Assignment 4:

Title:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an "alert" to the IBM cloud and display in the device recent events. Upload document with wokwi share link and images of IBM cloud.

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Wowki Link: https://wokwi.com/projects/348308707259449940

Source Code:

```
#include <WiFi.h>//library for wifi
#include <WiFiClient.h>
#include <PubSubClient.h>//library for MQtt
#include <ArduinoJson.h>
// creating the instance by passing pin and typr of dht connected
float distance;
#define sound_speed 0.034
int trigpin=18;   int
echopin=19;  int led=5;
int LED=9;   long
duration;
 String message;// creating the instance by passing pin and typr of
dht connected

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

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

#define ORG "4k7d8l"//IBM ORGANITION ID
#define DEVICE_TYPE "IBM"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "63697477"//Device ID mentioned in ibm watson IOT
Platform
#define TOKEN "2(zMmQG_bjWs3d+-7b"     //Token
String data3; float
h, t; //--------
```

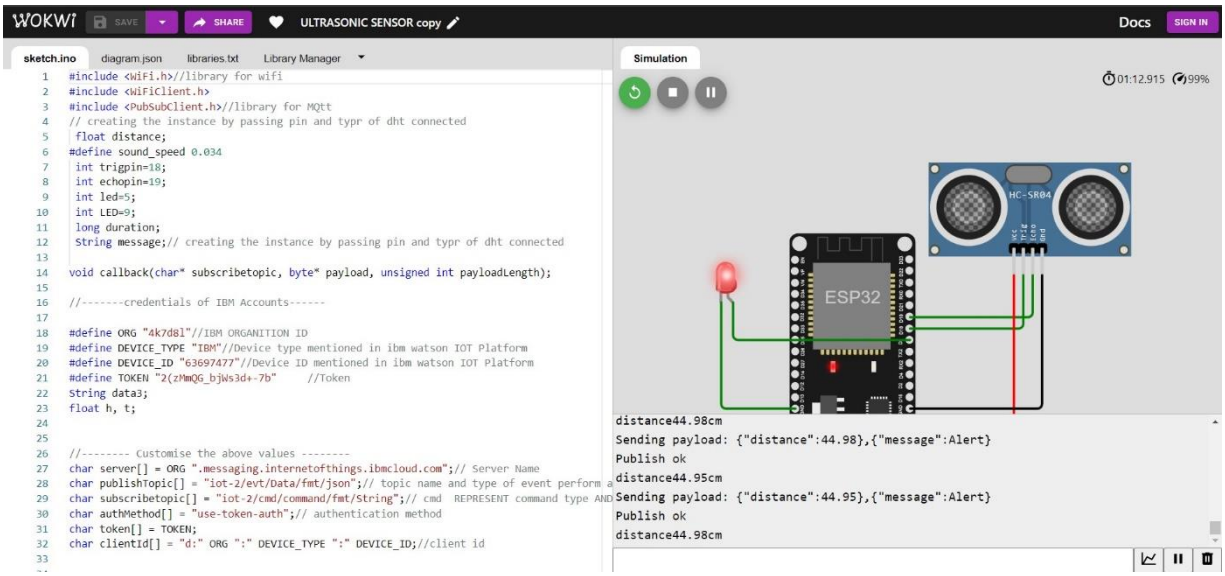
```
Customise the above
values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";//
Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and
type of event perform and format in which data to be send char
subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd
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
void setup()// configureing the ESP32
{
  Serial.begin(115200);
pinMode(trigpin,OUTPUT);
pinMode(echopin,INPUT);
pinMode(led,OUTPUT);
delay(10);   Serial.println();
wificonnect();
mqttconnect();
}

void loop()// Recursive Function
{

digitalWrite(trigpin,LOW);
digitalWrite(trigpin,HIGH);
delay(1000);
digitalWrite(trigpin,LOW);  duration=pulseIn(echopin,HIGH);
distance=duration*sound_speed/2;
Serial.println("distance"+String(distance)+"cm");
if(distance<100)
 {
   message="Alert";
digitalWrite(led,HIGH);
   } else {
  message="No problem";
digitalWrite(led,LOW);
  }
delay(1000);
```

