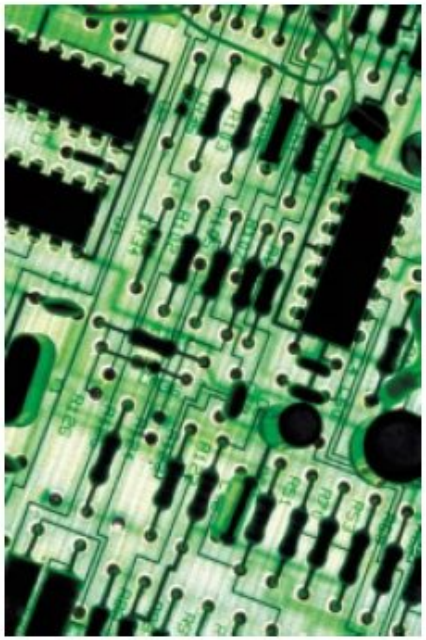
Welcome to EECS 40!

- Today:
  1. Who am I?
  2. Go over course policies and syllabus
  3. Introduction to circuits
- Figure copyright of Sheila R. Ross.



Who am I?

- Manaloor Govindarajan Balasubramanian Manikantan Bharathwaj Muthuswamy
- Aka Bharath
- 3rd semester graduate student @ Berkeley
- Concentration: Robotics
- THE way to reach me is email:
  - mbharat@cory.eecs.berkeley.edu

Course Policies

- The Course
  - Where does EECS 40 fit in?
  - Course goals
    - Understand microelectronics
    - Get the most out of labs
    - Get the most out of the reader
  - Prerequisites
  - Course materials
    - The Reader
    - Course website: http://inst.eecs.berkeley.edu/~ee40
    - Lab website: http://inst.eecs.berkeley.edu/~ee40/Labs

Course Policies

- The Lab
  - 140 Cory Hall
  - Must be taken concurrently
  - 2 labs/week
  - Labs done in groups
  - Individual prelab and group lab report
  - Quiz on lab material?

Course Policies

- Instructors and Office hours
  - Instructor: ME!
  - Meet your TAs and readers - Nir, Jesse, Jonathan and Amy, Kun
  - Office hours

Course Policies

- Newsgroup: ucb.class.ee40
- Please take a look at the course homepage on how to set it up
- Use newsgroup judiciously!

Course Policies

- The Lecture
  - In 2060 Valley Life Sciences Building
  - Lecture will start at 12:10, end at 2:00
  - 10 minute break every lecture from 1:00 - 1:10
- Lectures on “Cutting-Edge EE stuff”
- PLEASE ASK QUESTIONS!
- Need feedback: in-person, newsgroup or anonymous feedback

Course Policies

- Homeworks
  - Assigned on Wednesdays at 12PM and due promptly next Wednesday at 12:10 PM.
  - You can turn in homeworks in groups

Course Policies

- Midterms
  - Midterm 1: July 16th
  - Midterm 2: August 06th
  - Midterm location: In class, 2 hours long.
  - Review session: Yes, TBA.
  - Cheat sheet: Yes, One 8.5” x 11” sheet, front and back etc.
- Final
  - Date: August 15th
  - Final location: In class, 3 hours long.
  - Review session: Yes, TBA.
  - Cheat sheet: Yes, TWO 8.5” x 11” sheets, front and back etc.

