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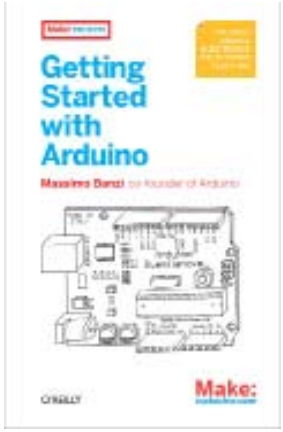
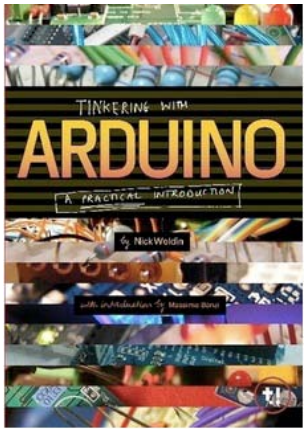
arduino - what?

OPEN SOURCE
HARDWARE HACKING
PLATFORM FOR
DESIGNERS, ARTISTS
AND HOBBYISTS



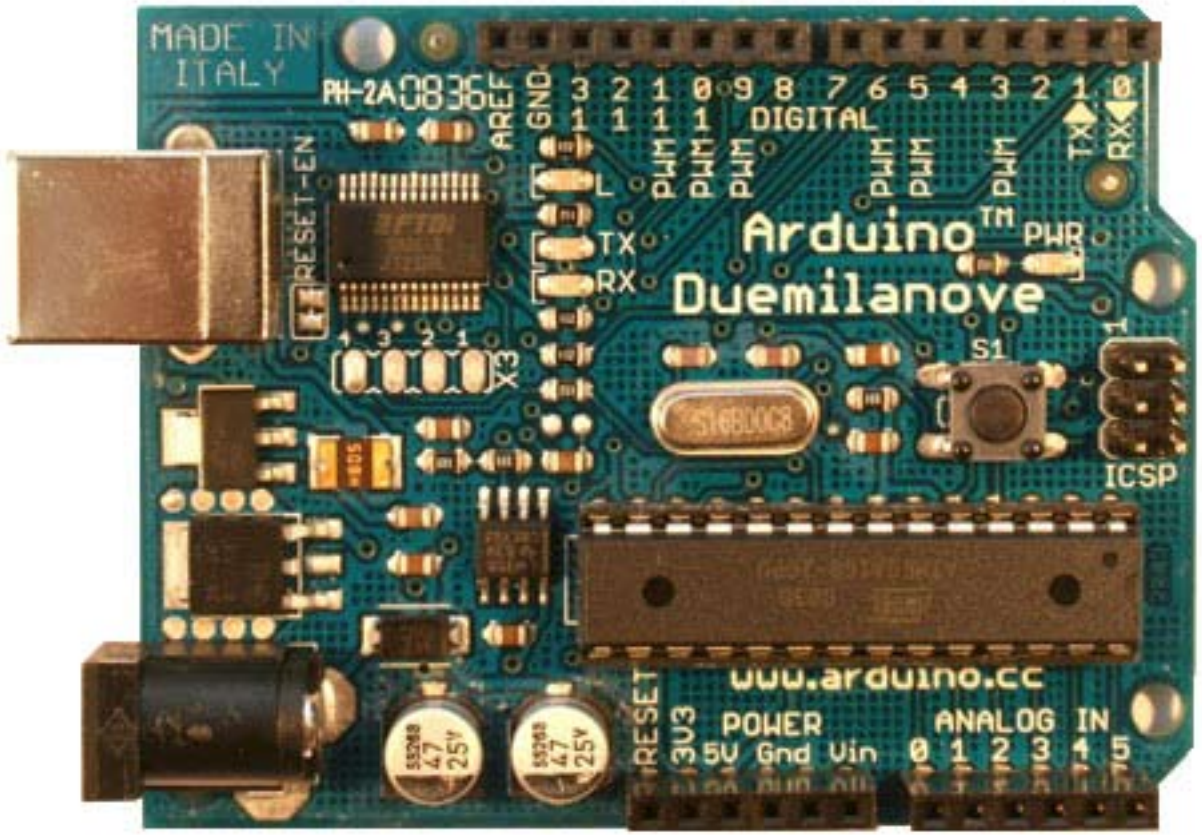


arduino.cc
arduinofun.com
arduinoprojects.com
fritzing.org
freeduino.org
youtube.com
makezine.com
hacknmod.com
tinker.it/now

