

Assignment-4

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

Solution:

```
//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
Pin Mode(TRIG_PIN, OUTPUT);
digital Write(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 (- 340m/s)
cm=pulse_Width / 58 ;
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!!");
        //}
    }

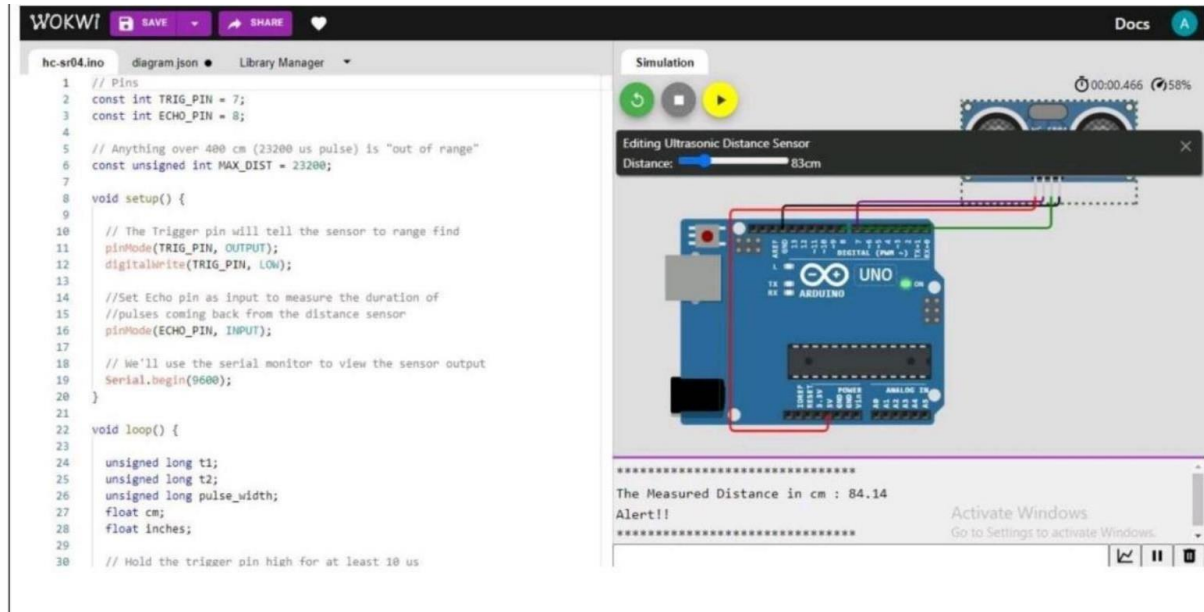
Serial.print("*****");
}

//wait at least 1000ms before next measurement
Delay(1000);
}

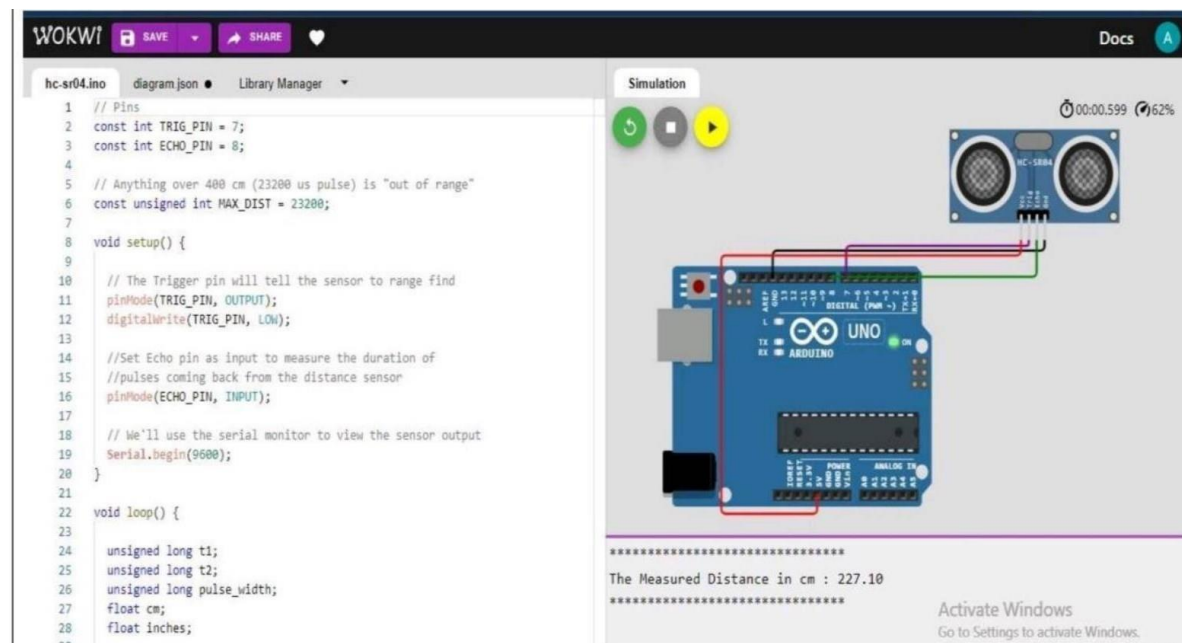
```

