Assignment – 4
Distance Detection using Ultrasonic Sensor

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Question:
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.

Wokwi Link:
https://wokwi.com/projects/346678740879671892

Code:

```
#include <WiFi.h>

#include <PubSubClient.h>


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


//----------IBM Credentials----------//


#define ORG "3747gc"//IBM ORGANITION ID

#define DEVICE_TYPE "kaiser"//Device type mentioned in ibm watson IOT Platform

#define DEVICE_ID "esp32"//Device ID mentioned in ibm watson IOT Platform

#define TOKEN "12345678"     //Token

String sub_data;

float distance;


//----------Server Setup----------//


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



//--------------Main Code--------------//
WiFiClient wificlient;                          //Ceating instance for WifiClient
PubSubClient client(server, 1883, callback , wificlient);  //mqtt Client

int Led = 4;
int trig = 5;
int echo = 18;

void setup() {
  Serial.begin(115200);
  pinMode(trig, OUTPUT);
  pinMode(Led, OUTPUT);
  pinMode(echo, OUTPUT);
  delay(10);
  wificonnect();
  mqttconnect();
}

void loop() {
  digitalWrite(trig, LOW);
  digitalWrite(trig, HIGH);
  delayMicroseconds(10);
  digitalWrite(trig, LOW);
  float duration = pulseIn(echo, HIGH);
  float distance = (duration * 0.0343) / 2;
  Serial.print("Distance in Cm = ");
  Serial.println(distance);
```

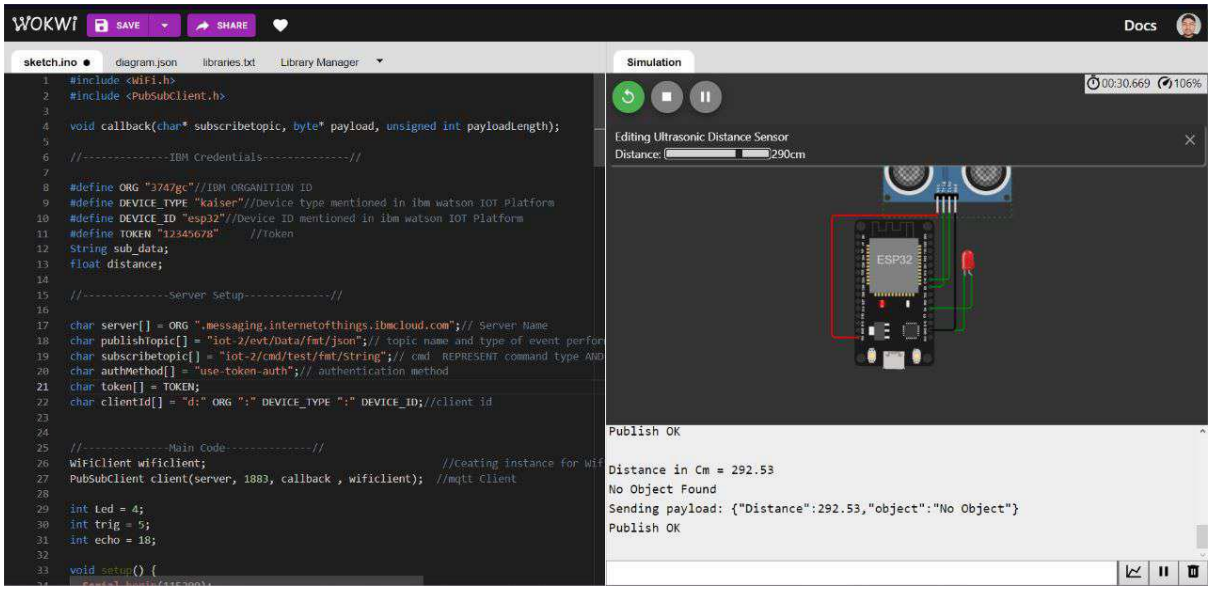
```
 Publish_Data(distance);
 delay(1000);
 if (!client.loop()) {
  mqttconnect();
 }
}

void Publish_Data(float dist) {
 mqttconnect();  //Connect to Server

 /* Creating the String in JSON format to send to the Cloud
     according to the diatance from the Ultrasonic Sensor*/
 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 Object";
 }

 String payload = "{\"Distance\":";
 payload += dist;
 payload += "," "\"object\":\"";
 payload += object;
 payload += "\"}";
```

