

SMART SOLUTION FOR WASTE MANAGEMENT

ASSIGNMENT-4

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QUESTION:

Write Code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cm send “Alert” to IBM cloud and display in device recent events.

CODING:

```
const int TRIG_PIN = 5;
const int ECHO_PIN = 9;
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 (cm < 100)
{
    Serial.print(cm);
    Serial.println("cm\t");
    Serial.println("Alert");
    delay (1000);
}
else {
    Serial.print(cm);
    Serial.print(" cm \t");
    Serial.print(inches);
    Serial.println(" in");
    Serial.println("*****Out of Range*****");
    delay (1000);
}

// Wait at least 60ms before next measurement
delay(60);
}

```

CASE 1: Distance less than 100cm

It Alerts

The screenshot displays the Wokwi IDE interface. The top bar includes the Wokwi logo, a 'SAVE' button, a 'SHARE' button, a heart icon, and links to 'Docs' and 'SIGN IN'. Below the top bar, the left pane shows the code for 'hc-sr04.ino'. The code includes a license comment, pin definitions for TRIG_PIN (5) and ECHO_PIN (9), a maximum distance constant (23200 cm), and a setup function that configures the trigger pin as an output and sets it to LOW. The right pane shows the 'Simulation' tab with a timer at 00:24.266 and 37% battery. A control panel for the 'Ultrasonic Distance Sensor' is visible, showing a distance of 33cm. Below this, a log window displays a series of 'Alert' messages with distance values: 33.45cm, 33.38cm, and 33.45cm.

```
19
20   License:
21   Public Domain
22   */
23
24   // Pins
25   const int TRIG_PIN = 5;
26   const int ECHO_PIN = 9;
27
28   // Anything over 400 cm (23200 us pulse) is "out of range"
29   const unsigned int MAX_DIST = 23200;
30
31   void setup() {
32
33       // The Trigger pin will tell the sensor to range find
34       pinMode(TRIG_PIN, OUTPUT);
35       digitalWrite(TRIG_PIN, LOW);
36
```

Simulation

00:24.266 37%

Editing Ultrasonic Distance Sensor

Distance: 33cm

Alert

33.45cm

Alert

33.38cm

Alert

33.45cm

Alert

CASE 2: Distance more than 100cm

It won't Alert

The screenshot shows the WOKWI IDE interface. On the left, the code for `hc-sr04.ino` is displayed:

```
19
20   License:
21   Public Domain
22   */
23
24   // Pins
25   const int TRIG_PIN = 5;
26   const int ECHO_PIN = 9;
27
28   // Anything over 400 cm (23200 us pulse) is "out of range"
29   const unsigned int MAX_DIST = 23200;
30
31   void setup() {
32
33     // The Trigger pin will tell the sensor to range find
34     pinMode(TRIG_PIN, OUTPUT);
35     digitalWrite(TRIG_PIN, LOW);
36
```

On the right, the **Simulation** tab shows a digital readout of the sensor's output. The output text is:

```
*****Out of Range*****
181.52 cm      71.14 in
*****Out of Range*****
181.59 cm      71.16 in
*****Out of Range*****
181.52 cm      71.14 in
*****Out of Range*****
```

The simulation also shows a timer at 00:17.800 and a progress indicator at 37%.