

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);

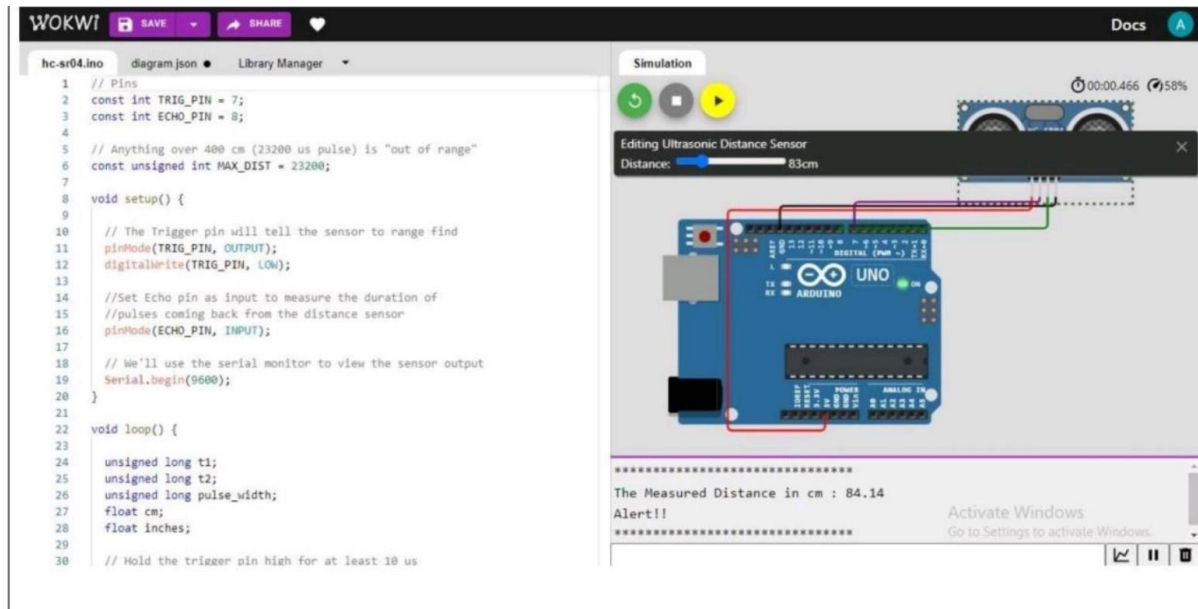
if( cm < 100 ){
    //while(true){
        Serial.println("Alert!!");
        //}
    }
Serial.print("*****");
}

