

CSCI111: Fundamentals of Programming I

Professor Sprenkle
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<http://www.cs.wlu.edu/~sprenkle/>

Handouts: Back of Room



My Bio

- From Dallastown, PA
- B.S., Gettysburg College
- M.S., Duke University
- Ph.D., University of Delaware
- For fun: pop culture, gardening, Rockbridge Animal Alliance



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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?

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What is Computer Science?

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

--Edsger Dijkstra

- CS = Complexity Science

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Jeannette Wing

- Microsoft VP of Research
- Formerly at NSF, CMU



When people talk about the smart grid, smart vehicles, and smart buildings — what makes them ‘smart’?

Computer science.

When people talk about personalized medicine and personalized learning, how do you think personalization is possible?

Computer science.

We’re not there yet, but the next generation of computer scientists can help us realize these visions — with immeasurable *benefits* to society and the economy.

<http://www.nytimes.com/roomfordebate/2011/06/15/computer-sciences-sputnik-moment/writing-code-has-become-self-expression>

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(emphasis is mine)

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CS == Complexity Science or the Study of Complexity

- How can it be done?
 - Based on **information**
 - Managing, manipulating data
 - Possible algorithms
- How well can it be done?
 - Most **efficient** algorithm in terms of time and/or space
- Can it be done at all?
 - Often, proof is a program--an implementation of the above

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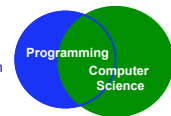
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Computer Science Fields

- | | | | |
|--|--|--|---|
| Systems <ul style="list-style-type: none"> • Architecture • Operating systems • Networks • Distributed and parallel systems • Databases • ... | Software <ul style="list-style-type: none"> • Compilers • Graphics • Software engineering • Software testing and verification, • ... | Theory <ul style="list-style-type: none"> • Algorithms • Theory of computation • ... | Other <ul style="list-style-type: none"> • Artificial intelligence • Robotics • Natural language processing • Bioinformatics • Visualization • Data science • ... |
|--|--|--|---|

- 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 **not** do as a Computer Scientist

- Fix hardware
- Fix Microsoft Windows (or other operating systems) problems
- Fix Microsoft Office (or other desktop applications) problems

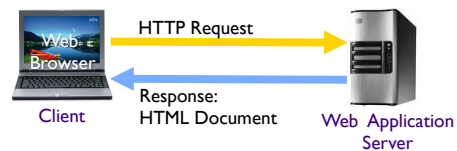
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What I Do as a Computer Scientist

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



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What I Do as a Computer Scientist

A screenshot of the Google Calendar interface. The calendar is for August 2006. The dates 0, 1, 2, 7, 8, 9, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 are visible. The date 21 is highlighted. The text 'Find the error(s)!' is overlaid on the calendar.

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Find the Errors

A screenshot of an e-commerce website showing a shopping cart. The cart contains four items: Signature Collection Shower Gel (Path Ambrosia), Signature Collection Shower Gel (Moonlight Path), Signature Collection Shower Gel (Exotic Coconut), and Signature Collection Shower Gel (Cotton Blossom). The total price is \$12.95 for the items plus \$6.95 for shipping, for a total of \$19.9. A message at the top says 'Dear SARA, You've spent \$0 in total as of September, 2010. You're almost there! Just spend \$0 more to receive your NY&C Reward!'.

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Digital Humanities

Home Search Pompeii Search Herculaneum Browse All Inscriptions Browse All Drawings About the Project


The Ancient Graffiti Project Search Engine

A digital resource for studying the graffiti of Herculaneum and Pompeii

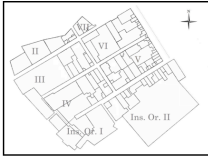
Welcome to The Ancient Graffiti Project, a website that provides a search engine for locating and studying graffiti of the early Roman empire from the cities of Pompeii and Herculaneum. At present, the search engine and database are under construction, so searches are running on only some of the handwritten wall-inscriptions from Pompeii and Herculaneum. Eighty graffiti from Herculaneum are currently available. More will be searchable after summer 2016, when we return to the field for further research.

Click on a map to search

Pompeii



Herculaneum



Digital Humanities

Symbolic Logic Tutorial

Home Practice Mode Graded Mode Statistics Change Password Log Out Help

Practice Mode

Key:

Z: Zebras drink from water holes Y: Yellow birds bathe in water holes W: Water holes are in Africa

Sentence 1 of 1: If water holes are in Africa, then zebras drink from water holes

Unanswered

Answer:

You can also use & or the caret (^) for "and", | for "or", ~ for not, -> for "implies", and <-> for "double implies."

