Assignment - 4

Distance Detection Using Ultra Sonic Sensor

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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.

CODE:

```
#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)
```

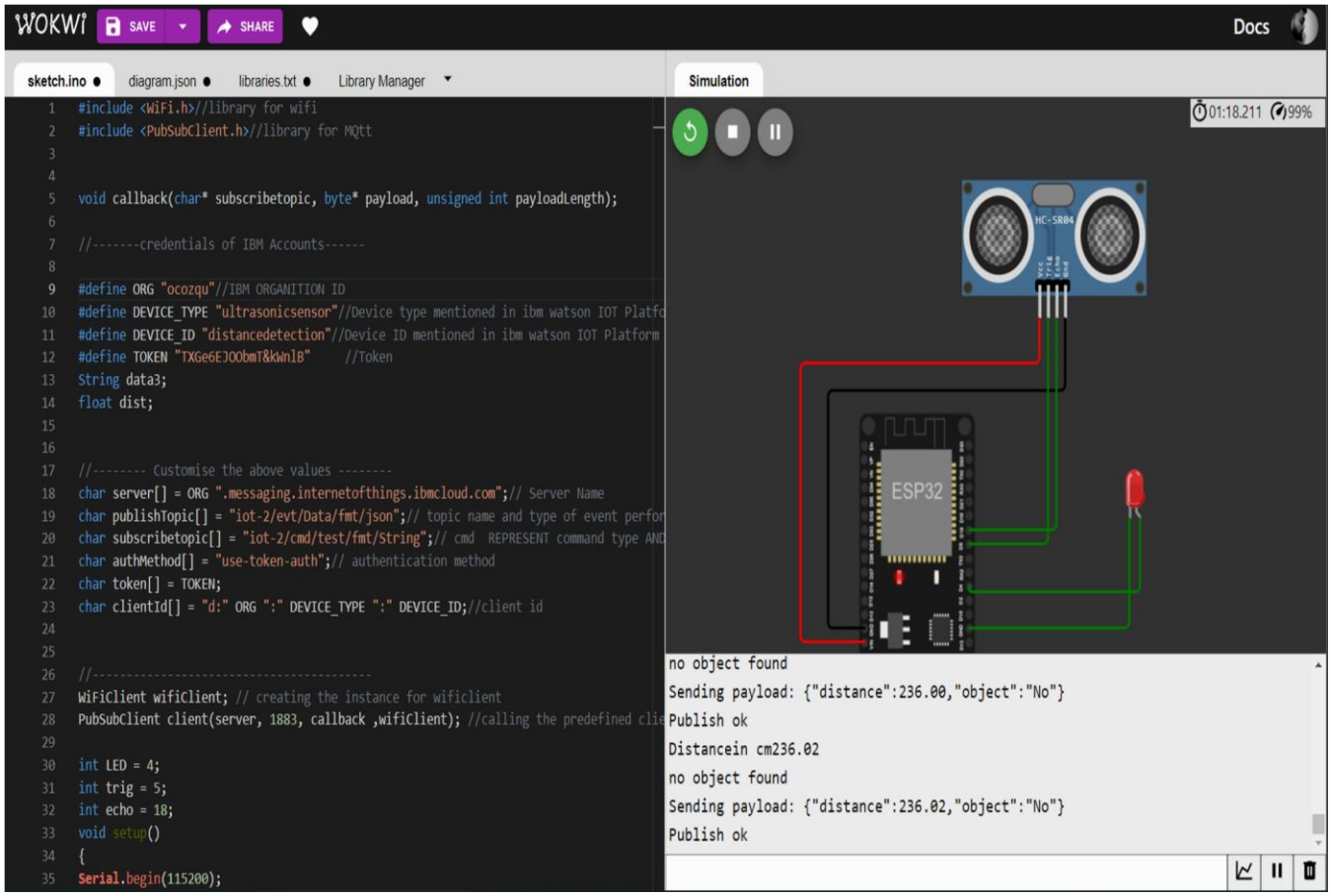
```
  {
    digitalWrite(LED,HIGH);
    Serial.println("object is near");
object = "Near";
  }
else
{
    digitalWrite(LED,LOW);
    Serial.println("no object found");
object = "No";
  }

  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);
```

