Physical Computing

http://itp.nyu.edu/physcomp/

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What is Physical Computing?

class structure

- lab assignments
- readings and in-class discussions
- journal
- observation project
- midterm project
- final project

introductions

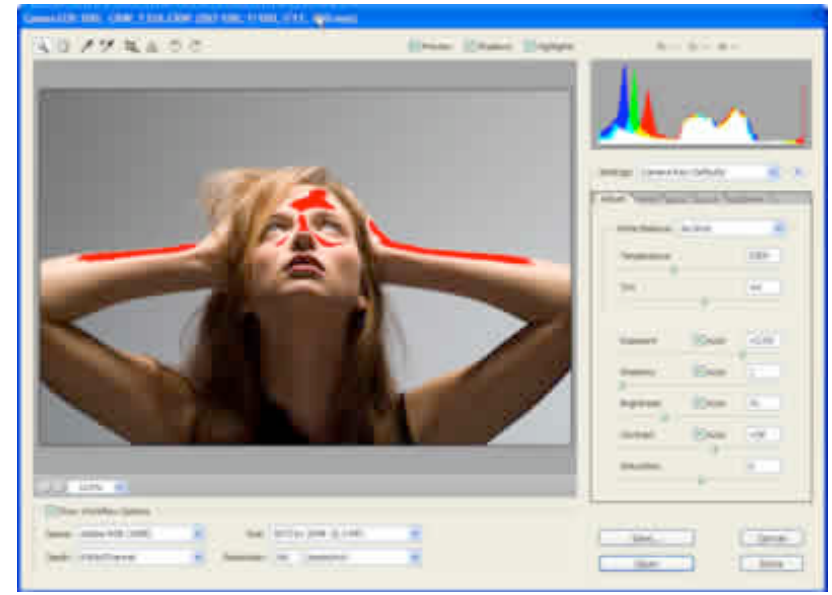
a little bit about me

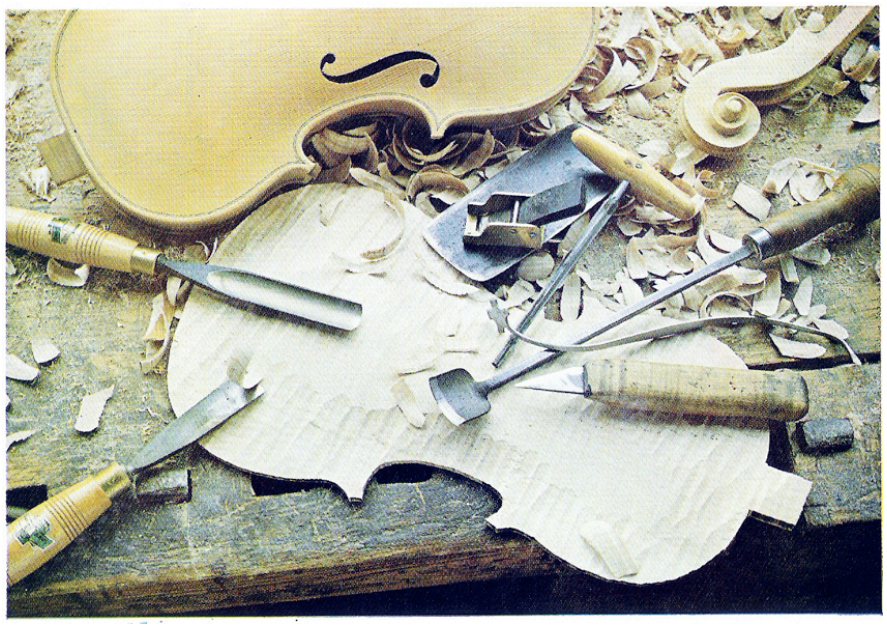
- Pd (aka Pure Data) developer
- Arduino contributor
- interested in interaction using sound
- computer music background
- advocate of free software and free culture

yoyo berimbau

free tools for creators

vs.





read/write literacy

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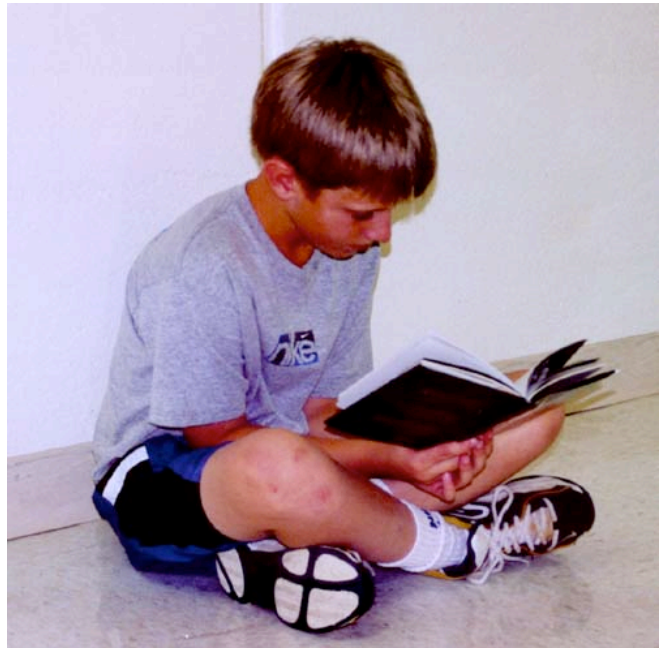

