Outline

- What can be done with a Computer Science degree.
- What it means for a student to study Computer Science.
- What Mathematics is required in the Computer Science curriculum.
- Why is Mathematics critical to the study of Computer Science.
User Versus Computer Science professional

- A user – uses a program
- Computer Science professional
  - Comes up with the idea
  - Develops the conceptual solution and required models
  - Designs the programs
  - Codes the programs and tests them
  - Integrates programs into existing software and hardware systems
Computing Career Paths

- Designing and implementing software.
- Devising new ways to use computers.
- Developing effective ways to solve computing problems.
- Developing models used in the solutions.
- Planning and managing organizational technology infrastructure.
Job Myths

Myth - Computer Science graduates work alone in a dark cubicle.

-> Most CS graduates work in teams and interact with people from other areas of the company.

Myth – All of the jobs have moved to India and China.

-> There are more people working IT today in the US than during the dot com boom
Popular Computer Science Degree Jobs (ordered by salary)

- Software Architect
- Information Technology Architect
- Senior Software Engineer
- Project Manager (IT)
- Information Technology Manager
- Systems Engineer (networking)
- Database Administrator
- Network Engineer
- Software Developer
- Bioinformatics
- Programmer Analyst
- Systems Administrator
- Web Developer
- Computer/Network Support Technician
What CS is Myth

Myth – Computer Science is just programming.

Programming is just a tool in the study of Computer Science.

Students write programs to learn Computer Science concepts.
What students study in Computer Science

- Problem-solving
- Programming
- Computing theory
- Modeling
- Data structures for organizing data within your programs
- Developing web applications
- Programs where you are the user, such as database management systems
- Working in teams, being an effective team member
- Using existing software libraries to carry out a variety of computing tasks
- Being aware of the uses to which computers are put, recognizing issues to do with security, safety, etc.
- Looking at innovative ways of using computers, creating tools, providing tools support, etc.
Computer Science programs, like the programs at ISU, UI, and UNI, don’t expect that incoming freshman have studied programming.

What is expected is that they have had sufficient high school Mathematics to start in the Mathematics curriculum with Calculus I.

All three universities provide background courses to bring the students up to speed, but the first Calculus course is typically at least a co-requisite for the first or second Computer Science course.
College Mathematics Course Requirements

- ISU requires Calculus I & II, plus a Mathematics elective and a Statistics elective.
- IU requires Calculus I & II, plus two Mathematics electives.
- UNI requires students to select 4 courses from a set of Mathematics courses starting with Calculus I & II.
Why is Mathematics critical to studying Computer Science

- Choice of data structure to store data (complexity)
- Choice of algorithm (complexity)
- Computability
- Modeling
- Analysis
- …
Thank you!

Questions??

lmiller@cs.iastate.edu