Pedagogy

Παιδαγωγέω

The Art or Science of Teaching

Teaching Style – The Big Picture

Immanuel Kant
1724-1804

Teleology
How all individual components fit into a larger system

my Thesis

Exploring an effective way to teach computer engineering concepts

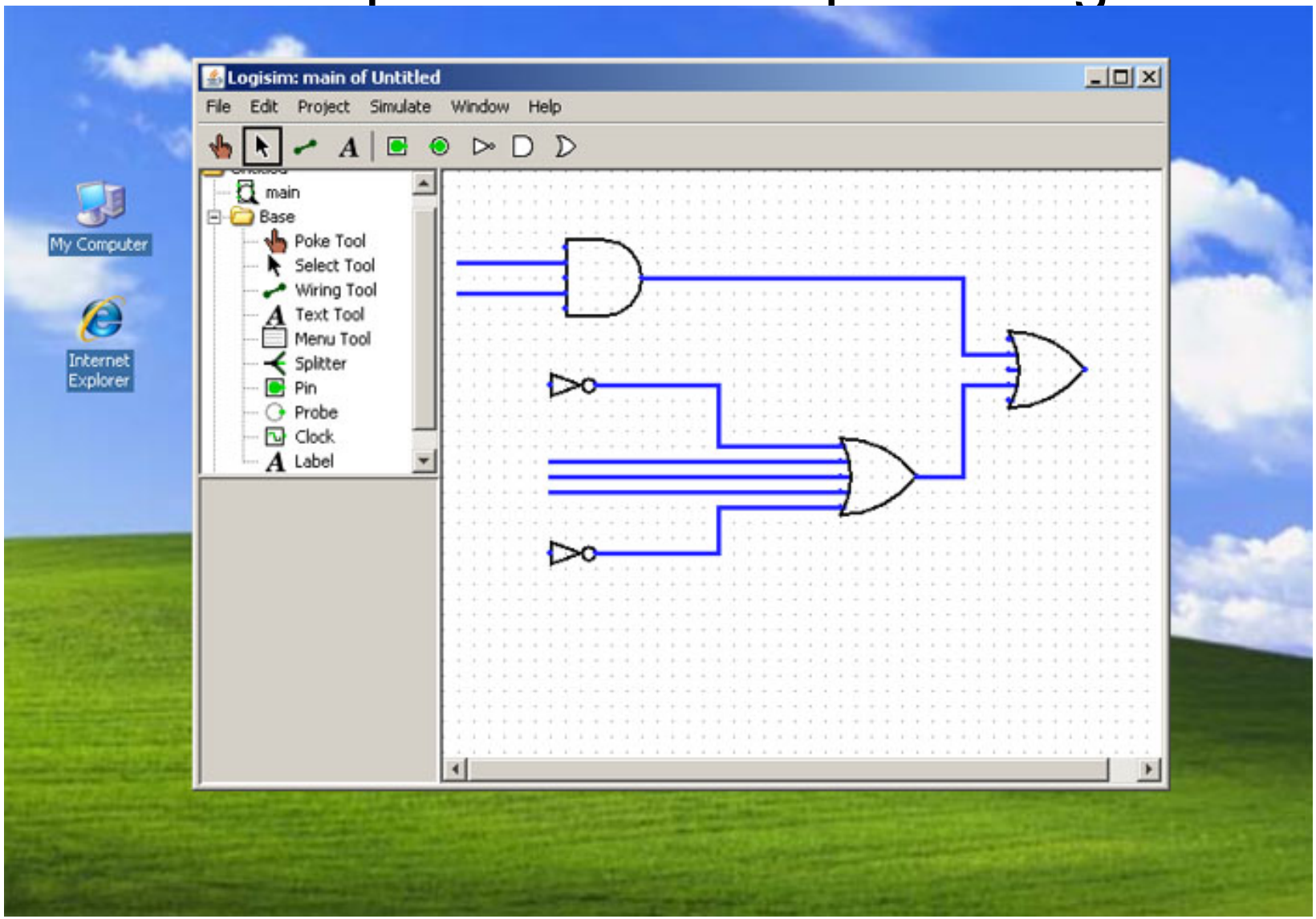
Using the Big Picture teaching style

Interactive Software

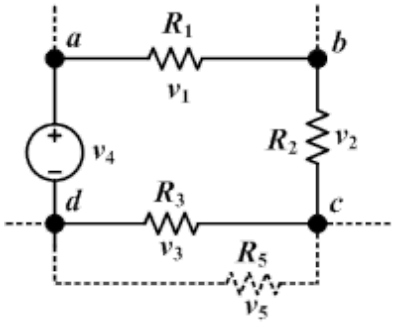
the Project

- Interactive Software
  - Html Format
    - Explaining each subject through links
  - Java/Flash applets
    - Electronic circuit illustrations created with components on a virtual protoboard
    - Kirchoff's/other circuit equations described
    - Electronic components also explained
  - Also incorporating learning material as links from outside sources

