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/348055074867511890

Source Code:

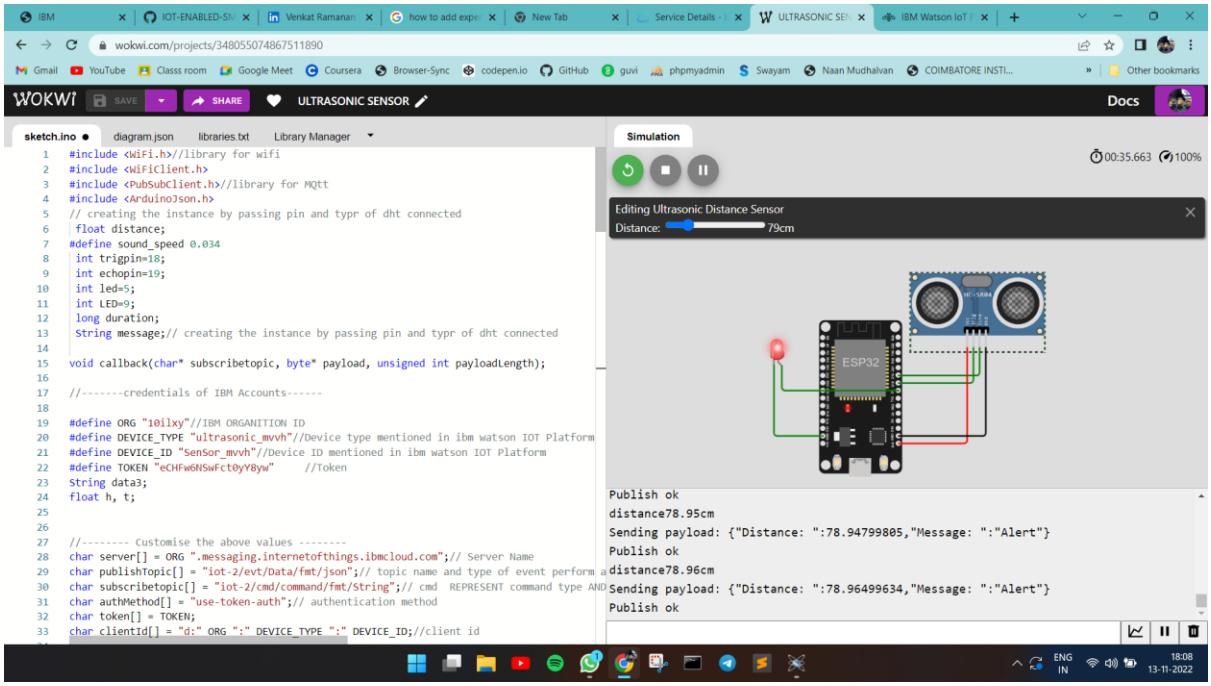
```
#include <WiFi.h>//library for wifi
#include <WiFiClient.h>
#include <PubSubClient.h>//library for MQtt
#include <ArduinoJson.h>
// creating the instance by passing pin and typr of dht connected
 float distance;
#define sound_speed 0.034
 int trigpin=18;
 int echopin=19;
 int led=5;
 int LED=9;
 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 "10ilxy"//IBM ORGANITION ID
#define DEVICE_TYPE "ultrasonic_mvvh"//Device type mentioned in ibm
watson IOT Platform
#define DEVICE_ID "SenSor_mvvh"//Device ID mentioned in ibm watson
IOT Platform
#define TOKEN "eCHFw6NSwFct0yY8yw"      //Token
String data3;
float h, t;
```

