

ASSIGNMENT-4

DISTANCE DETECTION USING ULTRASONIC SENSOR

Date	01 November 2022
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Maximum Marks	2 Marks

Question:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 centimeters it should send "alert" to IBM cloud and display in device recent events

Code:

```
#include <WiFi.h>
#include
<PubSubClient.h>
#include <ArduinoJson.h>
WiFiClient wifiClient;

#define ORG "9tg03j"

#define DEVICE_TYPE "RaspberryPi"
#define DEVICE_ID "12345"
#define TOKEN "12345678"
#define speed 0.034

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/status1/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

PubSubClient client(server, 1883, wifiClient);
void publishData();

const int trigpin=5;
```

```

const int echopin=19;
String command;
String data="";
String name="Alert";
String icon="";
long duration;
int dist;
void setup()
{
  Serial.begin(115200);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect();
  mqttConnect();
}
void loop() {
  publishData();
  delay(500);
  if (!client.loop()) {
    mqttConnect();
  }
}

void wifiConnect() {
  Serial.print("Connecting to ");
  Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.print("WiFi connected, IP address: "); Serial.println(WiFi.localIP());
}
void mqttConnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting MQTT client to "); Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      Serial.print("*");
      delay(1000);
    }
    initManagedDevice();
    Serial.println();
  }
}

void initManagedDevice() {

```

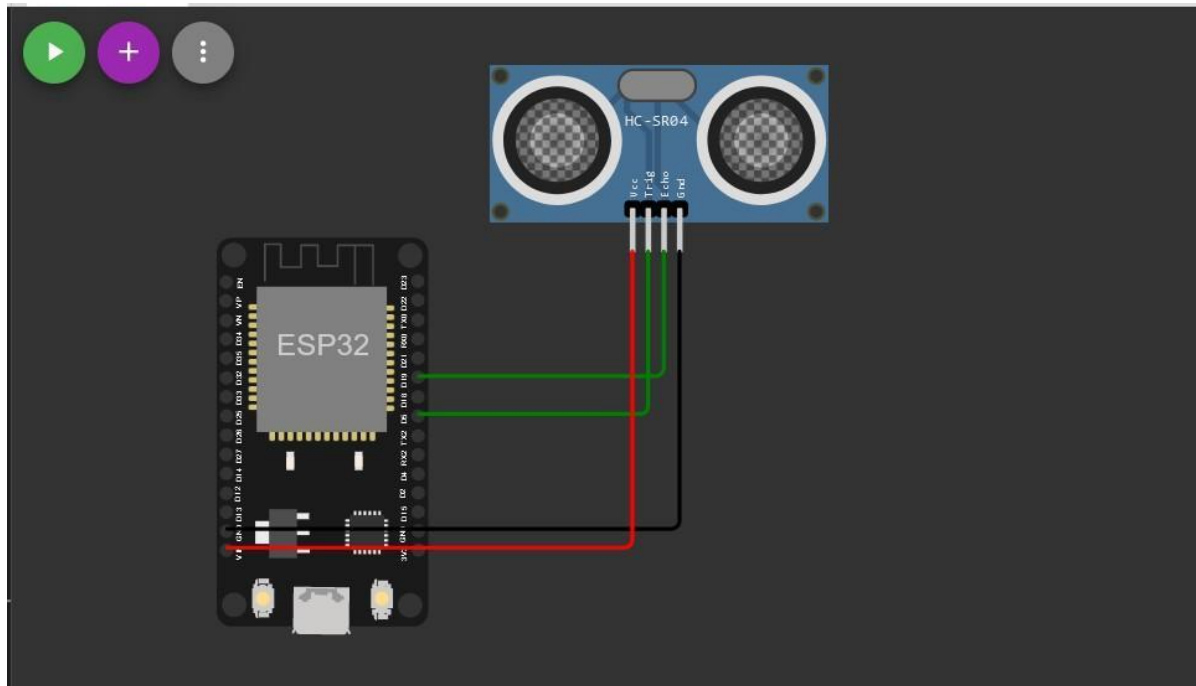
```

if (client.subscribe(topic)) {
    Serial.println(client.subscribe(topic));
    Serial.println("subscribe to cmd OK");
}
else {
    Serial.println("subscribe to cmd FAILED");
}
}

void publishData()
{
    digitalWrite(trigpin,LOW);
    digitalWrite(trigpin,HIGH);
    delayMicroseconds(10);
    digitalWrite(trigpin,LOW);
    duration=pulseIn(echopin,HIGH);
    dist=duration*speed/2;
    if(dist<100){
        dist=100-dist;
        icon="Not-Crashed";
    }
    else{
        dist=0;
        icon="Crashed";
    }
    DynamicJsonDocument doc(1024);
    String payload;
    doc["Name"]=name;
    doc["Impact"]=icon;
    doc["Distance"]=dist;
    serializeJson(doc, payload);
    delay(3000);
    Serial.print("\n");
    Serial.print("Sending payload: ");
    Serial.println(payload);
    if (client.publish(publishTopic, (char*) payload.c_str())) {
        Serial.println("Publish OK");
    }
    else {
        Serial.println("Publish FAILED");
    }
}