Output:


1.If the distance is less than 100 cm, it alerts.



2.If the distance is more than 100 cm, it won't alert



3.Simulation and code execution




WOKWI

Simulation Code

00:00.266 0%

Editing Ultrasonic Distance Sensor
Distance: 199cm

The Measured Distance in cm : 201.79



WOKWI

Simulation Code

00:00.300 48%

The Measured Distance in cm : 57.79
Alert it !!

```
1 // Pin
2 const int TRIG_PIN = 5;
3 const int ECHO_PIN = 4;
4 // Anything over 400 cm (13000 us pulse) is "out of range"
5 const unsigned int MAX_DIST = 23200;
6
7 void setup() {
8   // The trigger pin will still be used to trigger final
9   pinMode(TRIG_PIN, OUTPUT);
10  digitalWrite(TRIG_PIN, LOW);
11
12  // Set the pin as input to measure the duration of
13  // pulses coming back from the distance sensor
14  pinMode(ECHO_PIN, INPUT);
15
16  // We'll use the serial monitor to view the sensor output
17  Serial.begin(9600);
18
19  while (true) {
20
21    unsigned long t1;
22    unsigned long t2;
23    unsigned long pulse_width;
24    float cm;
25    float inches;
26
27    // Hold the trigger pin high for at least 10 us
28    digitalWrite(TRIG_PIN, HIGH);
29    delayMicroseconds(10);
30    digitalWrite(TRIG_PIN, LOW);
31
32    // Wait for pulse on echo pin
33    while (digitalRead(ECHO_PIN) == 0);
34
35    // Measure how long the echo pin was held high (pulse width)
36    // as long as the distance sensor will operate after ~30 ms
37    t1 = micros();
38    while (digitalRead(ECHO_PIN) == 1);
39    t2 = micros();
40    pulse_width = t2 - t1;
41
42    // Calculate distance in centimeters and inches, the constants
43    // are found in the constants, and calculated from the assumed speed
44    // of sound in air at sea level (340 m/s).
45    cm = pulse_width / 58.8;
46    inches = pulse_width / 146.0;
47
48    // Print out results
49    if (pulse_width < MAX_DIST) {
50      Serial.println("In range");
51    } else {
52      Serial.println("Out of range");
53    }
54
55    Serial.print("Measured Distance in cm : ");
56    Serial.println(cm);
57
58    if (cm < 100) {
59      Serial.print("Alert it !!");
60    }
61
62    Serial.print("Measured Distance in inches : ");
63    Serial.println(inches);
64
65    // Wait at least 100ms before next measurement
66    delay(100);
67  }
68 }
```