ASSIGNMENT - 4

Date	06 September 2022
Team ID	PNT2022TMID41909
Project Name	Signs with Smart Connectivity for Better Road Safety
Team Member	Manojkumar Kowsalya Monishkumar Santhosh

Question:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms 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.

Code:

```
#include <WiFi.h>
#include <WiFiClient.h>
#include <PubSubClient.h>
const int trigPin = 5;
const int echoPin = 18;
//define sound speed in cm/uS
#define Speed 0.034
#define cm_to_inch 0.393701
long duration;
float distance;
float distanceInch;


void callback(char* subscribetopic, byte* payload, unsigned  int
payloadLength);
 //-------credentials of IBM Accounts------

#define ORG "rvj4qg"//IBM ORGANITION ID
#define DEVICE_TYPE "ultrasonic"//Device type mentioned in ibm
watson IOT Platform
#define DEVICE_ID "ultrasonicsensor"//Device ID mentioned in ibm
watson IOT Platform
#define TOKEN "8Jst2BeIl8Epo1Me0d"     //Token
String data3;



//-------- 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);

void setup() {
  Serial.begin(115200); // Starts the serial communication
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT); // Sets the echoPin as an Input
  Serial.println();
  wificonnect();
  mqttconnect();

}

void loop() {
  // Clears the trigPin
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin on HIGH state for 10 micro seconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  // Reads the echoPin, returns the sound wave travel time in
microseconds
  duration = pulseIn(echoPin, HIGH);

  // Calculate the distance
  distance = duration * Speed/2;

  // Convert to inches
  distanceInch = distance * cm_to_inch;

  // Prints the distance in the Serial Monitor
  Serial.print("Distance : ");
  Serial.println(distance);

  PublishData(distance);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}

  void PublishData(float centimeter) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"Distance in Centimeter\":";
  payload += centimeter;
  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");
  }

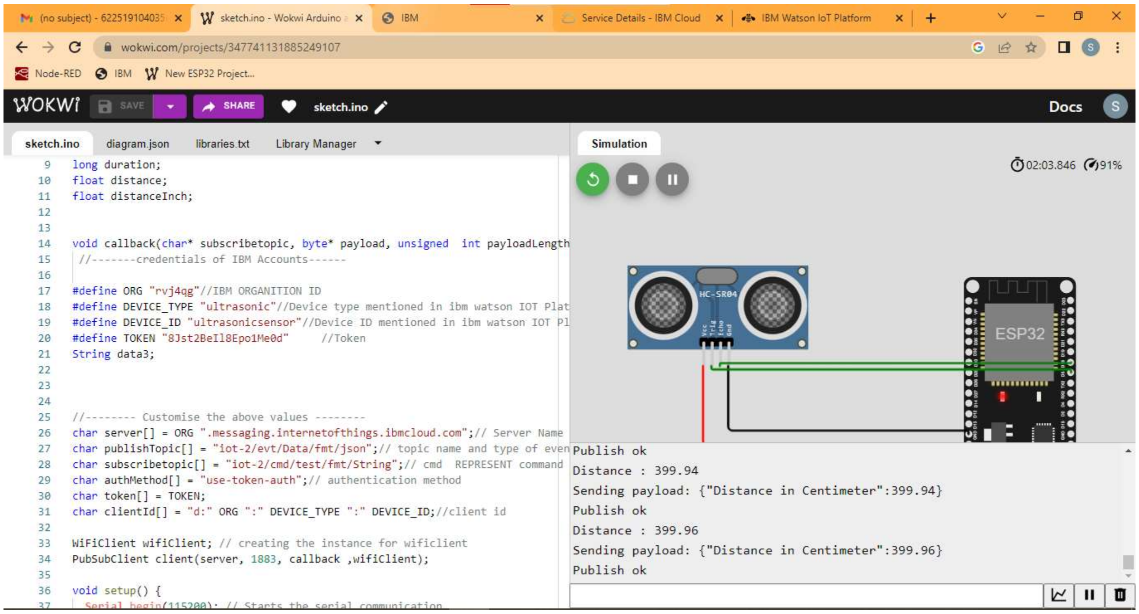
}
void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!!!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }

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

  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];
  }
}
```



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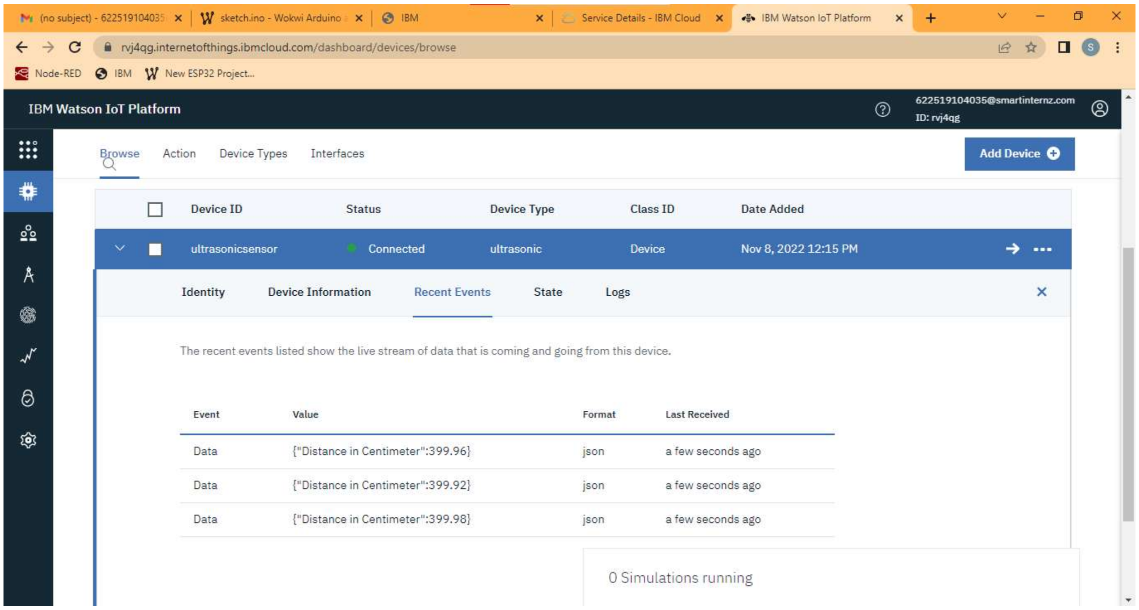
```

```
Publish ok
Distance : 399.94
Sending payload: {"Distance in Centimeter":399.94}
Publish ok
Distance : 399.96
Sending payload: {"Distance in Centimeter":399.96}
Publish ok
```



□	Device ID	Status	Device Type	Class ID	Date Added
□	ultrasonicsensor	● Connected	ultrasonic	Device	Nov 8, 2022 12:15 PM

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 in Centimeter":399.96}	json	a few seconds ago
Data	{"Distance in Centimeter":399.92}	json	a few seconds ago
Data	{"Distance in Centimeter":399.98}	json	a few seconds ago

Wokwi Share link:

https://wokwi.com/projects/347741131885249107