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/346932931904668243

Code:

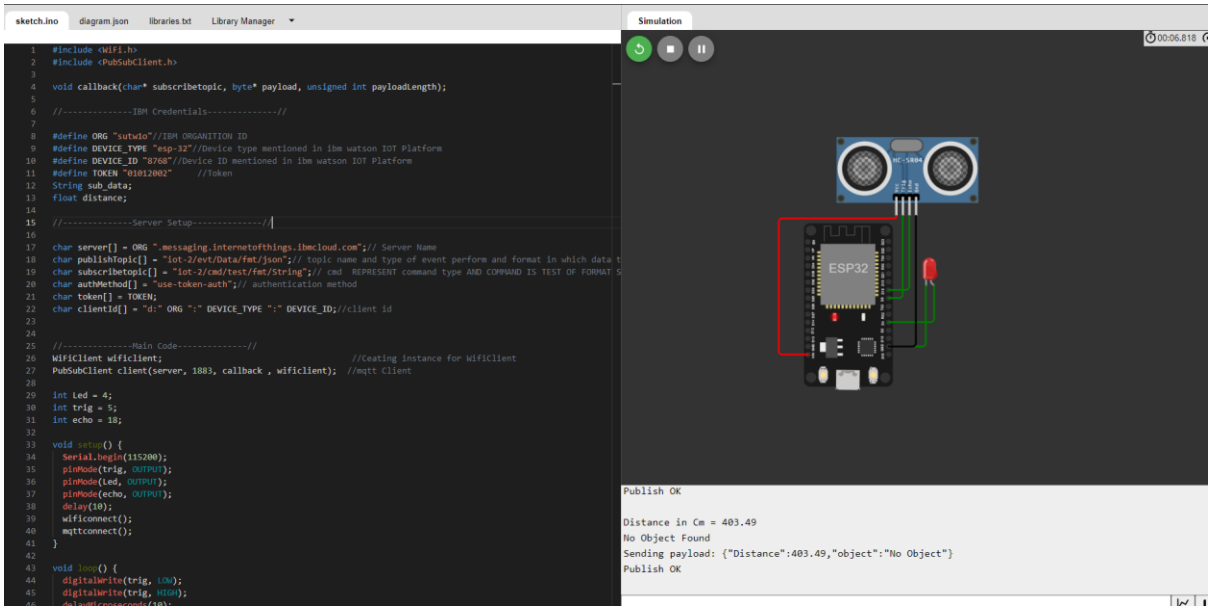
```
#include <WiFi.h>
#include <PubSubClient.h>

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

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

#define ORG "sutw1o"//IBM ORGANITION ID
#define DEVICE_TYPE "esp-32"//Device type
mentioned in ibm watson IOT Platform
#define DEVICE_ID "8768"//Device ID
mentioned in ibm watson IOT Platform
#define TOKEN "01012002"     //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");
 }
}
```

