Assignment - 4

Ultrasonic sensor simulation in Wokwi

Assignment Date	November 7,2022
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Maximum Marks	2 Marks

Question-1:

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an “Alert” to IBM cloud and display in the device recent events.

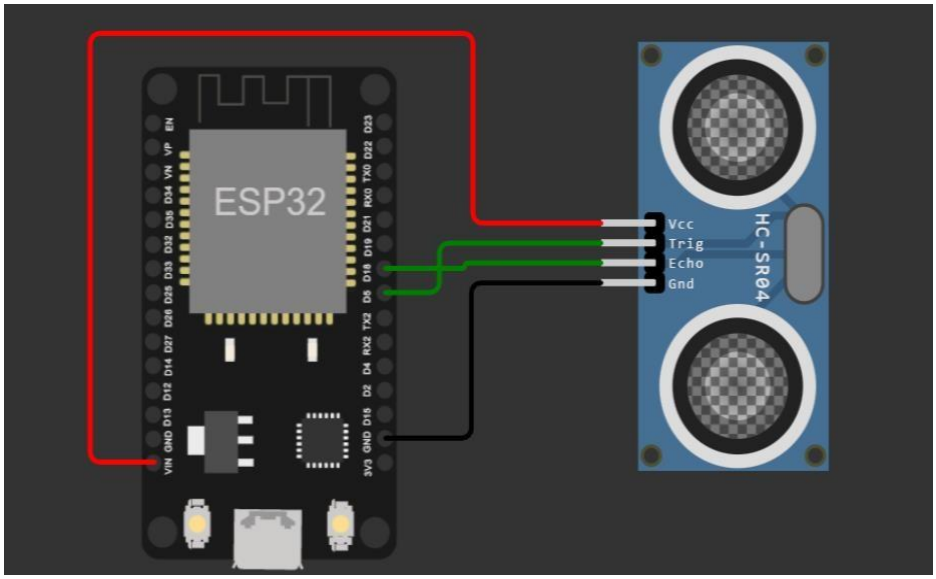
Code:

```
#include <WiFi.h>
#include <PubSubClient.h>
 void callback(char* subscribetopic, byte* payload, unsigned
int payloadLength);

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

#define ORG "ytluse"//IBM ORGANITION ID
#define DEVICE_TYPE "2702"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "O+n)Eh+lNX0y3?rG!8"     //Token
String data3;
 char server[] = ORG
".messaging.internetofthings.ibmcloud.com"; char publishTopic[]
= "iot-2/evt/Data/fmt/json"; char subscribetopic[] = "iot-
2/cmd/test/fmt/String"; char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient;
PubSubClient client(server, 1883, callback
,wifiClient);  const int trigPin = 5; const int echoPin
= 18; #define SOUND_SPEED 0.034 long duration; float
distance;

void setup() {
  Serial.begin(115200);
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
```

```
  wificonnect();
mqttconnect();
}  void
loop()
{   digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);   duration
= pulseIn(echoPin, HIGH);   distance =
duration * SOUND_SPEED/2;
  Serial.print("Distance (cm): ");
Serial.println(distance);   if(distance<100)
  {
    Serial.println("ALERT!!");
delay(1000);

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

}  void PublishData(float
dist) {   mqttconnect();

  String payload = "{\"Distance\":";   payload += dist;
payload += ",\"ALERT!!\":""\"Distance less than 100cms\"";
payload += "}";

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

  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");
  } 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()  {
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST",    "",    6);
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);
data3="";
}
```

Circuit Diagram:

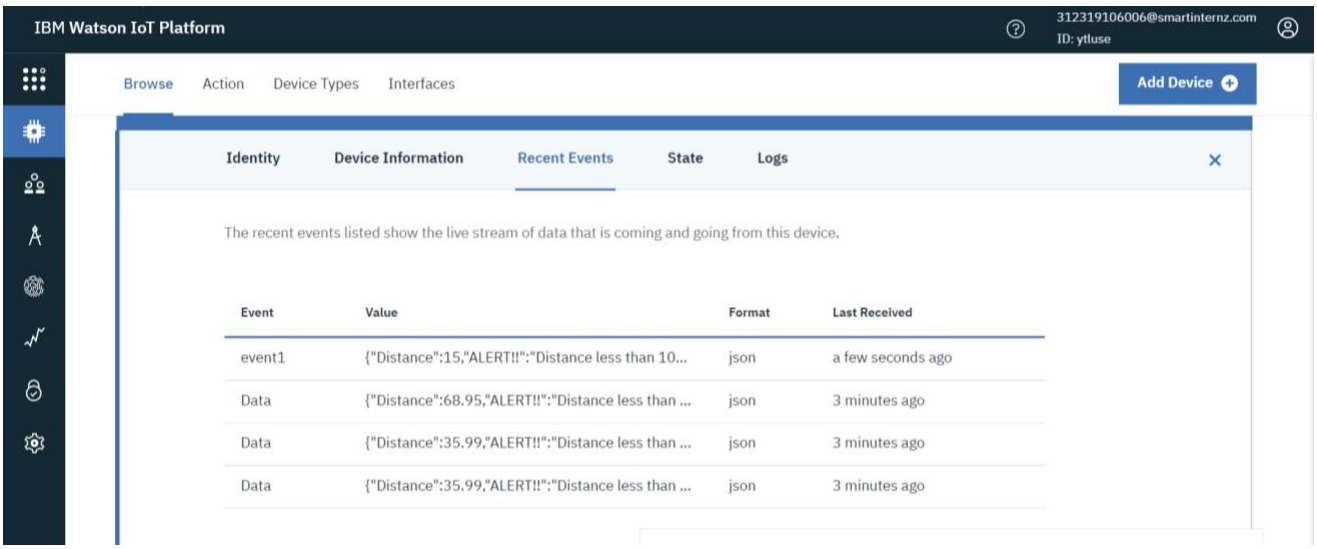


Output:

Wokwi output:

```
Connecting to ...
WiFi connected
IP address:
10.10.0.2
Reconnecting client to ytluse.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 35.99
ALERT!!
Sending payload: {"Distance":35.99,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 35.99
ALERT!!
Sending payload: {"Distance":35.99,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 68.95
ALERT!!
Sending payload: {"Distance":68.95,"ALERT!!":"Distance less than 100cms"}
Publish ok
```

IBM cloud output:



Wokwi simulation link:

https://wokwi.com/projects/346236324918854227