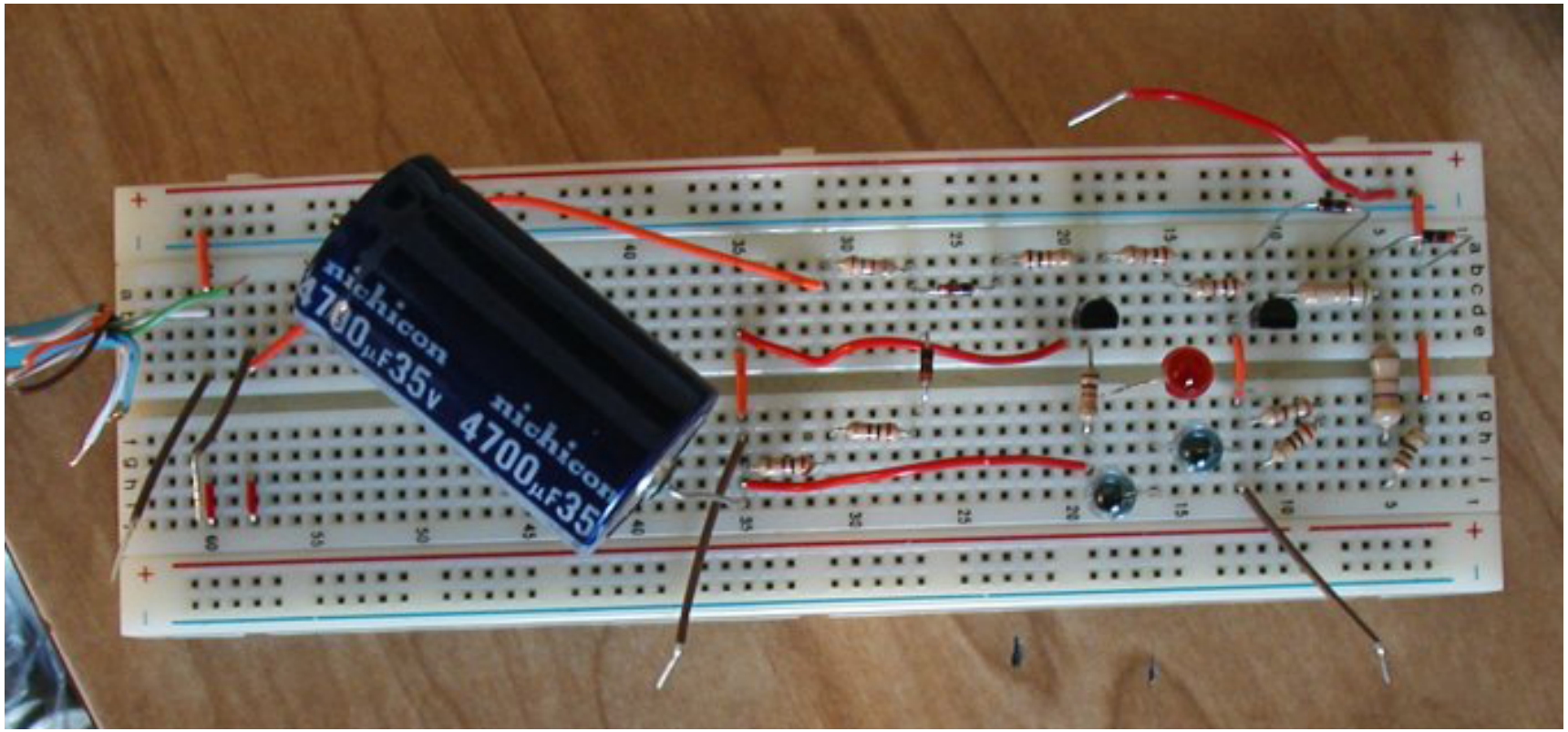
Interactive Software – Electronic Components – Computer Logic