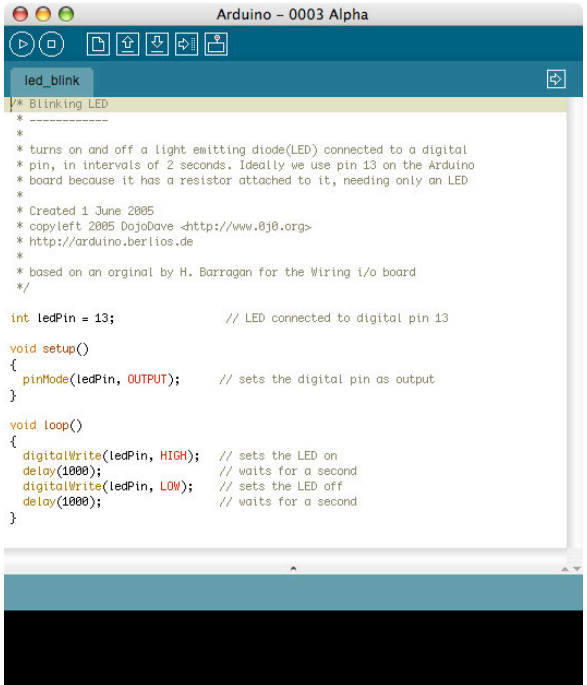

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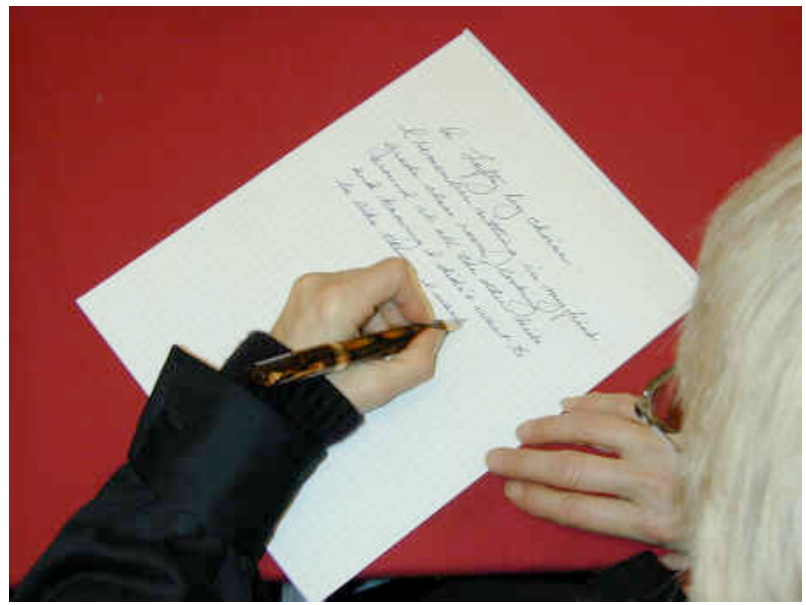
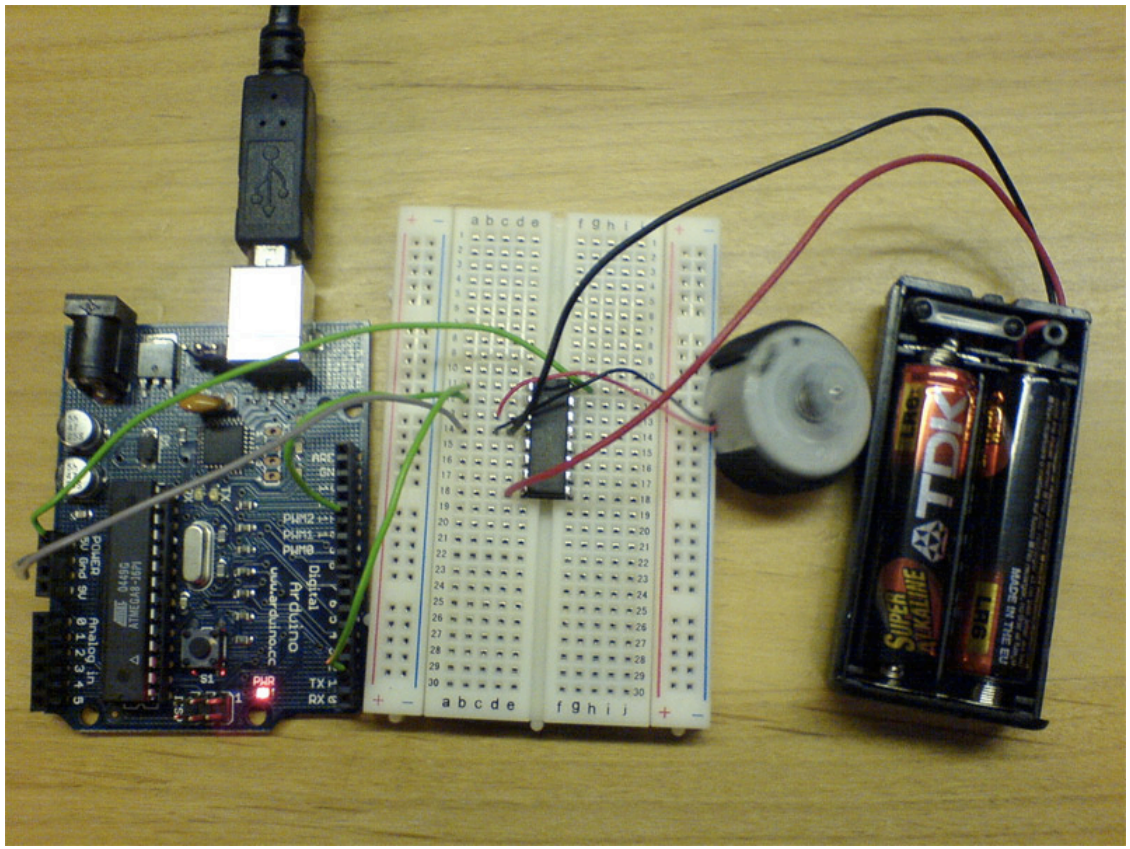
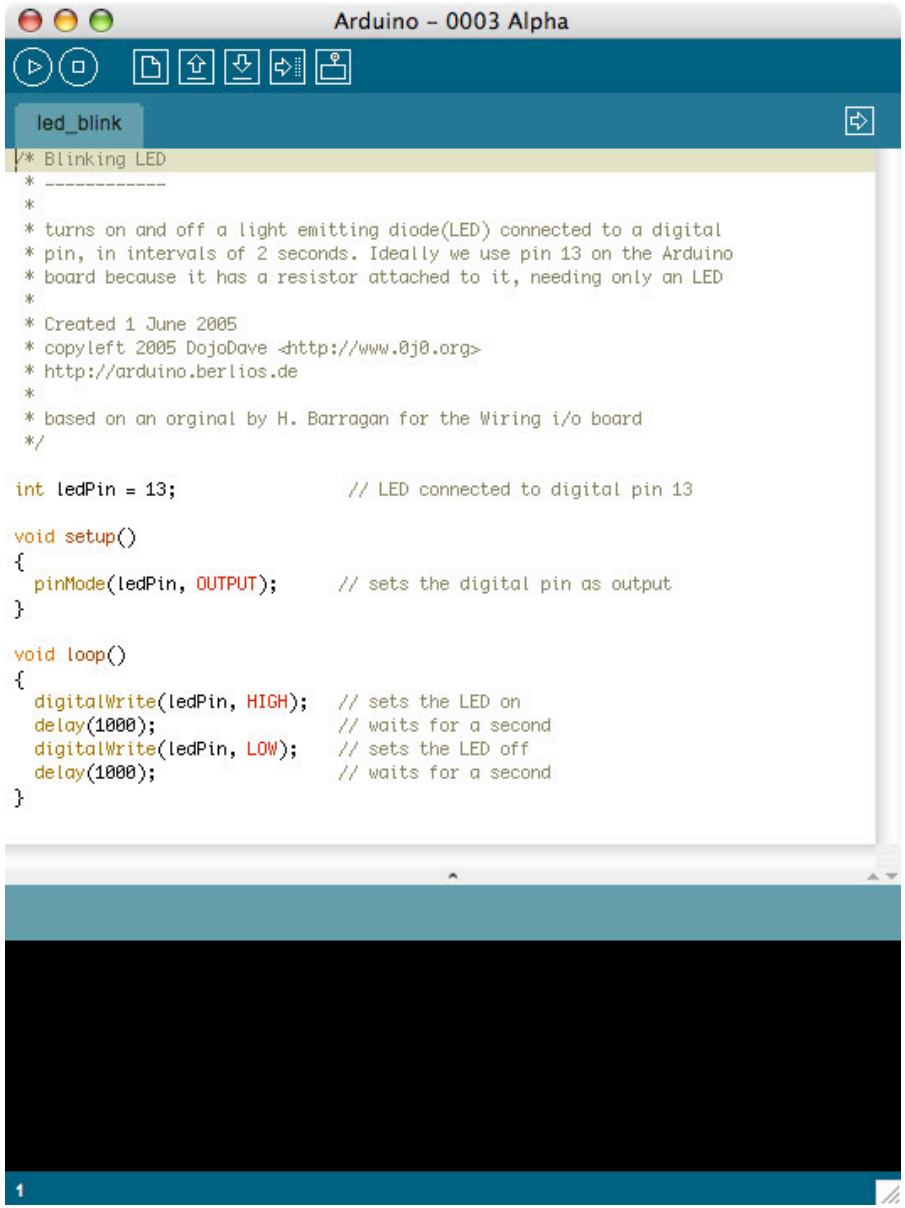
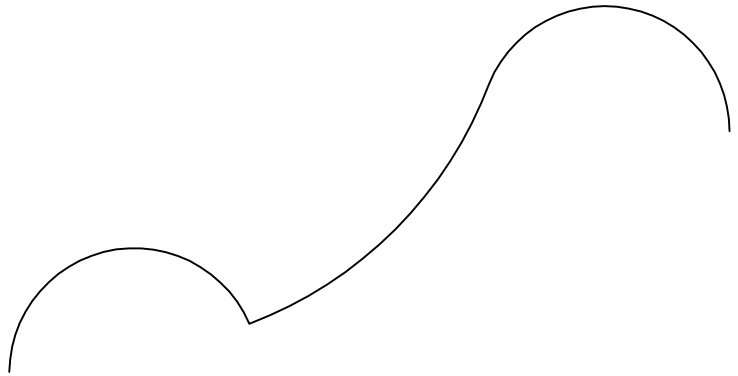


arduino

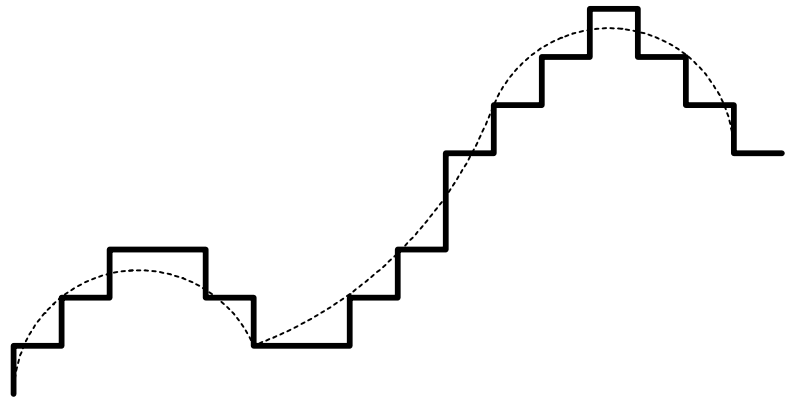

TDK
Super Alkaline
LR6
MADE IN THE EU
Arduino
www.arduino.cc
Digital
Analog in
POWER
PWR
TX
RX


