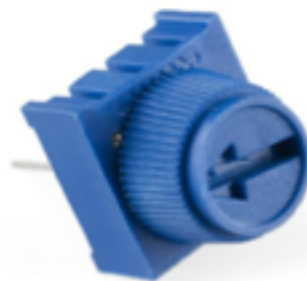# Week 2: Inputs
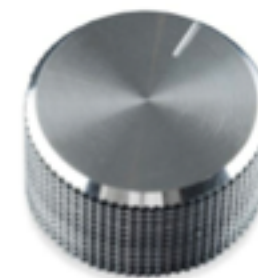
SFPC Electronics

Button

Potentiometer

Knob

Keypad

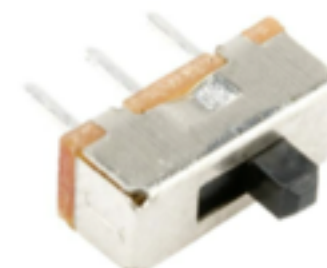Switch

Switch

Knob

Arcade Button

Switch

5 way switch

Pulse

Gas

Motion
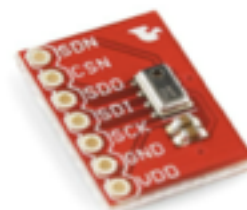
Pressure

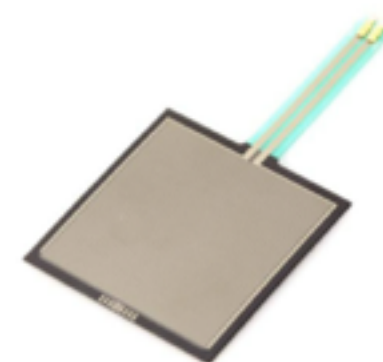Range Finder