Interactive Descriptions



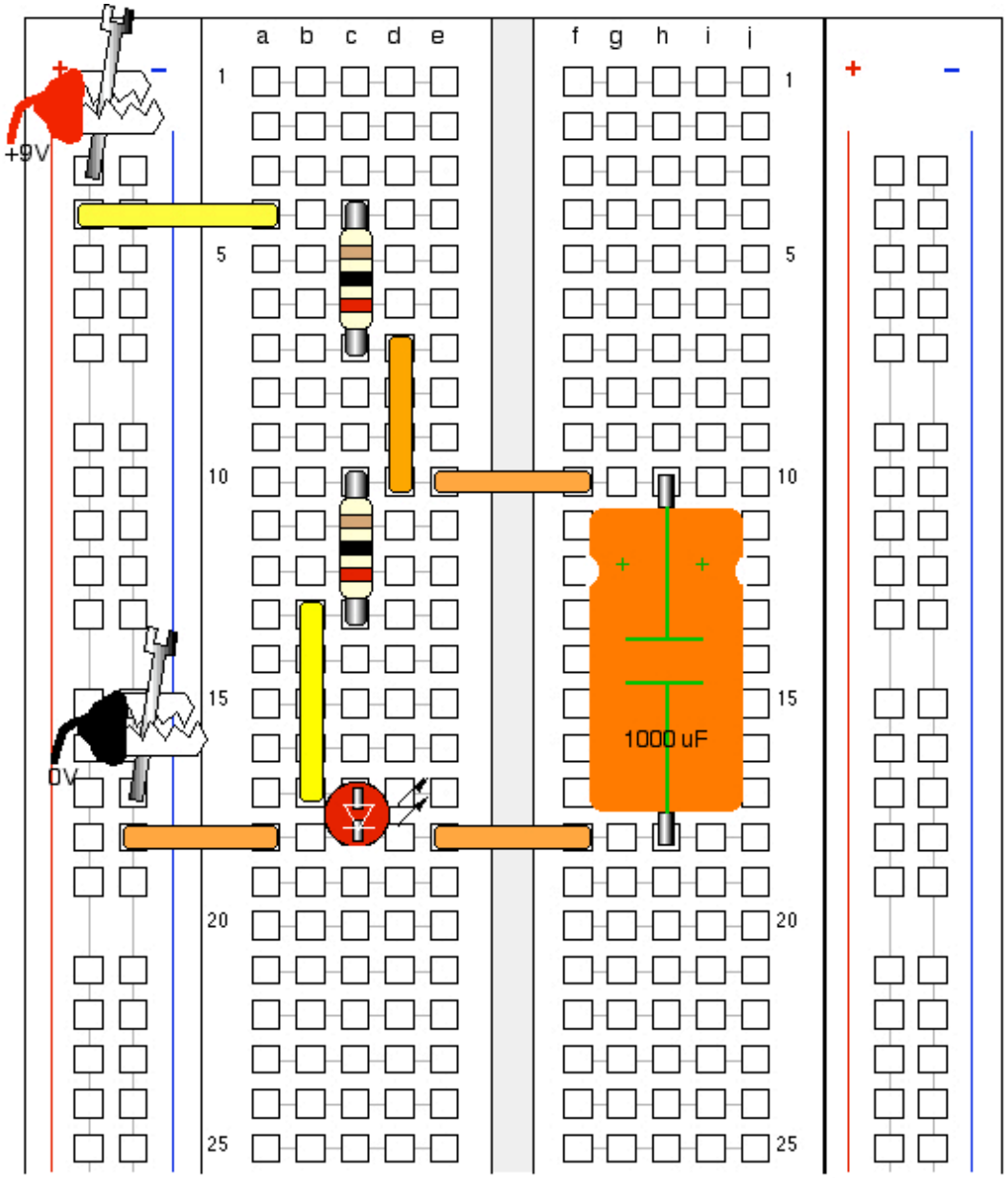
Software protoboard project – **electronic components** and **algebra**