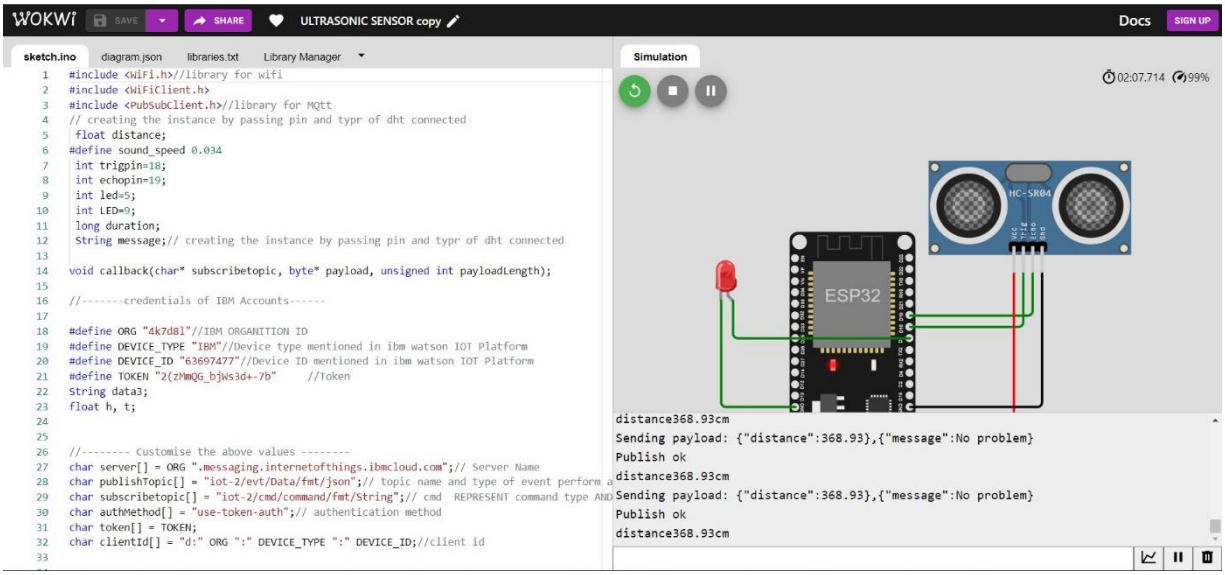
```
PublishData(dista
nce,message);
  // if (!client.loop()) {
  //   mqttconnect();
  // }
}


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

void PublishData(float d, String a) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm
cloud
  */
  DynamicJsonDocument doc(1024);
String payload;   doc["Distance:
"]=d;   doc["Message: "]=a;
serializeJson(doc, 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();
  }
```

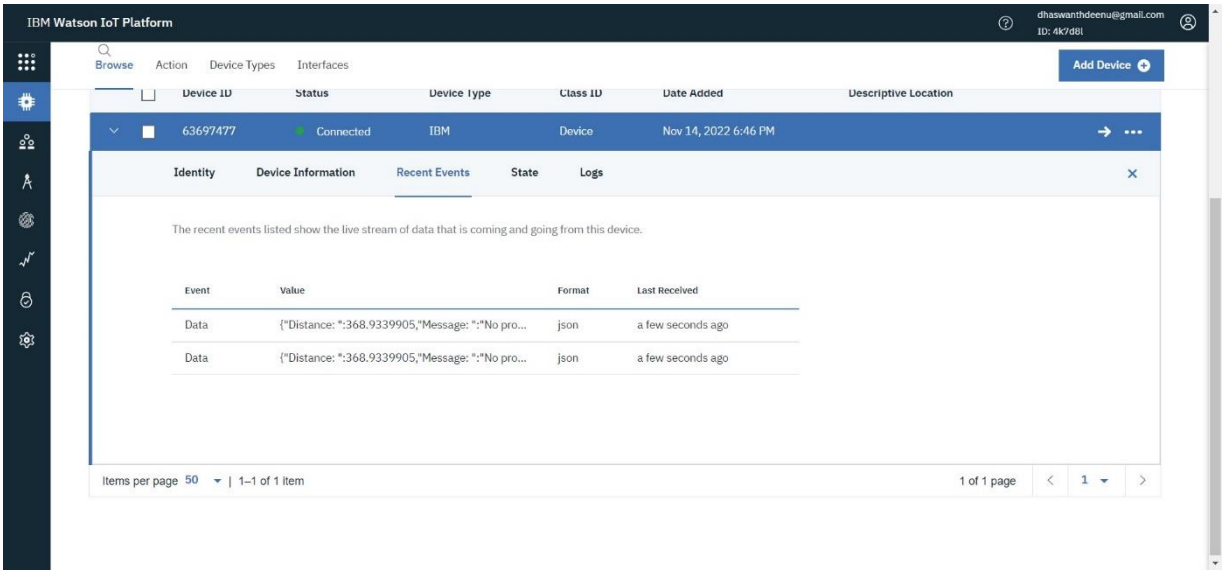
```
}
void wificonnect() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  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=="lighton")   {
Serial.println(data3);
digitalWrite(LED,HIGH);
  }
else
  {
Serial.println(data3);
digitalWrite(LED,LOW);
```