Arduino - 0003 Alpha
led_blink
/* Blinking LED
 * ------------
 *
 * turns on and off a light emitting diode(LED) connected to a digital
 * pin, in intervals of 2 seconds. Ideally we use pin 13 on the Arduino
 * board because it has a resistor attached to it, needing only an LED
 *
 * Created 1 June 2005
 * copyleft 2005 DojoDave <http://www.0j0.org>
 * http://arduino.berlios.de
 *
 * based on an orginal by H. Barragan for the Wiring i/o board
 */
int ledPin = 13;   // LED connected to digital pin 13
void setup()
{
  pinMode(ledPin, OUTPUT);   // sets the digital pin as output
}
void loop()
{
  digitalWrite(ledPin, HIGH);   // sets the LED on
  delay(1000);   // waits for a second
  digitalWrite(ledPin, LOW);   // sets the LED off
  delay(1000);   // waits for a second
}
1

digital vs. analog

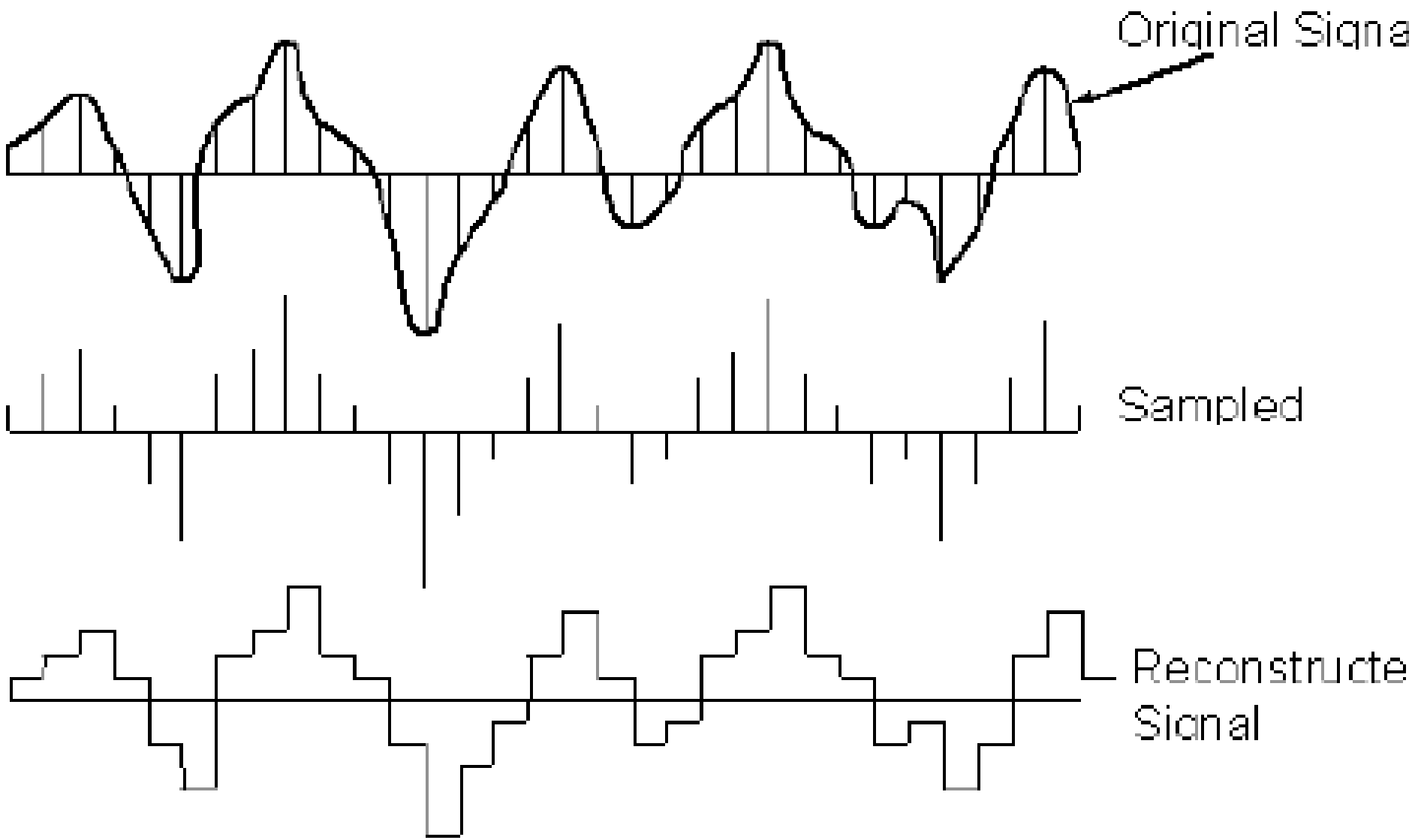


An analog signal

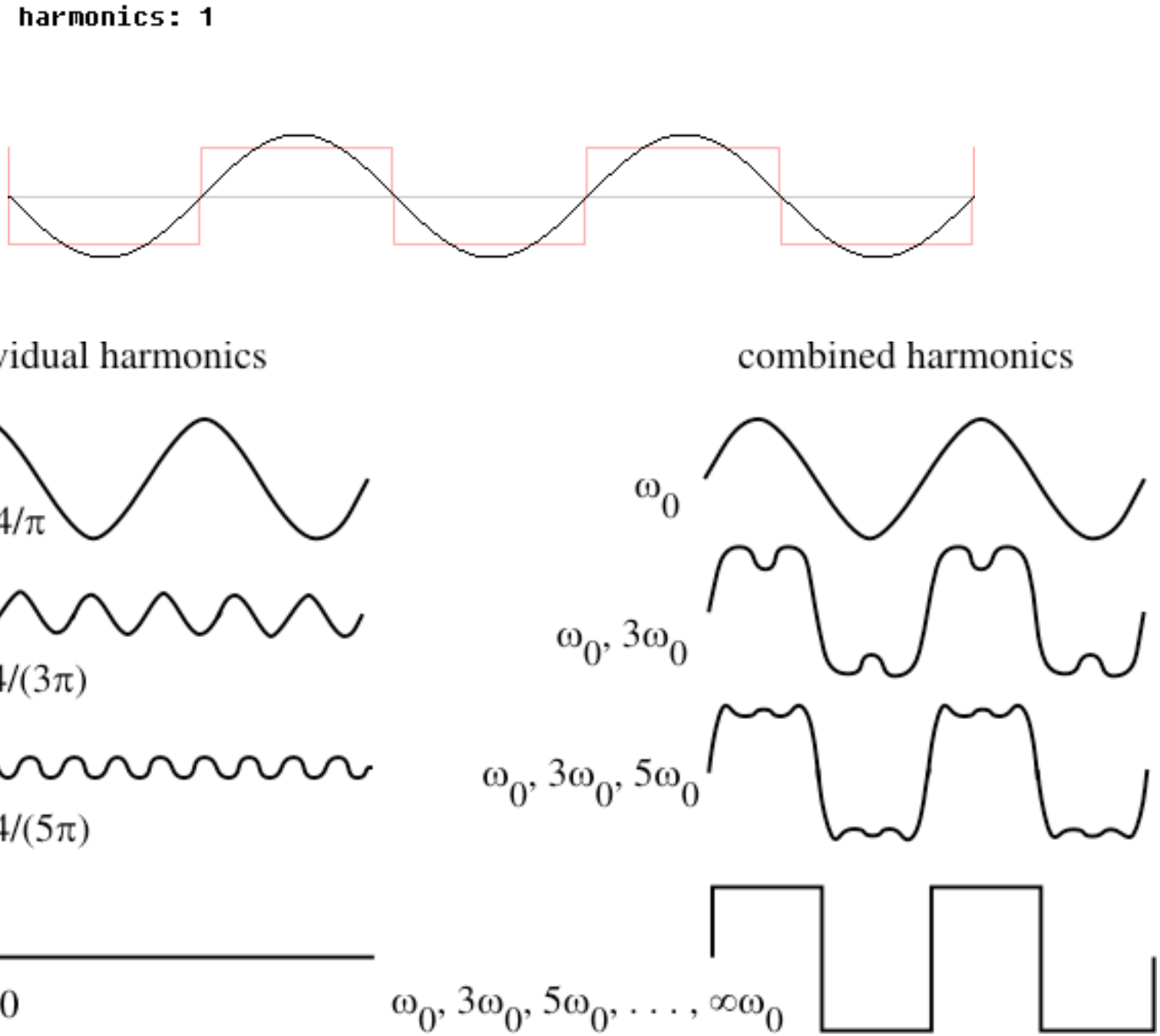


The digital equivalent

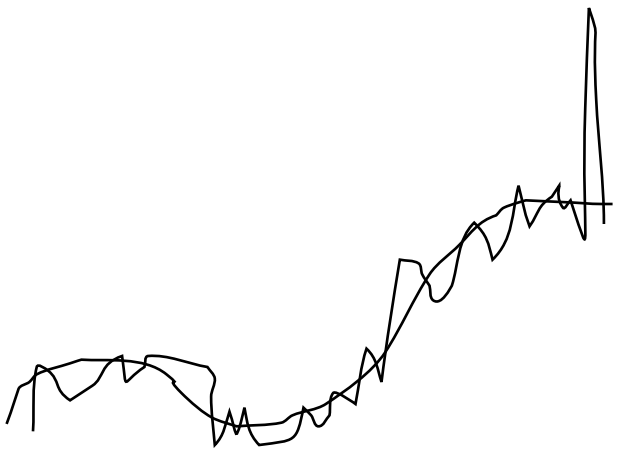
analog to digital



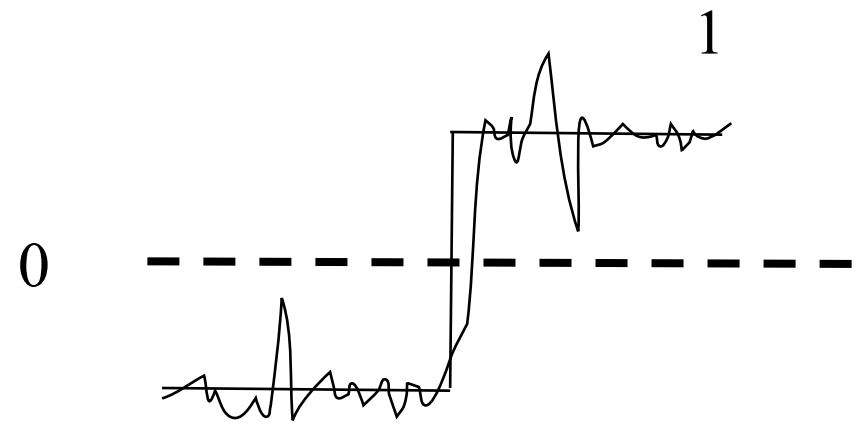
digital to analog



resistance to noise

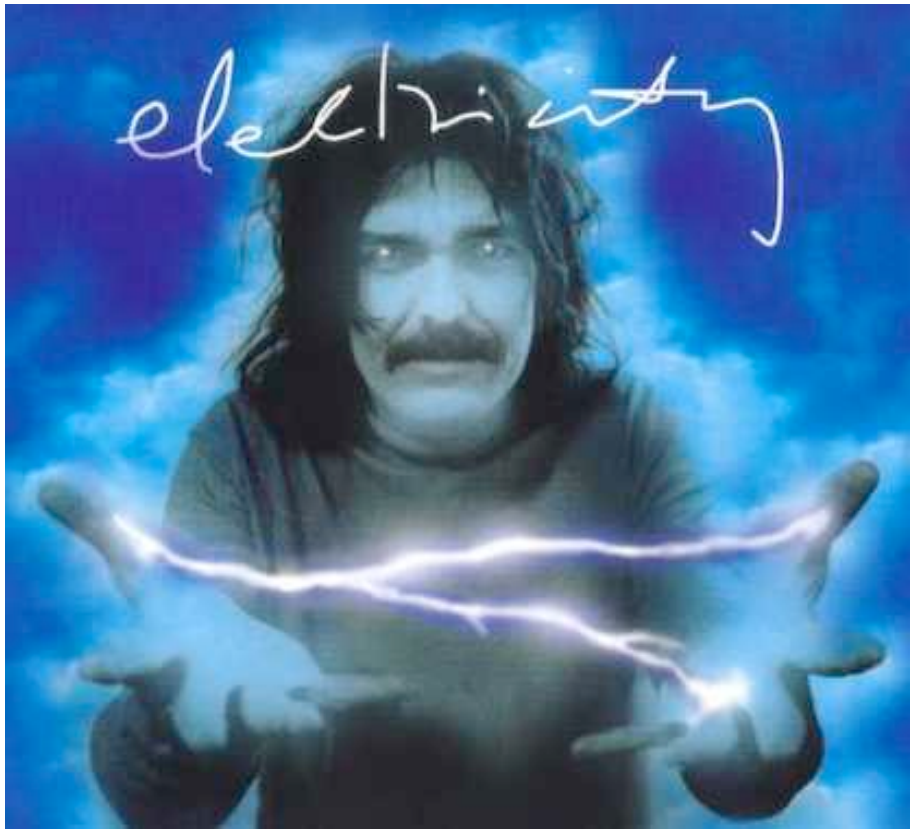


