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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);

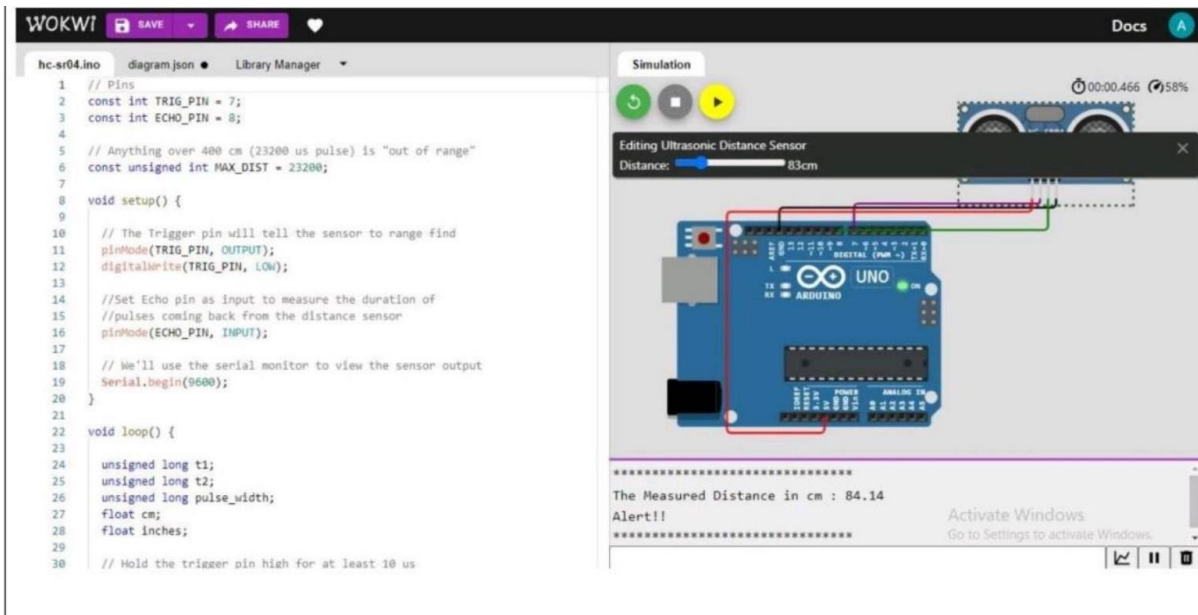
  if( cm < 100 ){
    //while(true){
      Serial.println("Alert!!");
    //}
  }
  Serial.print("*****");
}

