

ASSIGNMENT-4

DISTANCE DETECTION USING ULTRASONIC SENSOR

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|---------------------|------------------|
| Date | 01 November 2022 |
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| Student Roll Number | 713319EC071 |
| 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() {

```

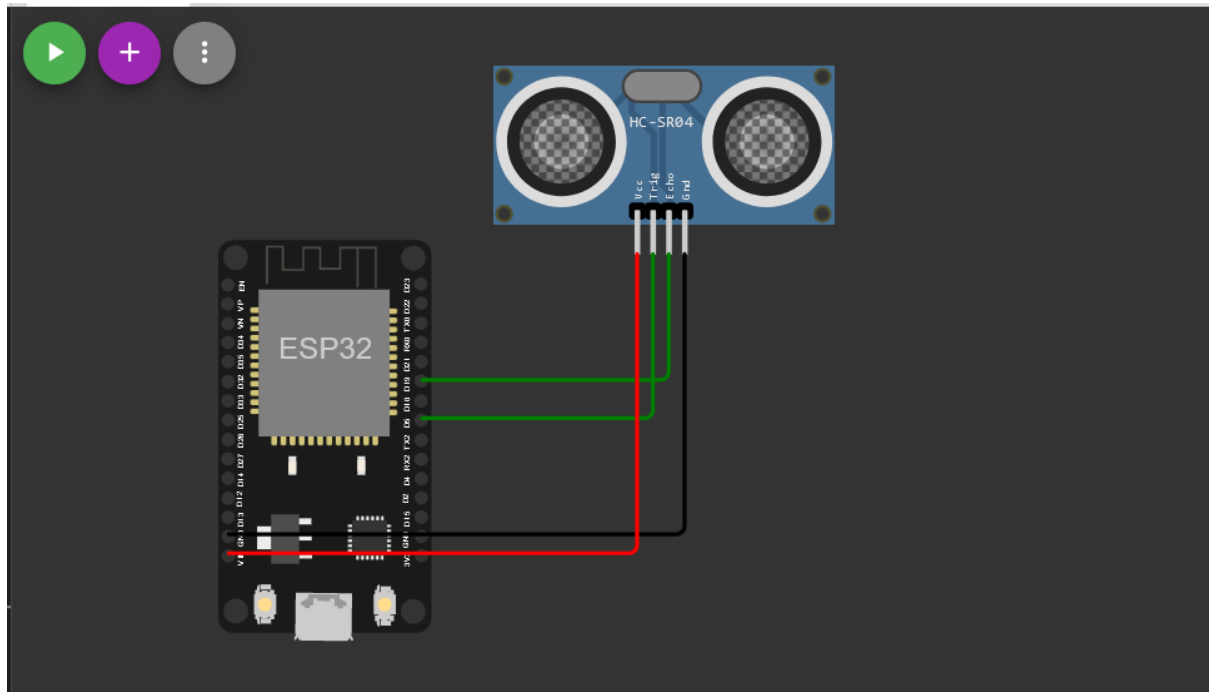
```

    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:



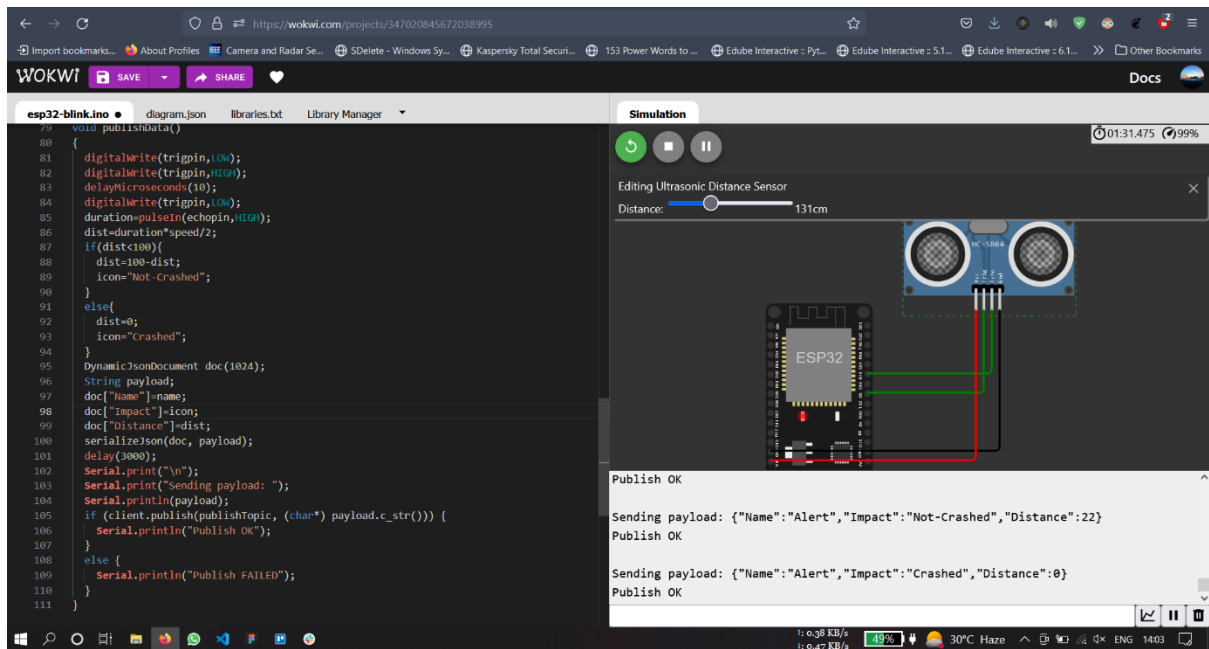
OUTPUT:

The screenshot shows the Wokwi IDE interface. On the left, the code for `esp32-blink.ino` is displayed. The code defines a `publishData()` function that uses the `HC-SR04` sensor to measure distance and publish data via MQTT. The code includes comments and uses `DynamicJsonDocument` for JSON handling. On the right, the `Simulation` window shows the hardware setup and the output of the `publishData()` function. The output shows two successful publishes with the following payloads: `{"Name": "Alert", "Impact": "Not-Crashed", "Distance": 22}` and `{"Name": "Alert", "Impact": "Not-Crashed", "Distance": 21}`. The simulation window also shows the sensor's distance reading as 79cm.

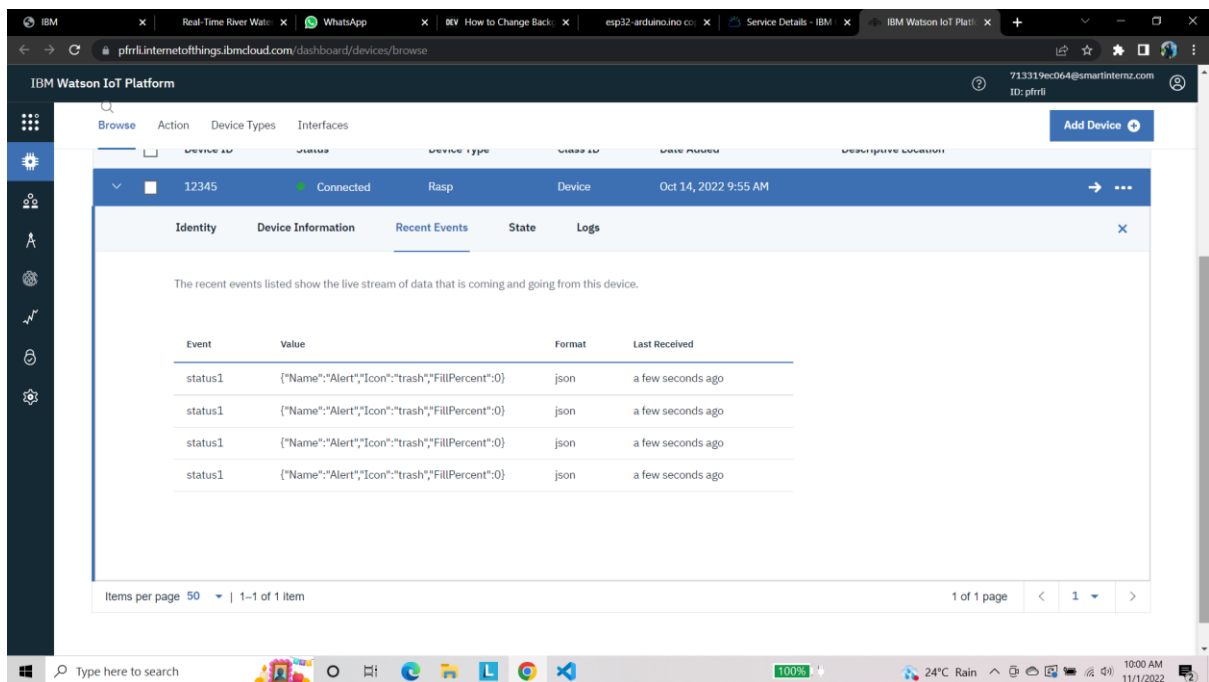
```
79 void publishData()
80 {
81   digitalWrite(trigpin, LOW);
82   digitalWrite(trigpin, HIGH);
83   delayMicroseconds(10);
84   digitalWrite(trigpin, LOW);
85   duration=pulseIn(echopin, HIGH);
86   dist=duration*speed/2;
87   if(dist<100){
88     dist=100-dist;
89     icon="Not-Crashed";
90   }
91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

Simulation Output:

```
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/347027183915500115>