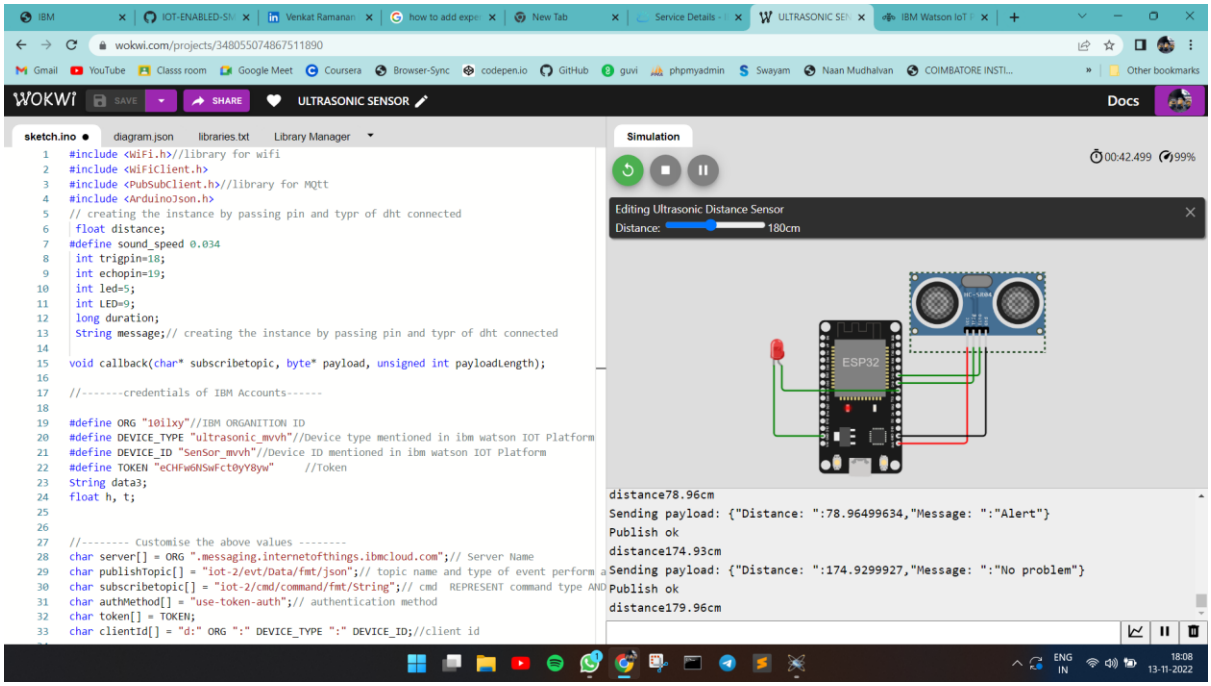
```
//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";//
Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and
type of event perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/command/fmt/String";//
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);
```

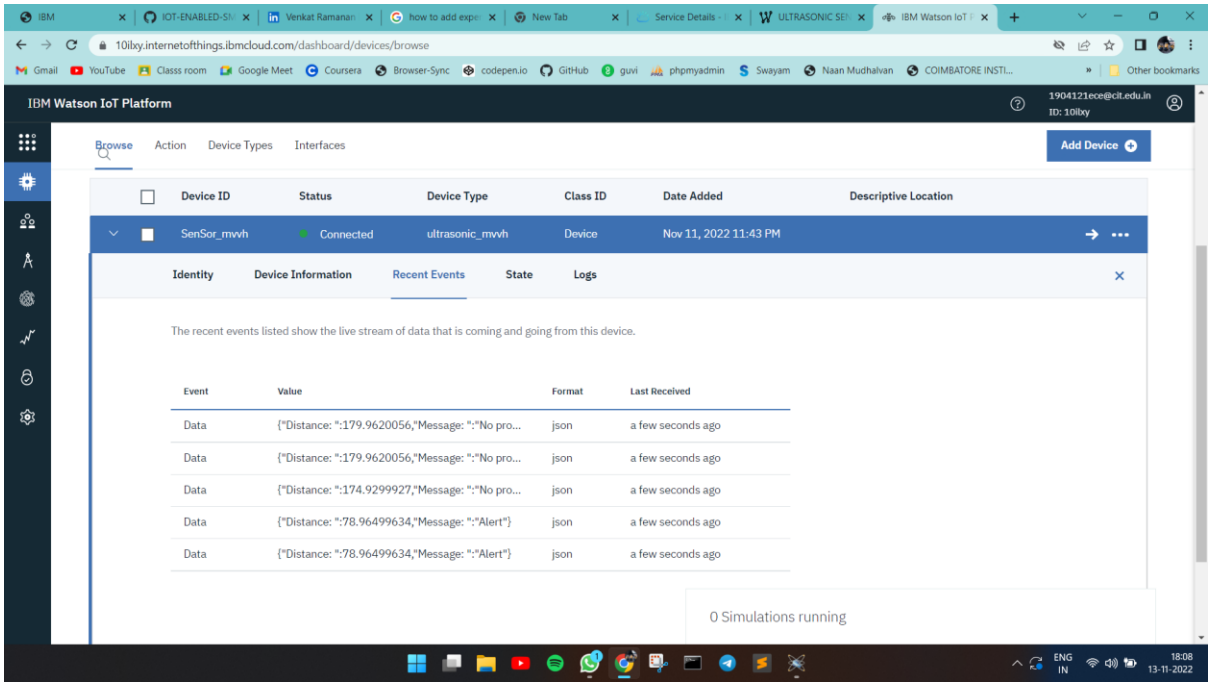
```
  PublishData(distance,message);
  // if (!client.loop()) {
  //   mqttconnect();
  // }
}


/*.....................................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();
  }
}
```

