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CSCE 181: Introduction to Computer Science

Spring 2010
Prof. Jennifer Welch

Today's Class

- What is Computer Science?
- Why is writing important?
- Review of the syllabus
- Brief overview of the department and curriculum

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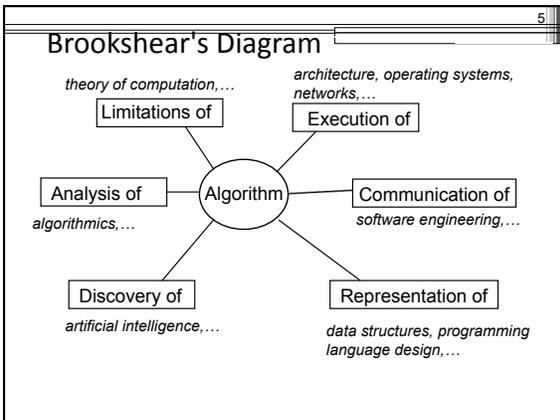
What is Computer Science?

- Bierman: Computer science is the study of algorithms
 - how to conceive them and write them down, programming-in-the-small vs. programming-in-the-large
 - how to execute them (why does a machine act the way it does, what are limitations, what improvements are possible)

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What is Computer Science? (v. 2)

- Brookshear: "Computer Science is the discipline that seeks to build a scientific foundation for such topics as computer design, computer programming, information processing, algorithmic solutions of problems, and the algorithmic process itself."
 - Most fundamental concept of CS is an algorithm: a set of steps that defines how a task is performed
 - An algorithm is instantiated in a program and then executed on a machine



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What is Computer Science? (v. 3)

- Schneider and Gersting start with what computer science is *not*:
 1. Computer science is *not* the study of computers. Fellows and Parberry: "Computer science is no more about computers than astronomy is about telescopes, biology is about microscopes, or chemistry is about beakers and test tubes. Science is not about tools. It is about how we use them, and what we find out when we do."

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What is Computer Science? (v. 3)

2. Computer science is *not* the study of how to write computer programs.

Programming is a very important tool for studying new ideas and building and testing new solutions.

A program is a means to an end (solving some problem), not the end in itself.

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What is Computer Science? (v. 3)

3. Computer science is *not* the study of the uses and applications of computers and software.

Schneider and Gersting: "Learning to use a software package is no more a part of computer science than driver's education is a branch of automotive engineering."

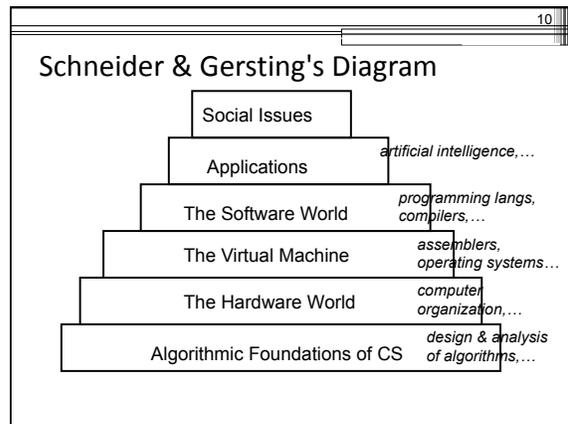
Computer scientist works on specifying, designing, building, and testing software for others to use.

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What is Computer Science? (v. 3)

Schneider and Gersting: Computer science is "the study of algorithms, including

- o their formal and mathematical properties
- o their hardware realizations
- o their linguistic realizations
- o their applications"



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What is Computer Science? (v. 4)

- C.A.R. Hoare: the central core of computer science is "the art of designing efficient and elegant methods of getting a computer to solve problems"
- D. Reed: Identifies 3 main themes:
 - hardware: circuit design, chip manufacturing, systems architects, parallel processing
 - software: systems software (e.g., operating systems), development software (e.g., compilers), applications software (e.g., web browsers)
 - theory: understand inherent capabilities and limitations of different models of computation (for instance, proving that certain problems CANNOT be solved algorithmically)

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What is Computer Science?

- Anything else?
- Other views?