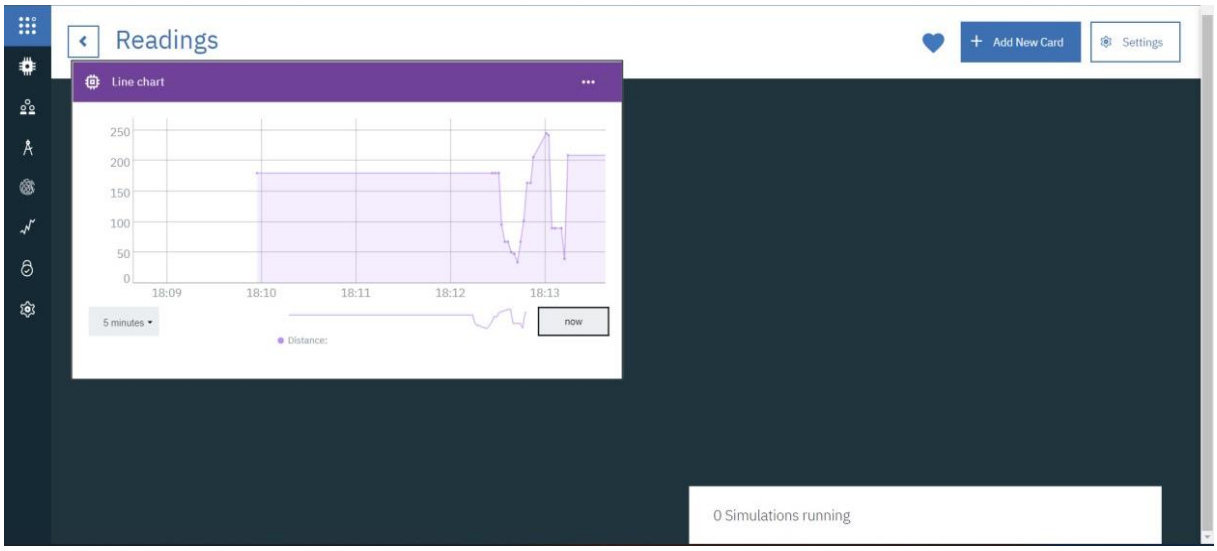
```
  } data3="";
}
```

Output:






IBM Watson IoT Platform
dhaswanthdeenu@gmail.com
ID: 4k7d8l
Browse
Action
Device Types
Interfaces
Add Device
Device ID
Status
Device Type
Class ID
Date Added
Descriptive Location
63697477
Connected
IBM
Device
Nov 14, 2022 6:46 PM
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: ":368.9339905,"Message: ":"No pro...
json
a few seconds ago
Data
{"Distance: ":368.9339905,"Message: ":"No pro...
json
a few seconds ago
Items per page 50
1–1 of 1 item
1 of 1 page
1


Readings
Add New Card
Settings
Line chart
250
200
150
100
50
0
18:09
18:10
18:11
18:12
18:13
5 minutes
now
Distance:
0 Simulations running