Computer Science “Topic Explosion”

- A very broad spectrum, with new topics pressuring existing curricula every day
  - bioinformatics
  - medical informatics
  - cyber-security & privacy
  - crisis response
  - ubiquitous computing
  - game culture & technology
  - K-12 education
  - …
A Spectrum of Concerns

Different fundamentals, techniques, approaches, principles, and practices underlie different parts of this spectrum.

- People, Organizations
- Circuits, Devices
Bren School B.S. Degree Programs

People, Organizations

Informatics (est. 2004) — software emphasis

Computer Science (est. 2003) — theory emphasis

Computer Science and Engineering (joint with School of Engineering; est. 2003) — hardware emphasis

Information and Computer Science (est. 1968) — make your own

Circuits, Devices
Informatics

People, Organizations

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Circuits, Devices
Informatics: What Do We Mean?

- Interdisciplinary study of the design, application, use and impact of information technology
  - software and information
  - development and design
  - technical and social
  - creation and analysis/understanding

- Broadly speaking: computing and people

- Key characterization: a design discipline focusing on the relationship between information technology design and use in social and organizational settings
Informatics Pedagogical Philosophy

- Studio-style design courses
- Multi-course sequences
- Balance theory and practice
- Apply spiral approach of “just in time learning”
- End-of-year projects and year-long senior project
- Be excellent designers, but know how to build too
- Group work from the start
- Encourage creativity and reflection

- Designed from the ground up as an integrated four-year curriculum
# Course Comparison (Part 1)

<table>
<thead>
<tr>
<th>Course</th>
<th>INF</th>
<th>CS</th>
<th>CSE</th>
<th>ICS</th>
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<td>Intro programming/data structures</td>
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<td>Algorithms/theory</td>
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<td>Digital signal processing</td>
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<td>Digital logic</td>
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## Course Comparison (Part 2)

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<td>Human-computer interaction</td>
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## Student Numbers

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Difficult Experiences

- The name “Informatics”
  - lots of recruitment materials
  - Informatics Q&A on web site
  - outreach efforts
  - repeated exposure
  - parents

- Choosing the right major is difficult for freshmen
  - allow seamless transfer among majors until the end of the first year, despite different courses
  - http://www.ics.uci.edu/ugrad/degrees/advisor

- Balancing the programmers versus the non-programmers
- Inflexibility of the program due to many new courses
- Initial high percentage of female students has dropped
- Skepticism in industry (but…)

July 17, 2008 – 19:16:04
Positive Experiences

- Informatics students have been superb
- Breadth of interests and background among the Informatics students
  - programmers versus non-programmers
- First class of 12 students graduated this Spring
  - very positive feedback on final survey
  - representative of breadth of the program
  - strong career paths
- Industry has begun to recognize and support the program
  - “reverse recruitment visits”
  - project classes
- Faculty are very engaged with the program
- FIPSE and NSF support
Thank you

http://www.ics.uci.edu/informatics/ugrad
Future

- The experiment continues
  - larger sustainable base of students is needed
- Name change of and/or tracks in the program
  - very divided opinions among the faculty
- Monitor the students after graduation
- High-school outreach
- Community colleges
The Informatics Focus
Informatics
Resulting Skills

- Able to design and coordinate implementation of software and information systems
  - not hackers, not just tool users or coders
  - instead, professionals who
    - write software but also do much more
    - design with expertise
    - listen to programmers and other people involved
    - interact with customers
    - analyze, compare, and discuss the quality of alternative designs
    - devise the best implementation techniques in every situation
    - understand the role of quality control
    - adapt to changing requirements

- Able to adapt to new concepts and technologies

- Able to act as agents of change
Areas of Study

- Software engineering
- Human-computer interaction
- Project management
- Programming languages
- Databases
- Computer-supported collaborative work
- IT organizations
- User modeling
- Information retrieval, management, and visualization
- Ethics, privacy & security
- Computation-social relationships
- And others at the periphery
  - business, management, organizational computing, social science, cognitive science, anthropology, digital arts, game technology, medical informatics, and so on
Computer Science “Topic Explosion”
## Curriculum

<table>
<thead>
<tr>
<th>Fall Year 1</th>
<th>Winter Year 1</th>
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<tr>
<td>Informatics Core</td>
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<td>Writing</td>
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<td>Critical Reasoning</td>
<td>Discrete Mathematics</td>
<td>Fundamental data structures</td>
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<td><strong>Winter Year 2</strong></td>
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<td>Human-Computer Interaction</td>
<td>Project in HCI and User Interfaces</td>
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<td>Breadth</td>
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<td>Social Analysis of Computerization</td>
<td>Organizational Information Systems</td>
<td>Proj in Social &amp; Org Impacts of Comp</td>
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<tr>
<td>Software Design I</td>
<td>Software Design II</td>
<td>SW Arch, Dist Syst, &amp; Interoperability</td>
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<tr>
<td>Proj. in File and Database Mgmt</td>
<td>Breadth / Elective</td>
<td>Project Management</td>
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<td><strong>Winter Year 4</strong></td>
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<td>Computer-Supported Coop Work</td>
<td>Information Retrieval</td>
<td>Information Visualization</td>
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Who Should Be Interested?

- We expect a broad variety of students with a diverse range of backgrounds
- The degree program moves away from the popular belief that computer scientists are "mad hackers", and instead welcomes students
  - who may not know how to program
  - who have an interest in creative design
  - who generally are curious about designing proper solutions, not just programs
  - who are ready to work with others in a team to solve problems
- Basic skills necessary
  - listening, reading and writing
  - independent, critical, and free thinking
  - a desire for innovation and creativity
  - willingness to work on precise technical problems
Potential Careers

- Software Engineer
- Human-Computer Interface Designer
- Information Architect
- Mobile Computing Systems Designer
- Game Designer
- Systems Analyst
- Management Consultant
- Usability Engineer
- Web Developer
- Database Designer/Manager
- …