Goodbye, world!

CSE 143

When a user takes a photo, the app should check whether they're in a National Park...

Sure, easy GIS lookup, gimme a few hours.

...and check whether the photo is of a bird.

I'll need a research team and five years.

In CS, it can be hard to explain the difference between the easy and the virtually impossible.
Major themes

- Abstraction
  - Leverage existing components without understanding details
  - Create components that can be used as black boxes

- Algorithm analysis
  - Scalability and growth
  - Tradeoffs between implementations

- Recursion
  - Reason about problems in terms of self-similarity
  - Write very short code to achieve complex behaviors

- Beauty
Beyond programming

• Mind-controlled robots
  - http://www.youtube.com/watch?v=TQ7EOpPNQyw

• Muscle-controlled interfaces
  - http://www.youtube.com/watch?v=pktVSTwC8qo

• 3D models from pictures
  - http://www.youtube.com/watch?v=25Yifq70eIY

• Face aging
  - http://www.youtube.com/watch?v=fLQtssJDMMc

• Animation
  - http://www.youtube.com/watch?v=b4kkPlLdMvl

• Security
Computing for good

- Foldit
- Open Data Kit
- Mobile Midwives’ Ultrasound
- MobileASL
- Tactile Graphics
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
Explore Big Ideas

Historical context  Key algorithms  Privacy  Automate all the things
Do a project!

- Little text-processing applications
  - identify lines above 100
  - remove line-breaks

- Add a GUI to the random sentence generator

- Automate chemistry, physics, calculus problems, etc

- Find quotes by keyword in books

- What are you currently doing that a computer could do?
Other languages?

• Expanding your Java knowledge with a project is valuable

• Pick a project, see what language is most appropriate
  – iOS: Objective-C or Swift
  – Android: Java
  – Client-side web: Javascript
  – Beautiful visuals: Processing
  – Quick data processing: Python
  – Embedded systems: C/C++

• Learn a new paradigm
  – Functional languages: Racket, Haskell
Leveraging existing code

• Accessing Facebook data
  – http://restfb.com/

• Processing language
  – http://nlp.stanford.edu/software/

• Building games with physics
  – http://jbox2d.org/

• Processing biological data
  – http://biojava.org/wiki/Main_Page
Weekly meetings

• Change – technologies for low-income regions

• Dub – human-computer interaction and design