arduino duemilanova

DIGITALE INPUTS / OUTPUTS
& 6 PWM PINS

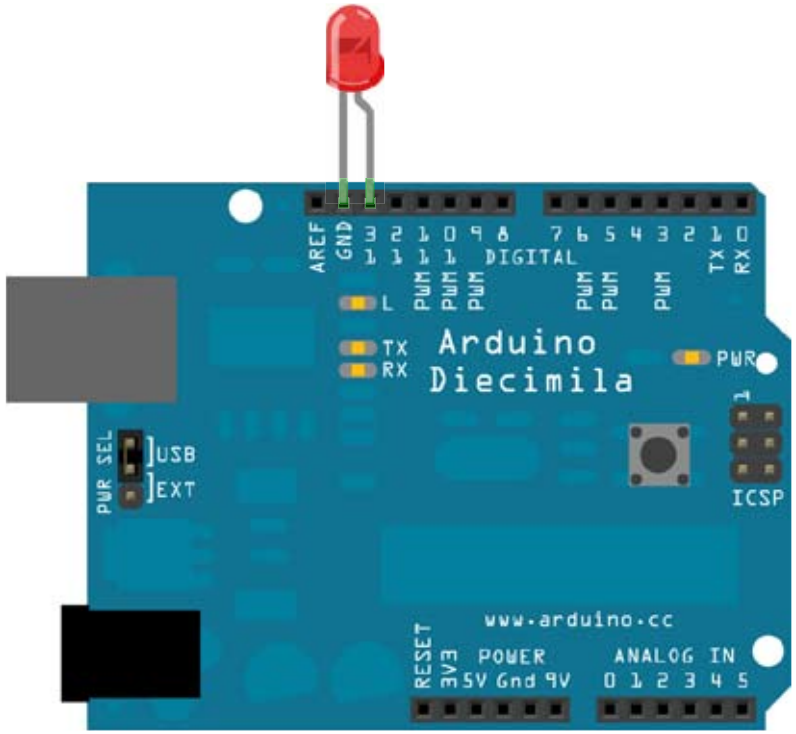
USB PLUG



EXTERNAL
POWER

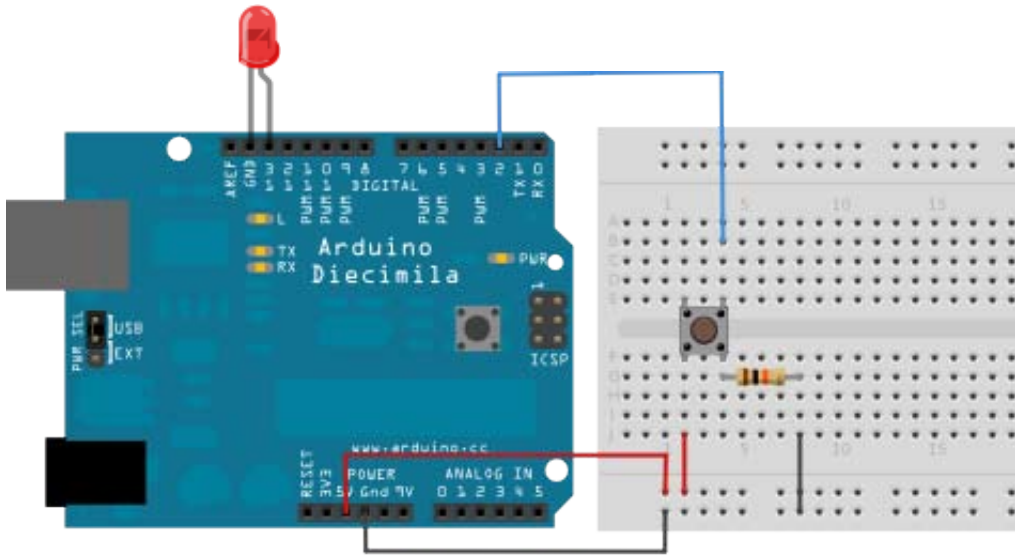
ANALOGE INPUTS

blink



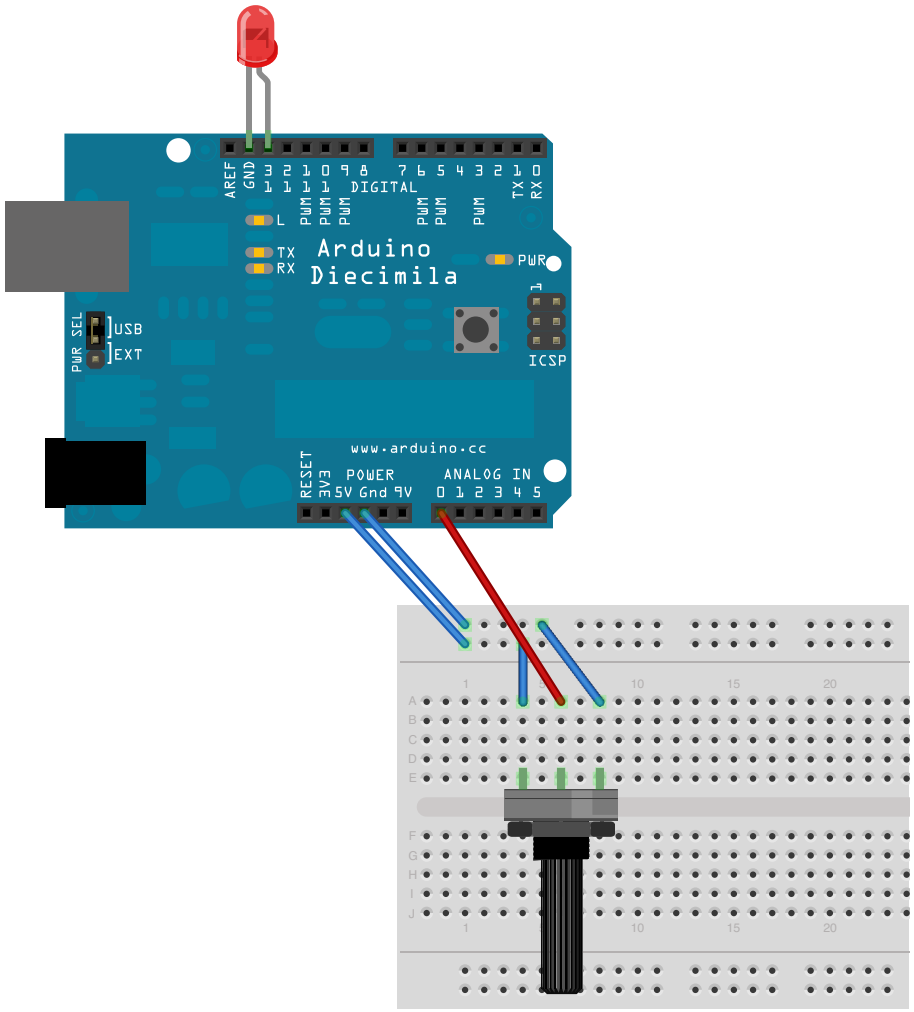

```
int ledPin =  13;    // LED connected to digital pin 13

void setup()   {
  // initialize the digital pin as an output:
  pinMode(ledPin, OUTPUT);
}
void loop()
{
  digitalWrite(ledPin, HIGH);   // set the LED on
  delay(1000);                  // wait for a second
  digitalWrite(ledPin, LOW);    // set the LED off
  delay(1000);                  // wait for a second
}
```

blink I/O



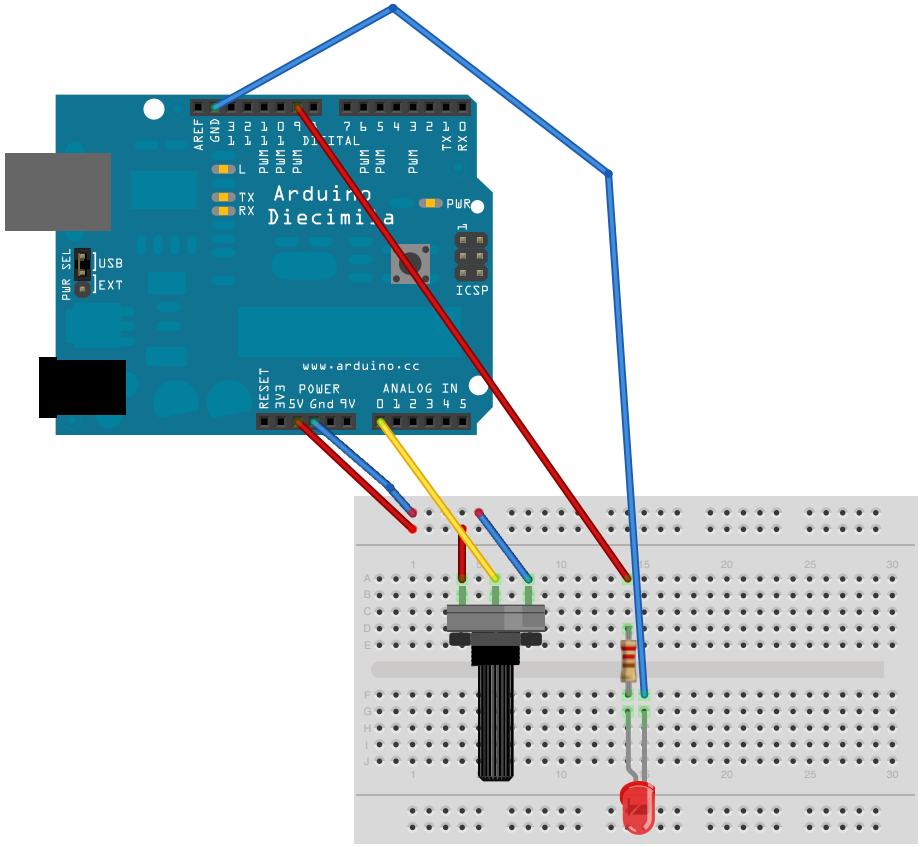

```
int buttonPin = 2;         // the number of the pushbutton pin
int ledPin =  13;          // the number of the LED pin
int buttonState = 0;       // variable for reading the pushbutton status

 void setup() {
pinMode(ledPin, OUTPUT);    // initialize the LED pin as an output
pinMode(buttonPin, INPUT);  // initialize the pushbutton pin as an input

 }

 void loop(){
      // read the state of the pushbutton value:
 buttonState = digitalRead(buttonPin);
      // check if the pushbutton is pressed.
      // if it is, the buttonState is HIGH:
   if (buttonState == HIGH) {
      // turn LED on:
     digitalWrite(ledPin, HIGH);
   }
   else {
      // turn LED off:
     digitalWrite(ledPin, LOW);
   }
 }
```

blink / control



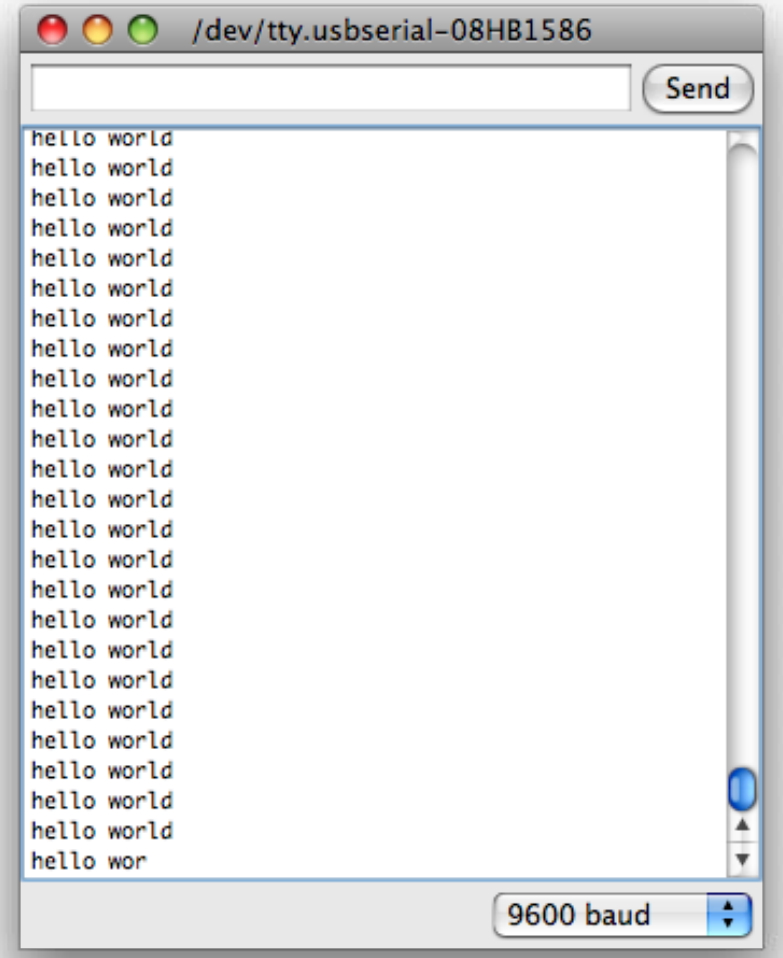

```
int sensorPin = 0;    // select the input pin for the potentiometer
 int ledPin = 13;      // select the pin for the LED
 int sensorValue = 0;  // variable to store the value coming from the
sensor

 void setup() {
   // declare the ledPin as an OUTPUT:
   pinMode(ledPin, OUTPUT);
   // start reading serial input at 9600:
   Serial.begin(9600);
 }

 void loop() {
   // read the value from the sensor:
   sensorValue = analogRead(sensorPin);
   // turn the ledPin on
   digitalWrite(ledPin, HIGH);
   // stop the program for <sensorValue> milliseconds:
   delay(sensorValue);
   // turn the ledPin off:
   digitalWrite(ledPin, LOW);
   // stop the program for for <sensorValue> milliseconds:
   delay(sensorValue);
   // show serial input value in the gui:
   Serial.println(sensorValue);
   Serial.println();
 }
```

