

**Assignment -4**  
Ultrasonic Sensor

Assignment Date	10 November 2022
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Maximum Marks	2 Marks

**Question-1:**

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

**Source Code:**

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
#define ORG "ir6i2l"
#define DEVICE_TYPE "node_assgn4"
#define DEVICE_ID "73585"
#define TOKEN "91766210"
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 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++)
  {
    data3 += (char)payload[i];
  }
  Serial.println("data: "+ data3);
  data3="";
}

```

### Output:

The screenshot shows the Wokwi IDE interface. On the left, the 'sketch.ino' file is open, displaying the following code:

```

1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
4 #define ORG "ir612l"
5 #define DEVICE_TYPE "node_assgn4"
6 #define DEVICE_ID "73585"
7 #define TOKEN "91766210"
8 String data3;
9 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
10 char publishTopic[] = "iot-2/evt/data/fmt/json";
11 char subscribetopic[] = "iot-2/cmd/test/fmt/String";
12 char authMethod[] = "use-token-auth";
13 char token[] = TOKEN;
14 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
15 WiFiClient wificlient;
16 PubSubClient client(server, 1883, callback, wificlient);
17 const int trigPin = 5;
18 const int echoPin = 18;
19 #define SOUND_SPEED 0.034
20 long duration;
21 float distance;
22 void setup() {
23   Serial.begin(115200);
24   pinMode(trigPin, OUTPUT);
25   pinMode(echoPin, INPUT);
26   wificlient.connect();
27   mqttconnect();
28 }
29 void loop()
30 {
31   digitalWrite(trigPin, LOW);
32   delayMicroseconds(2);
33   digitalWrite(trigPin, HIGH);

```

On the right, the 'Simulation' window shows a visual representation of the ESP32 and the HC-SR04 sensor connected by wires. Below the simulation, the serial monitor displays the output:

```

ALERT!!! ALERT!!! Object Detected
ALERT!!! ALERT!!! Object Detected
ALERT!!! ALERT!!! Object Detected
ALERT!!! ALERT!!! Object Detected

```