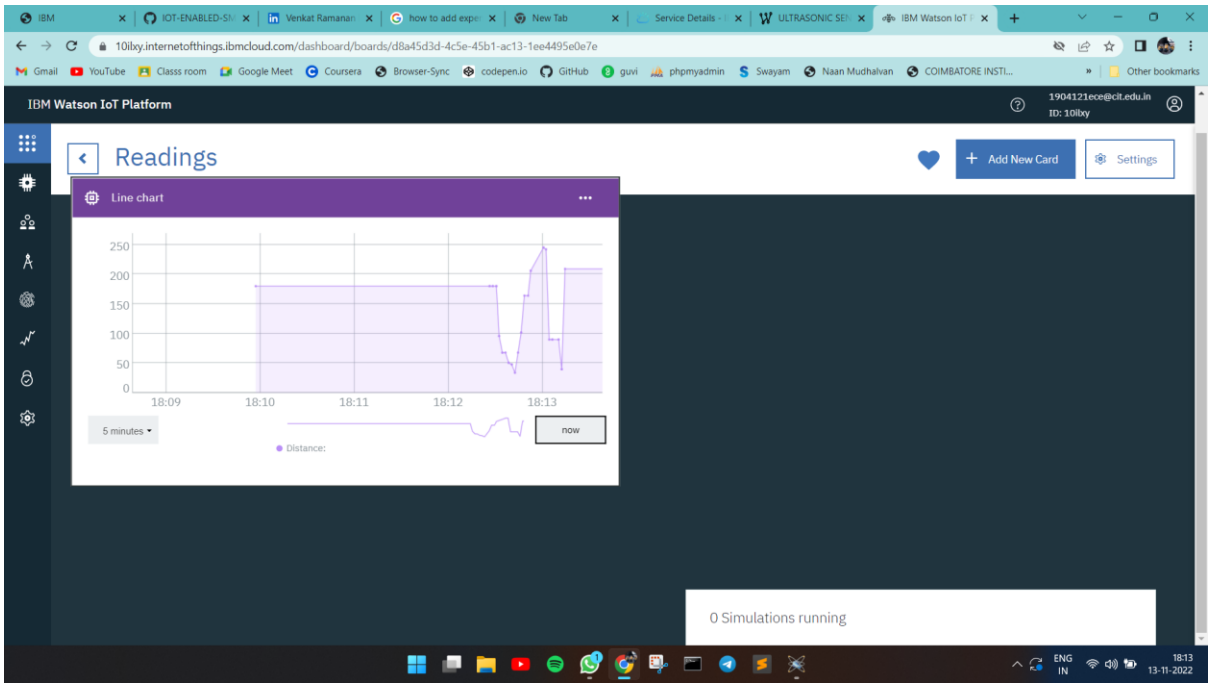
```
void wificonnect() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  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:


wokwi.com/projects/348055074867511890
ULTRASONIC SENSOR
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:35.663
100%
Editing Ultrasonic Distance Sensor
Distance: 79cm
ESP32
Publish ok
distance78.95cm
Sending payload: {"Distance: ":78.94799805,"Message: ":"Alert"}
Publish ok
distance78.96cm
Sending payload: {"Distance: ":78.96499634,"Message: ":"Alert"}
Publish ok


wokwi.com/projects/348055074867511890
ULTRASONIC SENSOR
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:42.499
99%
Editing Ultrasonic Distance Sensor
Distance: 180cm
ESP32
distance78.96cm
Sending payload: {"Distance: ":78.96499634,"Message: ":"Alert"}
Publish ok
distance174.93cm
Sending payload: {"Distance: ":174.9299927,"Message: ":"No problem"}
Publish ok
distance179.96cm


IBM Watson IoT Platform
1904121ece@cit.edu.in
ID: 10ilxy
Browse
Action
Device Types
Interfaces
Add Device
Device ID
Status
Device Type
Class ID
Date Added
Descriptive Location
SenSor_mvvh
Connected
ultrasonic_mvvh
Device
Nov 11, 2022 11:43 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: ":179.9620056,"Message: ":"No pro...
json
a few seconds ago
Data
{"Distance: ":179.9620056,"Message: ":"No pro...
json
a few seconds ago
Data
{"Distance: ":174.9299927,"Message: ":"No pro...
json
a few seconds ago
Data
{"Distance: ":78.96499634,"Message: ":"Alert"}
json
a few seconds ago
Data
{"Distance: ":78.96499634,"Message: ":"Alert"}
json
a few seconds ago
0 Simulations running


IBM Watson IoT Platform
1904121ece@cit.edu.in
ID: 10ilxy
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