PWM / control



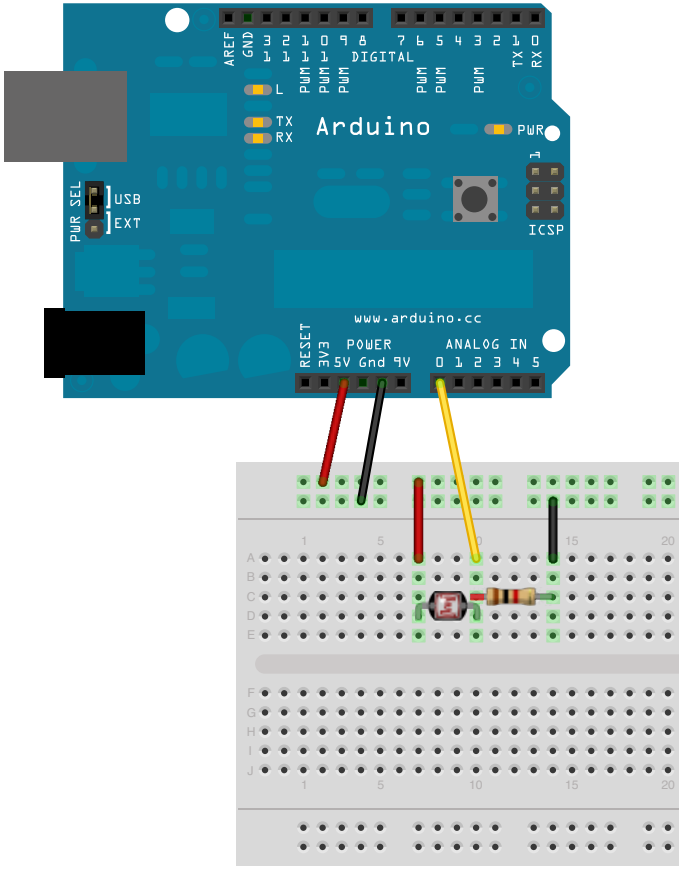

```
int fadeValue;                    // fading wert
int Poti = 1;                 // analoger steckplatz 1
int potiwert;                     // poti wert
int LED = 9;                  // digitaler steckplatz  9

void setup()  {
  pinMode(LED, OUTPUT);
  pinMode(Poti, INPUT);
}

void loop()  {
  potiwert = analogRead(Poti) /100;
  // fade in from min to max in increments of the poti value/100:
  for(int fadeValue = 0 ; fadeValue <= 255; fadeValue += potiwert) {
    // sets the value (range from 0 to 255):
    analogWrite(LED, fadeValue);
    // wait for 30 milliseconds to see the dimming effect
    delay(0);
  }

  // fade out from max to min in increments of of the poti value/100:
  for(int fadeValue = 255 ; fadeValue >= 0; fadeValue -= potiwert) {
    // sets the value (range from 0 to 255):
    analogWrite(LED, fadeValue);
    // wait for 30 milliseconds to see the dimming effect
    delay(0);
  }
}
```

"hello world"



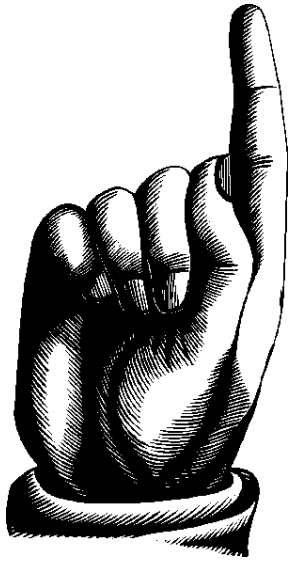
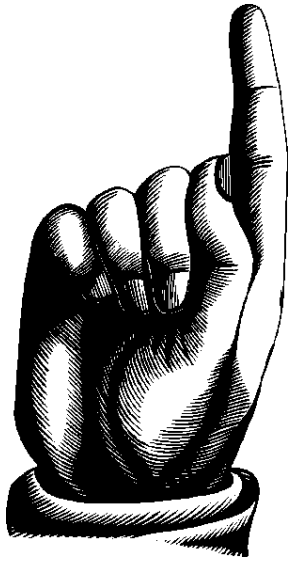

```
void setup() {
 //Initialisiert die Seriele Kommunikation
 Serial.begin(9600);
}

void loop(){
 // schreibt „hello world“ in den serielen Port
 Serial.print(„hello world“);
}
```

SerialDebugging



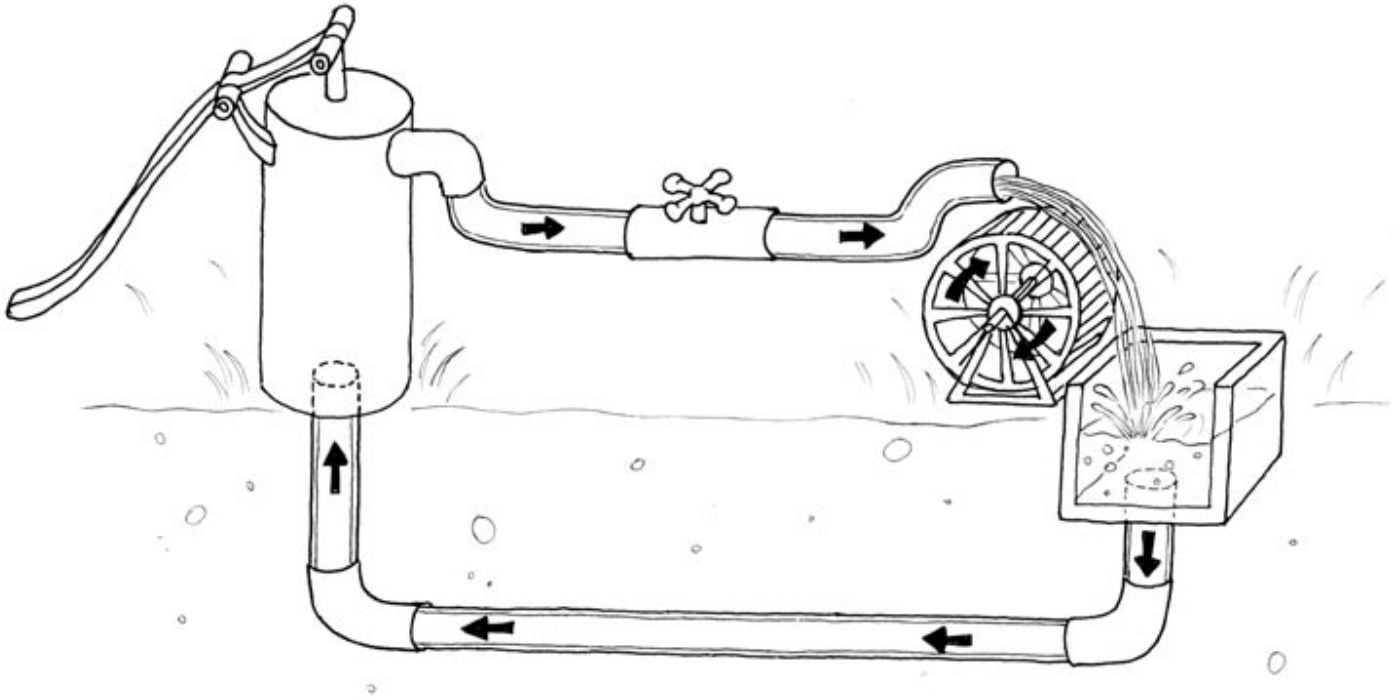

```
#define sensorPin 0    // select the input pin for the potentiometer
int sensorValue = 0;  // variable to store the value coming from the sensor

void setup() {
  Serial.begin(9600);  //configure the serial port for 9600bps
}

void loop() {
  // read the value from the sensor:
  sensorValue = analogRead(sensorPin);

  // schriebt den String ”Wert: ” in den Serielen Port
  Serial.print(”Wert: ”);

  // schriebt den SensorWert in den Serielen Port und macht einen Umbruch
  Serial.println(sensorValue);
}
```

