hr-sr04-Ultrasonic-Simulation.ino

#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);

}

diagram.json

{

  "version": 1,

  "author": "Sasi Balaji",

  "editor": "wokwi",

  "parts": [

    { "type": "wokwi-arduino-uno", "id": "uno", "top": 259.31, "left": 31.06, "attrs": {} },

    {

      "type": "wokwi-hc-sr04",

      "id": "ultrasonic",

      "top": 86.99,

      "left": 109.89,

      "attrs": { "distance": "20" }

    }

  ],

  "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" ] ]

  ],

  "dependencies": {}

}

Ultrasonic.h

#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

Ultrasonic.cpp

#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);

}