Course Policies

- Final (contd).
  - Policy on make-up midterms and finals
  - Address special needs

Course Policies

- Grading
  - Homework: 20% Midterm I: 17.5% Midterm II: 17.5% Final: 45%
  - No curve
  - Letter grade assignment:
    - A+: 96-100; A: 89-95; A-:83-89; B+:77-82; B:70-76; B-:66-69
    - C+: 62-65; C: 56-61; C-:50-55; F $<$ 50

Course Policies

- Penalty for Cheating: Severe
  - "F" in the course
  - Throw you out of the department
  - Throw you out of the University
- Questions on the Course Policies

The Syllabus

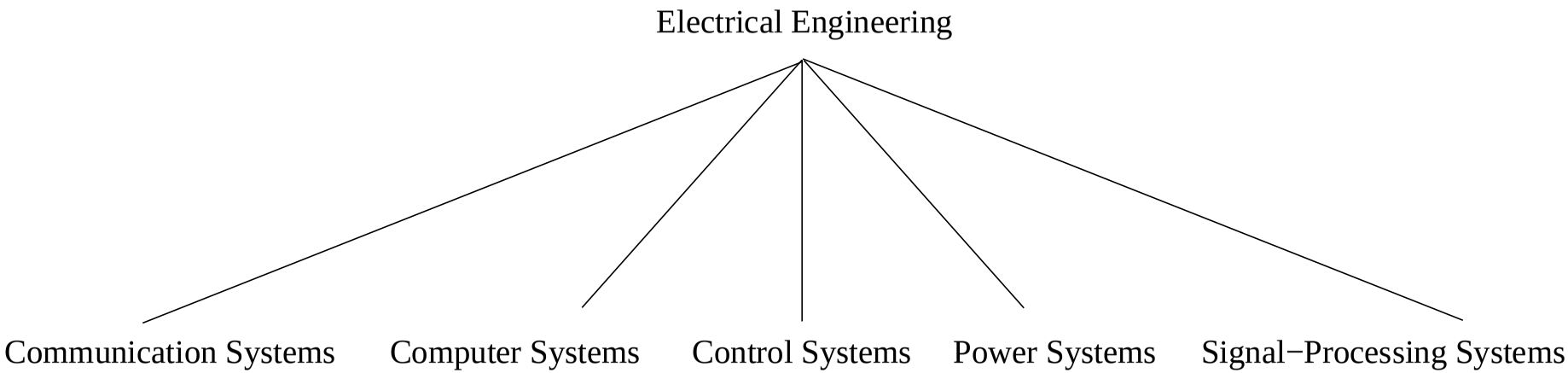
- Major topics in this course:
  - Circuit Analysis
  - Nonlinear devices: Diodes and Transistors
  - Microelectronic Circuit Applications
    - Propogation Delay
    - Fabrication
- TRY NOT TO FALL BEHIND IN COURSE!

Rest of the lecture...

- Intro. to Electrical Engineering
  - Overview of Electrical Engineering
  - Engineering View of Circuit Analysis
  - Review of SI Units
- Voltage and Current
- Power and Energy
- The Ideal Basic Circuit Element
- Basic Circuit Elements

Intro. to Electrical Engineering

- Overview of Electrical Engineering



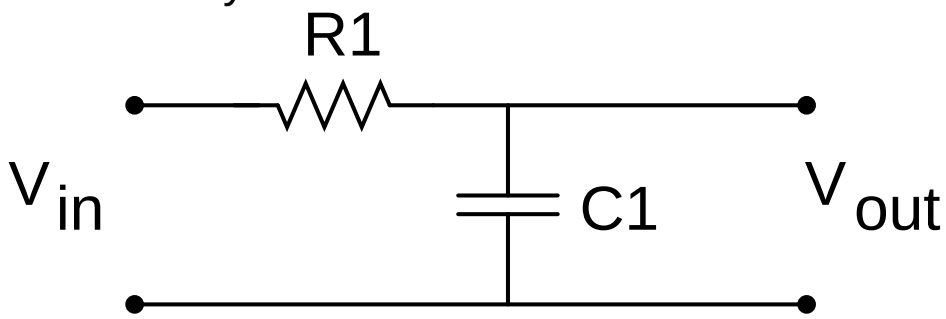
- EE is just applied Math!
- Involves “mathematical manipulation” of:
  - Circuits
  - Ten (!!!!!!) Devices

Intro. to Electrical Engineering

- These ten devices are:

Intro. to Electrical Engineering

- An Engineering View of Circuit Analysis



- Definition of an electric circuit
- What does the circuit above model? Answer:
- Circuit assumptions
  - Electrical effects happen instantaneously throughout a system.
  - The net charge on every component is always zero.
  - There is no magnetic coupling between elements in a system.