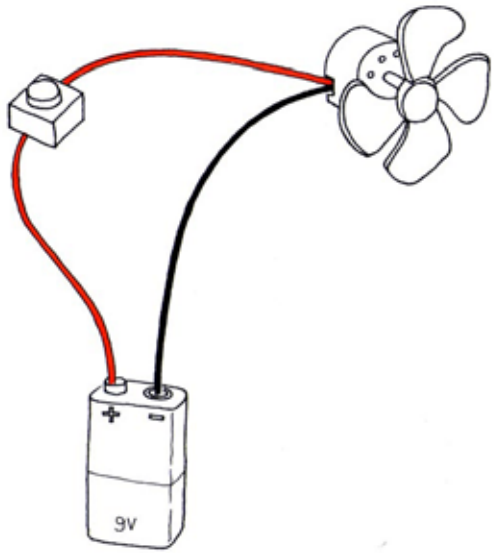
Strom, Spannung, Widerstand

Wasserdruck	= Spannung	= Volt	= U	U = R * I
Wasserfluss	= Strom	= Ampere	= I	I = U / R
Wasserhahn	= Widerstand	= Ohm	= R	R = U / I

Strom, Spannung, Widerstand



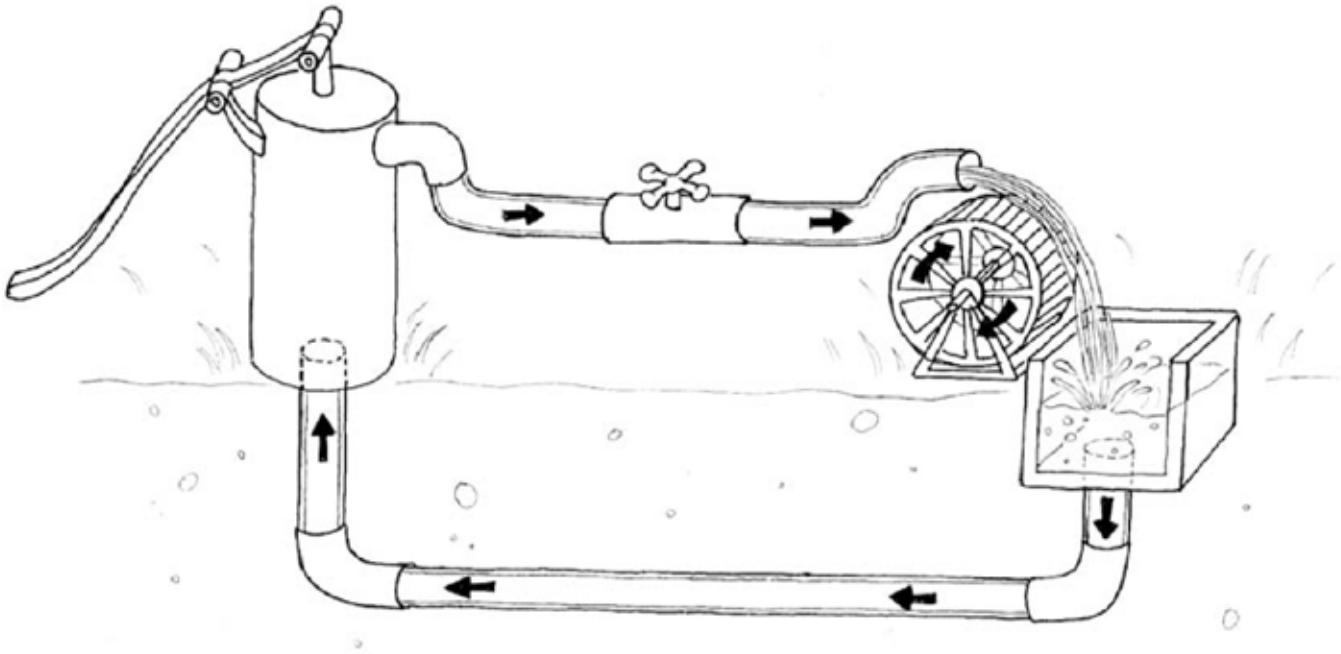


Wasserdruck	= Spannung	= Volt	= U	U = R * I
Wasserfluss	= Strom	= Ampere	= I	I = U / R
Wasserhahn	= Widerstand	= Ohm	= R	R = U / I

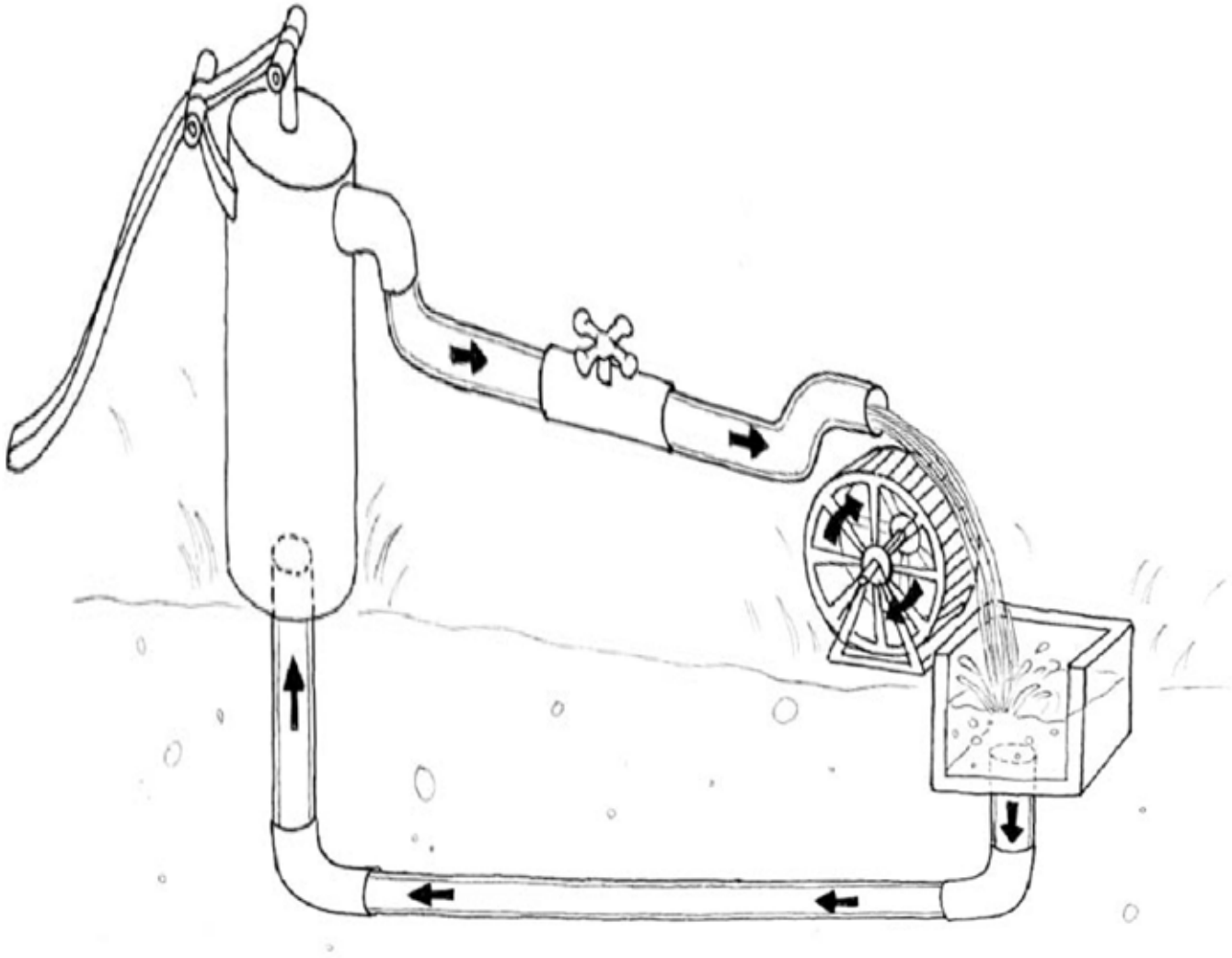
So what to
do with that?

