Dramaläb

Sensors

MAP Function

- you might need to convert the data from your sensors value range into your own value range

- e.g. photoresistor values between -231 - + 1357, your desired range: 0 - 100

MAP Function

```
long map(long x, long in_min, long in_max, long out_min, long out_max)
{
  return (x - in_min) * (out_max - out_min) / (in_max - in_min) + out_min;
}
```

use like this:
val = map(val, 0, 1023, 0, 255);

MAP Function
Attention: not an even distribution!

```
map(0..1023, 0, 1023, 0, 15);
    0     69
    1     68
    2     68
    3     68
    4     68
    5     69
    6     68
    7     68
    8     68
    9     68
   10     69
   11     68
   12     68
   13     68
   14     68
   15      1
```

from documentation: The map() function uses integer math so will not generate fractions, when the math might indicate that it should do so. Fractional remainders are truncated, and are not rounded or averaged.

example taken from: http://www.jetmore.org/john/blog/2011/09/arduinos-map-function-and-numeric-distribution/

MAP Function

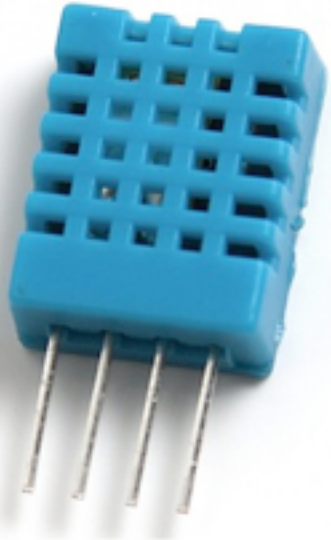## Solution: increase in_max and out_max by 1

```
map(0..1023, 0, 1024, 0, 16);
   0    64
   1    64
   2    64
   3    64
   4    64
   5    64
   6    64
   7    64
   8    64
   9    64
  10    64
  11    64
  12    64
  13    64
  14    64
  15    64
```

… and use constrain(x, a, b)

example taken from: http://www.jetmore.org/john/blog/2011/09/arduinos-map-function-and-numeric-distribution/
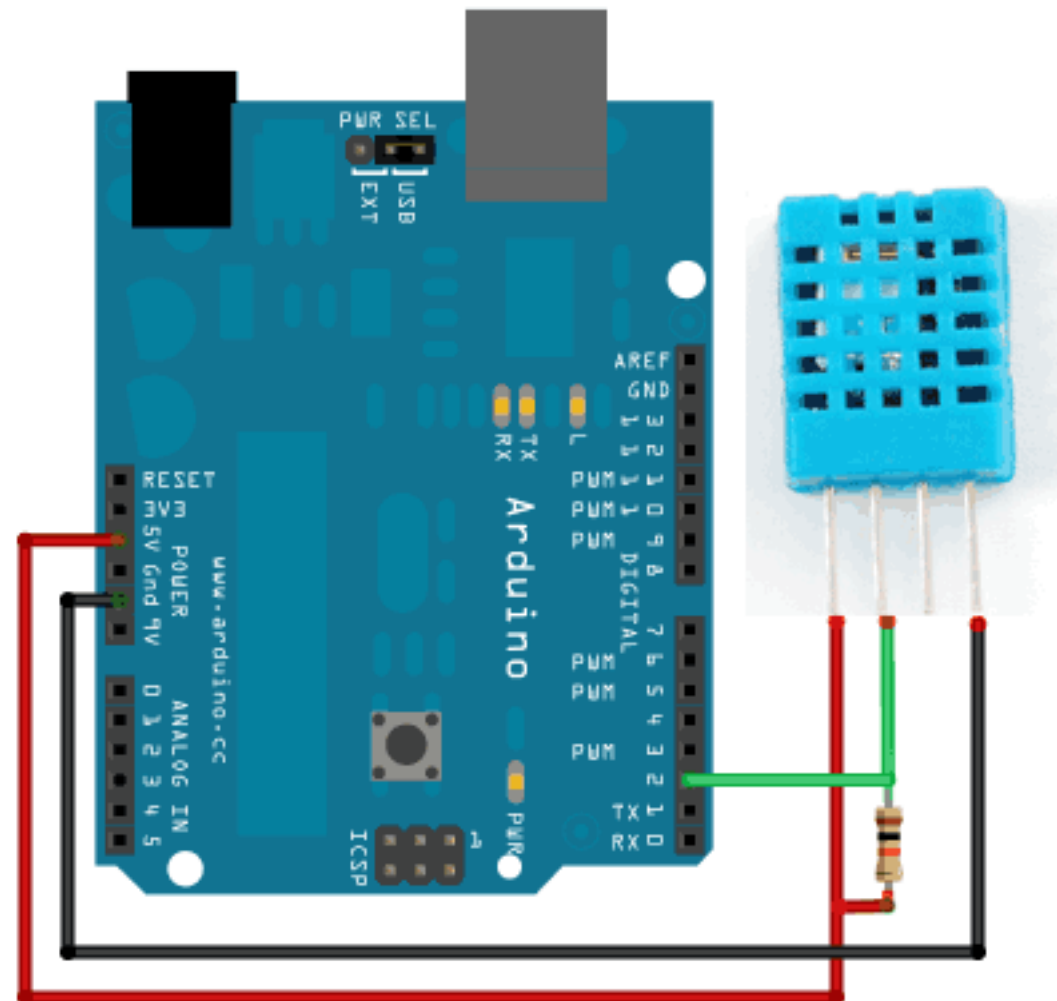
DHT-11

