

Assignment - 4

Assignment Date	21 October 2022
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Student Roll Number	813819205050
Maximum Marks	2 Marks

Question :

To write a code and connection in wokwi for ultrasonic sensor. Whenever distance is less than 100cms send alert to IBM cloud to display in device recent events

Program Code :

```
// Pins

const int TRIG_PIN = 7;
const int ECHO_PIN = 8;

// Anything over 400 cm (23200 us pulse) is "out of range"
const unsigned int MAX_DIST = 23200;

void setup() {
    // The Trigger pin will tell the sensor to range find
    pinMode(TRIG_PIN, OUTPUT);
    digitalWrite(TRIG_PIN, LOW);

    //Set Echo pin as input to measure the duration of
    //pulses coming back from the distance sensor
    pinMode(ECHO_PIN, INPUT);

    // We'll use the serial monitor to view the sensor output
    Serial.begin(9600);
}

void loop() {
    unsigned long t1;
    unsigned long t2;
    unsigned long pulse_width;
    float cm;
    float inches;

    // Hold the trigger pin high for at least 10 us
    digitalWrite(TRIG_PIN, HIGH);
```

```

delayMicroseconds(10);
digitalWrite(TRIG_PIN, LOW);
// Wait for pulse on echo pin
while ( digitalRead(ECHO_PIN) == 0 );
// Measure how long the echo pin was held high (pulse width)
// Note: the micros() counter will overflow after ~70 min
t1 = micros();
while ( digitalRead(ECHO_PIN) == 1);
t2 = micros();
pulse_width = t2 - t1;
// Calculate distance in centimeters and inches. The constants
// are found in the datasheet, and calculated from the assumed speed
// of sound in air at sea level (~340 m/s).
cm = pulse_width / 58.0;
inches = pulse_width / 148.0;
// Print out results
if ( pulse_width > MAX_DIST ) {
    Serial.println("Out of range");
} else {
    Serial.println("*****");
    Serial.print("The Measured Distance in cm : ");
    Serial.println(cm);
    if(cm>100){
        // while(true){
        Serial.println("Alert it !!");
        // }
    }
    else{
        Serial.println("Don't Alert it !!");
    }
    Serial.print("*****");

```

```

}

// Wait at least 1000ms before next measurement

delay(1000);

}

```

Output :

I) If the Measured Distance is Less than 100, then it alert

The screenshot shows the WOKWI simulation interface. On the left, the code for `hc-sr04.ino` is displayed. The code sets up the TRIG_PIN (7) as an output and the ECHO_PIN (8) as an input. It defines a maximum distance of 23200 cm. In the `loop()` function, it measures the distance and prints it to the serial monitor. The right side of the interface shows the simulation of the Arduino Uno and the HC-SR04 sensor. A slider for the sensor's distance is set to 66 cm. The serial monitor output shows: "The Measured Distance in cm : 66.97" followed by "Alert it !!".

```

1 // Pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
4
5 // Anything over 400 cm (23200 us pulse) is "out of range"
6 const unsigned int MAX_DIST = 23200;
7
8 void setup() {
9
10 // The Trigger pin will tell the sensor to range find
11 pinMode(TRIG_PIN, OUTPUT);
12 digitalWrite(TRIG_PIN, LOW);
13
14 //Set Echo pin as input to measure the duration of
15 //pulses coming back from the distance sensor
16 pinMode(ECHO_PIN, INPUT);
17
18 // We'll use the serial monitor to view the sensor output
19 Serial.begin(9600);
20 }
21
22 void loop() {
23
24 unsigned long t1;
25 unsigned long t2;
26 unsigned long pulse_width;
27 float cm;
28 float inches;

```

Simulation: 00:00.466 15%

Editing Ultrasonic Distance Sensor
Distance: 66cm

The Measured Distance in cm : 66.97
Alert it !!