Take care;-)

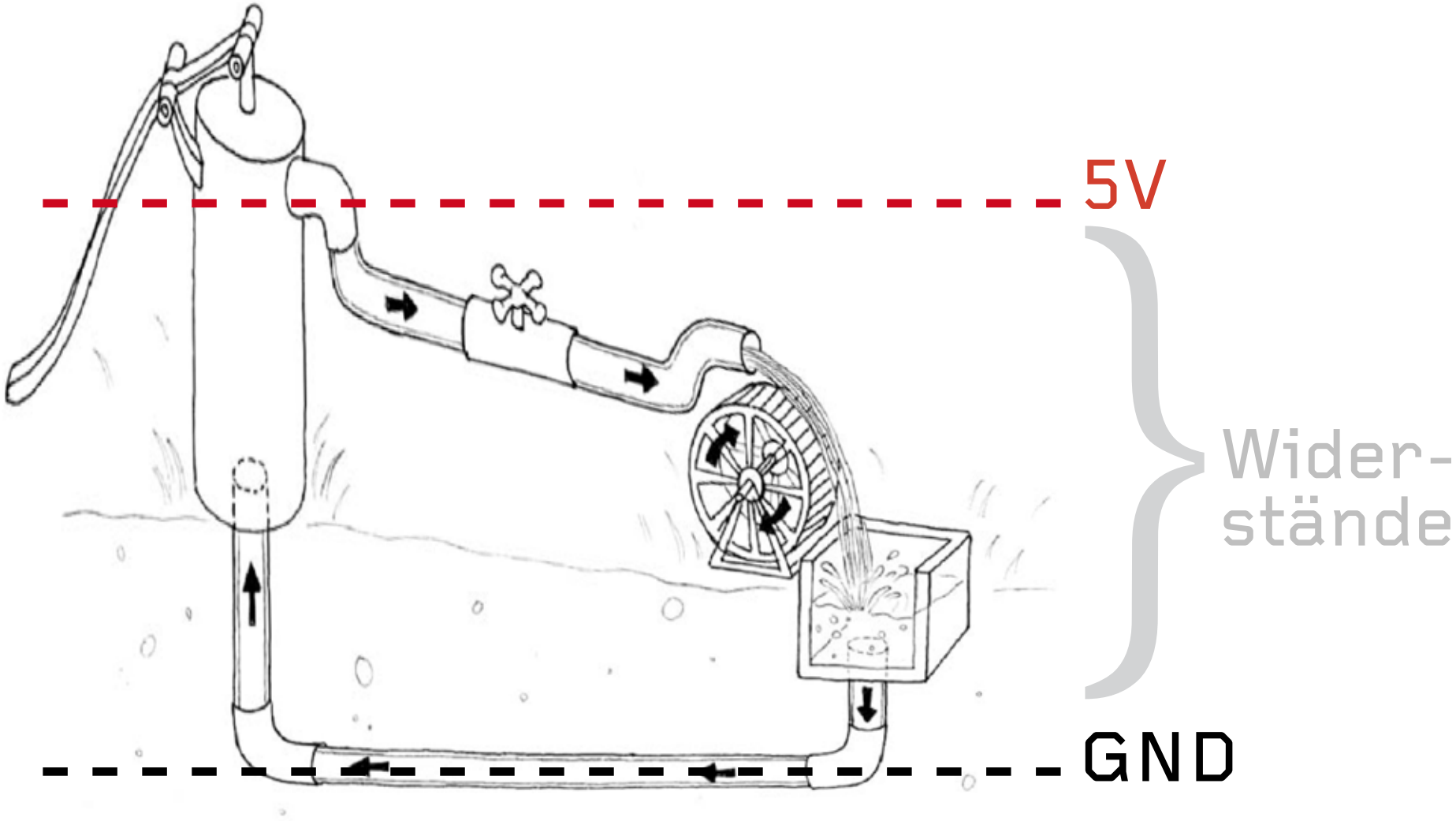
Elektrischer Kreislauf



Elektrischer Kreislauf

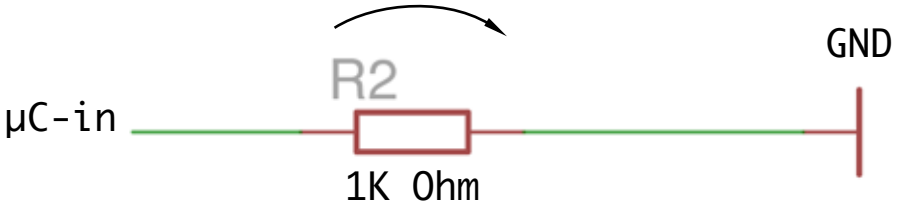


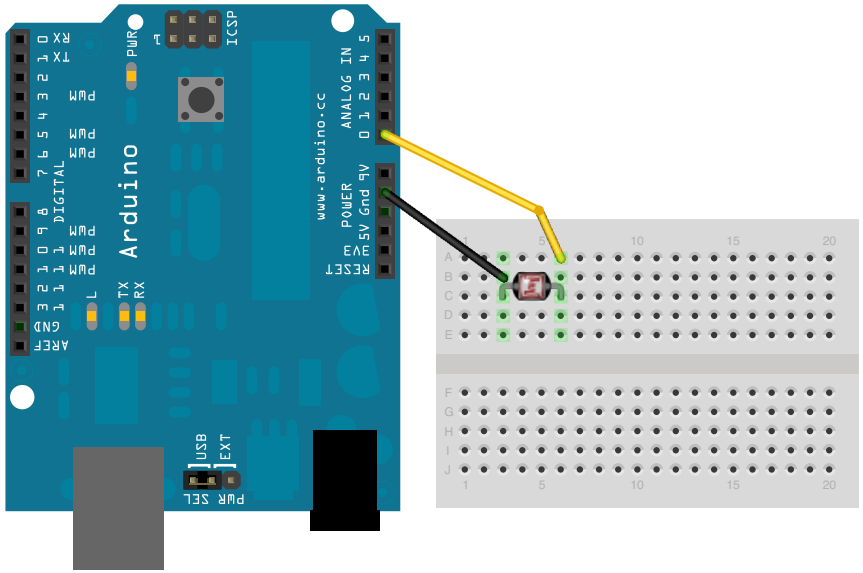
Elektrischer Kreislauf



Sensor Reading

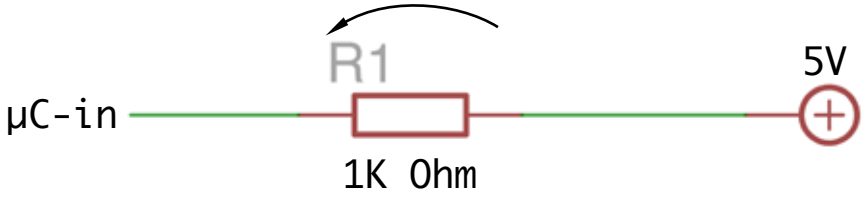
Was können wir am Arduino AnalogIn messen?