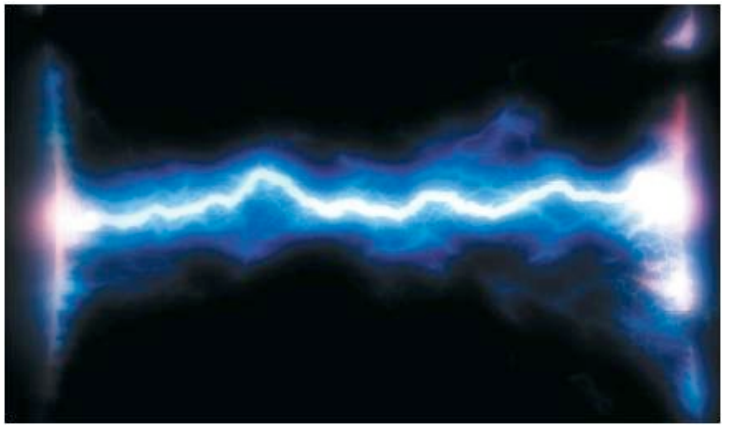
An analog signal
with noise



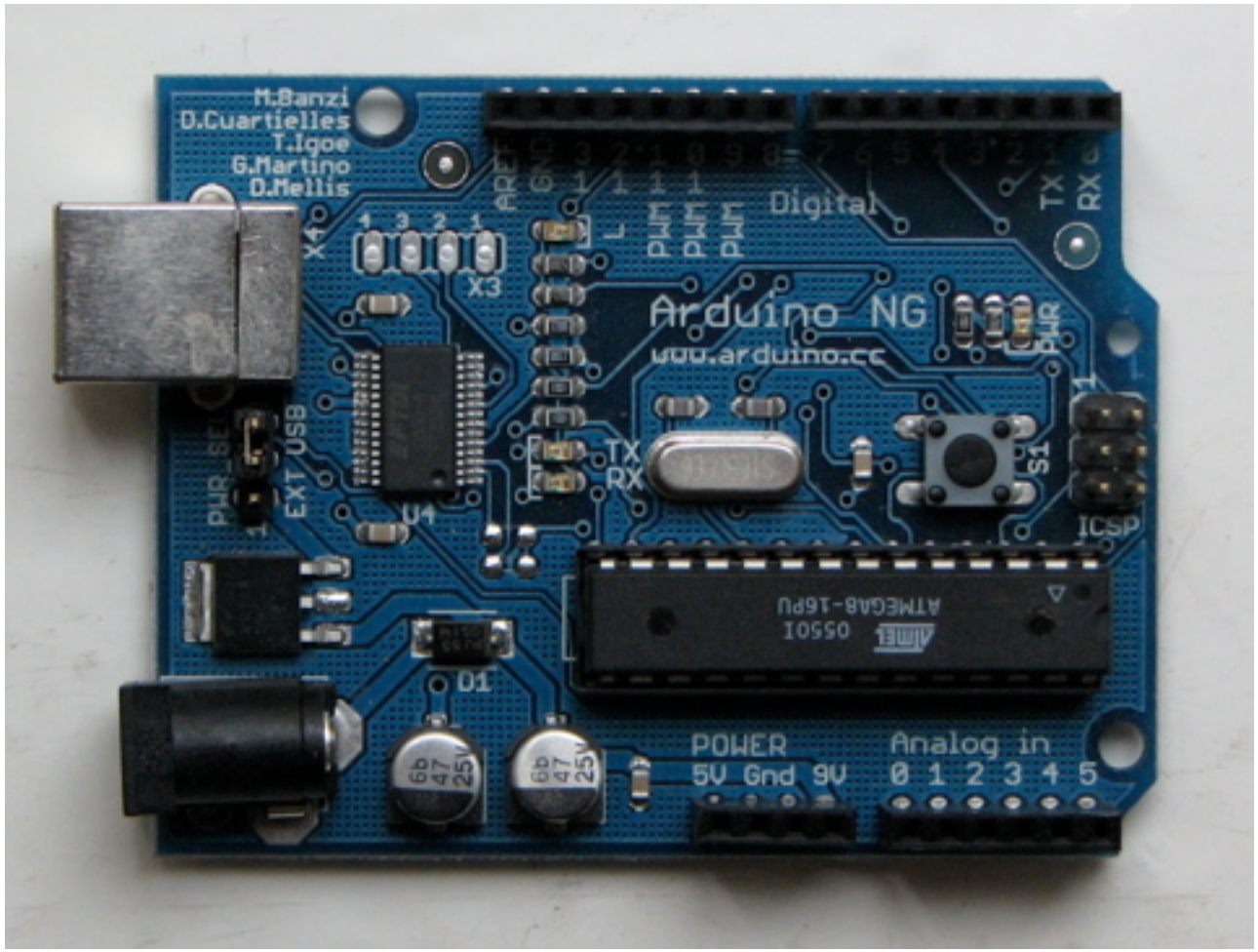
A digital signal
with noise

electricity

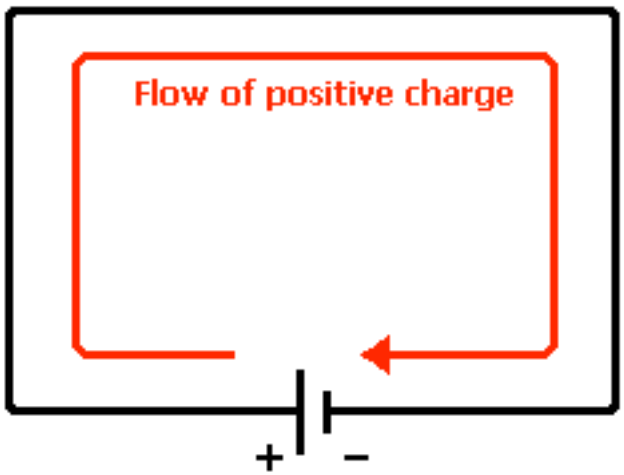




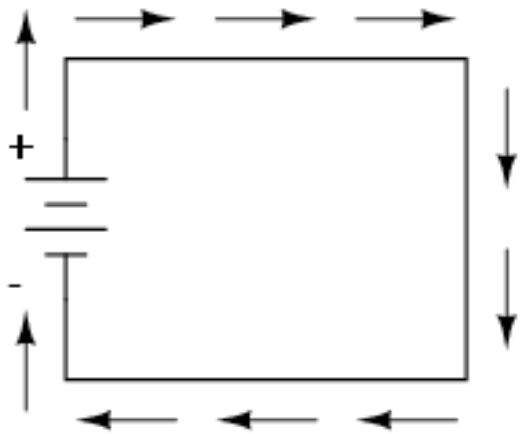
make it blink



flow of electricity

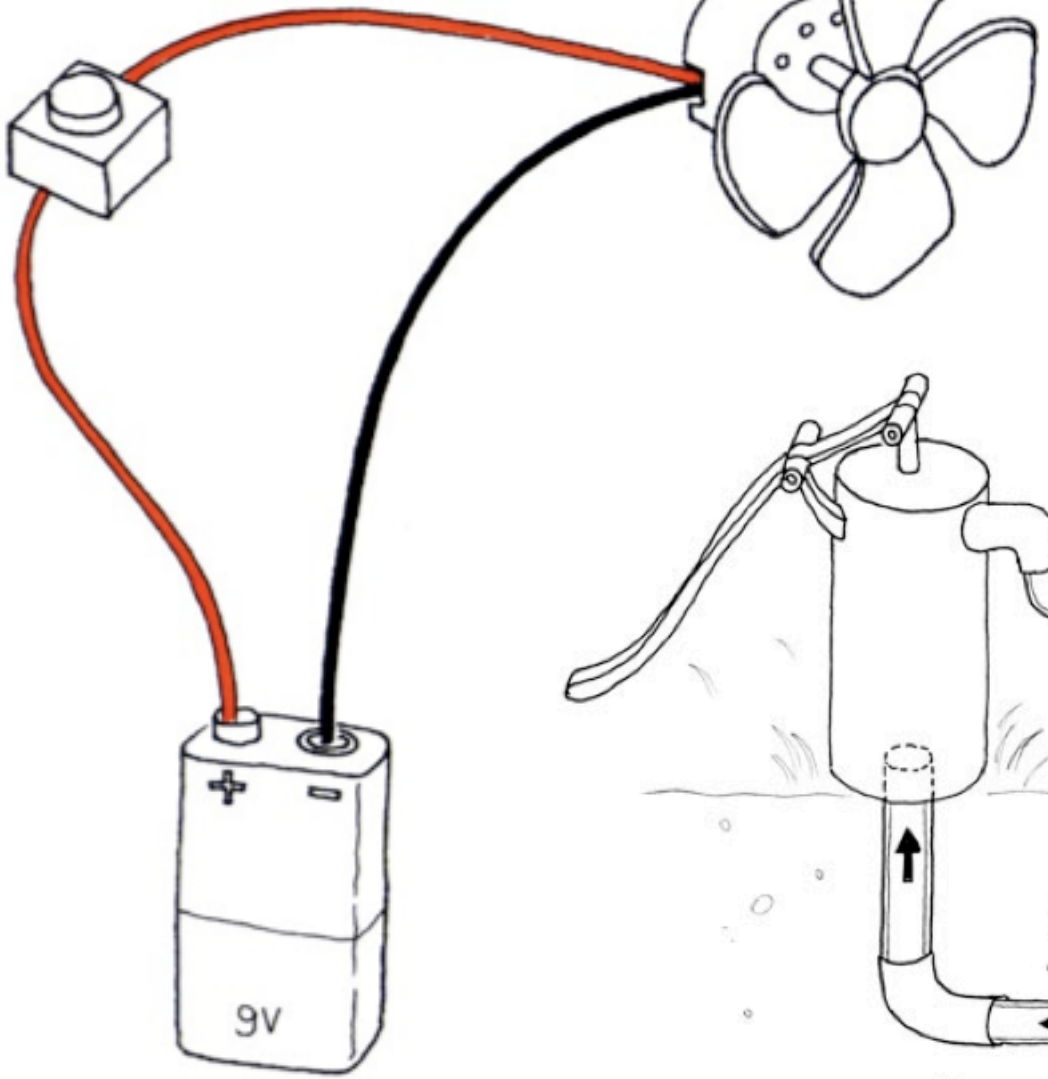


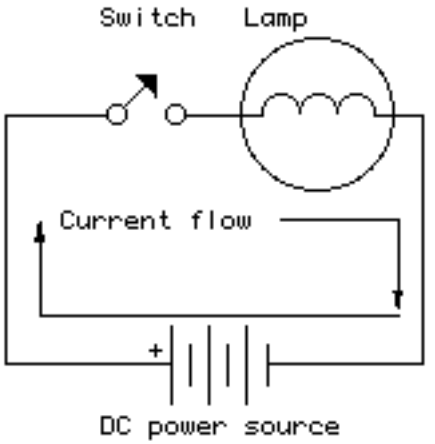
Conventional flow notation

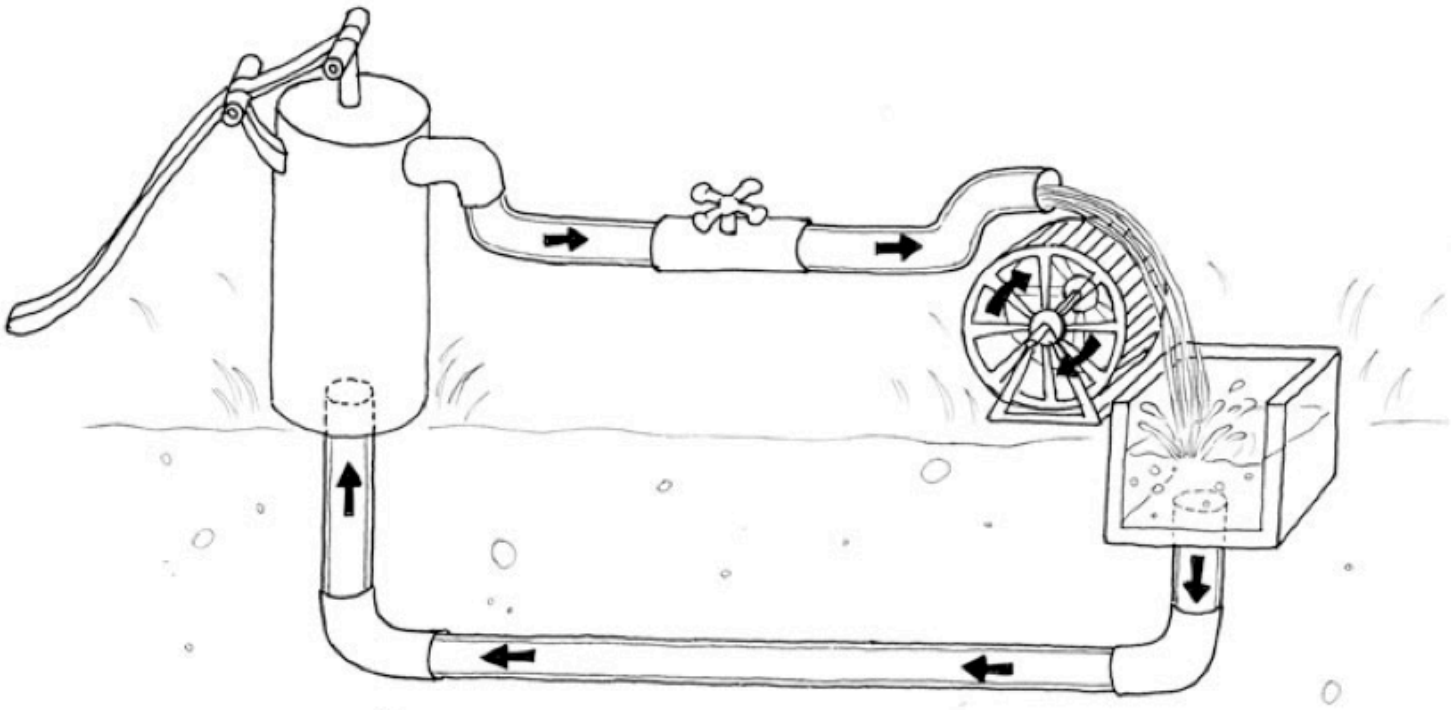


Electric charge moves from the positive (surplus) side of the battery to the negative (deficiency) side.

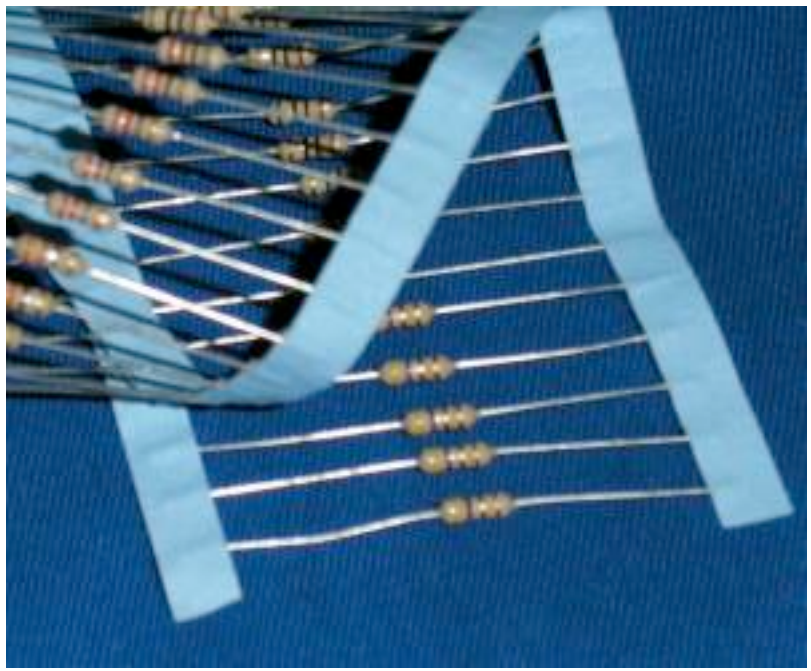
simple circuit





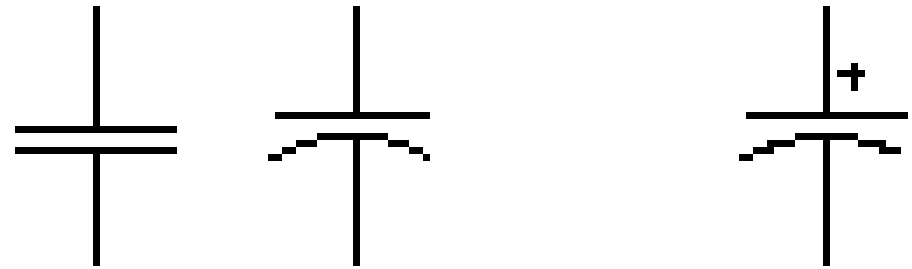


resistors

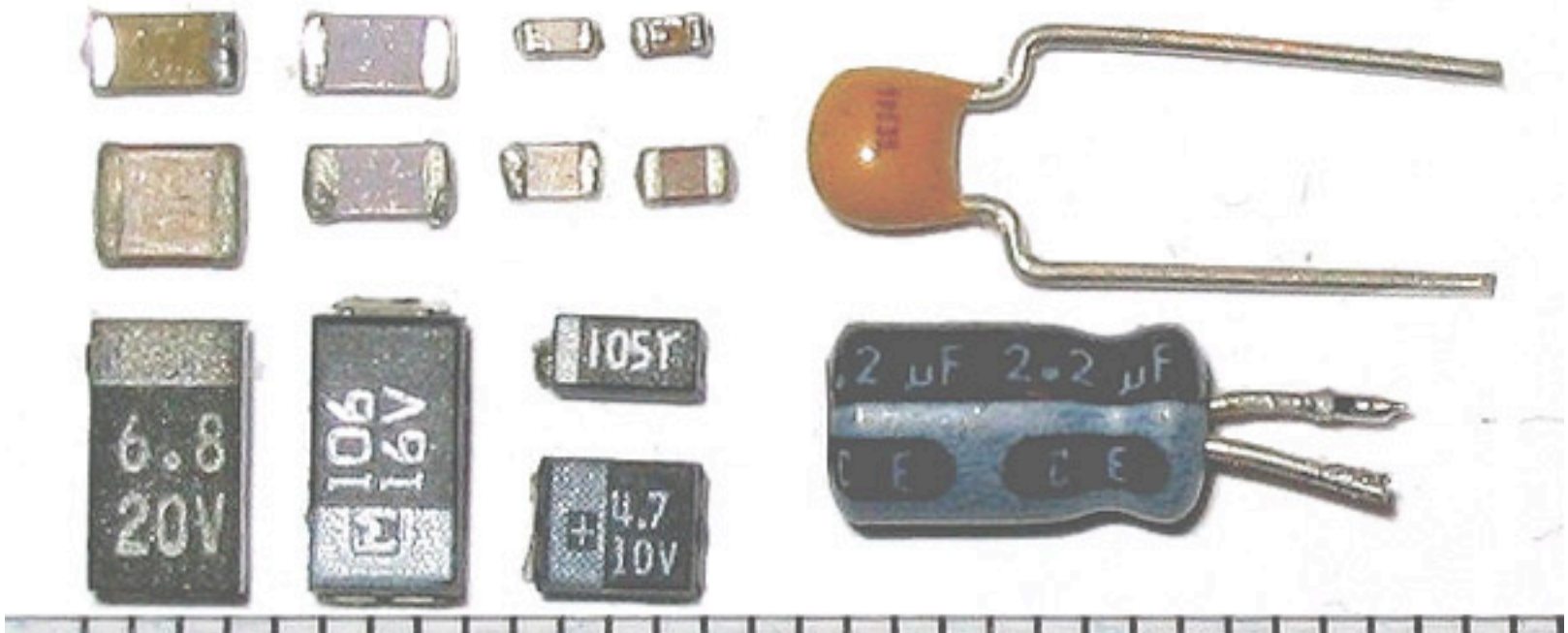


Color	1st band	2nd band	3rd band (multiplier)	4th band (tolerance)	Temp. Coefficient
Black	**0**	**0**	**×10⁰**		
Brown	1	1	×10¹	±1% (F)	100 ppm
Red	2	2	×10²	±2% (G)	50 ppm
Orange	3	3	×10³		15 ppm
Yellow	4	4	×10⁴		25 ppm
Green	5	5	×10⁵	±0.5% (D)	
Blue	6	6	×10⁶	±0.25% (C)	
Violet	7	7	×10⁷	±0.1% (B)	
Grey	8	8	×10⁸	±0.05% (A)	
White	9	9	×10⁹		
Gold			×0.1	±5% (J)	
Silver			×0.01	±10% (K)	
None				±20% (M)	

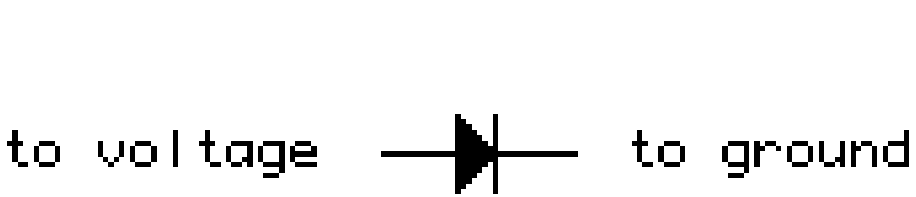
capacitors

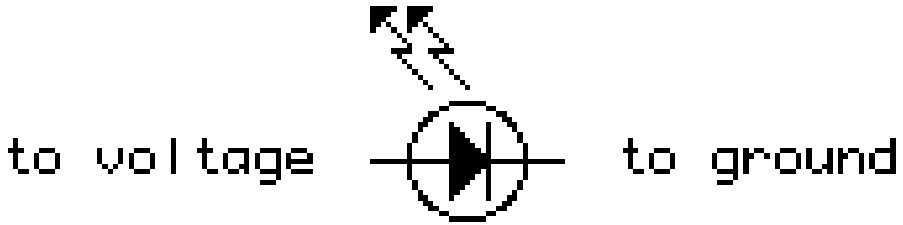


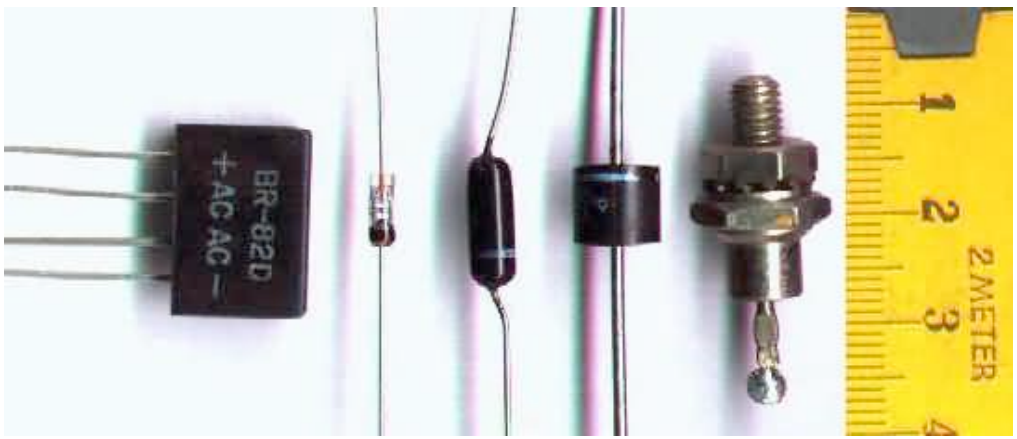
non-polarized polarized

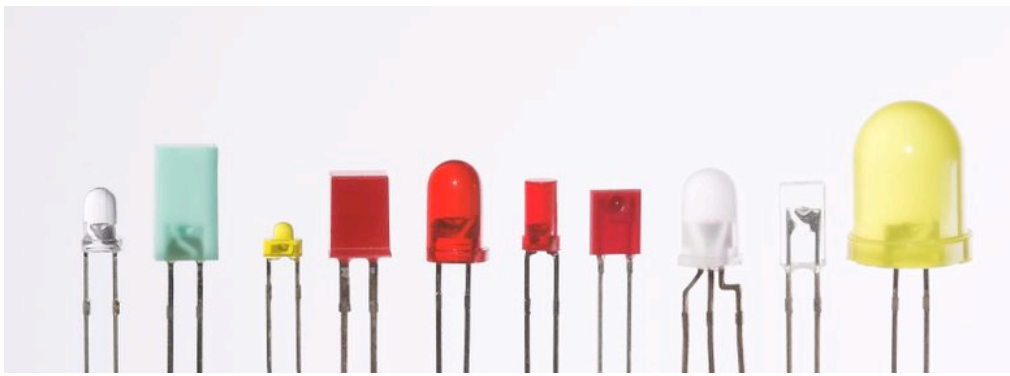


diodes



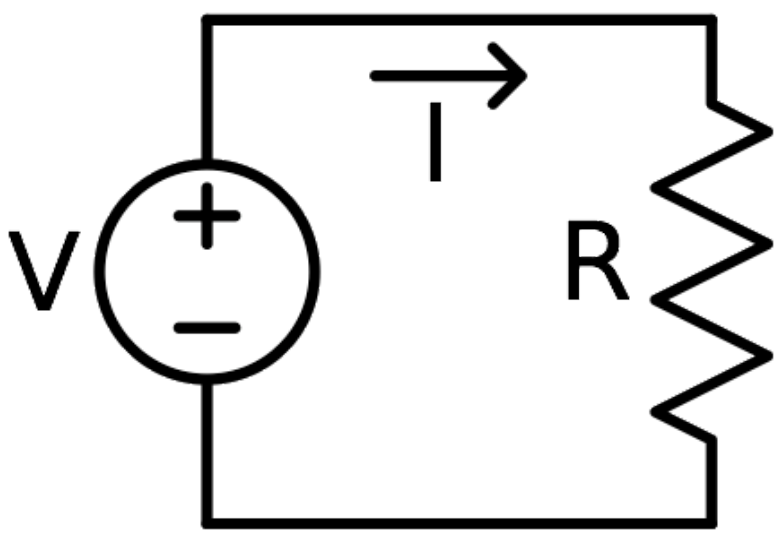






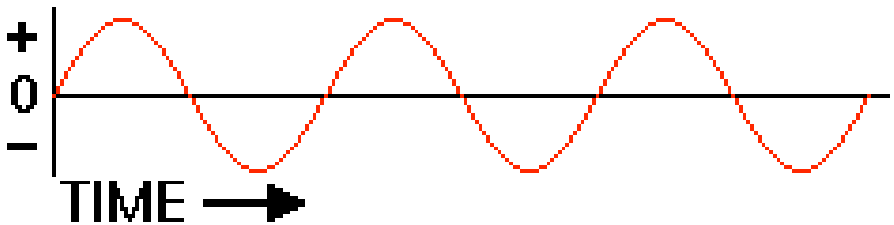
Ohm's Law

$$V = IR$$

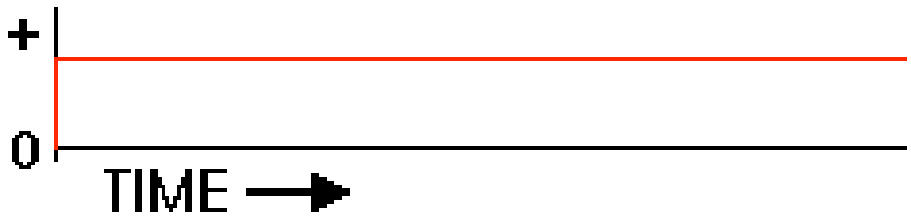


ACDC

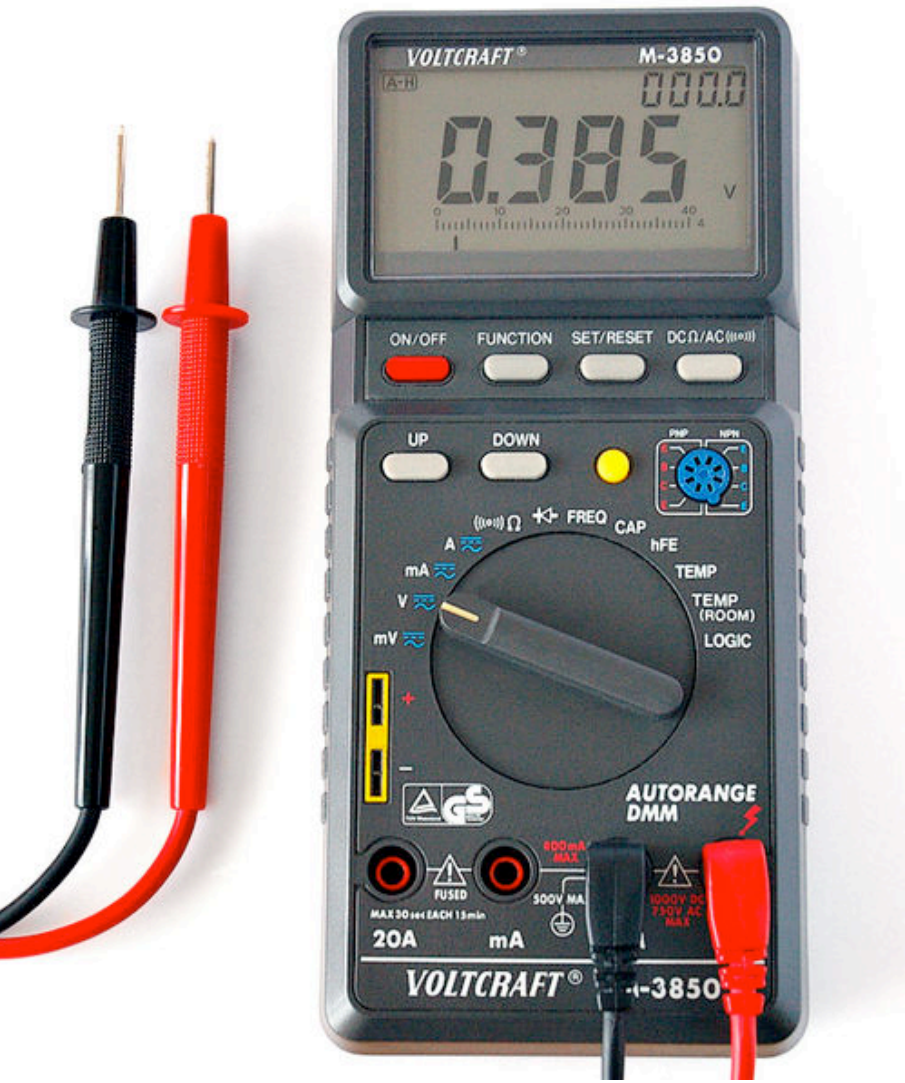
Alternating Current

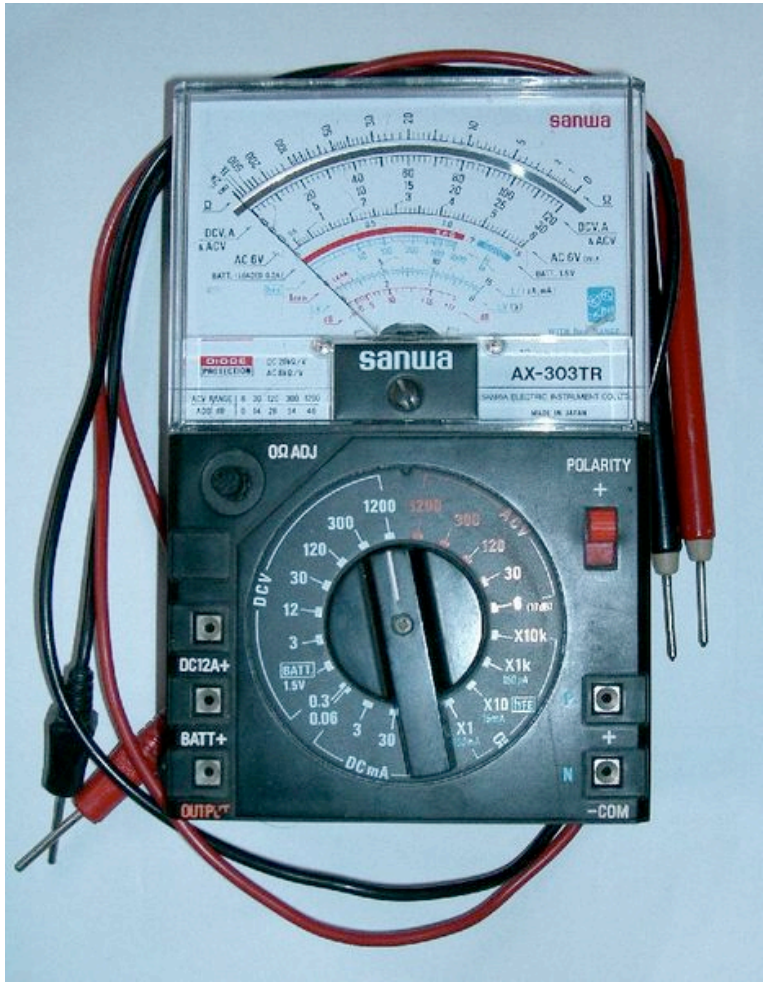


Direct Current

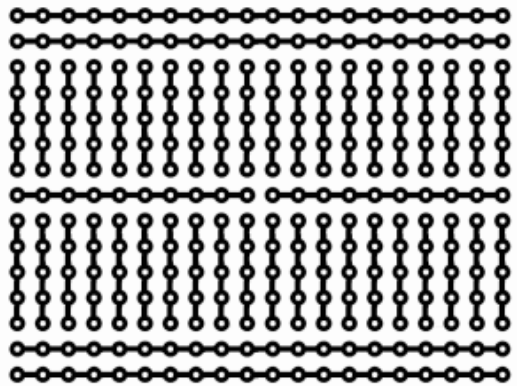


