

## 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;

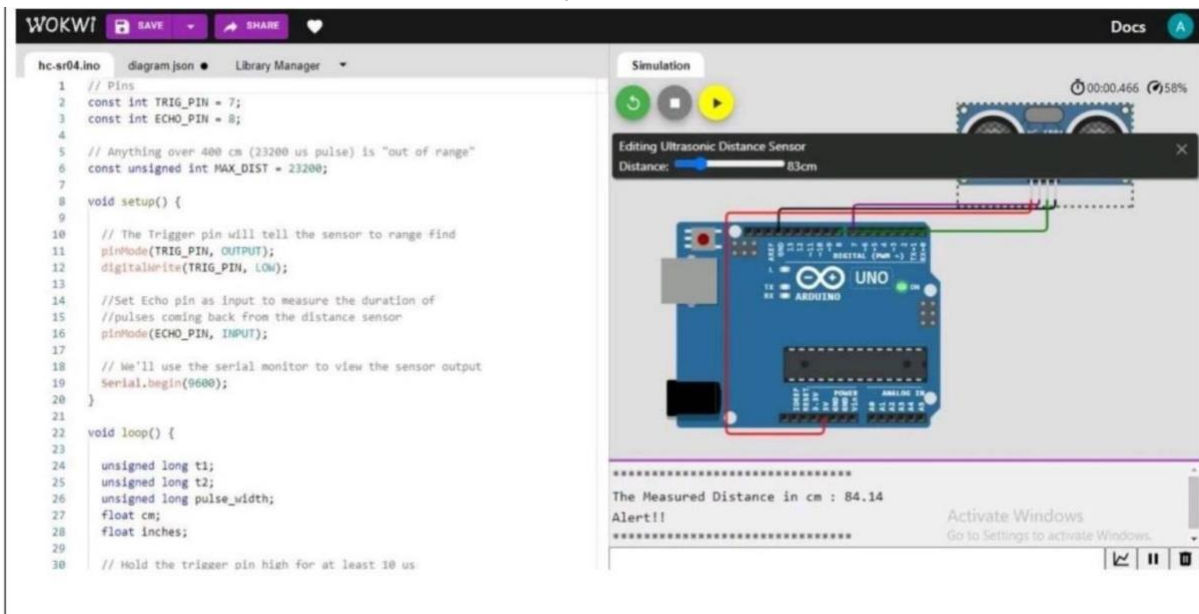
// Print out results if
(pulse_width >MAX_DIST ){

```

```
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.



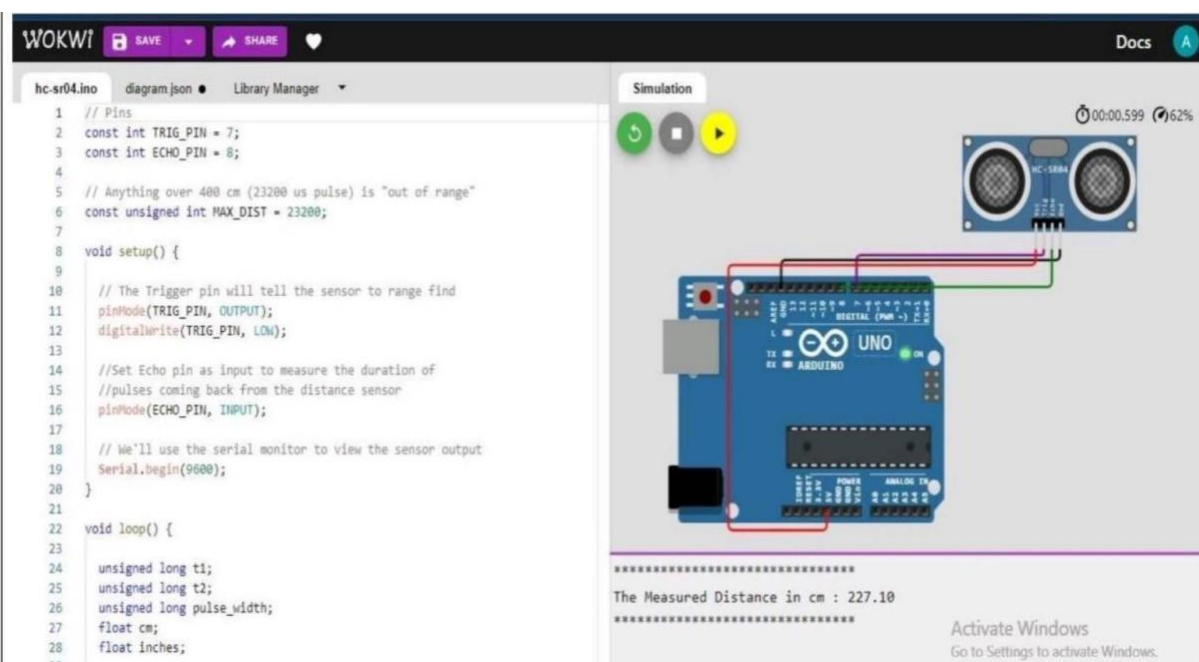
The screenshot shows the Wokwi simulation environment. On the left, the code for `hc-sr04.ino` is displayed:

```
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
```

On the right, the simulation shows an Arduino Uno board connected to an HC-SR04 ultrasonic sensor. A pop-up window titled "Editing Ultrasonic Distance Sensor" displays a distance of 83cm. Below the simulation, the serial monitor output shows:

```
*****
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 Wokwi simulation environment. On the left, the code for `hc-sr04.ino` is displayed:

```
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
```

On the right, the simulation shows an Arduino Uno board connected to an HC-SR04 ultrasonic sensor. A pop-up window titled "Editing Ultrasonic Distance Sensor" displays a distance of 227.10cm. Below the simulation, the serial monitor output shows:

```
*****
The Measured Distance in cm : 227.10
*****
```

### 3.Simulation and code execution