temperature and humidity sensor
low cost (3-5€)
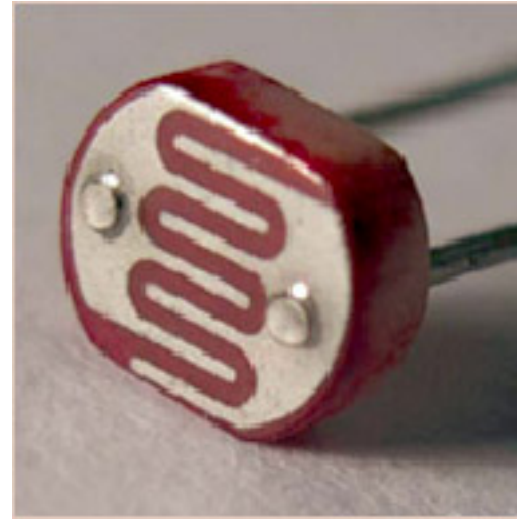good for 20-80% humidity readings with 5% accuracy
good for 0-50°C temperature readings ±2°C accuracy
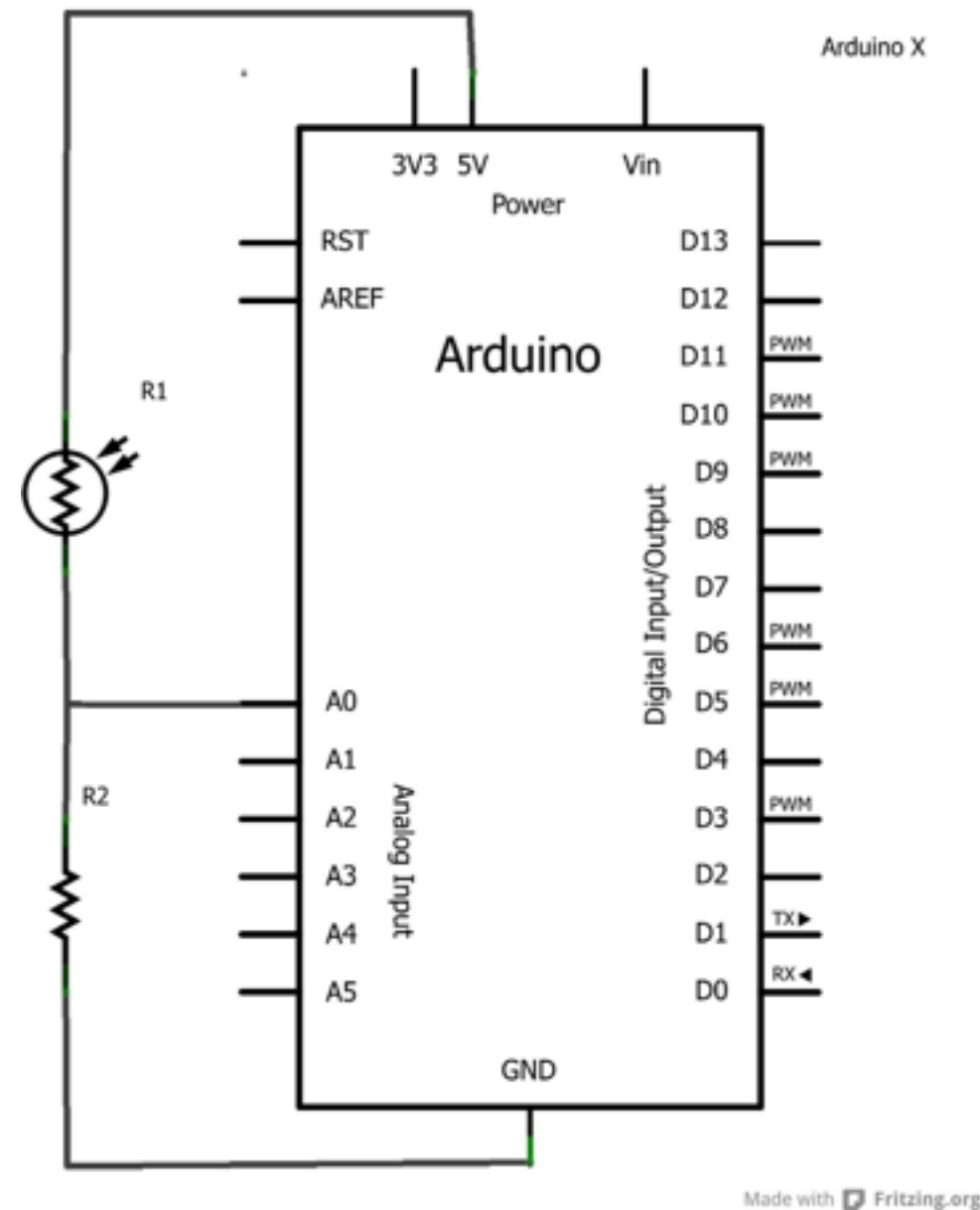no more than 1 Hz sampling rate