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Subfields of Computer Science

- Algorithms and Data Structures
- Architecture
- Operating Systems and Networks
- Software Engineering
- Artificial Intelligence and Robotics
- Bioinformatics
- Programming Languages
- Databases and Information Retrieval
- Graphics
- Human-Computer Interaction
- Computational Science
- Organizational Informatics

(From Reed, based on work by Denning)

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What Do Computing Professionals Write?

- Proposals
- Reports
- Code documentation
- User manuals
- Websites
- Blogs
- Research papers
- ...
- [Joel Spolsky on Software](#)

**Communicate
your ideas!**

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Overview of Writing Process

- Prewrite: what is purpose of document? Who is audience? Gather content
- Draft: plan and put prewriting into text format. Focus on organization (e.g., outline)
- Revise and Edit: Review, think about modifying the organization (order of presentation), get feedback from others
 - Professor, TA, peers, University Writing Center
- Proofread: spelling, grammar, style

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Summarizing

- What? Give the main points of an article or presentation, in your own words
 - Concise sentences with main ideas
 - Remain faithful to author's interpretation, objective
- Why?
 - Provide an overview, give background to what you are doing, help you understand the material
- How?
 - Read twice (to fully understand)
 - Identify main point ("thesis")
 - Highlight material that supports thesis
 - Rephrase main points in your own words
 - Cf: [Summarizing I University Writing Center](#)

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Syllabus

- Teaching Assistant: Virginia Walker
- Goals:
 - introduction to computing discipline, our department, post-graduation opportunities
 - introduction to writing for computer science
- Format:
 - presentations by industry representatives
 - presentations by faculty members
 - student panel
- Schedule: Usually meet on Tuesdays, maybe a few times on Thursdays instead - check web!!
- Textbook: *Writing for Computer Science*, Zobel
- Grading: Pass/Fail (i.e., A/F)

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Writing Assignments

- Several short written assignments, one longer
- Typically a review of a lecture
 - Summarize topic, lecture information,
 - Give personal view
- The first will be a summary of Chapters 1 and 13 in textbook
 - Due in 1 week (Tue,1/26)
 - For practice: feedback will be given but no grade (as long as you turn it in)
- Check web site for details!

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The CSE Department

- Faculty:
 - Tenured/Tenure-Track
 - Have both research and teaching responsibilities
 - Assistant Professors: Newer, not tenured
 - Associate Professors: Not new, usually tenured
 - Professors: Tenured
 - Teaching Faculty
 - Lecturers and Senior Lecturers
 - Primary duties are teaching

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The CSE Department

- Advising: Richardson 9th floor
 - Dr. Joe Hurley, Prof. Rick Furuta
 - Ms. Marilyn Payton
- Computing Services Group: HRBB 1st floor (just moved)
 - Helpdesk
- Administrative, Financial,...

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The CSE Department

- Look at the department website:
 - <http://www.cse.tamu.edu>
 - Lots of information there to help you learn about the department
- Also, individual faculty, research groups have their own websites

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The Computer Science Curriculum

- New CS curriculum
 - Give students more Computer Science earlier on
 - Most fundamental information in first 2 years
 - Give students more flexibility later on
 - Allow students to tailor degree to match interests
 - Makes students more competitive for internships after 2 years
 - Intro class to give overview of Computer Science
 - Capstone class at the end: can do research for this (and even get paid!)

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The "Intro" Sequence of CS classes

<ul style="list-style-type: none"> • Semester 1: <ul style="list-style-type: none"> ◦ CSCE 181: Intro Seminar ◦ CSCE 121: Intro to Programming in C++ • Semester 3: <ul style="list-style-type: none"> ◦ CSCE 314: Programming Languages ◦ CSCE 312: Computer Organization 	<ul style="list-style-type: none"> • Semester 2: <ul style="list-style-type: none"> ◦ CSCE 221: Data Structures and Algorithms ◦ CSCE 222: Discrete Structures for Computing • Semester 4: <ul style="list-style-type: none"> ◦ CSCE 315: Programming Studio ◦ CSCE 313: Computer Systems
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Upper Level

- Four "tracks" of classes (upper-level electives):
 - Algorithms/Theory
 - Systems
 - Software
 - Information and Intelligent Systems
- Take 1 class from each track (breadth)
- Take 3 classes in one track (depth)
- Take 1 class in any track
- Also: upper-level seminar class (CSCE 481), senior capstone class (CSCE 482)