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

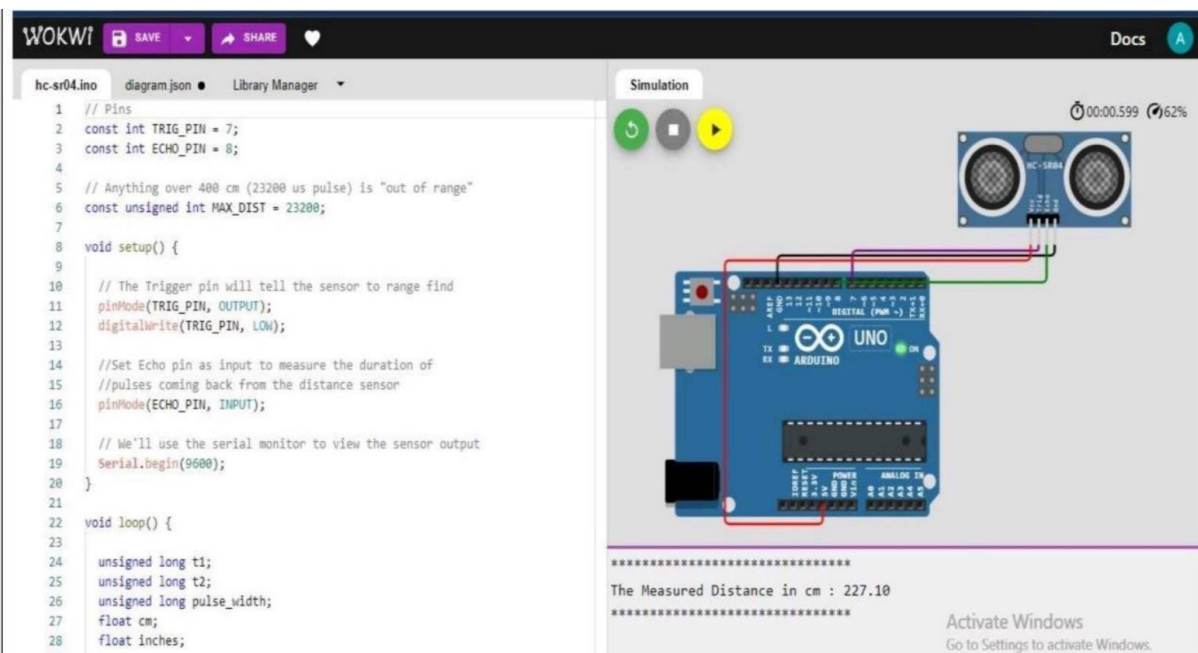
```

Output:

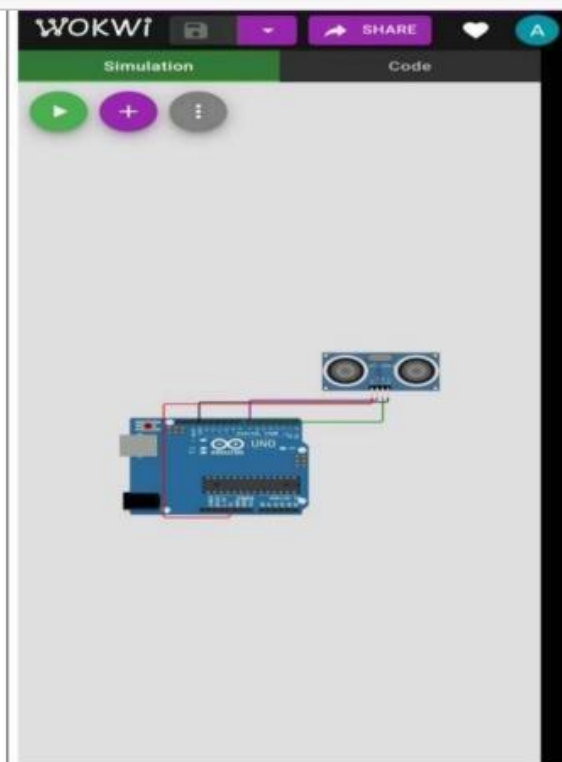
1.If the distance is less than 100 cms ,it alerts.



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 = 7;
3 const int ECHO_PIN = 8;
4 // Anything over 400 cm (1200 us pulse) is "out of range"
5 const unsigned int MAX_DIST = 2000;
6
7
8
9
10 // The trigger pin will send 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
31   digitalWrite(TRIG_PIN, HIGH);
32   digitalWrite(TRIG_PIN, LOW);
33   digitalWrite(TRIG_PIN, LOW);
34
35   // Wait for pulse on echo pin
36   while ( !digitalRead(ECHO_PIN) ) {}
37
38   // Measure how long the echo pin was held high (pulse width)
39   // Note: the microcontroller's clock is 16MHz, so 1 us = 16ns
40   t1 = micros();
41   while ( digitalRead(ECHO_PIN) == HIGH )
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 sound
47   // of sound in air at sea level (340 m/s).
48   cm = pulse_width / 58.0;
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 is cm : ");
57     Serial.println(cm);
58   }
59
60   // Wait 100ms
61   // Serial.println("Wait 100ms");
62   // }
63   Serial.println("*****");
64
65   // Wait at least 100ms before next measurement
66   delay(100);
67 }

```