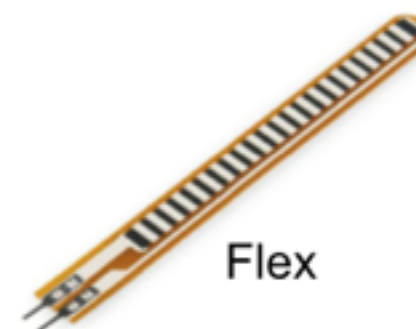Photocell

Humidity

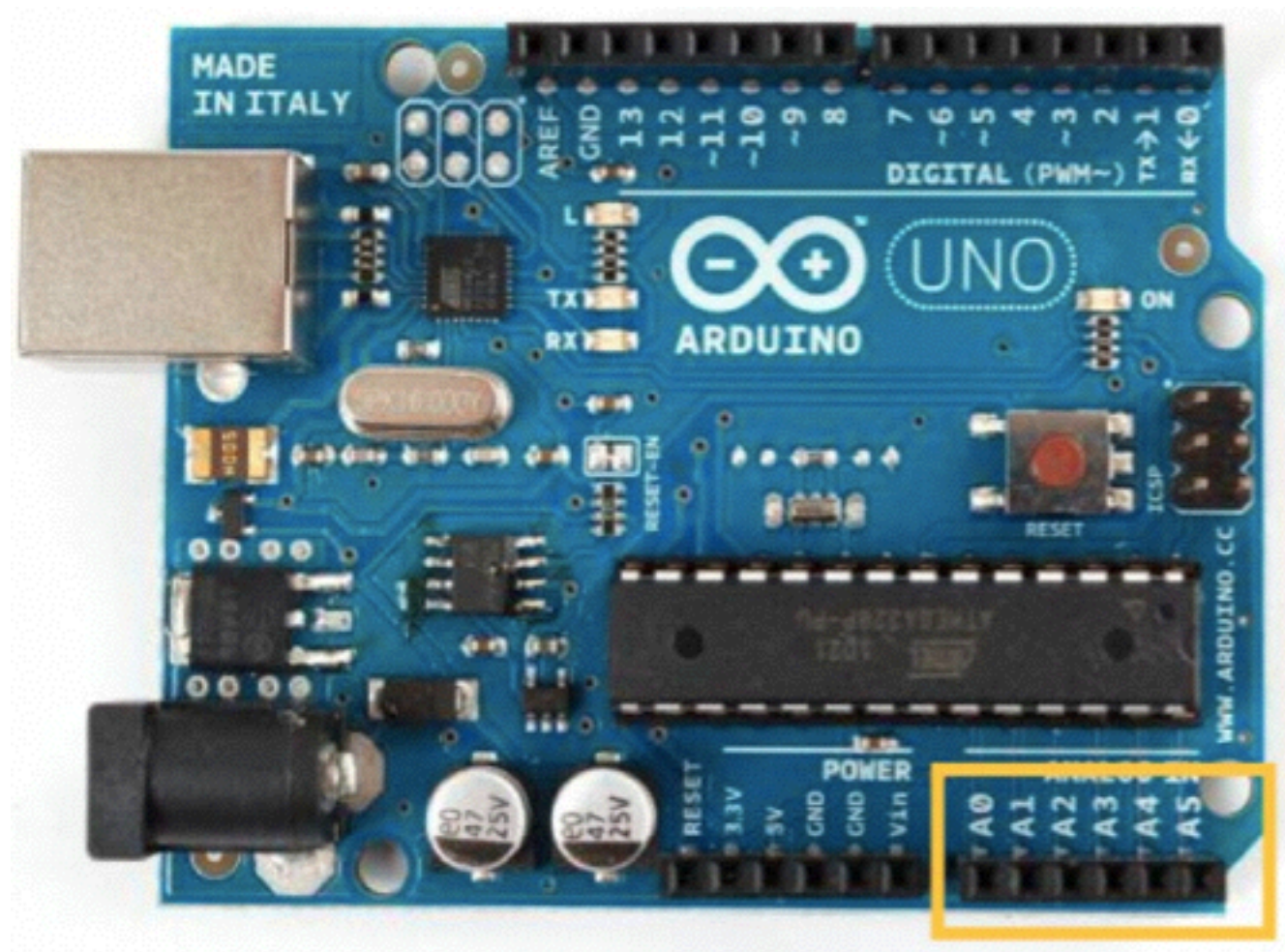Barometric
Pressure

Temperature

Force

Flex

pH

Color

Light

