

ASSIGNMENT-4

QUESTION:

Write Code and connections in wokwi for ultrasonic sensor. whatever distance is less than 100 cm send "Alert" to IBM cloud and display in device recent events.

CASE 1: Distance less than 100cm → It Alerts

The screenshot displays the Wokwi IDE interface. On the left, the code for `hc-sr04.ino` is shown. The code initializes the trig and echo pins, defines a `readDistanceCM()` function, and a `loop()` function that checks if the distance is less than 100cm. If true, it prints "Measured distance: " followed by the distance value to the serial monitor. The right side shows a simulation of an Arduino Uno with an HC-SR04 sensor connected. The serial monitor at the bottom displays the output of the code.

```
1 // pinMode(TRIG_PIN, OUTPUT);
2 // pinMode(ECHO_PIN, INPUT);
3
4 }
5
6
7
8
9
10
11 float readDistanceCM() {
12   digitalWrite(TRIG_PIN, LOW);
13   delayMicroseconds(2);
14   digitalWrite(TRIG_PIN, HIGH);
15   delayMicroseconds(10);
16   digitalWrite(TRIG_PIN, LOW);
17   int duration = pulseIn(ECHO_PIN, HIGH);
18   return duration * 0.034 / 2;
19 }
20
21 void loop() {
22   float distance = readDistanceCM();
23
24   bool isNearby = distance < 100;
25   digitalWrite(LED_BUILTIN, isNearby);
26
27   Serial.print("Measured distance: ");
28   Serial.println(readDistanceCM());
29
30   delay(100);
31 }
32
```

Simulation output (Serial Monitor):

```
Measured distance: 79.87
Measured distance: 79.78
Measured distance: 79.78
Measured distance: 79.78
Measured distance: 79.87
Measured distance: 79.78
Measured distance: 79.78
```

CASE 2: Distance more than 100cm → It won't Alert

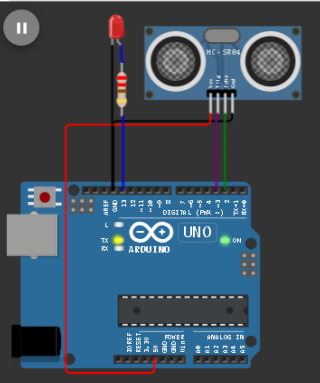
WOKWI SAVE SHARE Docs

hc-sr04.ino diagram.json Library Manager

```
1 #define ECHO_PIN 2
2 #define TRIG_PIN 3
3
4 void setup() {
5   Serial.begin(115200);
6   pinMode(LED_BUILTIN, OUTPUT);
7   pinMode(TRIG_PIN, OUTPUT);
8   pinMode(ECHO_PIN, INPUT);
9 }
10
11 float readDistanceCM() {
12   digitalWrite(TRIG_PIN, LOW);
13   delayMicroseconds(2);
14   digitalWrite(TRIG_PIN, HIGH);
15   delayMicroseconds(10);
16   digitalWrite(TRIG_PIN, LOW);
17   int duration = pulseIn(ECHO_PIN, HIGH);
18   return duration * 0.034 / 2;
19 }
20
21 void loop() {
22   float distance = readDistanceCM();
23
24   bool isNearby = distance < 100;
25   digitalWrite(LED_BUILTIN, isNearby);
26
27   Serial.print("Measured distance: ");
28   Serial.println(readDistanceCM());
29
30   delay(100);
31 }
32
```

