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Assignment 4 :

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.

### Program

```
//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 (- 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 cms ,it alerts.

sketch.ino diagram.json Library Manager

```

1 //Pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
4
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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 //Set Echo pin as input to measure the duration of
14 //pulses coming back from the distance sensor
15 pinMode(ECHO_PIN, INPUT );
16 // We'll use the serial monitor to view the sensor output
17 Serial.begin(9600);
18 }
19
20 void loop() {
21   unsigned long t1;
22   unsigned long t2;
23   unsigned long pulse_width;
24   float cm;
25   float inches;

```

Simulation

00:10.464 100%

Editing Ultrasonic Distance Sensor

Distance: 2cm

\*\*\*

The Measured Distance in cm: 368.00

\*\*\*\*\*Out of range

\*\*\*\*\*

The Measured Distance in cm: 197.00

\*\*\*\*\*

The Measured Distance in cm: 2.00

Alert!!

\*\*\*\*\*

sketch.ino diagram.json Library Manager

```

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20 void loop() {
21   unsigned long t1;
22   unsigned long t2;
23   unsigned long pulse_width;
24   float cm;
25   float inches;

```

Simulation

00:10.464 100%

The Measured Distance in cm: 2.00

Alert!!

Wokwi project page showing a sketch of an Arduino Uno connected to an HC-SR04 ultrasonic sensor. The sketch code is displayed on the left, and the simulation results are shown on the right.

```
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21   unsigned long t1;
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23   unsigned long pulse_width;
24   float cm;
25   float inches;
```

Simulation results:

```
*****
The Measured Distance in cm: 91.00
Alert!!
*****
The Measured Distance in cm: 124.00
*****
```

Link:

<https://wokwi.com/projects/34674346902421563>

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