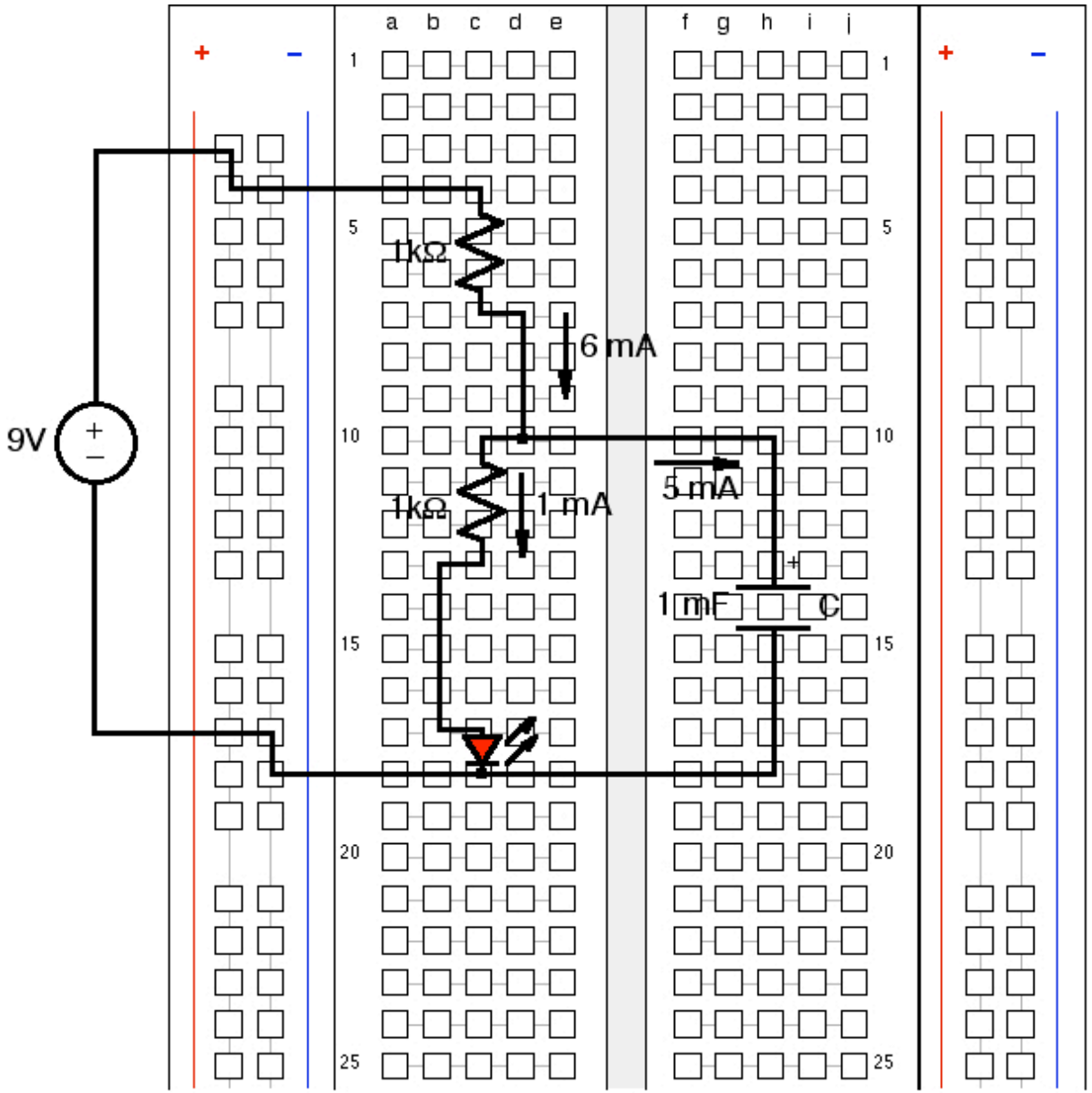
$$v_1 + v_2 + v_3 + v_4 = 0$$

place
components
on protoboard
in software

illustrates
physical
electronics
project



relate the circuit to electrical schematic



High School Outreach Program – Professor Neil Cotter

- Introduction to Analog and Digital Electronics
- Presents physical projects and Lessons
- My Interactive Software will supplement and further teach the fundamental principles of electronics via these projects

Electronic Components and Concepts in the Software

- resistors, LED's, op-amps, switches, inductors, capacitors, transistors, LF353 OpAmp Chip, 4011 NAND Gate Chip

- voltage, power, current, Ohm’s Law, Kirchoff’s Laws

Priority List of Tasks for Thesis

Below I have outlined the tasks for my thesis based on priority. The tasks in level 1 are the top priority and will be accomplished. Level 2 and particularly level 3 tasks will be completed as time permits.

Level 1

Graphics Layout

-Circuit board

-Electronic components in box to choose from

-Place electronic component objects on circuit board

-Ability to rotate components on board

Learning - Interactive

-Explanation of each component

-Overview of a few projects + how the parts fit together

Level 2

Simulation

-Basic output waveforms at each node – voltage, current levels

-Graphic representation of short circuit/higher values than a component can handle (ie smoking/exploding component).

-Applied math variable illustrations

Learning

-Java applets incorporated

Level 3

Simulation

-Basic oscilloscope simulator

Learning

-Apply concepts to specific areas in classes

Work with high school teachers for each learning application based on their lesson plans.

Timeline

- Weekly meetings with Professors Cotter and Zachary for duration of thesis
- March/April – preliminary thesis proposal
- August/September – setup design layout and pseudo code, components as picture objects
- October/November - finish coding and obtain all materials from other sources
- January/February/March - work through bugs, interactivity with user, incorporate material and software from outside sources
- Done by April 1 (1 month before graduation)

Advisor - Professor Joe Zachary

- Will oversee my interactive software development
- Director of Educational Programs – CS
- Developed interactive learning software for our curriculum

  (ECE 1010 Intro to Unix, etc.)
- Currently teaching Introduction to Computing – using software to illustrate concepts

What is effective teaching?

- Describe the Big Picture
- Explain the Individual Details
- Tie the Pieces Together

THE BIG PICTURE

$v_1 + v_2 + v_3 + v_4 = 0$