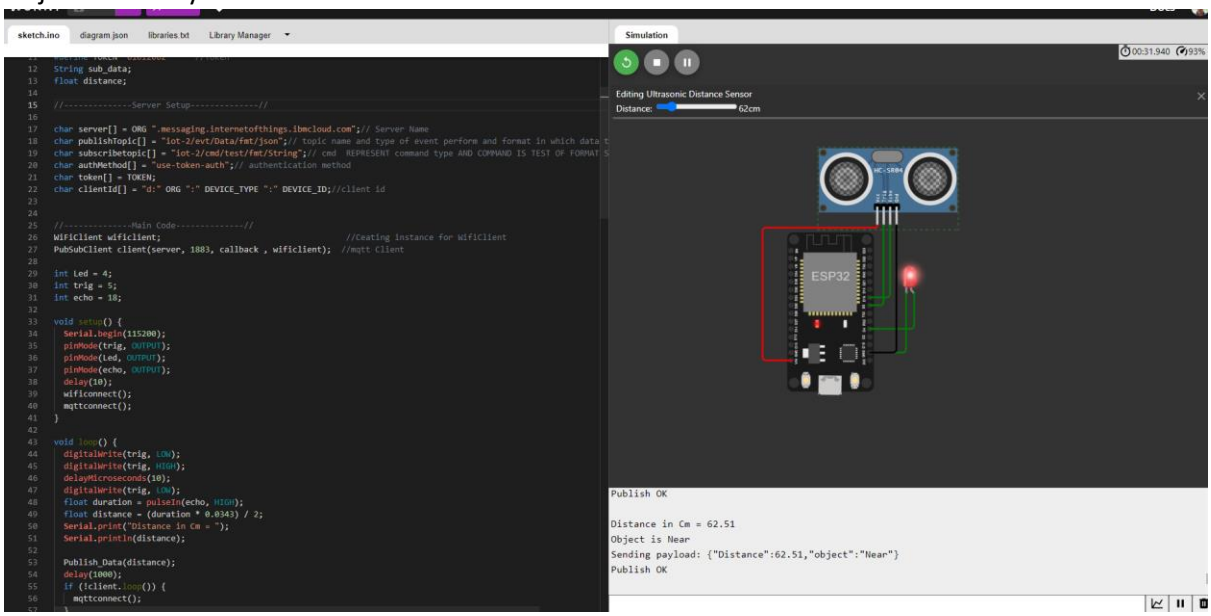
```
void callback(char* subscribetopic, byte*
payload, unsigned int payloadLength)
{

 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:

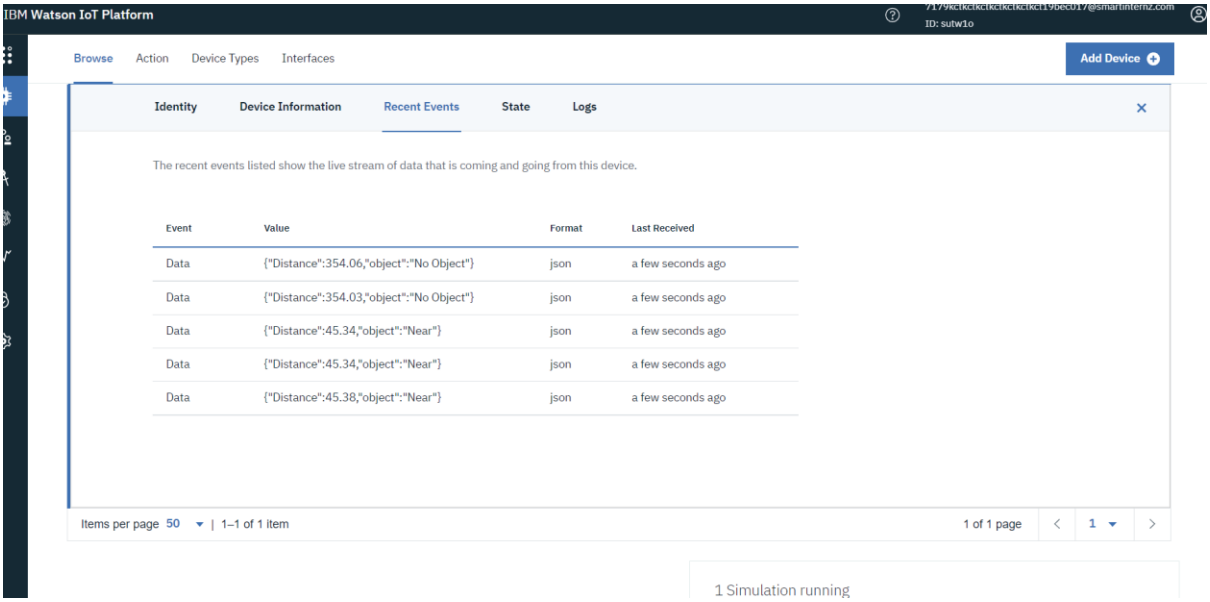
Object is Far:



Object is Nearby:



IBM Watson IoT Platform:


IBM Watson IoT Platform
ID: sutw1o
Browse
Action
Device Types
Interfaces
Add Device
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":354.06,"object":"No Object"}
json
a few seconds ago
Data
{"Distance":354.03,"object":"No Object"}
json
a few seconds ago
Data
{"Distance":45.34,"object":"Near"}
json
a few seconds ago
Data
{"Distance":45.34,"object":"Near"}
json
a few seconds ago
Data
{"Distance":45.38,"object":"Near"}
json
a few seconds ago
Items per page 50
1–1 of 1 item
1 of 1 page
1
1 Simulation running