II) If the Measured Distance is not Less than 100, then it won't alert

The screenshot shows the WOKWI simulation interface. On the left, the code for `hc-sr04.ino` is displayed. The code sets up the TRIG_PIN (7) as an output and the ECHO_PIN (8) as an input. It defines a maximum distance of 23200 cm. In the `loop()` function, it measures the distance and prints it to the serial monitor. The right side of the interface shows the simulation of the Arduino Uno and the HC-SR04 sensor. A slider for the sensor's distance is set to 168 cm. The serial monitor output shows: "The Measured Distance in cm : 170.41".

```

1 // Pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
4
5 // Anything over 400 cm (23200 us pulse) is "out of range"
6 const unsigned int MAX_DIST = 23200;
7
8 void setup() {
9
10 // The Trigger pin will tell the sensor to range find
11 pinMode(TRIG_PIN, OUTPUT);
12 digitalWrite(TRIG_PIN, LOW);
13
14 //Set Echo pin as input to measure the duration of
15 //pulses coming back from the distance sensor
16 pinMode(ECHO_PIN, INPUT);
17
18 // We'll use the serial monitor to view the sensor output
19 Serial.begin(9600);
20 }
21
22 void loop() {
23
24 unsigned long t1;
25 unsigned long t2;
26 unsigned long pulse_width;
27 float cm;
28 float inches;

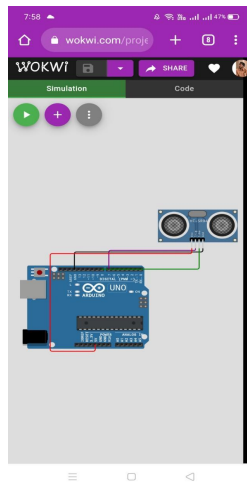
```

Simulation: 00:00.200 2%

Editing Ultrasonic Distance Sensor
Distance: 168cm

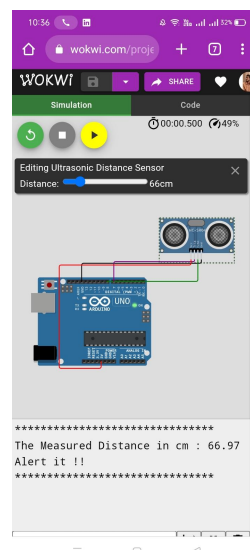
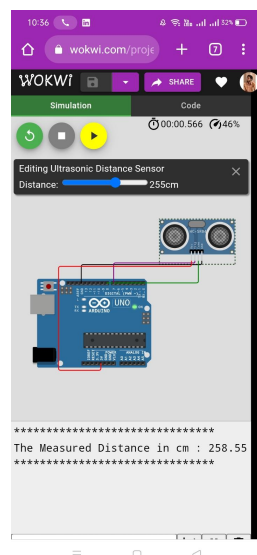
The Measured Distance in cm : 170.41

III) Simulation and Code Execution



```
hc-sr04.ino  diagram.json  Library Manager
1 // Pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
4
5 // Anything over 400 cm (23200 us)
6 const unsigned int MAX_DIST = 23200;
7
8
9 void setup() {
10   // The Trigger pin will tell the sensor to send a pulse
11   pinMode(TRIG_PIN, OUTPUT);
12   digitalWrite(TRIG_PIN, LOW);
13
14   // Set Echo pin as input to measure the time it takes for the
15   // pulses coming back from the sensor
16   pinMode(ECHO_PIN, INPUT);
17
18   // We'll use the serial monitor to see the results
19   Serial.begin(9600);
20 }
21
22 void loop() {
23   unsigned long t1;
24   unsigned long t2;
25   unsigned long pulse_width;
26   float cm;
27   float inches;
28
29   // Hold the trigger pin high for 10 microseconds to
30   // send a pulse
31   digitalWrite(TRIG_PIN, HIGH);
32   delayMicroseconds(10);
```

```
31 digitalWrite(TRIG_PIN, HIGH);
32 delayMicroseconds(10);
33 digitalWrite(TRIG_PIN, LOW);
34
35 // Wait for pulse on echo pin
36 while ( digitalRead(ECHO_PIN) == LOW )
37   ;
38
39 // Measure how long the echo pulse lasted
40 // Note: the micros() counter is in microseconds
41 t1 = micros();
42 while ( digitalRead(ECHO_PIN) == HIGH )
43   ;
44 t2 = micros();
45 pulse_width = t2 - t1;
46
47 // Calculate distance in centimeters
48 // Note: the speed of sound is 340m/s
49 // are found in the datasheet
50 // of sound in air at sea level
51 cm = pulse_width / 58.0;
52 inches = pulse_width / 148.0;
53
54 // Print out results
55 if ( pulse_width > MAX_DIST ) {
56   Serial.println("Out of range");
57 } else {
58   Serial.println("*****");
59   Serial.print("The Measured Distance in cm : ");
60   Serial.println(cm);
61
62   if (cm > 100) {
63     // while(true){
64     Serial.println("Alert it !!");
65     // }
```



Project Link :

<https://wokwi.com/projects/346136429340918356>