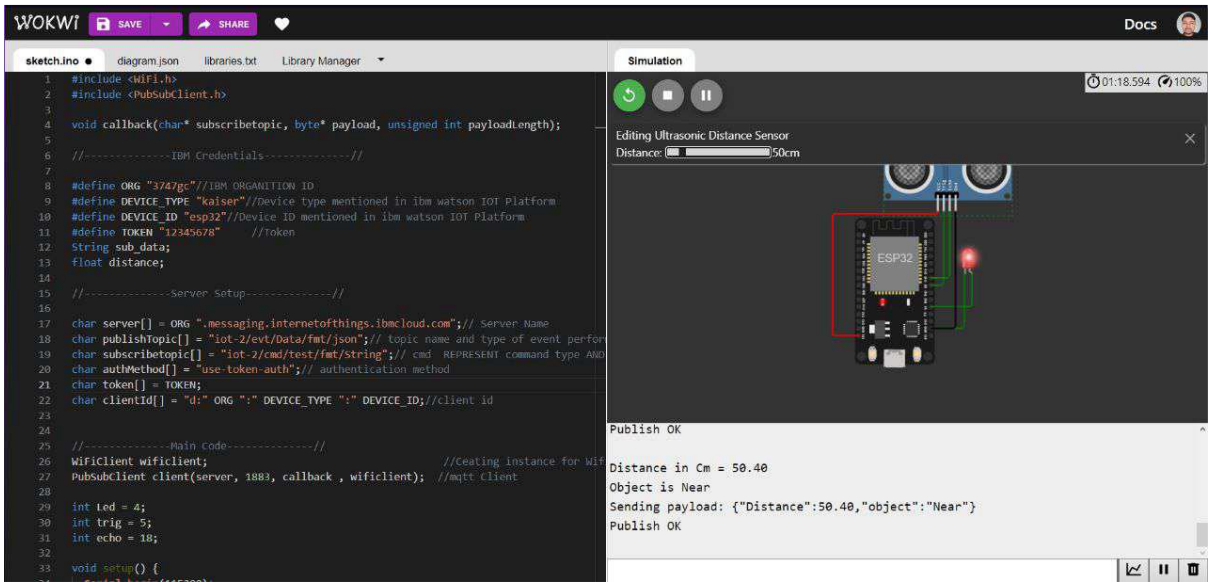
```
  Serial.print("Sending payload: ");
  Serial.println(payload);

  //Publish payload Message

  if (client.publish(publishTopic , (char*) payload.c_str())) {
    Serial.println("Publish OK");
  } else {
    Serial.println("Publish Failed");
  }
  Serial.println("");
}

//--------------User Fuctions--------------//

//Connect to Mqtt

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
```

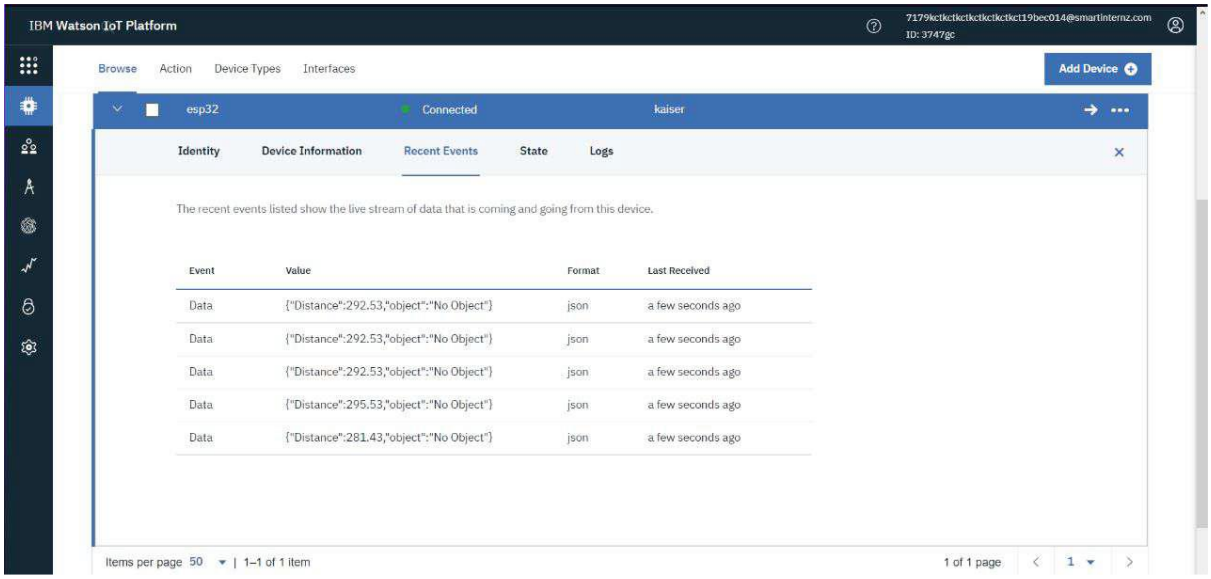
```
{
  Serial.println();
  Serial.print("Connecting to ");

  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]);
```