#1 Submit Clear Input

Submit your last answer before clicking the "Submit Answers for Grading" button.


Submit Answers for Grading

MEET SOME MORE COMPUTER SCIENTISTS

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Alex Jackson '09

- Software Engineer II at SportsMEDIA Technology Corp
 - Develop and maintain systems for parsing and data processing of multiple sources for use with live on air graphics during televised events.
 - Lead data processing engineer for NBC's Emmy-nominated coverage of British Premier League Soccer for the 2013/2014 season.



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Lucy Simko '11 and Camille Cobb '12

UNIVERSITY of WASHINGTON SECURITY AND PRIVACY RESEARCH LAB



Worked for the Dept of Defense on Cybersecurity




Interned with Google's Geo-Oceans team.

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Olivier Mahame '14

- Software Developer at Goldman Sachs
 - Develops applications for internal use



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Samantha O'Dell '15

- Computer Science and English double major →
- Associate Technical Writer at Salesforce



<http://www.wfu.edu/transformational-education?feature=true&id=x10977>

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Sue Lister

- Double major in CS and Psychology
- Technical Associate for One Acre Fund
- Formerly Technical Lead at Clinton Health Access Initiative



Sue with Alex, one of the computer teachers at Ketasco Secondary School, in the computer lab in Keta, Ghana

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Matt Welsh

- Senior software engineer at Google
- Research: sensor networks
 - Variety of applications: monitor volcanoes, health care, ...
- Wrote *Running Linux*



Matt at Volcán Reventador in Ecuador

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Jennifer Chu-Carroll

- Former IBM Research Staff Member
 - Worked on Watson
 - Advanced search technology through use of natural language processing and machine learning techniques
- Now at Bridgewater Associatesj



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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

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Erich Geist FEEDING™ food banks AMERICA

We use data analytics, computer systems, servers, programming, network and database administration all the time to provide the data necessary to inform our donors, government officials, advocates, and the general public about our mission to feed the hungry.

Without good computer science...there is no food.

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Personal Correspondence 24

Hilary Mason



- Founder of Fast Forward Labs
 - a machine intelligence research company
- Formerly Chief Scientist at bitly.
- “Teaching someone to program is like giving them a **superpower.**” quote in *Glamour*, November 2011

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What This Course Is About

Problem Solving!



From
30 Rock

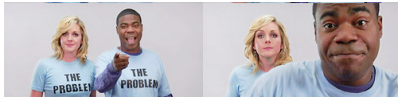
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Computational Problem Solving 101

- **Computational Problem:**
A problem that can be solved by logic
- To solve the problem:
 1. Create a **model** of the problem
 2. Design an **algorithm** for solving the problem using the model
 3. Write a **program** that *implements* the algorithm



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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*
 - As code base grows, becomes an *application*

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What to Expect from this Class

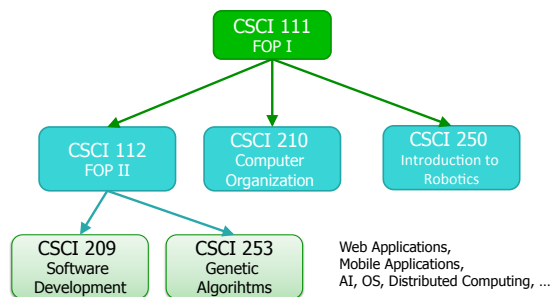
- First programming course
- Lots to learn!
 - Introductions to a lot of new ideas
- Different way of thinking
 - Similar yet different from math
 - May get stuck but ask for help!
- Writing some basic programs
 - Foundations for more complex, sophisticated code
- Great power, great responsibility

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Where You Can Go From Here



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Class Details

- Course web page
 - <http://www.cs.wlu.edu/~sprenkle/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
 - Parmlly 405, 413

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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 Sakai, due Fridays by 11 a.m.
 - Discussion Friday
 - Opportunities for extra credit for finding, reading, summarizing additional articles

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Instructor Responsibilities

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

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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
 - Bring your notes and handouts
- Turn off cell phone
- Be patient, flexible, and learn from mistakes

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Textbook

- *Python Programming: An Introduction to Computer Science—2nd Edition*. John Zelle
 - **Optional:** *Fundamentals of Python: First Programs*. K. Lambert
- Supplement to the material
 - Different perspective, additional practice problems

Consequence: my lecture slides and handouts and your notes are vitally important

- Reference frequently
- **Bring with you to lab!**

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Your TODO List

- Review the course web page and syllabus
 - Schedule (may change)
- View the "Computational Thinking" Video
- Complete the survey and submit to me tomorrow in lab

- See you in lab tomorrow!

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