analog-digital converter

10-bit converter on pins A0-A5; converts
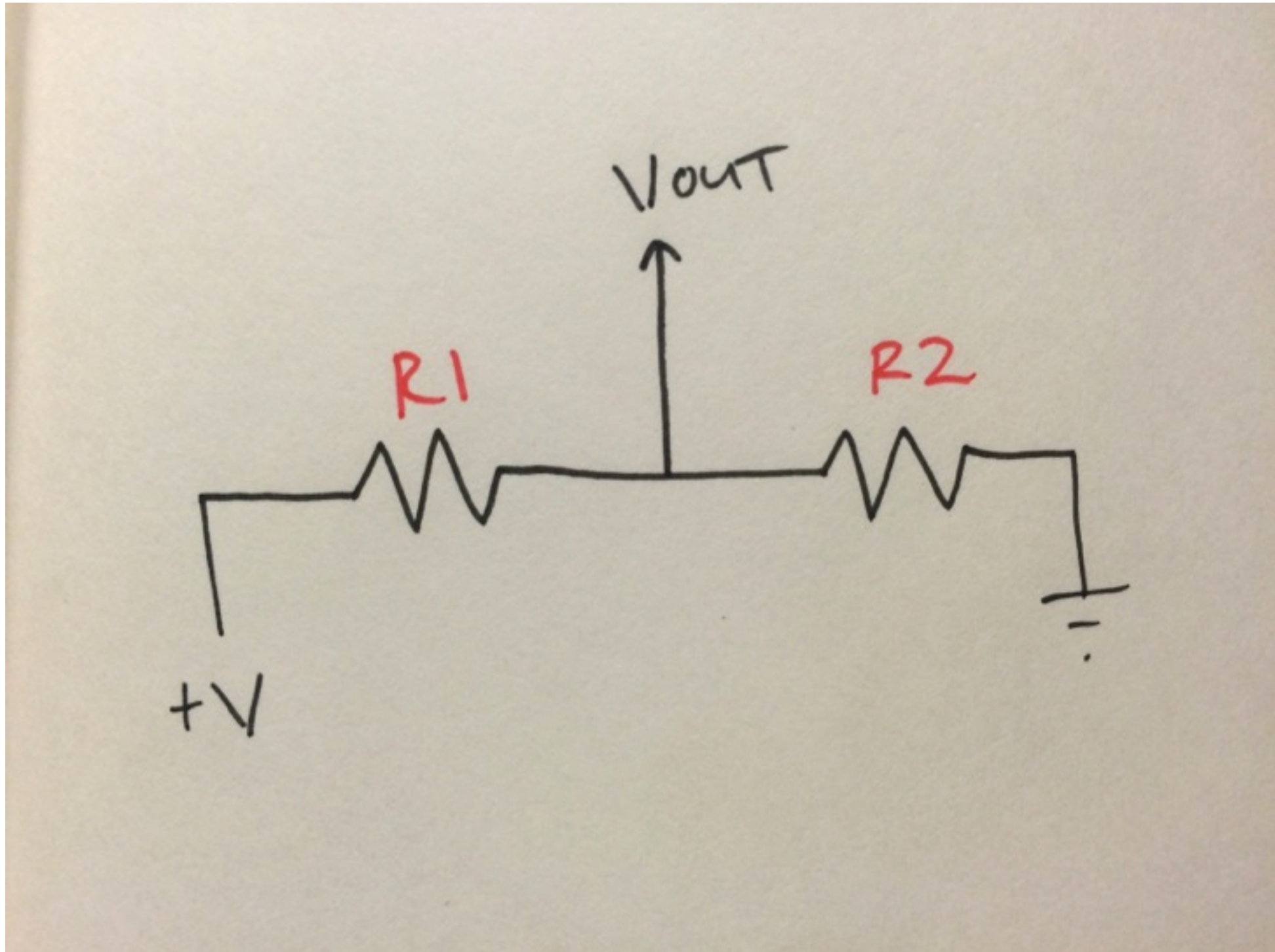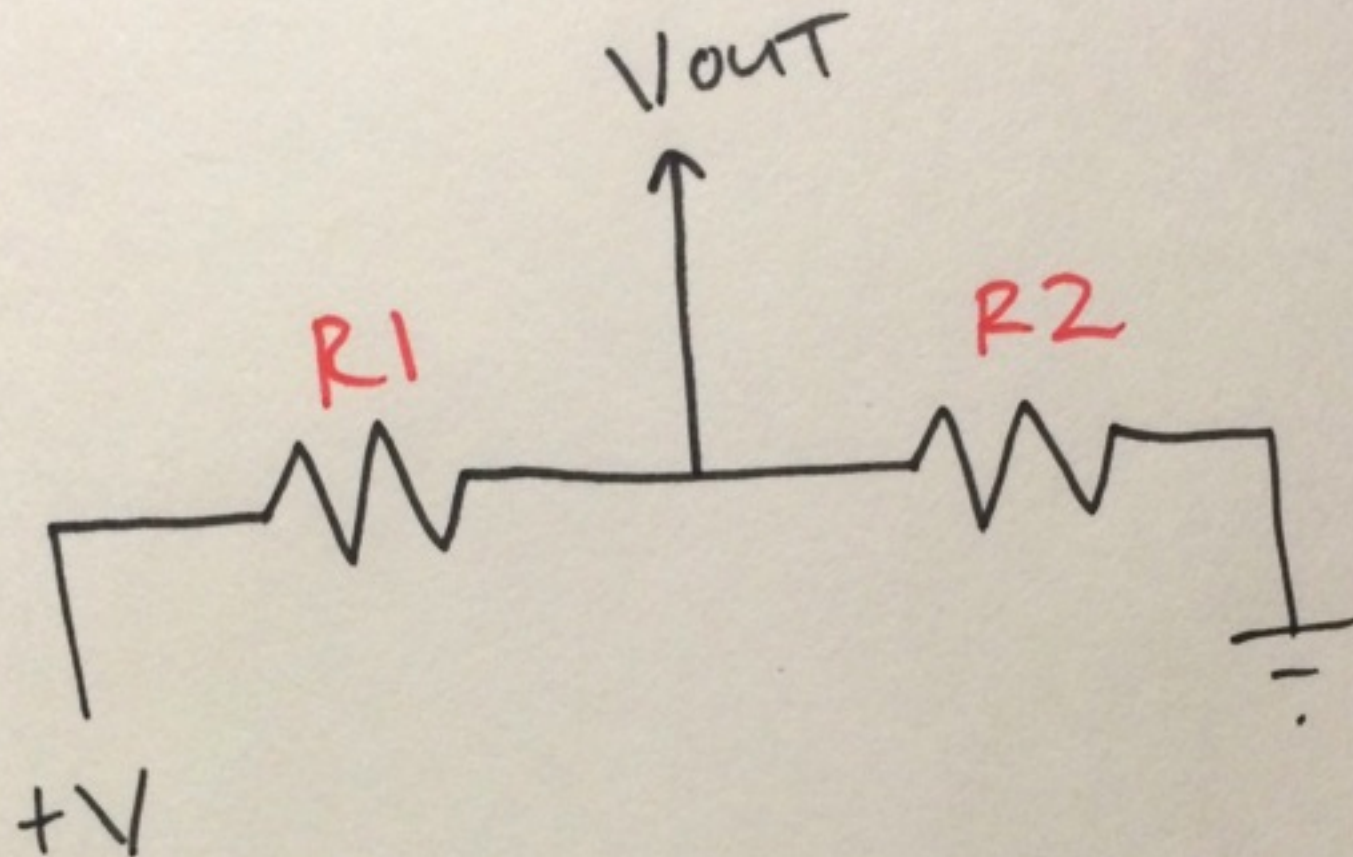returning voltage to a value range of 0-1023

