

## IBM ASSIGNMENT - 4

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**1. Write Code and connections in wokwi for ultrasonic sensor. whatever distance is less than 100 cms 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 cms ,it alerts.

The screenshot shows a Wokwi simulation environment. On the left, the code for `hc-sr04.ino` is displayed. The code defines pins for the trigger and echo, sets up the pins, and includes a loop to measure the distance and print it to the serial monitor. The right side shows the simulation of the Arduino Uno and the HC-SR04 sensor. A window titled "Editing Ultrasonic Distance Sensor" shows the measured distance as 83cm. Below the simulation, the serial monitor output is visible, showing "The Measured Distance in cm : 84.14" and "Alert!!".

```
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;
29
30 // Hold the trigger pin high for at least 10 us
```

Simulation window: Editing Ultrasonic Distance Sensor  
Distance: 83cm

Serial Monitor Output:  
\*\*\*\*\*  
The Measured Distance in cm : 84.14  
Alert!!  
\*\*\*\*\*

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

The screenshot shows the same Wokwi simulation environment. The code is identical to the first screenshot. The simulation shows the Arduino Uno and the HC-SR04 sensor. The serial monitor output shows "The Measured Distance in cm : 227.10". Since the distance is greater than 100cm, no alert is triggered.

```
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;
29
30 // Hold the trigger pin high for at least 10 us
```

Simulation window: Editing Ultrasonic Distance Sensor  
Distance: 227.10cm

Serial Monitor Output:  
\*\*\*\*\*  
The Measured Distance in cm : 227.10  
\*\*\*\*\*

### 3.Simulation and code execution

