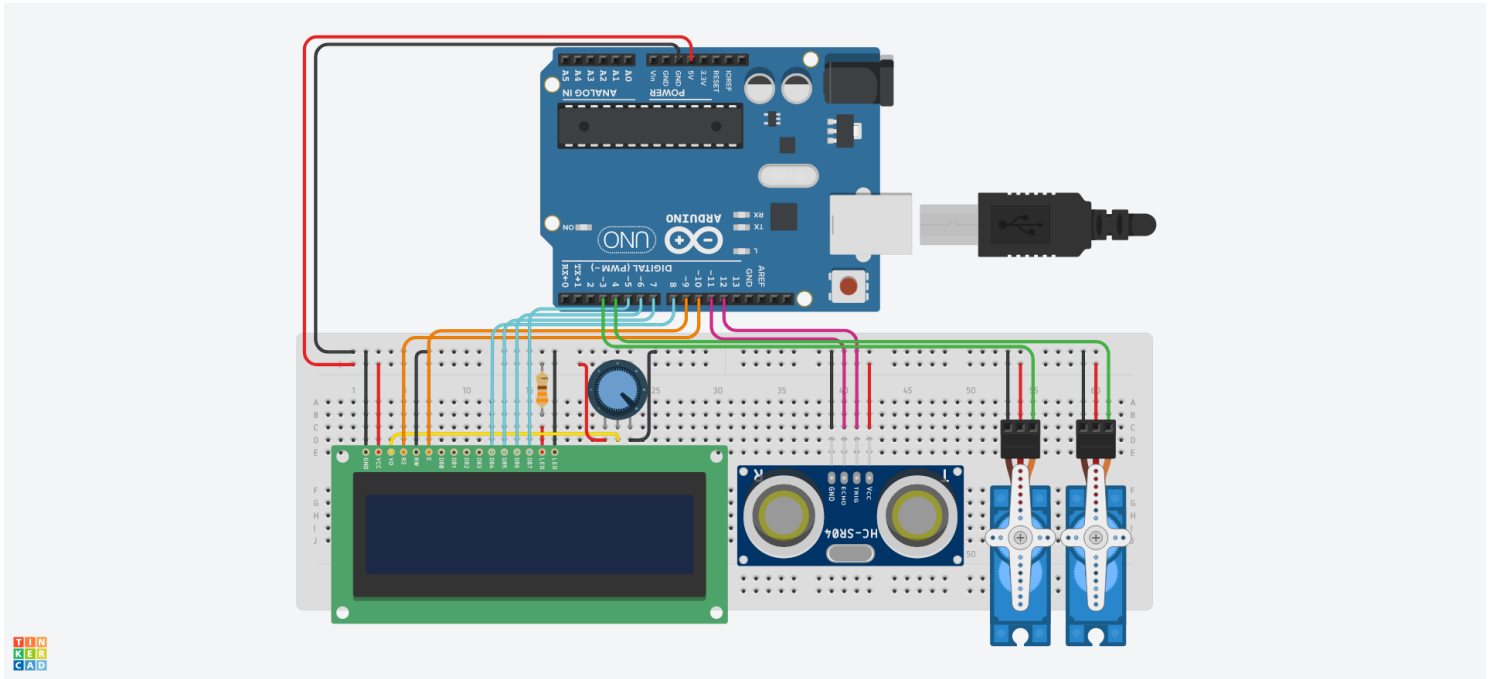# Μικροϋπολογιστές: Εργαστηριακή άσκηση 8

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1 Κύκλωμα

2 Κώδικας

```
#include <LiquidCrystal.h>
#include <Servo.h>

#define PIN_SERVO_X 3
#define PIN_SERVO_Y 4
#define PIN_ULTRASONIC_ECHO 11
#define PIN_ULTRASONIC_TRIGGER 12

LiquidCrystal lcd(10, 9, 8, 7, 6, 5);
Servo servo_x, servo_y;

void
setup()
{
        pinMode(PIN_ULTRASONIC_ECHO, INPUT);
        pinMode(PIN_ULTRASONIC_TRIGGER, OUTPUT);
        servo_x.attach(PIN_SERVO_X);
        servo_y.attach(PIN_SERVO_Y);
        servo_x.write(0);
        servo_y.write(0);
        lcd.begin(16, 2);
        Serial.begin(9600);
}

void
loop()
{
        int x, y;

        /*
         * in reality, the ultrasonic sensor is supposed to be mounted on the 2
         * servos so that it is able to move around.
         */
        for (x = 0; x < 180; x++)
                for (y = 0; y < 180; y++)
                        move_and_calc_distance(x, y);
        for (x = 180; x >= 0; x--)
                for (y = 180; y >= 0; y--)
                        move_and_calc_distance(x, y);

        delay(250);
}

void
```

```
move_and_calc_distance(int x, int y)
{
        float pingtime, distance;

        servo_x.write(x);
        servo_y.write(y);
        delay(10);

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

        pingtime = pulseIn(PIN_ULTRASONIC_ECHO, HIGH);
        /* calculate distance in cm */
        distance = (float)pingtime * 0.344 / 20;

        lcd.clear();
        lcd.setCursor(0, 0);
        lcd.print("Distance: ");
        lcd.setCursor(0, 1);
        lcd.print(distance);
        lcd.print(" cm");
        delay(50);
}
```