**//Speed of sound in air**

#define pin\_trigger 8

#define pin\_echo 9

#define contrast 6 \\ LCD contrast pin

#include <LiquidCrystal.h>

const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;

LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

float sa = 14.0; // insert the air columm height in "cm"

float t;

float va;

void setup() {

lcd.begin(16, 2);

pinMode(pin\_trigger, OUTPUT);

pinMode(pin\_echo, INPUT);

analogWrite(contrast, 110);

lcd.print(" SPEED OF SOUND ");

lcd.setCursor(0, 1);

lcd.print(" IN AIR ");

delay(2000);

lcd.clear();

}

void loop() {

digitalWrite(pin\_trigger, LOW);

delayMicroseconds(2);

digitalWrite(pin\_trigger, HIGH);

delayMicroseconds(10);

digitalWrite(pin\_trigger, LOW);

t = pulseIn(pin\_echo, HIGH); // t in microseconds

va = float((2 \* sa \* 10000.0) / t); // 10000.0 factor converts va value to m/s

lcd.clear();

lcd.setCursor(0, 0);

lcd.print("t = ");

lcd.print(time ); // print t in microseconds

lcd.print("us");

lcd.setCursor(0, 1);

lcd.print("v\_a = ");

lcd.print(va, 1); // print va in microseconds

lcd.print(" m/s");

delay(1000); // Wait for 1000 ms

}

**// Speed of sound in water**

#define pin\_trigger 8

#define pin\_echo 9

#define contraste 6

#include <LiquidCrystal.h>

const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;

LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

float sa = 343.0; // speed fo sound in air

float sa = 7.0; // insert the air columm height in "cm"

float sw = 30.0; // insert the water columm height in "cm"

float t;

float vw,va;

void setup() {

lcd.begin(16, 2);

pinMode(pin\_trigger, OUTPUT);

pinMode(pin\_echo, INPUT);

analogWrite(contraste, 110);

lcd.print(" SPEED OF SOUND ");

lcd.setCursor(0, 1);

lcd.print(" IN WATER ");

delay(2000);

lcd.clear();

}

void loop()

{

digitalWrite(pin\_trigger, LOW);

delayMicroseconds(2);

digitalWrite(pin\_trigger, HIGH);

delayMicroseconds(10);

digitalWrite(pin\_trigger, LOW);

t = pulseIn(pin\_echo, HIGH); // time in us

vw = 2. \* sa \* va / ((va \* t \* 0.0001) - (2. \* sa)); // 0.0001 factor converts va value to m/s

lcd.clear();

lcd.setCursor(0, 0);

lcd.print("t= ");

lcd.print(t);

lcd.print(" us");

lcd.setCursor(0, 1);

lcd.print("v\_w= ");

lcd.print(vw, 1);

lcd.print(" m/s");

delay(1000);

}