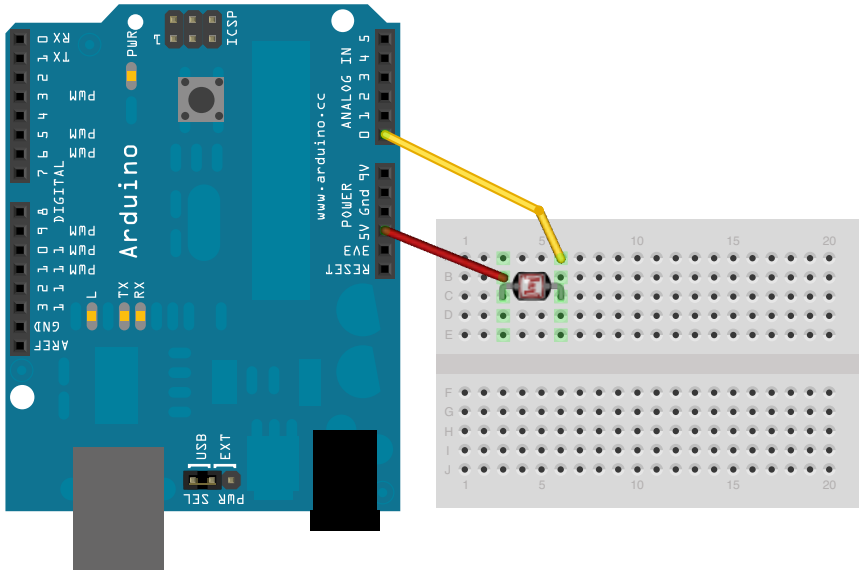




Sensor Reading

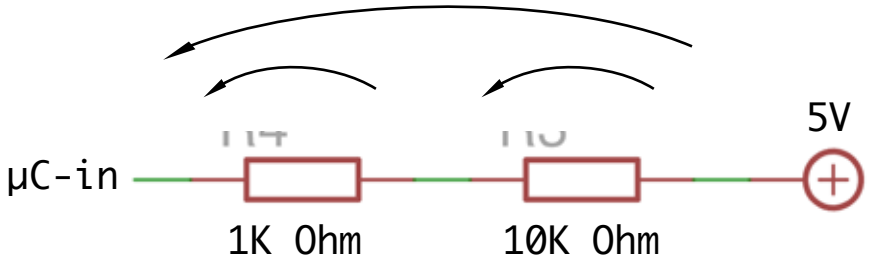
Was können wir am Arduino AnalogIn messen?

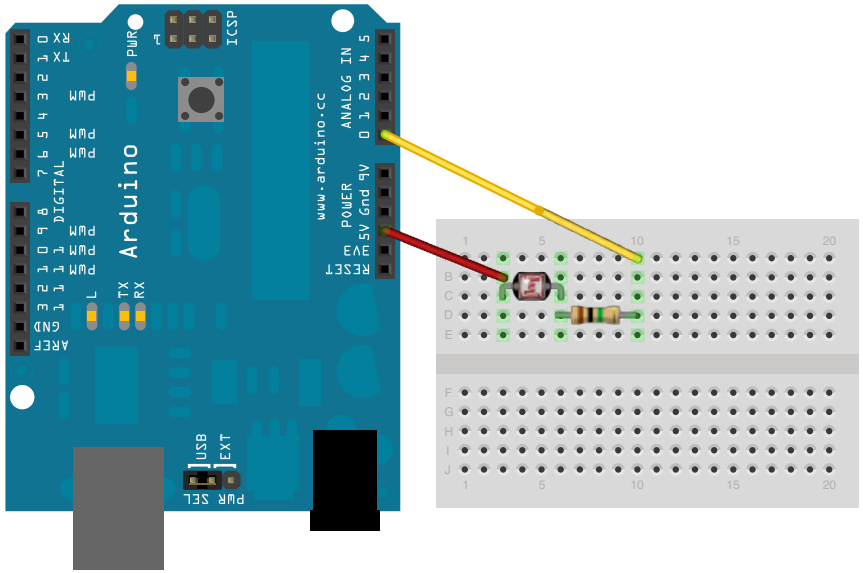




Sensor Reading

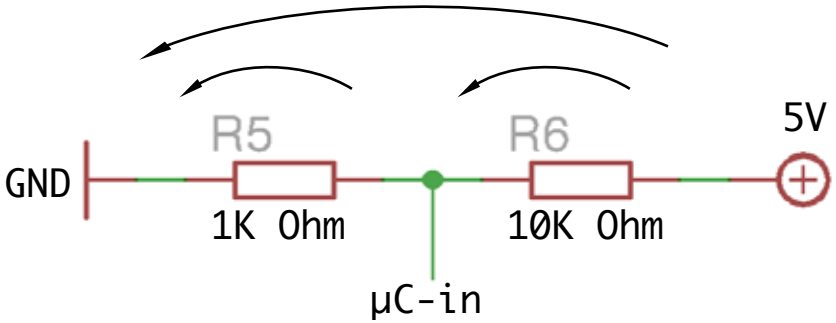
Was können wir am Arduino AnalogIn messen?

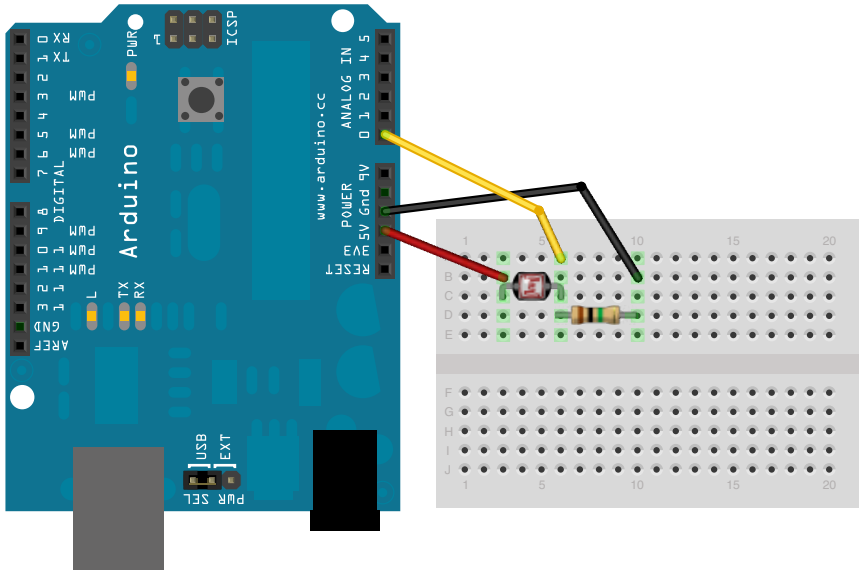


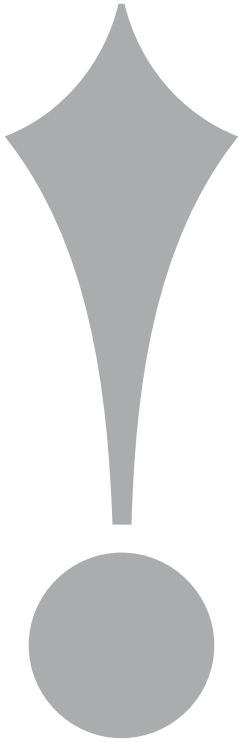


Sensor Reading

Was können wir am Arduino AnalogIn messen?







