CMPE1
HANDS-ON COMPUTER ENGINEERING
Lab 1 – Introduction
Spring 2010
Professor: Cyrus Bazeghi
WHAT IS ENGINEERING

- Engineering is Design
  - Always with constraints
- What is the process of design?
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WHAT IS ENGINEERING?

- What is a problem that needs solving?
- How might you start solving it?
WHAT IS COMPUTER ENGINEERING?

- Computer Engineering includes
  - Designing computers
  - Designing computer-based systems
    - Embedded systems
    - Autonomous systems
    - Multimedia systems
  - Creating design tools for computer engineering
WHAT IS COMPUTER ENGINEERING

- Computer engineering is a mix of hardware and software
  - Some problems are best solved with software
  - Other problems are best solved with hardware
  - The most fun problems require hardware and software.
WHAT IS ELECTRICAL ENGINEERING?

• Design and analysis of ....
  • Electronic/electrical/optical components and associated signals.
• Creation of systems using these components
  • Usually including computers
• Electrical engineering integrates disciplines
  • physics, chemistry, mathematics, computers, biology, electronics, optics, electromagnetics, communications, video, remote sensing......
• Devices to Systems and Applications to the real world
WHAT IS COMPUTER SCIENCE?

- Computer science is the study of the theoretical and practical aspects of computer technology and computer usage.
- Computer science generally concerns software and theoretical computing.
- As with other engineering fields, many computer scientists focus on solving problems in other disciplines.
COMPUTER TECHNOLOGY MINOR

- As much computer engineering as you can do without calculus
  - CE1, CE12/L, CE100/L, CE80N
  - 2 courses programming
  - CE80E, EE80T, ISM101 (1 credit)
  - 2 upper-division electives
  - 194F (2 credit) and essay.
HOW DO YOU CHOOSE?

- Pick Computer Engineering since you get to do everything.
- Or
  - Take CE1, CE12, CE100 (and possibly 8, 80N, 80U, 80A)
  - Take CS10, CS12A, CS12B
  - Take EE80T, EE70
- Or
  - Focus on the most requirement-intensive major you may be interested in
- Or
  - Talk to faculty and students
WHAT ELSE SHOULD YOU DO?

- The SOE majors are all hard, so
  - Join a student organization (or several!!)
    - SWE
      - Society of Women Engineers
    - ISMA
      - Information Systems Management Association
    - IEEE
      - Institute of Electrical and Electronics Engineers
  - Visit the advising WWW site often
  - Read the undergraduate newsletter
  - Drop in for advising too
  - Sign up for a peer mentor
  - Get free lunch at CEFULs
COMPUTER ENGINEERING RESEARCH

- Computer Aided Design
  - VLSI, FPGA, MCM
- Computer Systems
  - Computer architecture, parallel processing
- Sensing and Interaction
  - 3D modeling, sensor nets, assistive technology
- Embedded and Autonomous Systems
  - Embedded software, robotics and mechatronics
  - Biomedical robotics
- Networks
  - wired and wireless, ad hoc and mobile
WHAT DOES CYRUS DO?

- Logic design and Architecture
  - Media processors (think a Tivo on a chip)
  - 3D graphics
  - Memory controllers

- Embedded Systems
  - Dolphin tread mill
  - Elephant seal tracker
  - Logic Analyzer
  - Sensor systems
WHAT IS CYRUS’ BACKGROUND?

- BS in Computer Engineering
  - Hardware design track
- MS in Computer Engineering
  - Embedded systems and VLSI
  - Built a tracking device for elephant seal research
- PhD in Computer Engineering
  - Architecture based complexity analysis
- 14 years of industry experience in logic design and architecture
- Teaching at SOE since 1998 off and on fulltime and part time
CE 1 ORGANIZATION

- Weekly labs with short (?) talks beforehand
  - LEDs
  - Digital logic and computer hardware
  - Scribbler Robots
  - Unix & Programming
  - Networking
- Weekly graded research problems
- Guest lectures on computer engineering, e.g.
  - Robotics
  - Networks
  - Wireless communications
USING THE LAB

- CE174 & CE100 uses this lab
  - But not during our class
- No food or drink in the lab
- No backpacks on the lab tables
- Be careful of the equipment
CE1 Requirements

- Have Fun!
- Do the homework – it’s on the web page
- Come to class and do the labs (and check our website for notes and updates).
- Maintain a lab notebook
  - Bring a bound notebook (preferably graph paper) to the next class (see separate handout for background and details)
- Take the final!
  - Attend and report on the final activity event, TBA.
**Lab Notebooks**

- Lab notebooks are a critical component of engineering in general and is a requirement for CE1.
- Each lab section should have a title page containing the following information:
  - Date
  - Lab number and a title
  - Paragraph description that summarizing the days activity
  - Can be completed after the actual lab
- Each page should be numbered and dated.
- Take notes on any lecture given.
- Describe the experiments you do in class.
- Feel free to print and cut and paste material in your notebook.
ENGINEERING IN PRACTICE

- Short presentation on some engineering that is not your “typical” kind expected.
- Short video on an industrial design services company explaining what is design and the process that they go through.