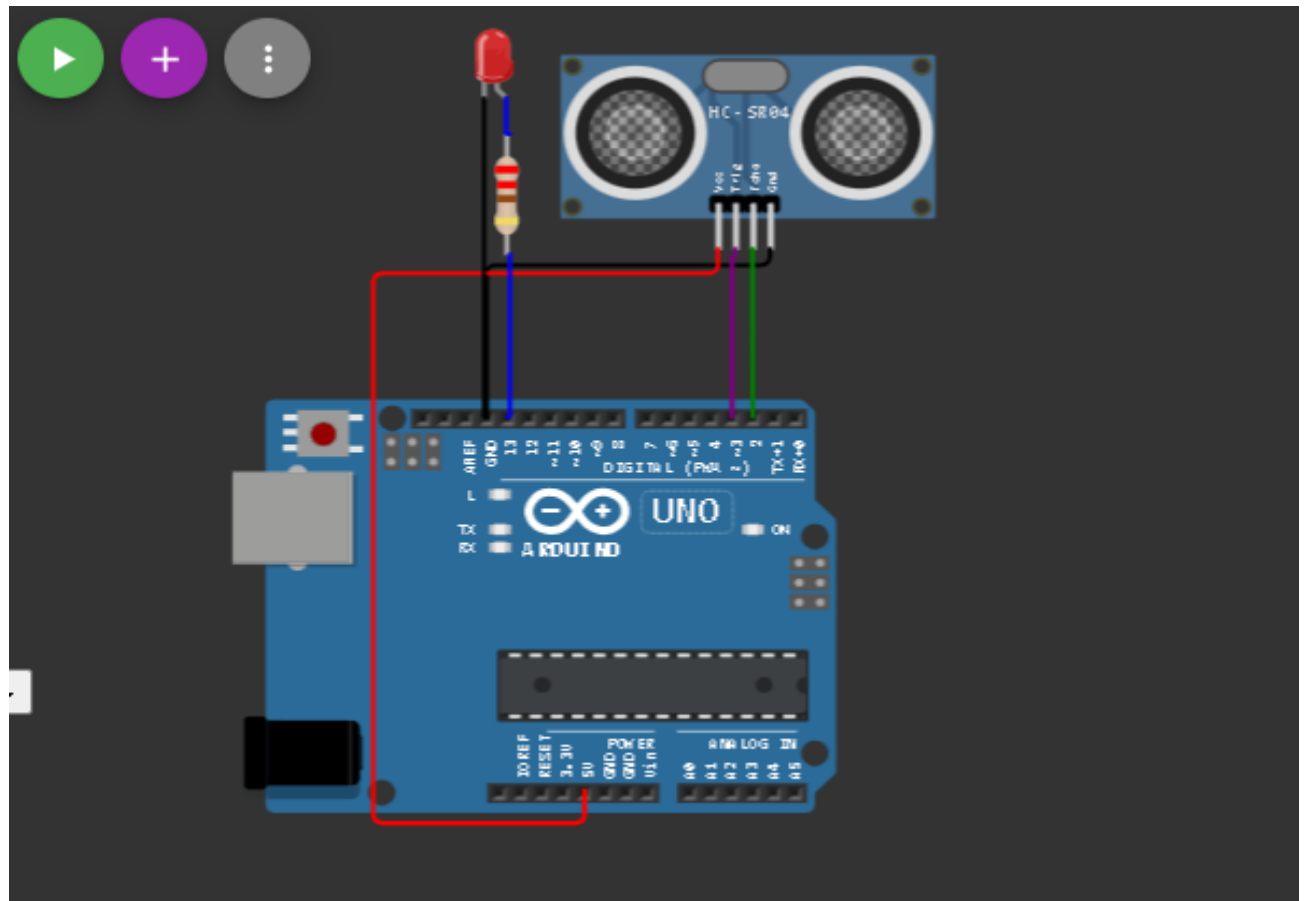
Simulation

00:14.080 92%



Measured distance: 118.58
Measured distance: 118.56
Measured distance: 118.58
Measured distance: 118.58
Measured distance: 118.58
Measured distance: 118.56
Measured distance: 118.58
Measured distance: 118.56
Measured distance: 118.58

Circuit Design:



CODING:

```
#define ECHO_PIN 2
#define TRIG_PIN 3

void setup() {
  Serial.begin(115200);
  pinMode(LED_BUILTIN, OUTPUT);
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);
}

float readDistanceCM() {
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);
  int duration = pulseIn(ECHO_PIN, HIGH);
  return duration * 0.034 / 2;
}

void loop() {
  float distance = readDistanceCM();

  bool isNearby = distance < 100;
  digitalWrite(LED_BUILTIN, isNearby);

  Serial.print("Measured distance: ");
  Serial.println(readDistanceCM());

  delay(100);
}
```

```

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.println("The Measured Distance in cm:");
    Serial.println(cm);

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

//wait at least 1000ms before next measurement

delay(1000);
}

```

WOKWI LINK:

<https://wokwi.com/projects/3466596108174628>

