

## ASSIGNMENT 4

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### QUESTION

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.

### 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 (~ 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

```
sketch.ino  diagram.json  Library Manager  Simulation
29 // Note: the micros() counter will overflow after 70 years
30 t1= micros ();
31 while (digitalRead(ECHO_PIN) == 1);
32 t2= micros ();
33 pulse_width = t2-t1;
34 // Calculate distance in centimeters
35 //are found in the datasheet, and calculate the distance
36 // of sound in air at sea level (~ 340 m/s)
37 cm=pulse_width / 58 ;
38 inches = pulse_width/148.0;
39 // Print out results
40 if (pulse_width > MAX_DIST ){
41 Serial.println("Out of range");
42 } else {
43 Serial.println("*****");
44 Serial.print("The Measured Distance in cm: ");
45 Serial.println(cm);
46 if( cm < 100 ){
47 //while(true){
48 Serial.println("Alert!!");
49 //}
50 }
51 Serial.print("*****");
52 }
53 //wait at least 1000ms before next measurement
54 delay(1000);
55 }
```

00:53.973 100%

The Measured Distance in cm: 8.00  
Alert!!  
\*\*\*\*\*  
The Measured Distance in cm: 26.00  
Alert!!  
\*\*\*\*\*

```
sketch.ino  diagram.json  Library Manager  Simulation
1 //Pins
2 const int TRIG_PIN = 7 ;
3 const int ECHO_PIN = 8;
4 //Anything over 400 cm (23200 us pulse) is "out of range"
5 const unsigned int MAX_DIST = 23200;
6 void setup() {
7 // The Trigger pin will tell the sensor to range find
8 pinMode(TRIG_PIN, OUTPUT);
9 digitalWrite(TRIG_PIN, LOW);
10 //Set Echo pin as input to measure the duration of
11 //pulses coming back from the distance sensor
12 pinMode(ECHO_PIN, INPUT );
13 // We'll use the serial monitor to view the sensor data
14 Serial.begin(9600);
15 }
16 void loop() {
17 unsigned long t1;
18 unsigned long t2;
19 unsigned long pulse_width;
20 float cm;
21 float inches;
22 // Hold the trigger pin high for at least 10 us
23 digitalWrite(TRIG_PIN, HIGH);
24 delayMicroseconds(10);
25 digitalWrite(TRIG_PIN, LOW);
26 // Wait for pulse on echo pin
27 while (digitalRead( ECHO_PIN )==0 );
28 // Measure the time the echo pin was high
29 t1= micros ();
30 while (digitalRead(ECHO_PIN) == 1);
31 t2= micros ();
32 pulse_width = t2-t1;
33 // Calculate distance in centimeters
34 //are found in the datasheet, and calculate the distance
35 // of sound in air at sea level (~ 340 m/s)
36 cm=pulse_width / 58 ;
37 inches = pulse_width/148.0;
38 // Print out results
39 if (pulse_width > MAX_DIST ){
40 Serial.println("Out of range");
41 } else {
42 Serial.println("*****");
43 Serial.print("The Measured Distance in cm: ");
44 Serial.println(cm);
45 Serial.println("*****");
46 }
47 //wait at least 1000ms before next measurement
48 delay(1000);
49 }
```

01:01.053 99%

\*\*\*\*\*  
The Measured Distance in cm: 134.00  
\*\*\*\*\*  
The Measured Distance in cm: 278.00  
\*\*\*\*\*  
The Measured Distance in cm: 278.00  
\*\*\*\*\*