

**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);

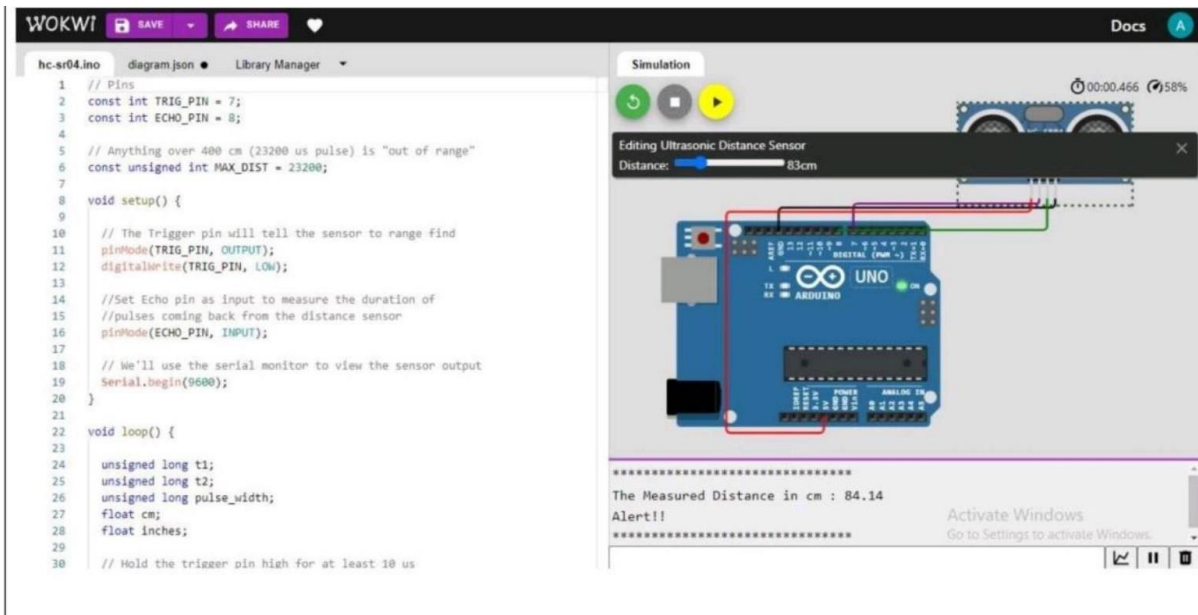
if( cm < 100 ){
    //while(true){
        Serial.println("Alert!!");
        //}
    }
Serial.print("*****");
}