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

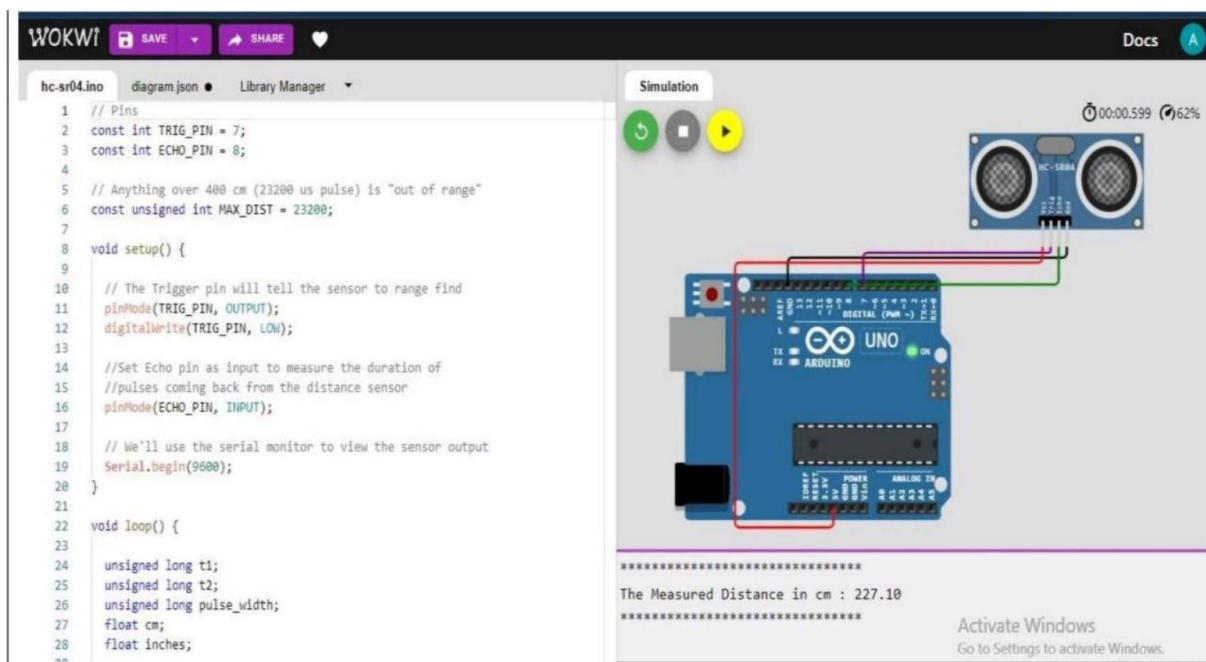
```

Output:

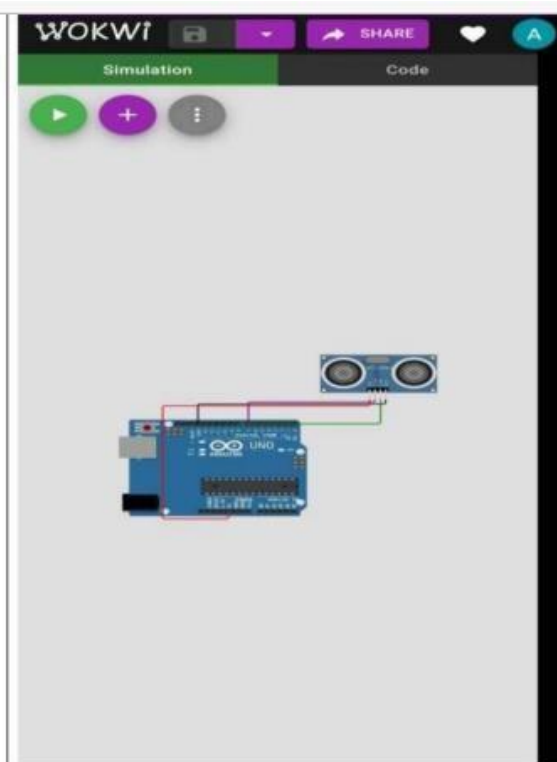
1.If the distance is less than 100 cms ,it alerts.



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 = 12;
3 const int ECHO_PIN = 11;
4
5 // anything over 400 cm (1200 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 pulse_width;
27   float cm;
28   float inches;
29
30 // Hold the trigger pin high for at least 10 us
31 digitalWrite(TRIG_PIN, HIGH);
32 delayMicroseconds(10);
33 digitalWrite(TRIG_PIN, LOW);
34
35 // Wait for pulse so echo pin
36 while (digitalRead(ECHO_PIN) == 0);
37
38 // Measure how long the echo pin was held high (pulse width)
39 // Note: the Arduino's counter will overflow after ~18 ms
40 t1 = micros();
41 while (digitalRead(ECHO_PIN) == 1);
42 t2 = micros();
43 pulse_width = t2 - t1;
44
45 // Calculate distance in centimeters and inches. The constants
46 // are found in the datasheet, and calculated from the assumed speed
47 // of sound in air at sea level (~340 m/s).
48 cm = pulse_width / 58.8;
49 inches = pulse_width / 148.0;
50
51 // Print our results
52 if ( pulse_width > MAX_DIST ) {
53   Serial.println("Out of range");
54 } else {
55   Serial.println("~~~~~");
56   Serial.print("The Measured Distance in cm : ");
57   Serial.println(cm);
58
59 // Print
60 // Serial.println("Alert it !!");
61 }
62
63 // Print~~~~~
64 Serial.println("~~~~~");
65
66 // Wait at least 100ms before next measurement
67 delay(100);
68 }

```

