When object is not near to the ultrasonic sensor



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



When object is nearer to the ultrasonic sensor



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