Potentiometer

Variable resistor. Resistivity varies with the position of the dial.
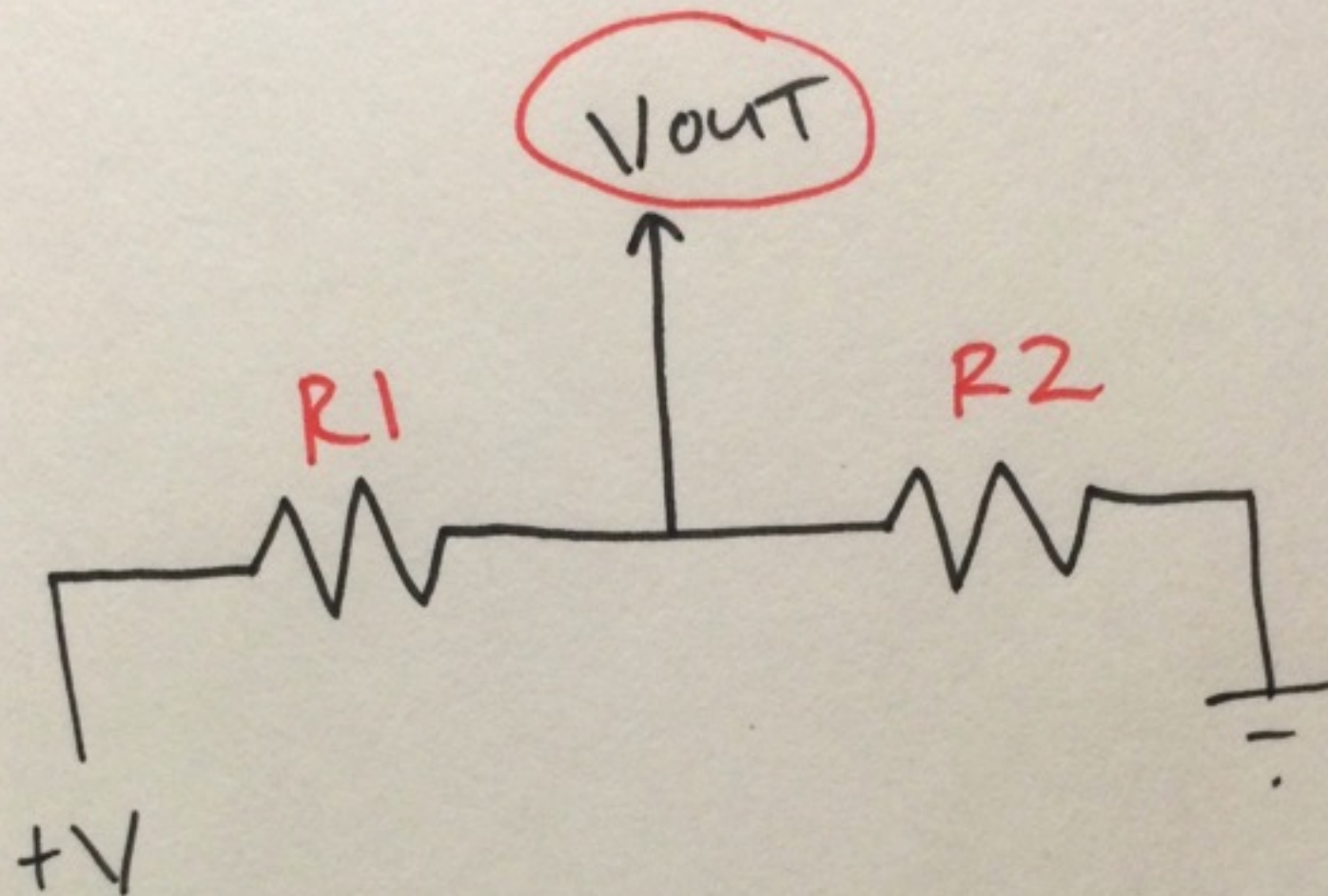
voltage dividers

voltage dividers

$$V_{OUT} = V_{IN} \cdot \frac{R2}{R1 + R2}$$

voltage dividers

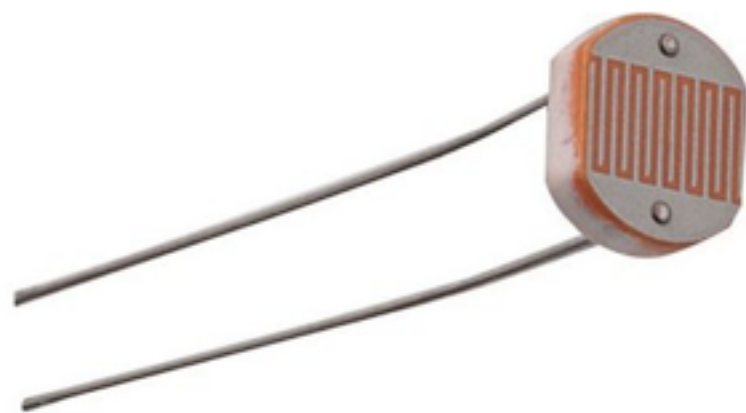$$V_{out} = V_{in} \cdot \frac{R2}{R1 + R2}$$

Photoresistor

Resistivity varies with the amount of light hitting the surface.