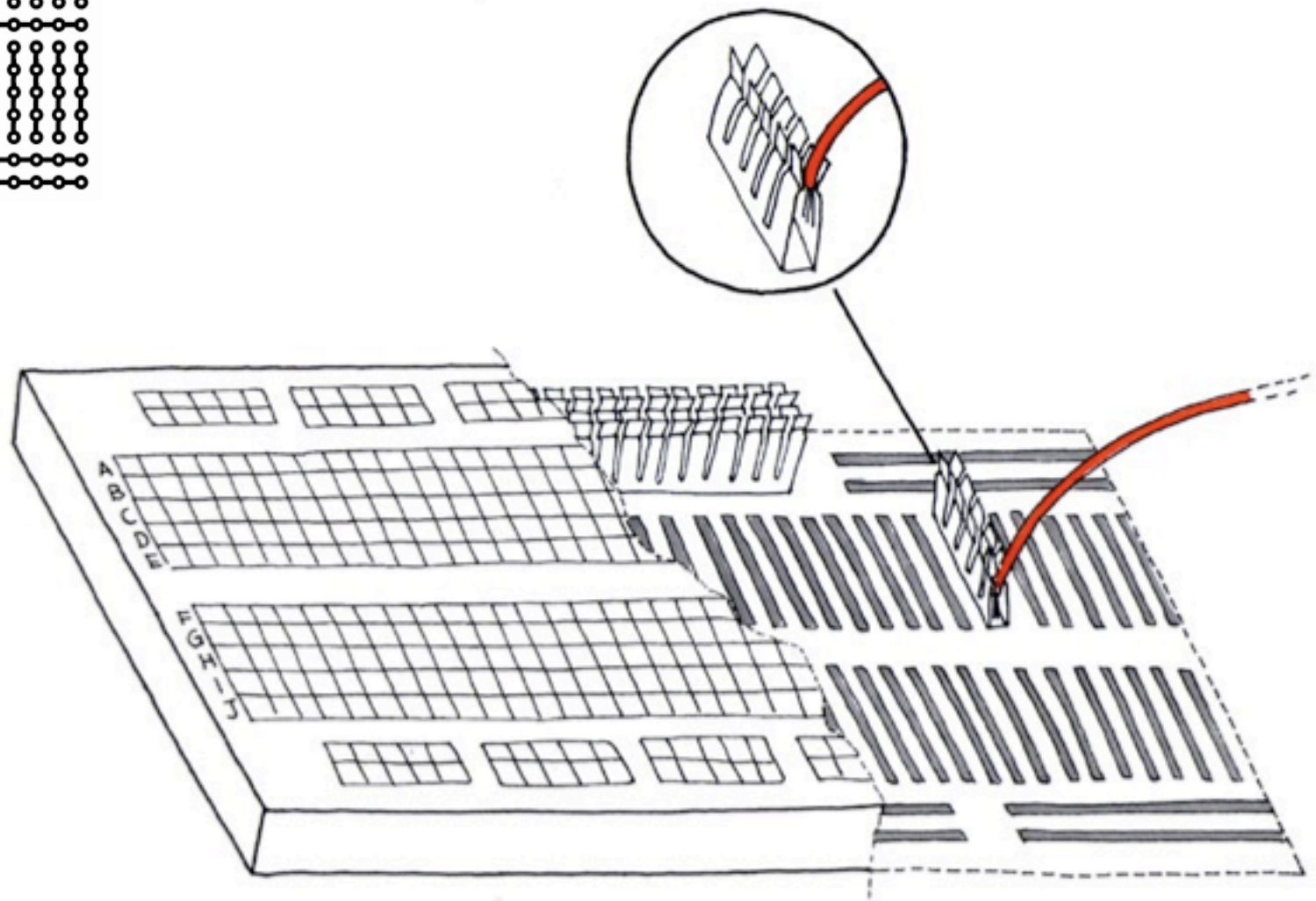
reading a meter





breadboards





soldering

journals

- write down thoughts
- take notes as your are working
- document your projects
- mull over the readings
- can a wiki, blog, web page, etc.

Help Session!

Saturday, 1pm, in the pcomp lab

led by Todd Holoubek

assignment for next week

- join the physcomp listserve
- create your journal and add link to it here: http://itp.nyu.edu/physcomp/Fall07/SteinerClass
- sign up for shop cleaning and tool safety
- complete first electronics lab and reading