Spannungsteiler

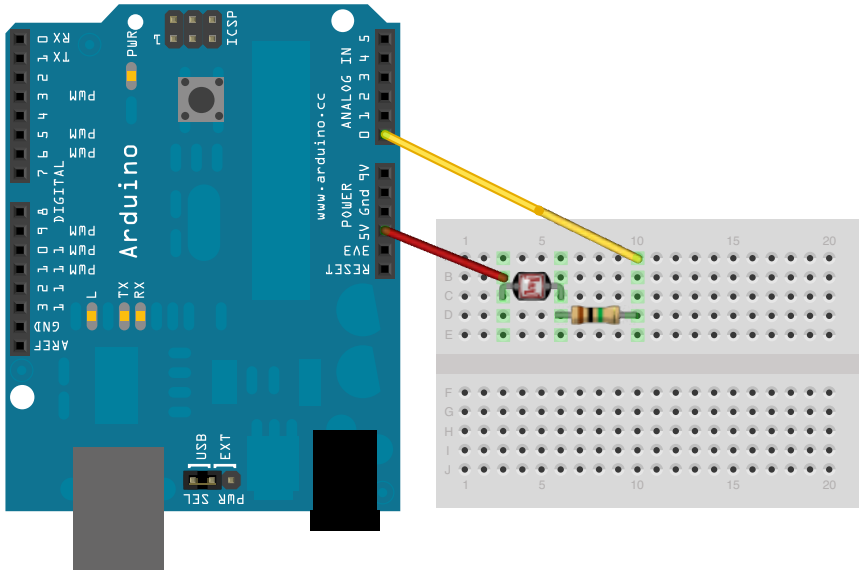
sensor reading

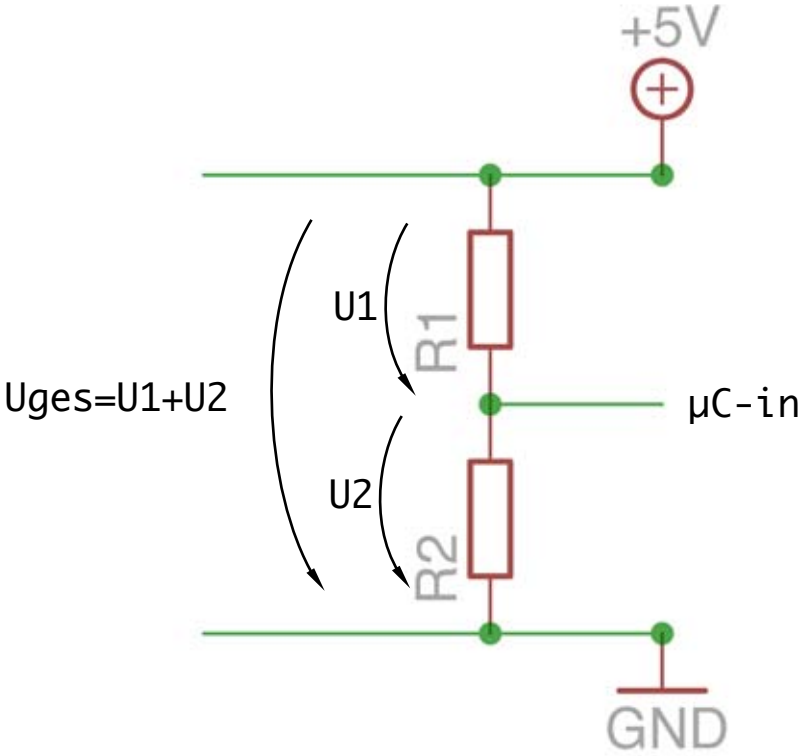
Im der Reihenschaltung gilt:
Die gesammte angelegte Spannung fällt an den Teilwiederständen ab.

Die Summe aller Teilspannungen ist gleich der GesamtSpannung.

Uges = U1 + U2 + ...

Tauschen wir einen der Wiederstand (R1 oder R2) in einen veränderbaren Wiederstand um, können wir über den Spannungsteiler die veränderte Spannung im Knotenpunkt messen.





