

ASSIGNMENT 4

Ultrasonic sensor simulation in Wokwi

Question :

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.

Wokwi simulation link:

<https://wokwi.com/projects/347021248667058770>

Code:

```
1  #define ECHO_PIN 2
2  #define TRIG_PIN 3
3  #define organization "9yby55"
4  #define deviceType = "Thiru"
5  #define deviceId = "18"
6  #define authMethod = "token"
7  #define authToken = "12345678"
8
9  void setup(){
10     Serial.begin(9600);
11     pinMode(TRIG_PIN,OUTPUT);
12     pinMode(ECHO_PIN,INPUT);
13 }
14
15 float readDistanceCM(){
16     digitalWrite(TRIG_PIN,LOW);
17     delayMicroseconds(2);
18     digitalWrite(TRIG_PIN,HIGH);
19     delayMicroseconds(10);
20     digitalWrite(TRIG_PIN,LOW);
21     int duration=pulseIn(ECHO_PIN,HIGH);
22     return duration*0.034/2;
23 }
24 void loop(){
```

```

25     float distance=readDistanceCM();
26     if(distance<=100)
27     {
28         Serial.println("person detected");
29     }
30     else{
31         Serial.print("Measured distance:");
32         Serial.println(readDistanceCM());
33     }
34     delay(1000);
35 }

```

IBM Cloud:

The screenshot displays the IBM Watson IoT Platform interface. The main window shows a list of devices, with one device selected. A modal window titled 'Device Type: Thiru' is open, allowing configuration of event types and schedules.

Device List Table:

Device ID	Status	Device Type	Class ID	Date
18	Disconnected	Thiru	Device	Oct

Recent Events Table:

Event	Value	Format	Last Received
event_1	{"randomNumber":2,"distance":24}	json	a few seconds ago
event_1	{"randomNumber":12,"distance":105}	json	a few seconds ago
event_1	{"randomNumber":63,"distance":43}	json	a few seconds ago
event_1	{"randomNumber":79,"distance":5}	json	a few seconds ago
event_1	{"randomNumber":27,"distance":32}	json	a few seconds ago

Device Configuration Modal (Device Type: Thiru):

- Events:** 1 event type named 'event_1'.
- Schedule:** 20 seconds, Every Minute.
- Payload:**

```

{
  "randomNumber": random(0, 100),
  "distance": random(0, 150)
}

```
- Buttons:** Send, Upload a CSV file, Cancel, Save.

Wokwi - Online Arduino and ESP8266 IDE x (1) WhatsApp x Service Details - IBM Cloud x IBM Watson IoT Platform x +

9by55.internetofthings.ibmcloud.com/dashboard/devices/browse/add

IBM Watson IoT Platform 613519106052@smartinternz.com ID: 9by55

Browse Action Device Types Interfaces

All Devices Diagnose

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Search by Device ID

Device ID	Status	Device Type	Class ID	Date Added
18	Disconnected	Thiru	Device	Oct 12, 2022 7:52 PM

Identity Device Information Recent Events State Logs

Device ID 18
Device Type Thiru
Date Added Oct 12, 2022 7:52 PM
Added By 613519106052@smartinternz.com
Connection Status Disconnected

Items per page 50 | 1-1 of 1 item

Device Type: Thiru

Events 1 New event type +

Event type name event_1 Send

Schedule 20 Every Minute

Payload Specify the event payload in the editor window or by uploading a CSV file.

```
0 {  
1  "randomNumber": random(0, 100)  
2  "distance": random(0, 150)  
3 }  
4
```

Upload a CSV file

Cancel Save

New Arduino Uno Project - Wokwi x (1) WhatsApp x sketchino - Wokwi Arduino IDE x Service Details - IBM Cloud x IBM Watson IoT Platform x +

9by55.internetofthings.ibmcloud.com/dashboard/boards/ceb3b0ad-c8be-45eb-b029-18d4791de59e

IBM Watson IoT Platform 613519106052@smartinternz.com ID: 9by55

ultrasonic

Line chart

1 minute now

Device Type: Thiru

Events 1 New event type +

Event type name event_1 Send

Schedule 20 Every Minute

Payload Specify the event payload in the editor window or by uploading a CSV file.

```
0 {  
1  "randomNumber": random(0, 100)  
2  "distance": random(0, 150)  
3 }  
4
```

Upload a CSV file

Cancel Save

Wokwi Simulation:

Wokwi Simulation interface showing a C++ sketch for an Arduino Uno connected to an HC-SR04 ultrasonic sensor.

Sketch Code:

```
2 #define TRIG_PIN 3
3 #define organization = "9yby55"
4 #define deviceType = "abcd"
5 #define deviceId = "16"
6 #define authMethod = "token"
7 #define authToken = "12345678"
8
9 void setup(){
10   Serial.begin(9600);
11   pinMode(TRIG_PIN,OUTPUT);
12   pinMode(ECHO_PIN,INPUT);
13 }
14
15 float readDistanceCM(){
16   digitalWrite(TRIG_PIN,LOW);
17   delayMicroseconds(2);
18   digitalWrite(TRIG_PIN,HIGH);
19   delayMicroseconds(10);
20   digitalWrite(TRIG_PIN,LOW);
21   int duration=pulseIn(ECHO_PIN,HIGH);
22   return duration*0.034/2;
23 }
24 void loop(){
25   float distance=readDistanceCM();
26
27   if(distance<=100)
28   {
29     Serial.println("person detected");
30   }
31   else{
32     Serial.print("Measured distance:");
33     Serial.println(readDistanceCM());
34   }
35   delay(1000);
36 }
37 }
```

Simulation Output:

```
Measured distance:395.39
Measured distance:395.39
Measured distance:222.96
Measured distance:131.27
person detected
person detected
person detected
```

The simulation shows the Arduino Uno board connected to the HC-SR04 sensor. The sensor's VCC pin is connected to the 5V pin on the Arduino, and its GND pin is connected to a GND pin. The TRIG pin is connected to digital pin 3, and the ECHO pin is connected to digital pin 4. The sensor is emitting an ultrasonic wave, and the distance is being measured.