DHT-11
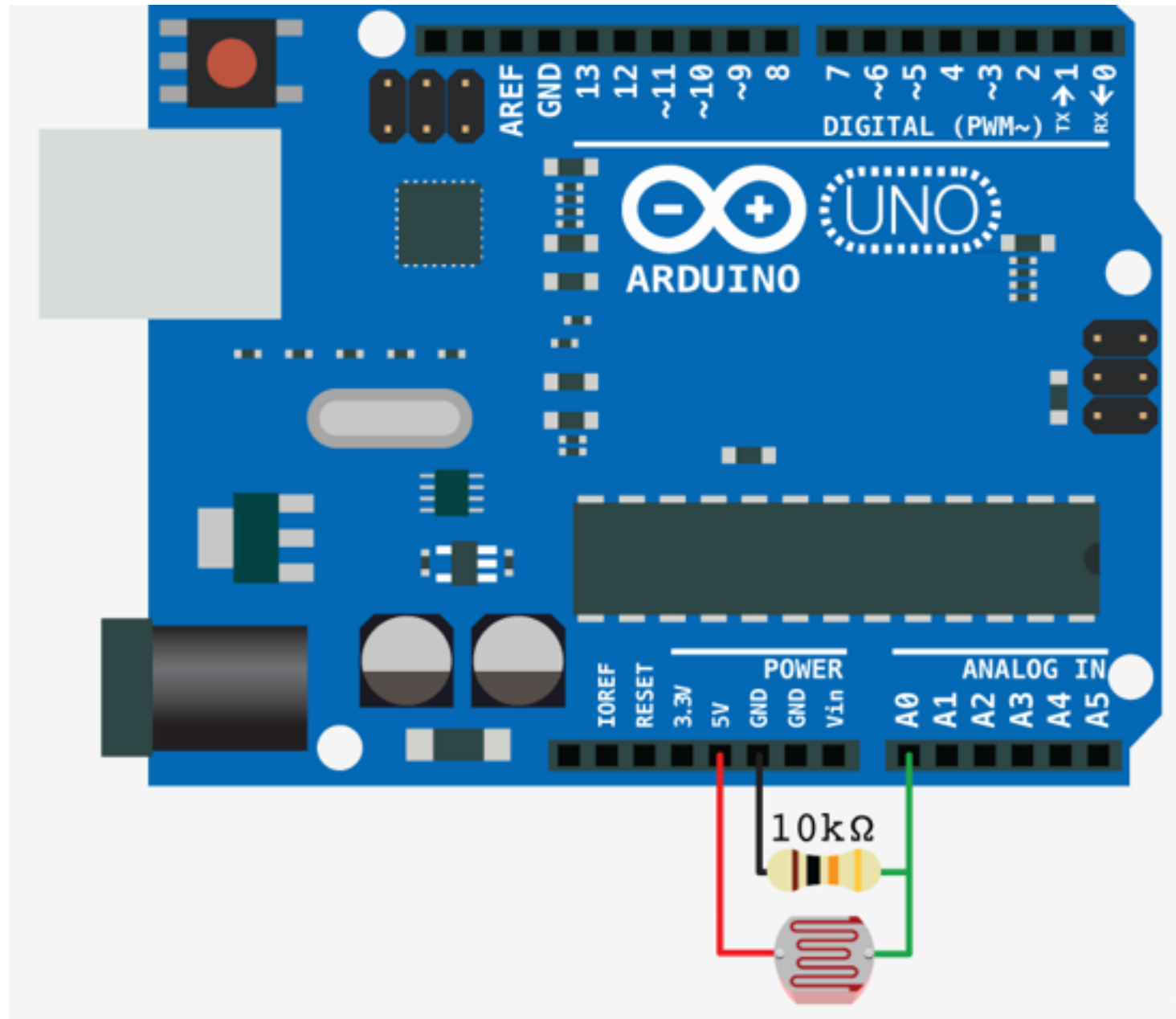
LDR - Photoresistor

changes resistance based on sensed light
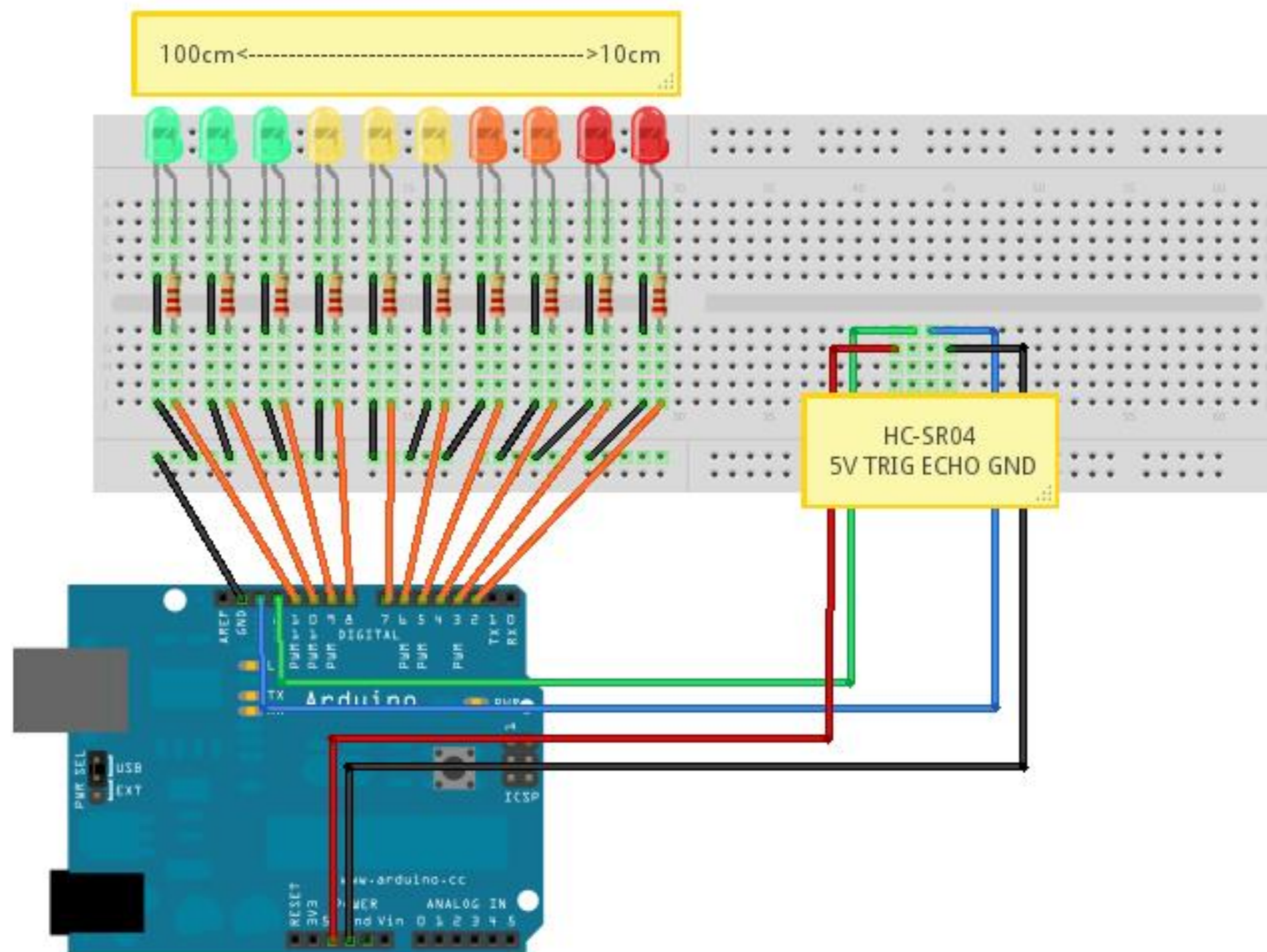
LDR - Photoresistor

LDR - Photoresistor

HC SR04 - Ultrasonic

HC SR04 - Ultrasonic

Joystick

internally contains a series of resistors
resistance varies based on knob position
read using analogRead()

Experiments

- switch lamp on on first button press, off on second

- Switch the lamp on if temperature < 28°C an off if temperature > 30°C

- Switch lamp on if it is to dark

- Switch the lamp on if you see an object between 30 and 50cm

- 2 groups: 2 Lamps, 2 LDR: switch each others lamp on and off