CS111: Fundamentals of Programming I

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My Bio

- From Dallastown, PA
- B.S., Gettysburg College
- M.S., Duke University
- Ph.D., University of Delaware
- For fun: ultimate, pop culture, ACC basketball

Survey Says...

- What year are you?
- Who has used a computer regularly?
- Who has used the Internet regularly?
- Who has made a web page?
- Who has written a program?
- Why are you taking this course?
- What is computer science?

Discussion: What is Computer Science?

- Know any famous computer scientists?

What is Computer Science?

“Computer Science is no more about computers than astronomy is about telescopes.”

--Edsger Dijkstra

- What is computable?
- How can we compute X most effectively/efficiently/accurately?
  - Organization of data
  - Optimize speed, space using optimum data structures, algorithms
  - Accurate modeling of “world”
  - Automation
### Computer Science Fields

- **Systems**
  - Architecture
  - Operating systems
  - Networks
  - Distributed and parallel systems
  - Databases
- **Software**
  - Compilers
  - Graphics
  - Software engineering
  - Software testing and verification
- **Theory**
  - Algorithms
  - Theory of computation
- **Other**
  - Artificial intelligence
  - Robotics
  - Natural language processing
  - Bioinformatics
  - Visualization
  - Numerical analysis

- Often research involves combinations of these fields
- Not just programming!
  - But programming is a tool to do much, much more!

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### What I do as a Computer Scientist

- **Interests**: Software testing, empirical studies, distributed systems
- **Focus**: Automated web application testing

![Diagram of HTTP Request and Response](image)

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### What I do as a Computer Scientist

- **Google Calendar**: Events and scheduling
- **Find the error(s)!**

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### Matt Welsh

- Assistant professor at Harvard University
- Research: distributed systems and networking
  - Sensor networks to monitor volcanoes
  - Wrote *Running Linux*

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### Jeannie Albrecht

- Assistant professor at Williams College
- Research: managing software that is running and communicating on computers around the world
- Hobbies: surfing, ultimate, rugby
Christyann Pulliam

- Double major in CS and Political Science from Gettysburg College
- Law Degree from Wake Forest University
- Patent Examiner at the US Patent and Trademark Office
  - Focus: Search engines, DB apps

Sue Lister

- 2007 graduate of the University of Delaware
- Double major in CS and Psychology
- Interested in decreasing the division between the technological havevs and haves
  - Only 3% of Africans have Internet access
  - Cell phones are commonly used

Jeff Forbes

- Assistant professor of the practice at Duke University
- Research:
  - computer science education, intelligent control and robotics, reinforcement learning, and social networks
  - HarambeeNet: CS education via social networks

Nina Bhatti

- HP Labs Principal Scientist
- Leads design for novel mobile technologies
  - System for matching your foundation, using pictures from your cell phone

Basic Computer Architecture

- What we create in CS111!
- Solve problems
  - MSOffice Applications (Excel, Word), Solitaire, Firefox, Internet Explorer
- Manages hardware resources
  - Windows, OSX, UNIX, Linux
- The machine, made up of CPU, memory, hard drive, keyboard, etc.
  - Dell, Apple, IBM, HP, Toshiba, ...
- Software
  - Hardware
  - Operating System
  - Application
  - System

Computational Problem Solving 101

- Computational Problem
  - A problem that can be solved by logic
- To solve the problem:
  - Create a model of the problem
  - Design an algorithm for solving the problem using the model
  - Write a program that implements the algorithm
Computational Problem Solving 101
- Algorithm: a well-defined recipe for solving a problem
  - Has a finite number of steps
  - Completes in a finite amount of time
- Program
  - An algorithm written in a programming language
  - Also called code
- Application
  - Large programs, solving many problems

What This Course Is About
- CS111
  - Introduction to problem solving
    - Algorithms, dealing with information, detective work
    - Introduction to programming (Python)
    - Introduction to UNIX/Linux
    - Introduction to issues in CS
- CS101
  - Survey of computer science topics: algorithms, circuits, low-level instructions, web/databases
  - Not offered this semester

What to Expect from this Class
- First programming course
- Lots to learn!
  - Introductions to a lot of new ideas
- Different way of thinking
  - Similar yet different from math
  - May get stuck but ask me for help!

Class Details
- Course web page
  - http://www.cs.wiu.edu/~sprekle/cs111
  - Check schedule frequently for updates
- Monday, Wednesday, Friday lectures
  - Slides posted after class, in PDF format
  - Don’t copy down slides verbatim
    - A lot isn’t on the slides
  - Use PDF slides later to review
- Tuesday labs
  - Programming projects due on Friday
  - Parmly 405

Class Details
- 3 Exams
  - 2 Exams (see schedule online for dates)
  - Final Exam
- Discussion of broader issues in CS
  - Articles about computer science’s effect on everything
    - Get big picture of CS
    - Write up on blog, due Fridays by 10 a.m.
    - Discussion on Fridays
    - Opportunities for extra credit for finding, reading, summarizing additional articles

Instructor Responsibilities
- Keep your interest in CS
- Prompt, constructive feedback on assignments
- Office hours:
  - Wednesday: 2:30-4:30 p.m.
  - Thursday: 1:30-3:30 p.m.
  - Email for appointments
- Respond within 24 hours to emailed questions
Student Responsibilities

• Check W&L email and course web page frequently for updates
  ➢ Review entire syllabus online
• Attend and participate in class and lecture
  ➢ Mandatory attendance
  ➢ Be respectful to other students
• Arrive promptly to lecture/lab
• Turn off cell phone
• Be patient, flexible, and learn from mistakes

Honor System

• You may discuss programming assignments informally with other students
  ➢ Sharing the code is an honor violation
• Students should know where to draw the line between getting legitimate outside assistance with course material and outright cheating
  ➢ Students who obtain too much assistance without learning the material ultimately cheat themselves
• If you have any uncertainty about what this means, consult with me before you collaborate
• All written assignments should be done individually

Your TODO List:

• Review the course web page
  ➢ Exam dates

  ➢ Due Friday
    ➢ First CS issues reading/writeup
    ➢ Tuesday’s lab/assignment

Summary

• Meet & greet
• What is computer science?
• What is this class?