

IBM ASSIGNMENT- 4

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Write Code and connections in wokwi for ultrasonic sensor. whatever distance is less than 100 cms send "Alert" to ibm cloud aand 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!!");
        //}
    }

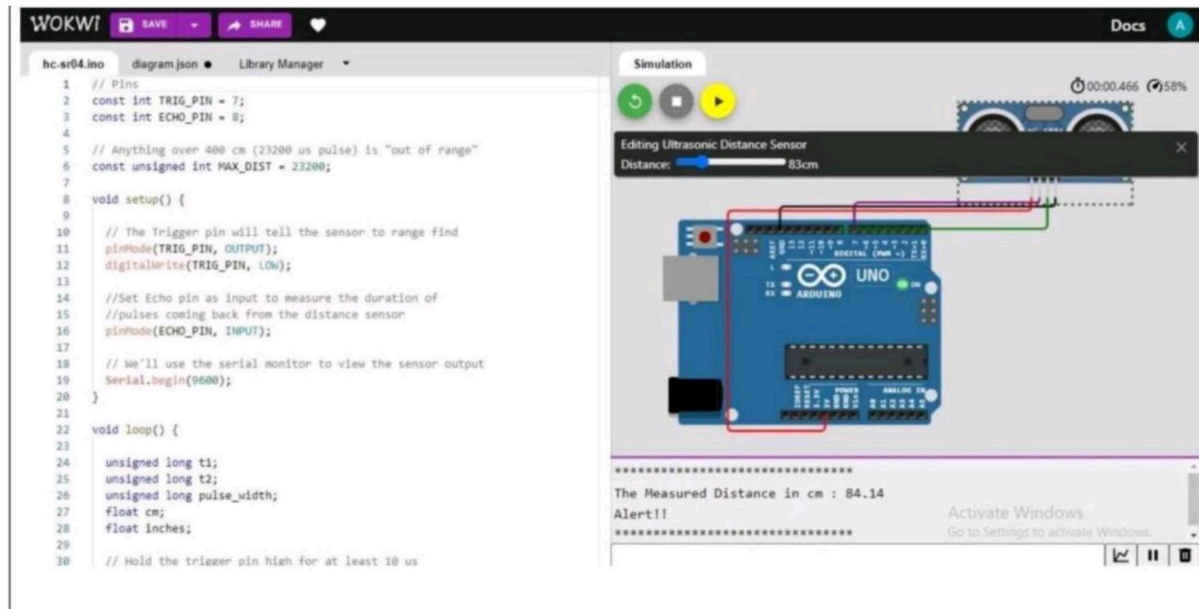
Serial.print("*****");
}

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

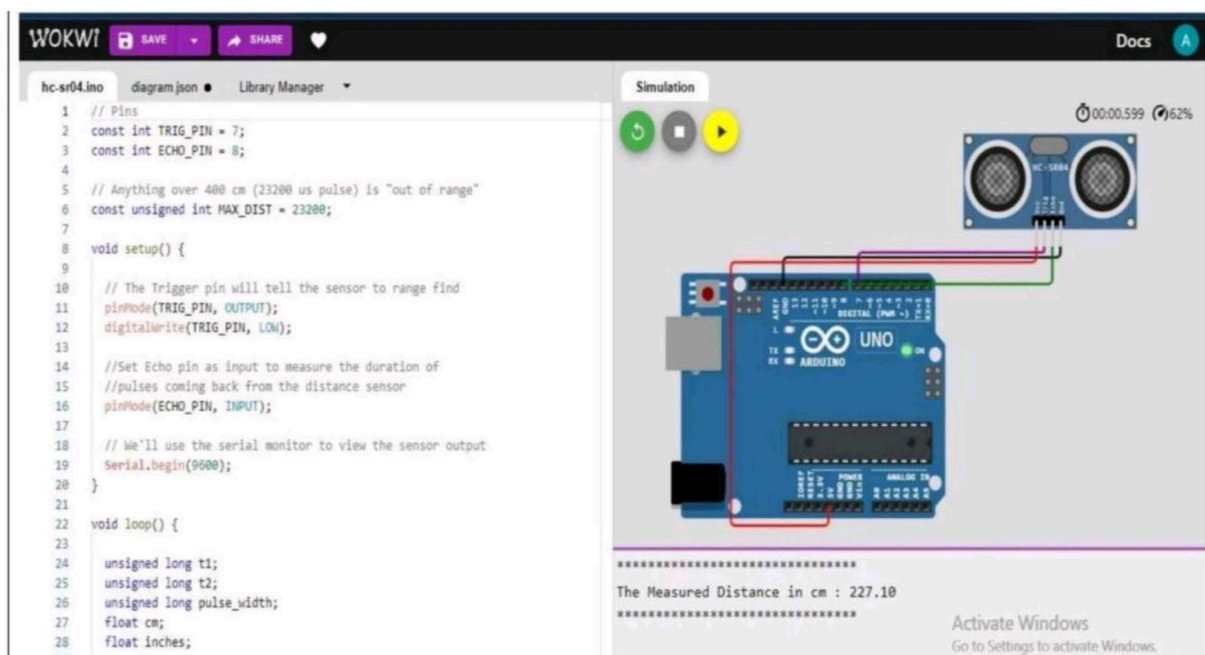
```

Output:

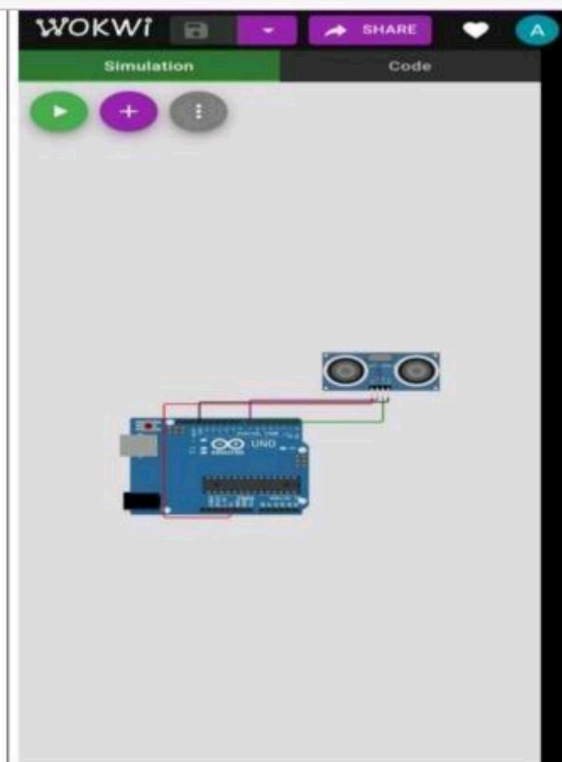
1.If the distance is less than 100 cms ,it alerts.



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 // Anything over 400 cm (1200 in inches) is "out of range"
6 const unsigned int MAX_DIST = 2100;
7
8 void setup() {
9
10 // The Trigger pin will send the sensor to range find
11 pinMode(TRIG_PIN, OUTPUT);
12 pinMode(ECHO_PIN, INPUT);
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
31 digitalWrite(TRIG_PIN, HIGH);
32 delayMicroseconds(10);
33 digitalWrite(TRIG_PIN, LOW);
34
35 // Wait for pulse on echo pin
36 while (digitalRead(ECHO_PIN) == 0);
37
38 // Measure how long the echo pin was held high (pulse width)
39 // Note: the sensor's internal 50K pull-up pin is on pin
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 speed of
47 // sound in air at sea level (340 m/s).
48 cm = pulse_width / 58.8;
49 inches = pulse_width / 148.0;
50
51 // Print out results
52 if (pulse_width < MAX_DIST) {
53   Serial.println("In range");
54   Serial.println("~~~~~");
55   Serial.print("The Measured Distance is cm : ");
56   Serial.print(cm);
57   Serial.println();
58 }
59
60 if (cm > 100) {
61   Serial.print("Alert !!");
62   Serial.println();
63 }
64
65 Serial.println("~~~~~");
66
67 // Wait at least 100ms before next measurement
68 delay(100);
69 }

```