Intro. to Electrical Engineering

- An Engineering View of Circuit Analysis
- Problem solving guideline:
  - What is given, what is to be found?
  - Draw a diagram
  - Think of several solutions
  - Calculate one solution
  - Be creative
  - Check your answers

Intro. to Electrical Engineering

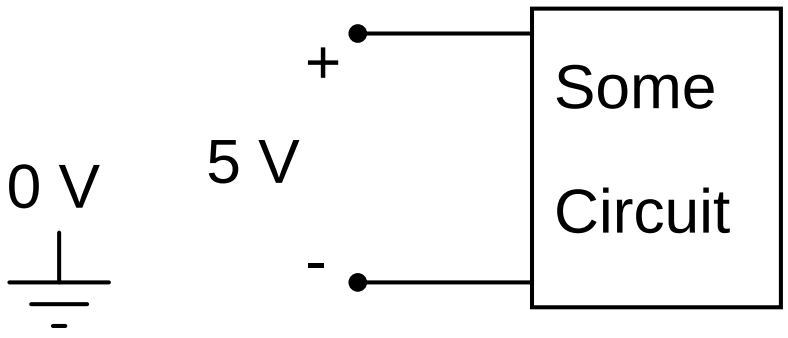
- Review of some SI Units
  - **DO NOT FORGET UNITS FOR CIRCUIT VARIABLES!**
  - Order of Magnitudes
  - Give the SI units for:
    - Energy:
    - Charge:
    - Power:
    - Current:
    - Voltage:

Voltage and Current

- Voltage
  - Separation of charges requires energy
  - This energy is described as VOLTAGE
  - Try this analogy:
  - Voltage is to _____ as Charge is to Inertia

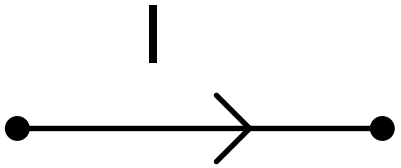
Voltage and Current

- Voltage
  - Circuit representation:



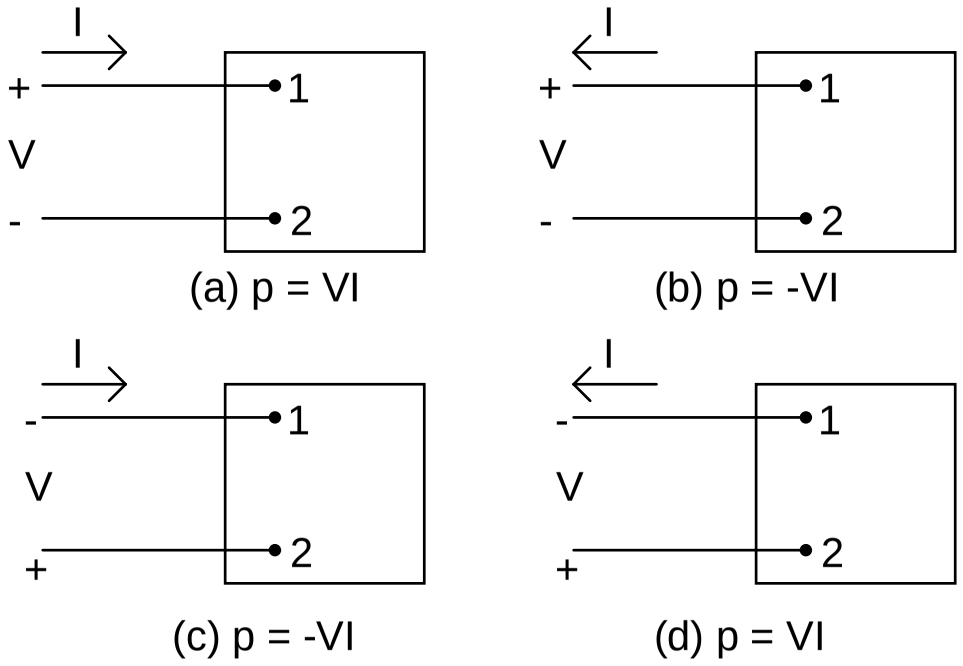
Voltage and Current

- Current
  - is defined as a flow of charge (compare with voltage)
  - The Mechanical Analogue of Current is _____
  - Circuit representation:



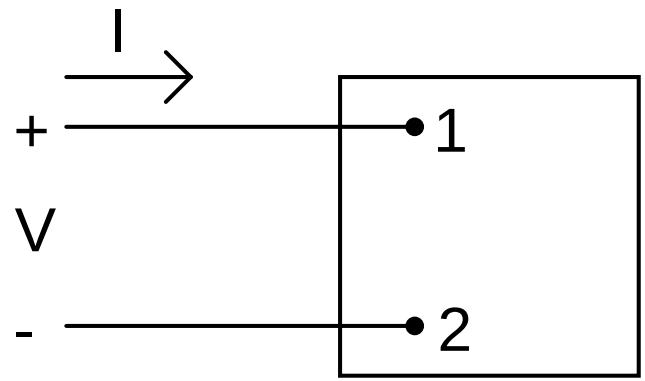
Power and Energy

- Power is the time rate of absorbing or releasing energy
- Passive sign convention:



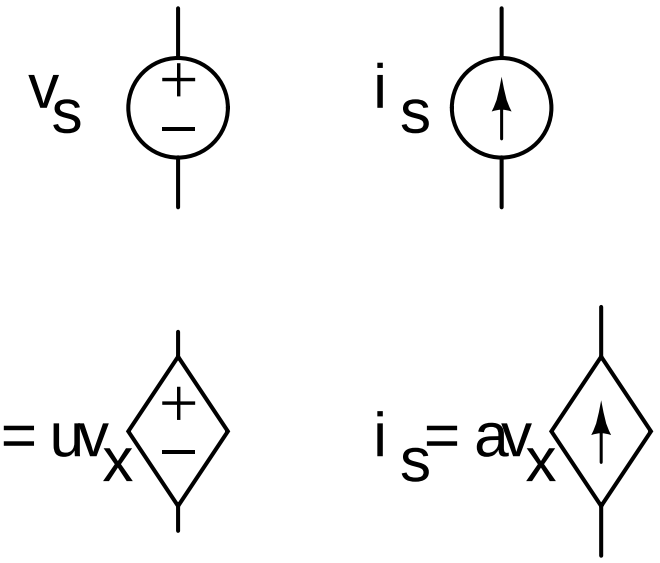
The Ideal Basic Circuit Element

- Circuit representation:
- Characteristics:
  - Has only two terminals
  - Is described mathematically in terms of current and/or voltage
  - Cannot be subdivided into other elements
- Example: Ideal voltage and current sources



Basic Circuit Elements

- Voltage and Current Sources



Tasks and Announcements

- Tasks:
  1. Get the reader!
  2. Get a named UNIX account
  3. Get a cardkey
  4. Look over the webpage and lab homepage...
  5. Reading for lecture 1: Course policies and Syllabus, Chapter 1, Section 2.1
  6. Reading for lecture 2: Chapters 2 and 3
- Announcements: I don't have office hours Tuesday morning!

In Lab This Week...

- Location: 140 Cory Hall
- This week: Intro. lab and The Oscilloscope
- Remember to get into groups!
- Remember to turn in pre-lab and lab-report

Next time...

- Series and Parallel Circuits
- Resistors
- Current and Voltage Divider
- Kirchoff's laws