ASSIGNMENT-4

```
/*
          * Ultrasonic.cpp
          *
          * Library for Ultrasonic Ranging Module in a minimalist way
          *
          */

         #if ARDUINO >= 100
           #include <Arduino.h>
         #else
           #include <WProgram.h>
         #endif

         #include "Ultrasonic.h"

         Ultrasonic::Ultrasonic(uint8_t trigPin, uint8_t echoPin, unsigned long
         timeOut) {
           trig = trigPin;
           echo = echoPin;
           threePins = trig == echo ? true : false;
           pinMode(trig, OUTPUT);
           pinMode(echo, INPUT);
           timeout = timeOut;
         }

         unsigned int Ultrasonic::timing() {
           if (threePins)
             pinMode(trig, OUTPUT);

           digitalWrite(trig, LOW);
           delayMicroseconds(2);
           digitalWrite(trig, HIGH);
           delayMicroseconds(10);
           digitalWrite(trig, LOW);

           if (threePins)
```

```
            pinMode(trig, INPUT);

          previousMicros = micros();
          while(!digitalRead(echo) && (micros() - previousMicros) <= timeout);
        // wait for the echo pin HIGH or timeout
          previousMicros = micros();
          while(digitalRead(echo)  && (micros() - previousMicros) <= timeout);
        // wait for the echo pin LOW or timeout

          return micros() - previousMicros; // duration
        }

        /*
         * If the unit of measure is not passed as a parameter,
         * sby default, it will return the distance in centimeters.
         * To change the default, replace CM by INC.
         */
        unsigned int Ultrasonic::read(uint8_t und) {
          return timing() / und / 2;  //distance by divisor
        }

        /*
         * This method is too verbal, so, it's deprecated.
         * Use read() instead.
         */
        unsigned int Ultrasonic::distanceRead(uint8_t und) {
          return read(und);
        }
/*
         * Ultrasonic.h
         *
         * Library for Ultrasonic Ranging Module in a minimalist way
         *
         */

        #ifndef Ultrasonic_h
        #define Ultrasonic_h

        /*
         * Values of divisors
```

```
 */
#define CM 28
#define INC 71

class Ultrasonic {
  public:
    Ultrasonic(uint8_t sigPin) : Ultrasonic(sigPin, sigPin) {};
    Ultrasonic(uint8_t trigPin, uint8_t echoPin, unsigned long timeOut =
20000UL);
    unsigned int read(uint8_t und = CM);
    unsigned int distanceRead(uint8_t und = CM) __attribute__
((deprecated ("This method is deprecated, use read() instead.")));
    void setTimeout(unsigned long timeOut) {timeout = timeOut;}
    void setMaxDistance(unsigned long dist) {timeout = dist*CM*2;}

  private:
    uint8_t trig;
    uint8_t echo;
    boolean threePins = false;
    unsigned long previousMicros;
    unsigned long timeout;
    unsigned int timing();
};

#endif // Ultrasonic_h
```

```
{
  "version": 1,
  "author": "Rozen Berg",
  "editor": "wokwi",
  "parts": [
    {
      "type": "wokwi-arduino-uno",
      "id": "uno",
      "top": 259.31,
      "left": 31.06,
      "rotate": 0,
      "hide": false,
      "attrs": {}
    },
    {
          "type": "wokwi-hc-sr04",
          "id": "ultrasonic",
          "top": 86.99,
          "left": 109.89,
          "rotate": 0,
          "hide": false,
          "attrs": { "distance": "100" }
        }
      ],
      "connections": [
        [ "uno:GND.1", "ultrasonic:GND", "black", [ "v-8", "*", "v8" ] ],
        [ "uno:13", "ultrasonic:ECHO", "green", [] ],
        [ "uno:12", "ultrasonic:TRIG", "purple", [ "*", "v4" ] ],
        [ "uno:5V", "ultrasonic:VCC", "red", [ "v16", "h-96", "*", "v12" ] ]
      ]
    }
/*
      Ultrasonic Simple
      Prints the distance read by an ultrasonic sensor in
      centimeters. They are supported to four pins ultrasound
      sensors (liek HC-SC04) and three pins (like PING)))
      and Seeed Studio sensors).
      The circuit:
     * * Module HR-SC04 (four pins) or PING))) (and other with
       three pins), attached to digital pins as follows:
      ---------------------    --------------------
      | HC-SC04 | Arduino |    | 3 pins | Arduino |
      ---------------------    --------------------
      |   Vcc   |   5V    |    |   Vcc  |   5V    |
      |   Trig  |   12    | OR |   SIG  |   13    |
      |   Echo  |   13    |    |   Gnd  |   GND   |
      |   Gnd   |   GND   |    --------------------
      ---------------------

    */

    #include "Ultrasonic.h"

    /*
      Pass as a parameter the trigger and echo pin, respectively,
      or only the signal pin (for sensors 3 pins), like:
      Ultrasonic ultrasonic(13);
    */
    Ultrasonic ultrasonic(12, 13);
    int distance;

    void setup() {
      Serial.begin(9600);
    }

    void loop() {
      // Pass INC as a parameter to get the distance in inches

      distance = ultrasonic.read(CM);

      Serial.print("Distance in CM: ");
      Serial.println(distance);

      distance = ultrasonic.read(INC);

      Serial.print("Distance in Inches: ");
      Serial.println(distance);

      delay(1000);
    }
```