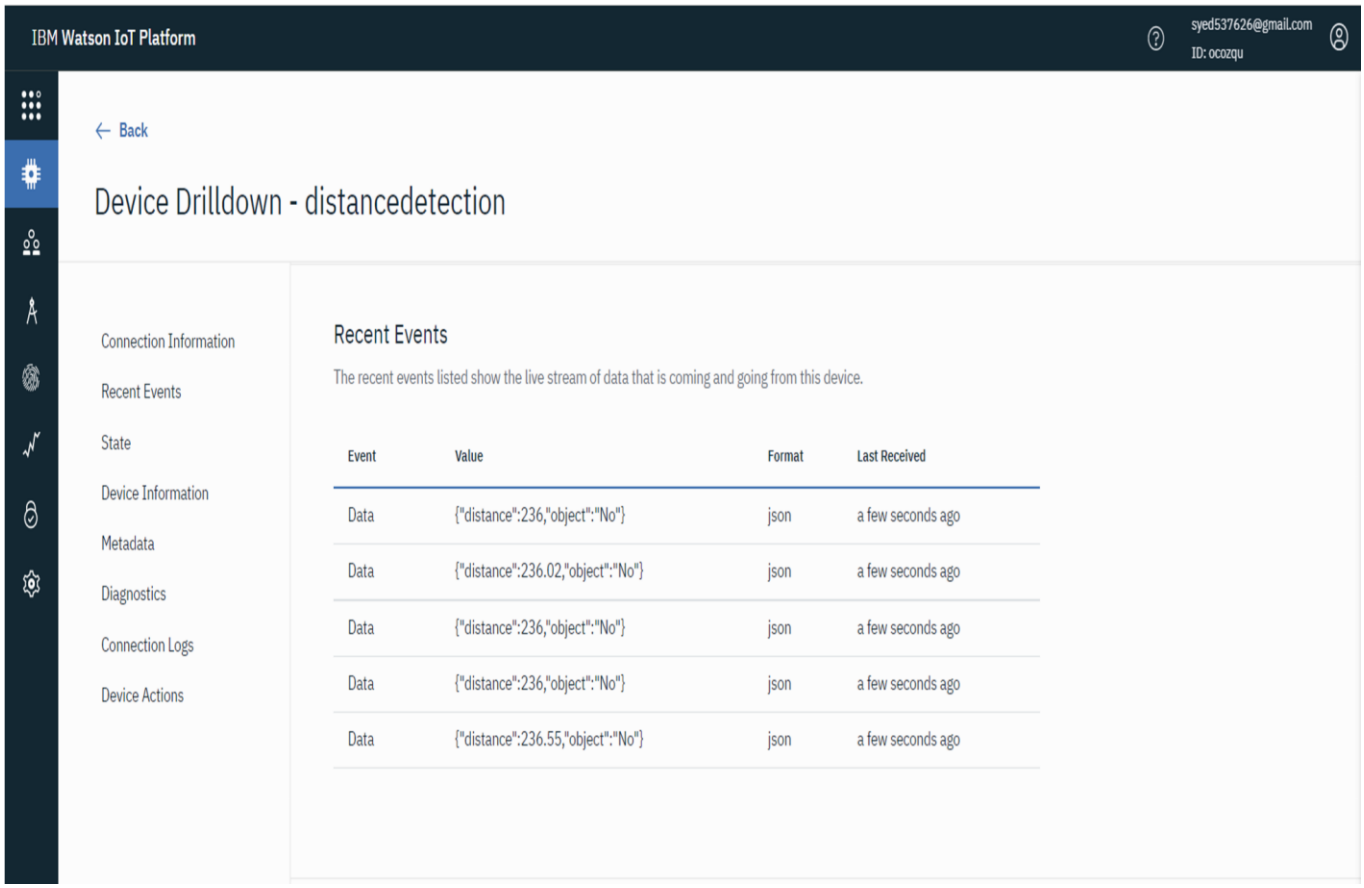
```
//    }
data3="";


}
```

OUTPUT:

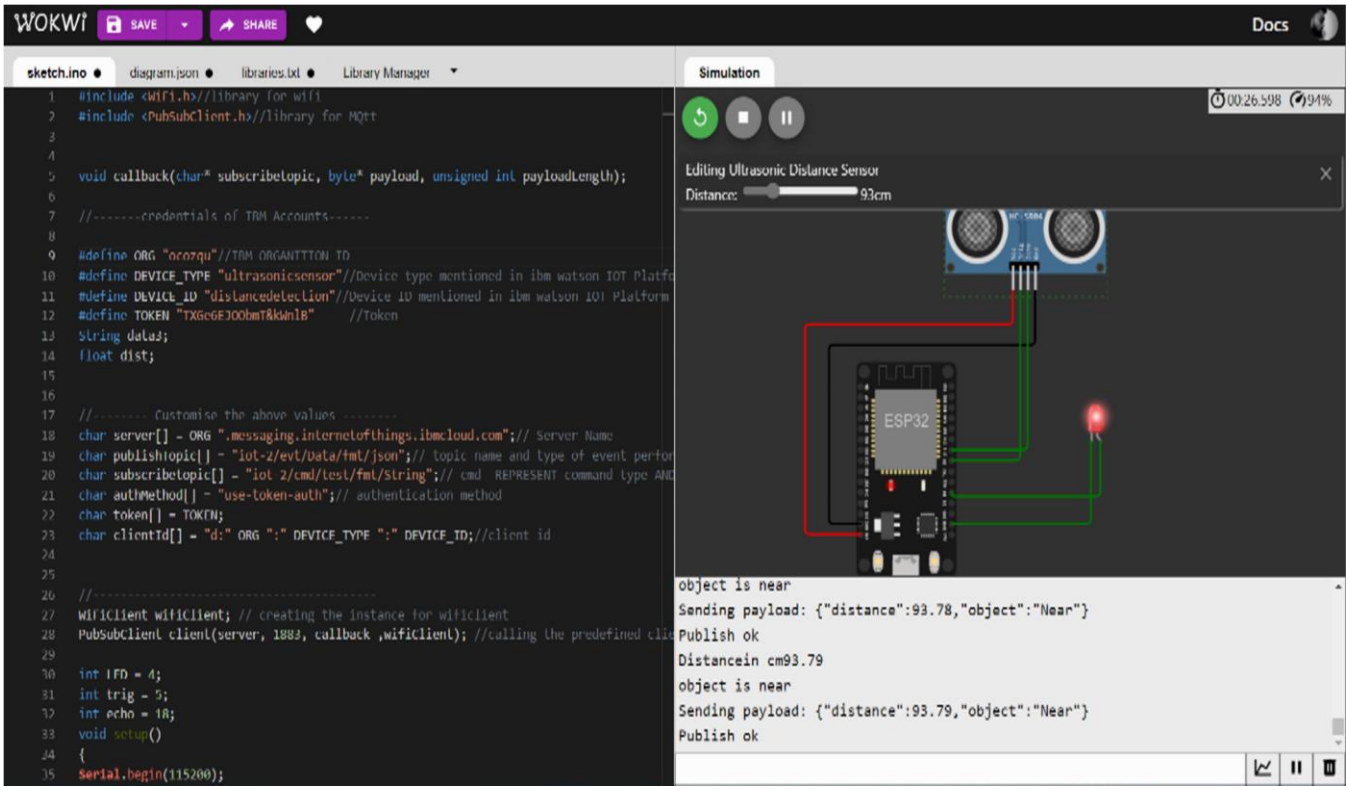
When the object is not near to ultrasonic sensor