```

DIAGRAM:



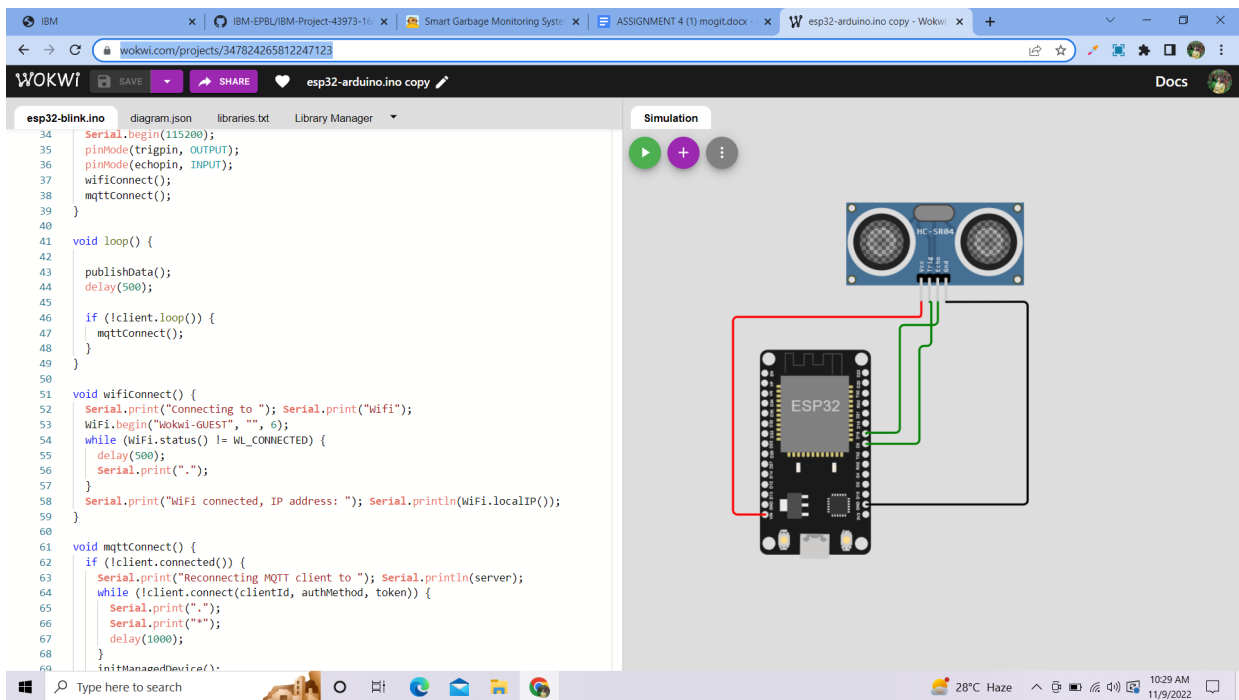
OUTPUT:

