Goodbye World!

YOUR PROGRAMMING JOKES ARE BAD

AND YOU SHOULD FEEL BAD
CSE 142 vs. CSE 143: The Big Picture

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Big Learning Goals

- Abstraction (implementation vs. client)
- Data Structures (organizing complex data)
- Algorithms (standard ways of completing common tasks)
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We built some *really cool* programs. And had a lot of fun?
Programmers waste enormous amounts of time thinking about, or worrying about, the speed of noncritical parts of their programs, and these attempts at efficiency actually have a strong negative impact when debugging and maintenance are considered. We should forget about small efficiencies, say about 97% of the time: premature optimization is the root of all evil. Yet we should not pass up our opportunities in that critical 3%.

Computer programming is an art, because it applies accumulated knowledge to the world, because it requires skill and ingenuity, and especially because it produces objects of beauty. A programmer who subconsciously views himself as an artist will enjoy what he does and will do it better.
Overview of Topics We Covered

- Lists
- Stacks and Queues
- Recursion
- Sets and Maps
- Grammars
- Searching
- Sorting
- Binary Trees

Computer Occupations = 71% of all STEM

- Computer Occupations
- Engineers (Aerospace, Biomedical, Chemical, Civil, Electrical, Electronics, Environmental, Industrial, Materials, Mechanical, Other)
- Life Scientists (Agricultural & Food Scientists, Biological Scientists, Conservation Scientists & Foresters, Medical Scientists, Other)
- Physical Scientists (Astronomers, Physicists, Atmospheric & Space Scientists, Chemists & Materials Scientists, Environmental Scientists & Geoscientists, Other)
- Social Scientists and Related Workers (Economists, Survey Researchers, Psychologists, Sociologists, Urban & Regional Planners, Anthropologists & Archeologists, Geographers, Historians, Political Scientists, Other)
- Mathematical Science Occupations
Computer Science + Your Interests = A Match Made In Heaven

- Foreign Policy: outcome prediction
- Law: evidence summary
- Medicine: smart diagnostics
- Music: hit identification
- Sports: superstar discovery
- Wall Street: high frequency trading
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- Learn more theoretical computer science (by reading a book, or something)
Book Recommendations

1. **Algorithms Unlocked**
   - Thomas H. Cormen

2. **Automate This**
   - Christopher Steiner

3. **The Hidden Language of Computer Hardware and Software**
   - Charles Petzold

4. **Engines of Logic**
   - Martin Davis

5. **The Golden Ticket**
   - Lance Fortnow
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- Write an app and sell it!
- Contribute to an open source project!
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- **Python** has very concise and clean syntax. It’s useful for whipping up quick programs.

- **Javascript** is the language of the internet.

- **Java** is the language for Android.

- **Objective-C** is the language for anything Apple.

- **C** is the language for low-level systems programming.

- **Haskell** is a “functional” programming language. Learn this one if you want a challenge!
What Courses?

**CSE Non-Majors**
- CSE 154: Web Programming
- CSE 373: Data Structures and Algorithms
- CSE 374: Programming Concepts and Tools (C/C++, Linux, ...)
- CSE 131: Digital Photography
- CSE 460: Animation Capstone (open to all majors)
- INFO, AMATH, DXARTS, ...

**CSE Majors**
- CSE 311: (Mathematical) Foundations of Computing
- CSE 332: Data Abstractions (Data Structures and Algorithms)
- CSE 331: Software Design and Implementation
- CSE 341: Programming Languages
- CSE 344: Intro to Data Management (and databases)
- CSE 351: Hardware/Software Interface
Making computers understand language:
http://nlp.stanford.edu/software/

Building Games:
http://lwjgl.org/

Building Games with Physics:
http://jbox2d.org/

Processing Biological Data:
http://biojava.org/wiki/Main_Page

Accessing Facebook Data:
http://restfb.com/