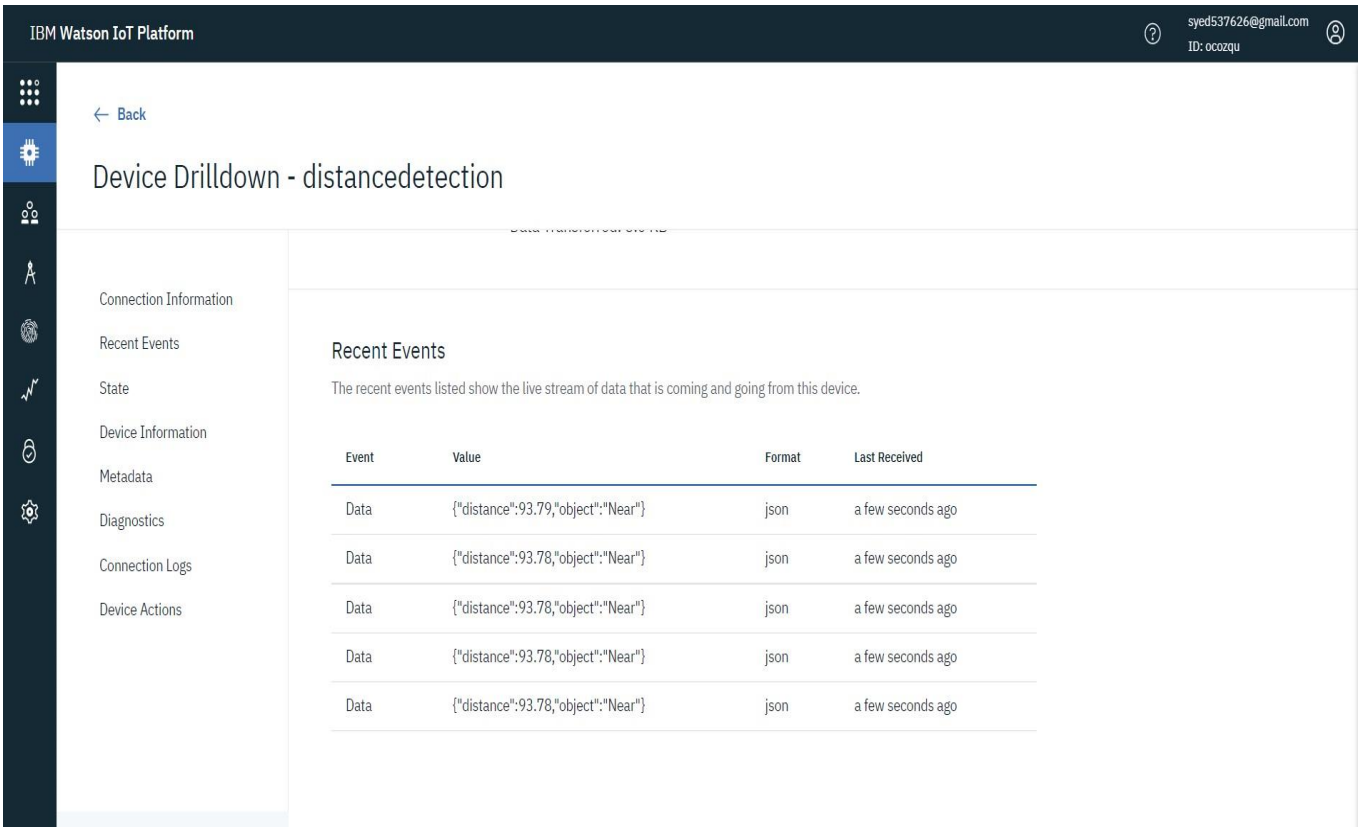
Data sent to the IBM Cloud device when the object is far



When the object is nearer to the ultrasonic sensor



Data sent to the IBM Cloud device when the device is near



https://wokwi.com/projects/346228322074624596