Talking

Processing + Ardunio

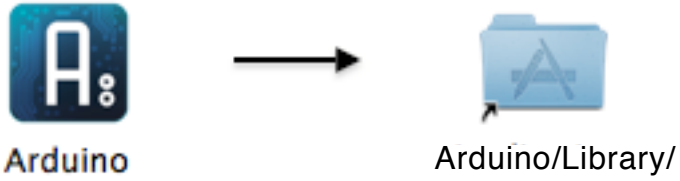
Arduni Library

for Processing

www.arduino.cc/playground/Interfacing/Processing

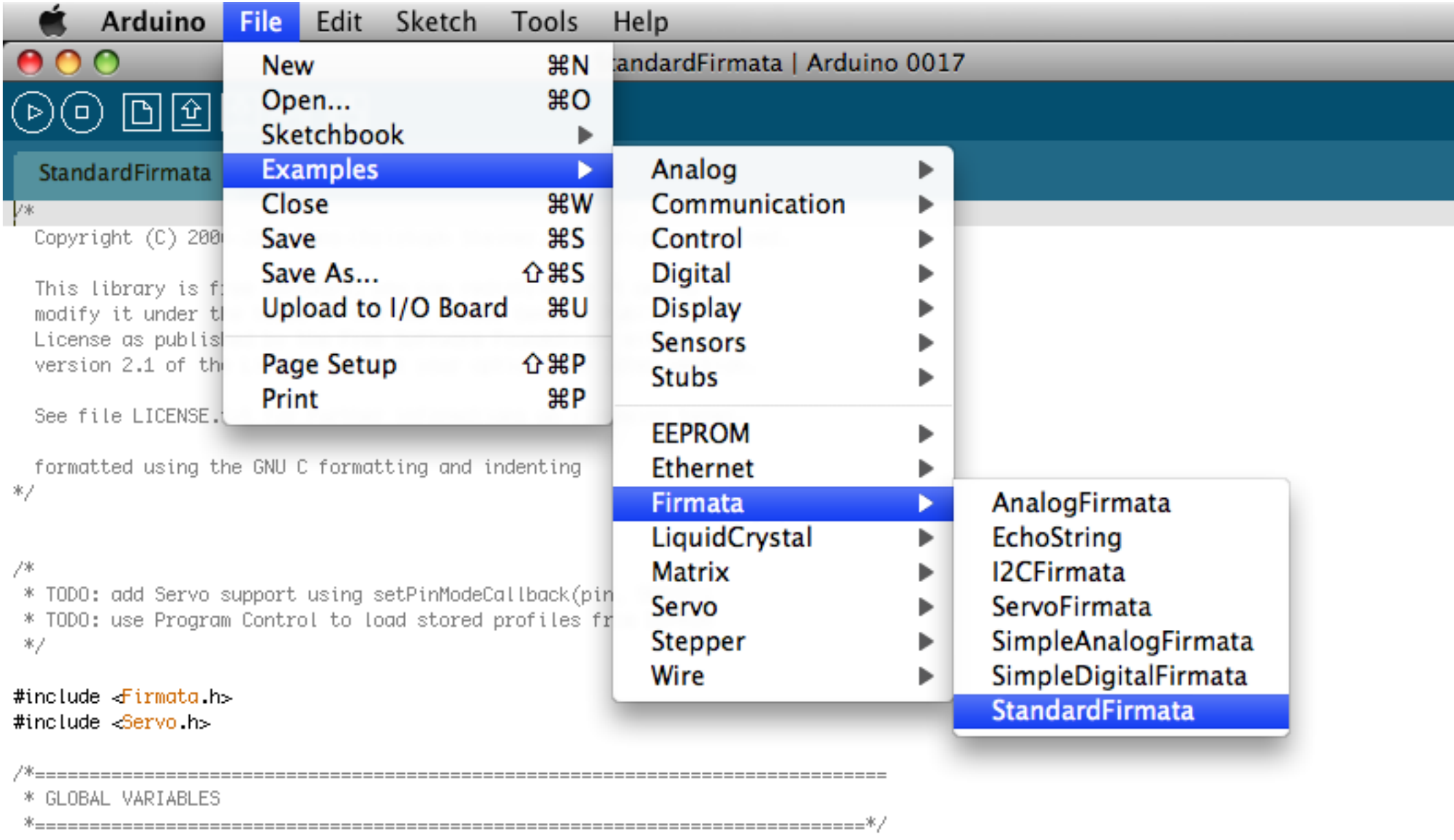
1.DOWNLOAD IT NOW

2. PUT IT IN THE ARDUINO/LIBRARY/ FOLDER



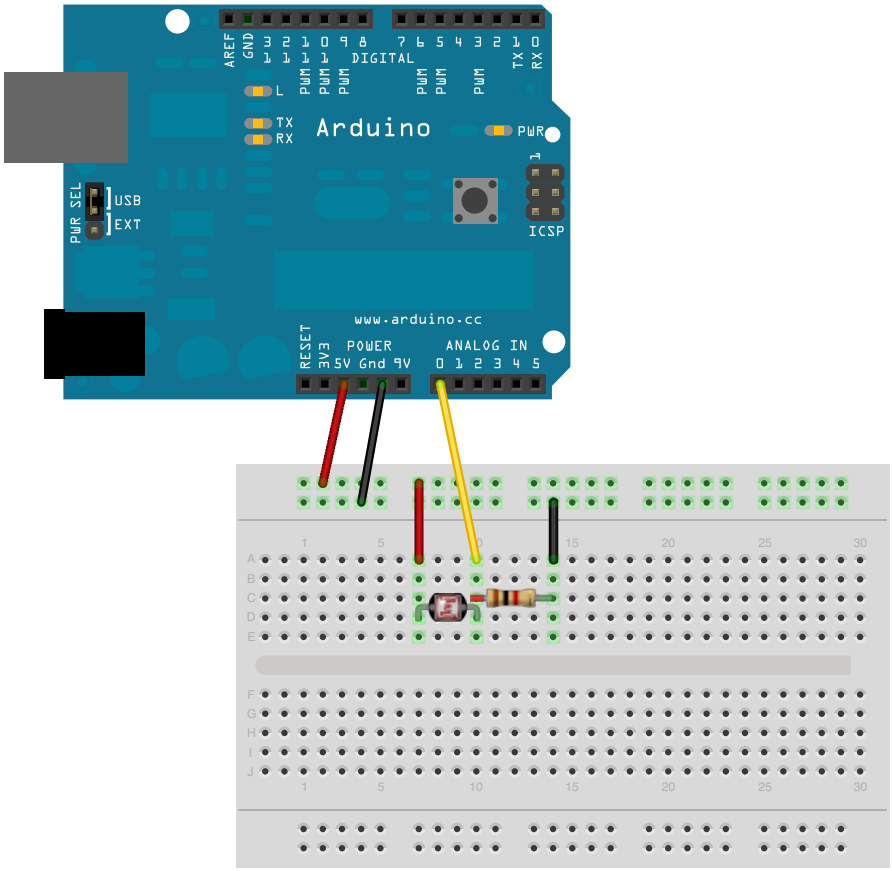
Arduni Library

read a sensor



Arduni Library

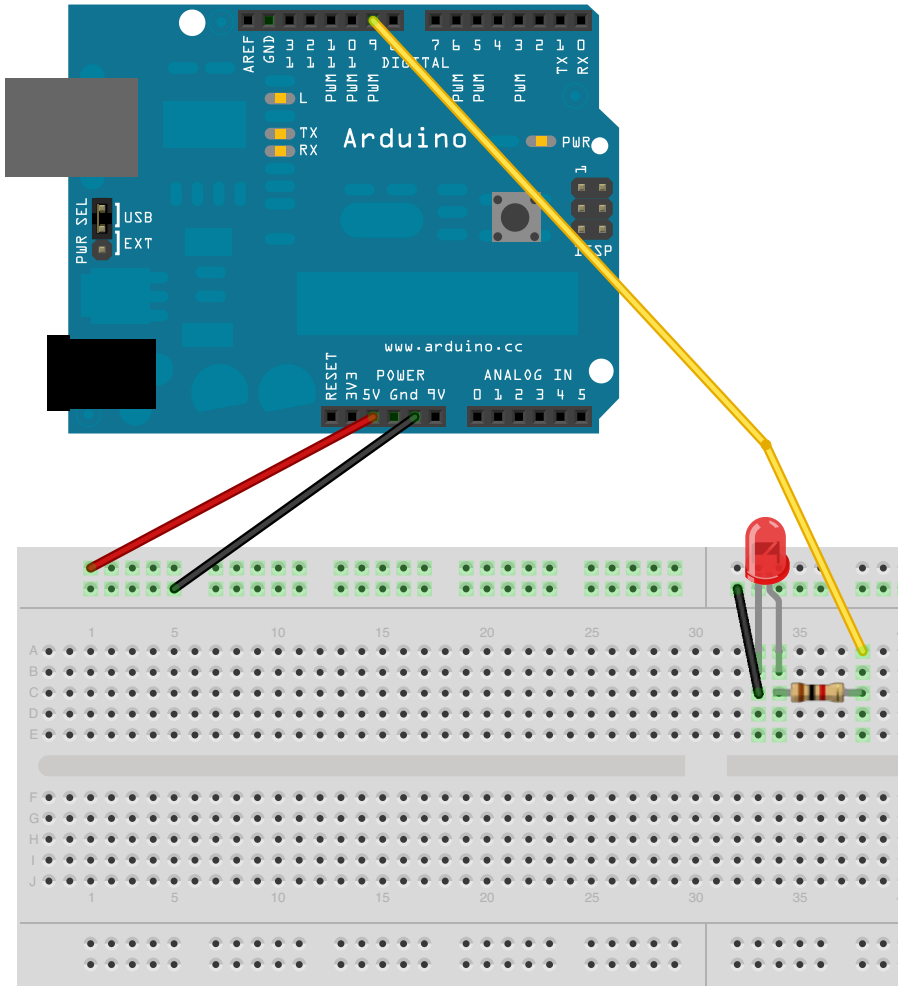
read a sensor




```
import processing.serial.*;

import cc.arduino.*;

Arduino arduino;

int sensorPin = 9;
int sensorValue =0;

void setup() {
  size(500, 200);

   //print list for find your arduino
  //normaly on list number [0]
  println(Arduino.list());

  //initialise the arduino and start communication
  arduino = new Arduino(this, Arduino.list()[0]);
}

void draw() {
  background(200);
  stroke(255,0,0);

  //read the sensor at the arduino
  sensorValue = arduino.analogRead(sensorPin);
  //map sensorValue between 0 and width
  sensorValue = map(sensorValue, 0, 1023, 0, width);

  line(sensorValue, 0, sensorValue, height);
}
```

Arduni Library

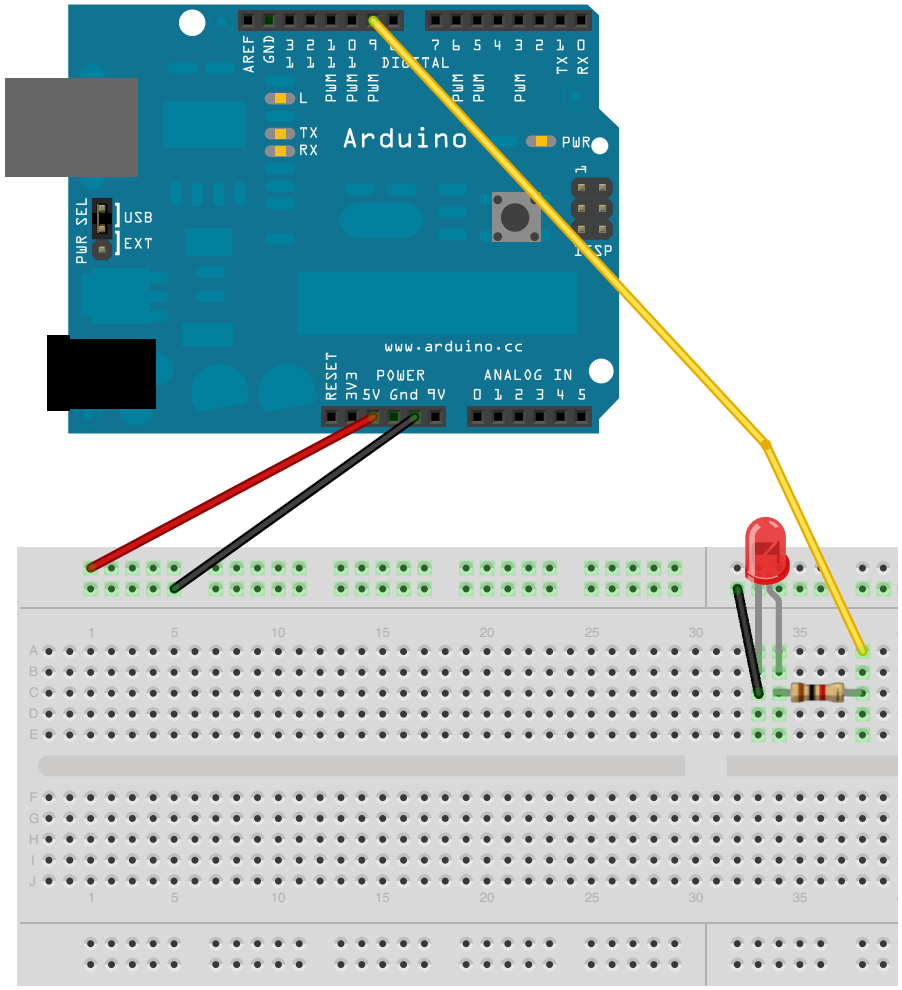
turn a led on and off




```
import cc.arduino.*;
import processing.serial.*;

Arduino arduino;

int ledPin = 13;

void setup(){
  size(500, 500);

  //print list for find your arduino
  //normaly on list number [0]
  println(Arduino.list());

  //initialise the arduino and start communication
  arduino = new Arduino(this, Arduino.list()[0]);
}

void draw(){
  if (mousePressed){
   background(255);
   //make ledPin on
   arduino.digitalWrite(ledPin, arduino.HIGH);
  } else {
    background(0);
    //make ledPin off
   arduino.digitalWrite(ledPin, arduino.LOW);
  }
}
```

Arduni Library

dimm a led




```
import cc.arduino.*;
import processing.serial.*;

Arduino arduino;

//pwm-Pin to make dimm LED
int ledPin = 9;

void setup(){
  size(800, 150);

  //print list for find your arduino
  //normaly on list number [0]
  println(Arduino.list());

  //initialise the arduino and start communication
  arduino = new Arduino(this, Arduino.list()[0]);
}

void draw(){
  //map mouseX between 0 and 255
  float bright = map(mouseX, 0, width, 0, 255);

  //give background the maped color
  background(bright);

  //write analog-PWM-signal to Arduino on pwm-pin 8.
  //need to cast the float value „bright“ to an integer value
  //with the command (int)
  arduino.analogWrite(ledPin, (int)bright);
}
```