The screenshot shows the Wokwi simulation environment. The code on the left is as follows:

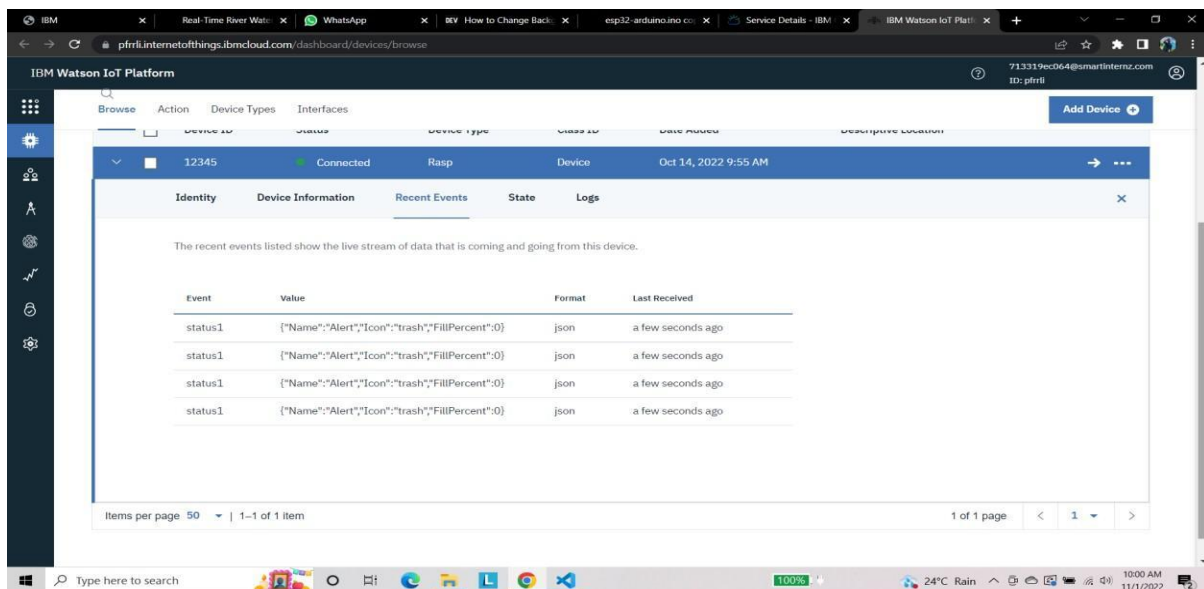
```
80 void publishdata()
81 {
82   digitalWrite(trigpin,LOW);
83   digitalWrite(trigpin,HIGH);
84   delayMicroseconds(10);
85   digitalWrite(trigpin,LOW);
86   duration=pulseIn(echopin,HIGH);
87   dist=duration*speed/2;
88   if(dist<100){
89     dist=100-dist;
90     icon="Not-Crashed";
91   }
92   else{
93     dist=0;
94     icon="Crashed";
95   }
96   DynamicJsonDocument doc(1024);
97   String payload;
98   doc["Name"]=name;
99   doc["Impact"]=icon;
100  doc["Distance"]=dist;
101  serializeJson(doc, payload);
102  delay(3000);
103  Serial.print("\n");
104  Serial.print("Sending payload: ");
105  Serial.println(payload);
106  if (client.publish(publishTopic, (char*) payload.c_str())) {
107    Serial.println("Publish OK");
108  }
109  else {
110    Serial.println("Publish FAILED");
111  }
112 }
```

The simulation output on the right shows the following messages:

```
00:53.745 99%
Editing Ultrasonic Distance Sensor
Distance: 79cm
Publish OK
Sending payload: {"Name":"Alert","Impact":"Not-Crashed","Distance":22}
Publish OK
Sending payload: {"Name":"Alert","Impact":"Not-Crashed","Distance":21}
Publish OK
```



Data uploaded to Iot Watson Platform



<https://wokwi.com/projects/347824265812247123>