Dark environment = high resistance

Bright environment = low resistance

Converting inputs to outputs

Use the map() function to convert the 10-bit input range (0-1023) to the 8-bit output range (0-255).

```
map(value, inMin, inMax, outMin, out Max);
```

Servomotors

Motors with embedded position sensing. These can be addressed with PWM, with the output range of 0-255 corresponding to their 0-180 degree rotation range.
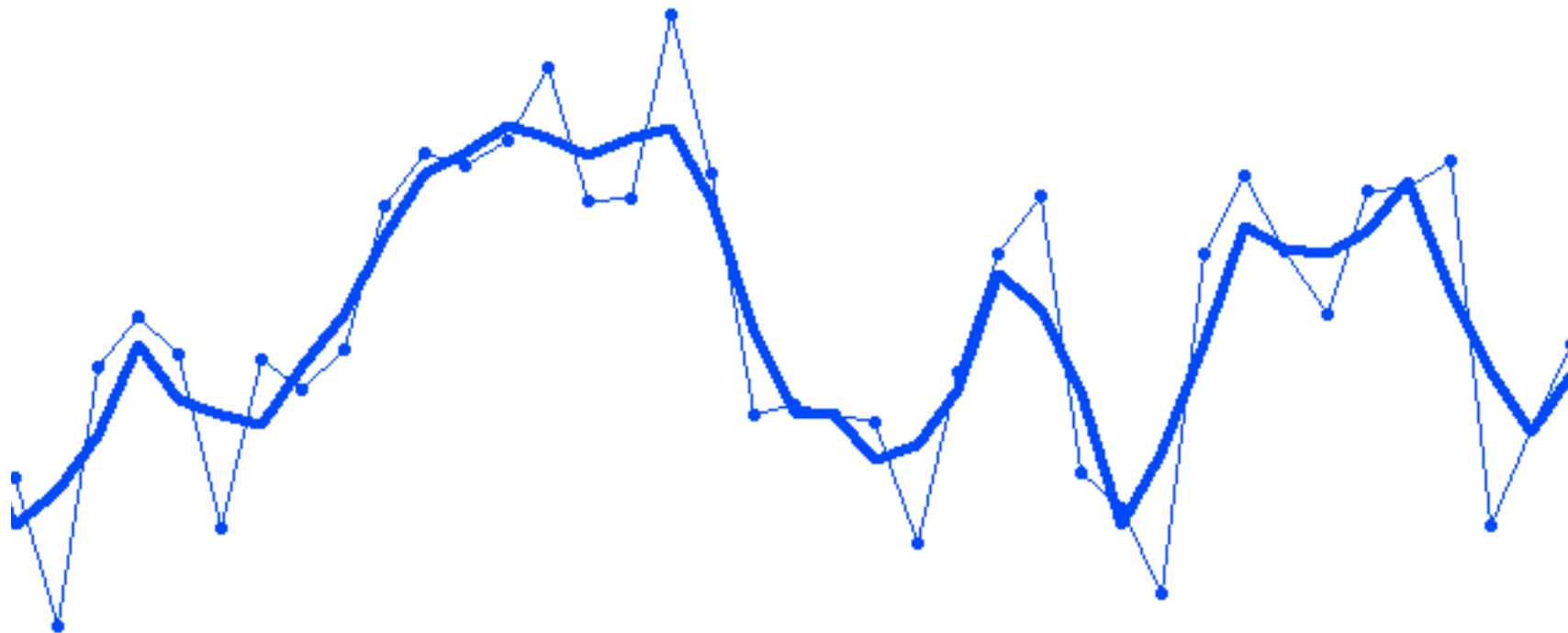
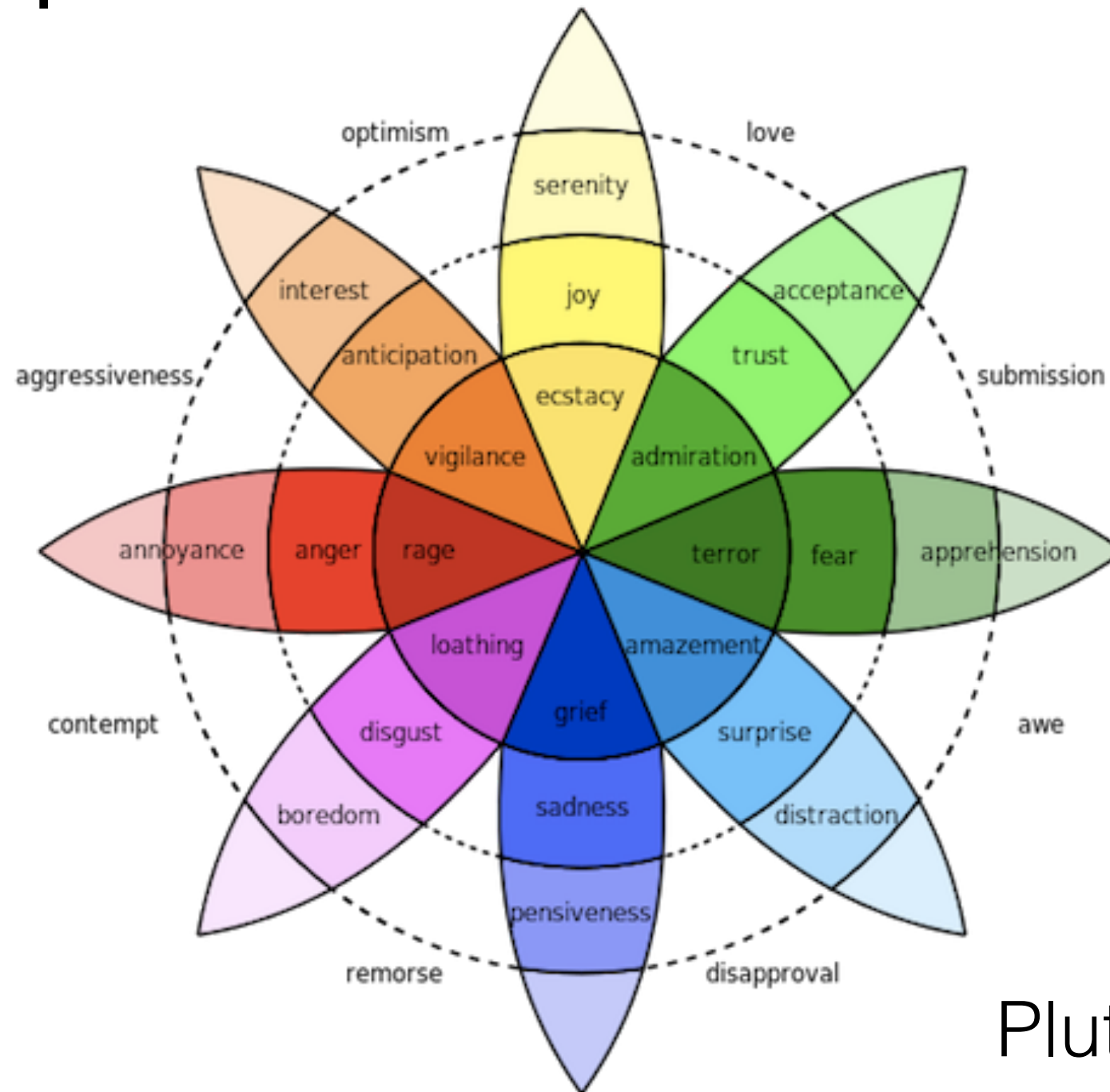# Exercise: map an analog input onto the rotation value of a servomotor

Smoothing analog data

Take a running average of the data to smooth it out over time.

Make a physical sketch to represent an emotion

Plutchik's Wheel