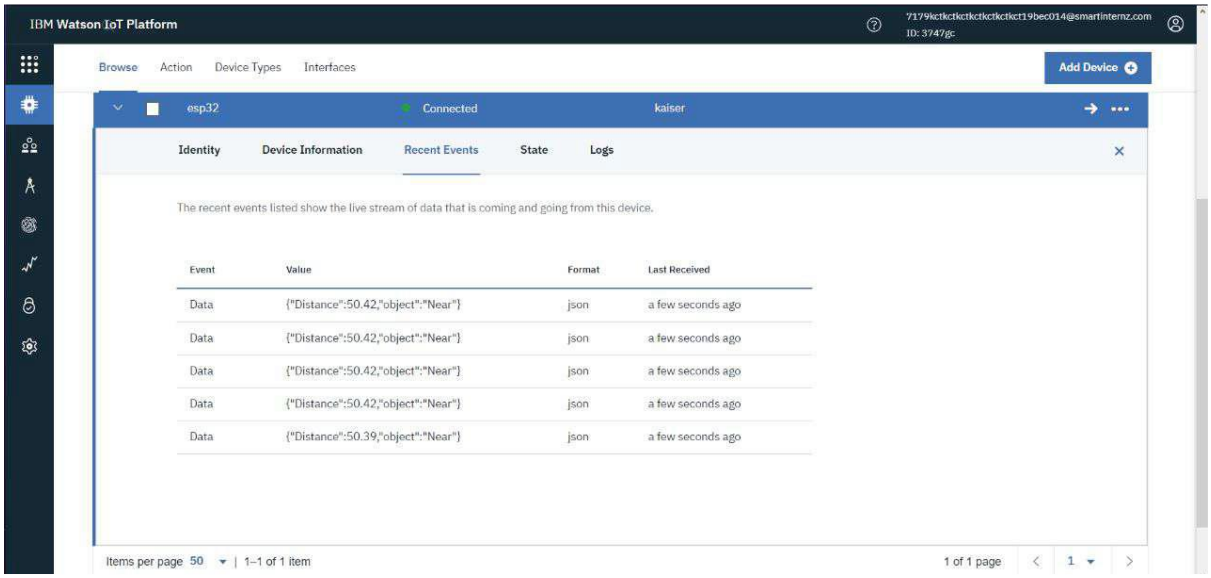
```
    sub_data += (char)payload[i];
  }
  Serial.println("data: "+ sub_data);
sub_data="";
}
```

Output:






IBM Watson IoT Platform
7179kctkctkctkctkctkct19bec014@smartinternz.com
ID: 3747gc
Browse
Action
Device Types
Interfaces
Add Device
esp32
Connected
kaiser
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":292.53,"object":"No Object"}
json
a few seconds ago
Data
{"Distance":292.53,"object":"No Object"}
json
a few seconds ago
Data
{"Distance":292.53,"object":"No Object"}
json
a few seconds ago
Data
{"Distance":295.53,"object":"No Object"}
json
a few seconds ago
Data
{"Distance":281.43,"object":"No Object"}
json
a few seconds ago
Items per page 50
1–1 of 1 item
1 of 1 page
1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Browse
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Identity
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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":50.42,"object":"Near"}
json
a few seconds ago
Data
{"Distance":50.42,"object":"Near"}
json
a few seconds ago
Data
{"Distance":50.42,"object":"Near"}
json
a few seconds ago
Data
{"Distance":50.42,"object":"Near"}
json
a few seconds ago
Data
{"Distance":50.39,"object":"Near"}
json
a few seconds ago
Items per page 50
1–1 of 1 item
1 of 1 page
1