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

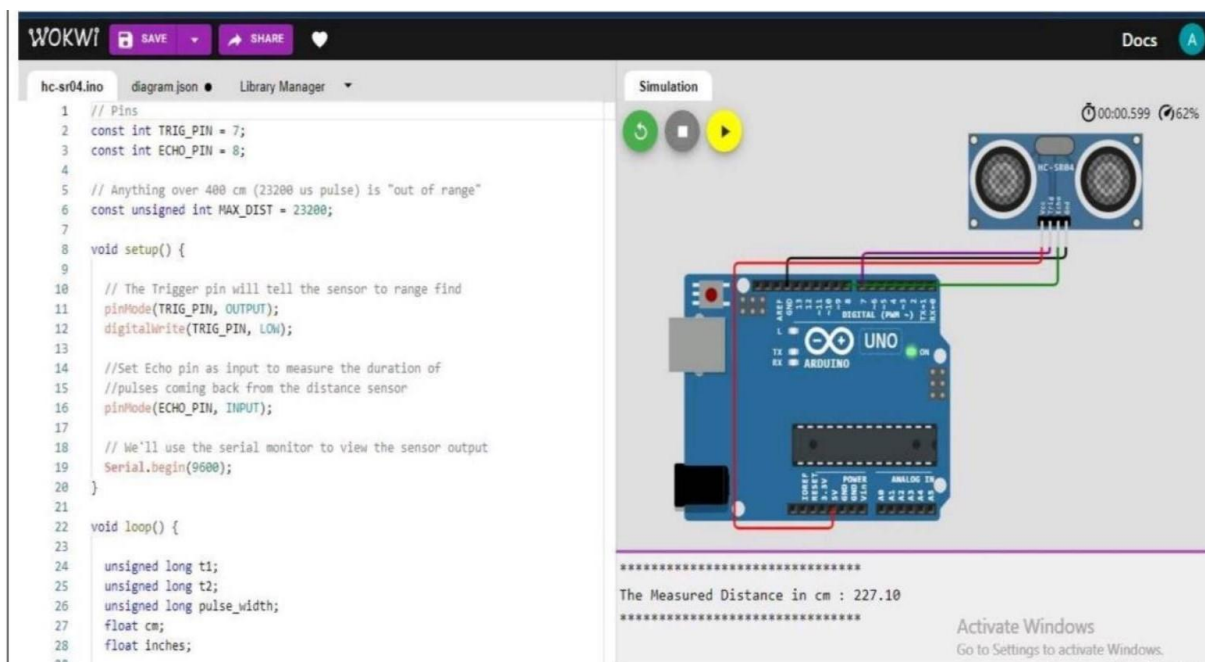
```

## Output:

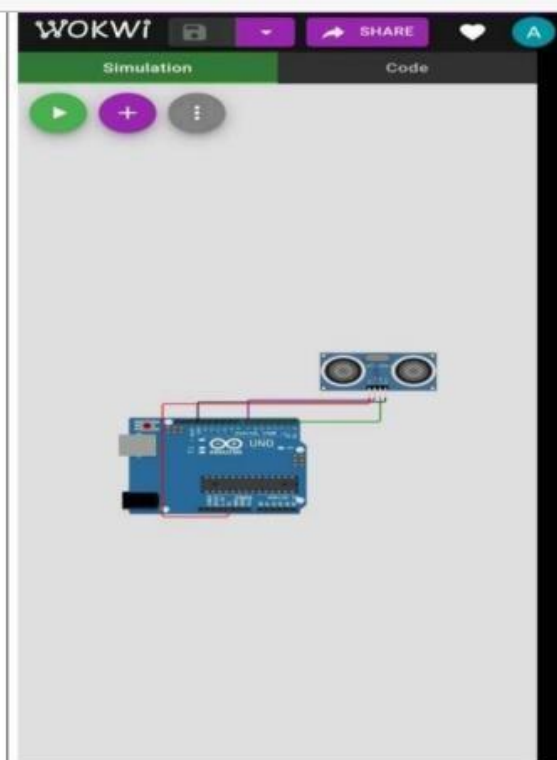
**1.If the distance is less than 100 cms ,it alerts.**



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



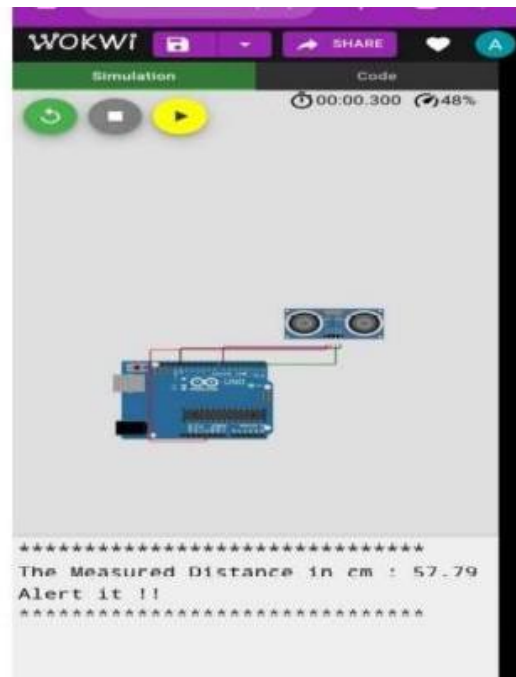
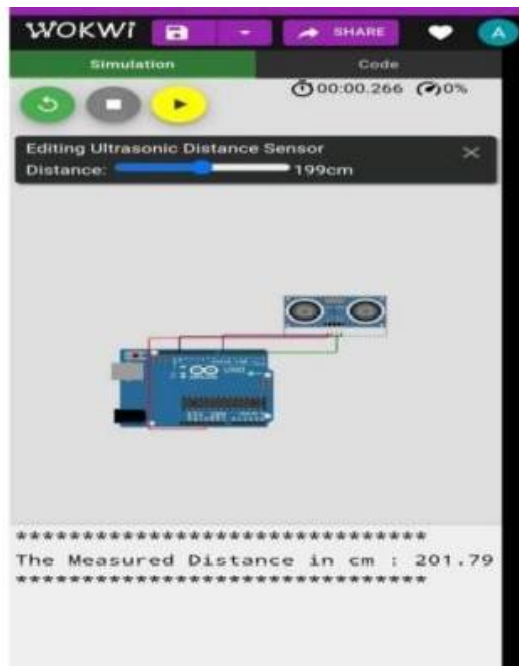
3.Simulation and code execution



```

1 // Pin
2 const int TRIG_PIN = 2;
3 const int ECHO_PIN = 3;
4
5 // Working over 200 cm (2000 us pulse) is "out of range"
6 const unsigned int MAX_DIST = 2000;
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 the 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
23 void loop() {
24
25   unsigned long t1;
26   unsigned long t2;
27   unsigned long pulse_width;
28   float cm;
29   float inches;
30
31 // Hold the trigger pin high for at least 10 us
32 digitalWrite(TRIG_PIN, HIGH);
33 delayMicroseconds(10);
34 digitalWrite(TRIG_PIN, LOW);
35
36 // Wait for pulse so echo pin
37 while (digitalRead(ECHO_PIN) == 0);
38
39 // Measure how long the echo pin was held high (pulse width)
40 // Note: the Arduino's counter will overflow after ~18 ms
41 t1 = micros();
42 while (digitalRead(ECHO_PIN) == 1);
43 t2 = micros();
44 pulse_width = t2 - t1;
45
46 // Calculate distance in centimeters and inches. The constants
47 // are found in the datasheet, and calculated from the assumed speed
48 // of sound in air at sea level (~340 m/s).
49 cm = pulse_width / 58.8;
50 inches = pulse_width / 148.3;
51
52 // Print our results
53 if ( pulse_width > MAX_DIST ) {
54   Serial.println("out of range");
55 } else {
56   Serial.println("The Measured Distance in cm : %f",
57   Serial.println(inches);
58 }
59
60 // Print results
61 // Print results
62 Serial.println("Alert it !!");
63 }
64
65 // Print results
66 // Print results
67 Serial.println("Alert it !!");
68 }
69
70 // Alert at least 100ms before next measurement
71 delay(1000);
72 }

```



### IBM cloud output:

Browse

Action

Device Types

Interfaces

Add Device

Identity

Device Information

Recent Events

State

Logs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
event_1	{"distance":7,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":8,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago