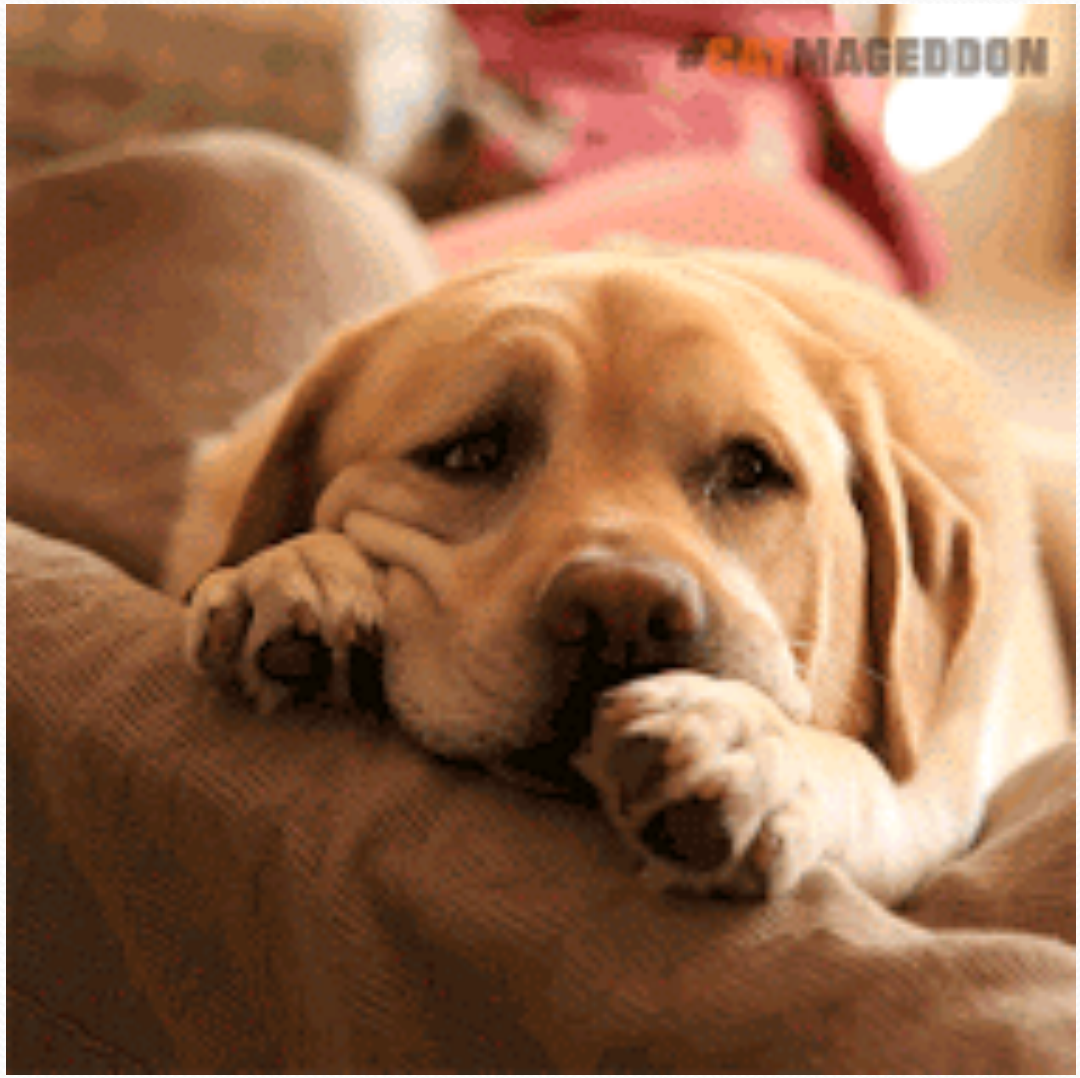

gifbin.com


#CATMAGEDDON


m-istica


YEAH-YOUGOTME

CSE 142 vs CSE 143

CSE 142 / AP CS A

- You learned how to write programs and decompose large problems with:
  - Print statements
  - Methods
  - Control Structures
    - loops, if/else
  - File I/O
  - Arrays
  - Objects

CSE 143

- Return of the objects
- You learned to solve more complex tasks efficiently
  - Data structures to organize and model data
  - Algorithms for solving common tasks
  - More advanced language features
- Abstractions are important!

Road Map

CS Concepts

- Client/Implementer
- Efficiency
- Recursion
- Regular Expressions
- Grammars
- Searching / Sorting
- Backtracking
- Hashing
- Huffman Compression

Java Language

- Exceptions
- Interfaces
- References
- Comparable
- Generics
- Inheritance / Polymorphism
- Abstract Classes

Data Structures

- Lists
- Stacks
- Queues
- Sets
- Maps
- Priority Queues

Java Collections

- Arrays
- ArrayList 
- LinkedList 
- Stack
- TreeSet / TreeMap 
- HashSet / HashMap 
- PriorityQueue

Major themes

- Abstraction
  - Leverage existing components without understanding details
  - Create components that can be used as black boxes
- Problem solving
  - Decomposing a large problem into smaller ones
- Design tradeoffs
  - Algorithm analysis - scalability and growth
  - Keeping code easy to read for maintainability
- Recursion
  - Reason about problems in terms of self-similarity
  - Write very short code to achieve complex behaviors

What project?

- Add a GUI to the random sentence generator
- Automate chemistry, physics, calculus problems, etc
  - Maybe even automate writing code with good style?
- Find quotes by keyword in books
- What are you currently doing that a computer could do?
- List of some project ideas

What language?

- Expanding your Java knowledge with a project is valuable

- Pick a project, see what language is most appropriate
  - iOS: Swift
  - Android: Java, Kotlin
  - Client-side web: Javascript (many frameworks to choose from)
  - Beautiful visuals: Processing
  - Data Processing + Machine Learning: Python
  - Data Management: SQL
  - Embedded systems: C / C++

- Learn a new programming paradigm
  - Functional languages: Racket, Haskell, Scala, (now, Java 8!)

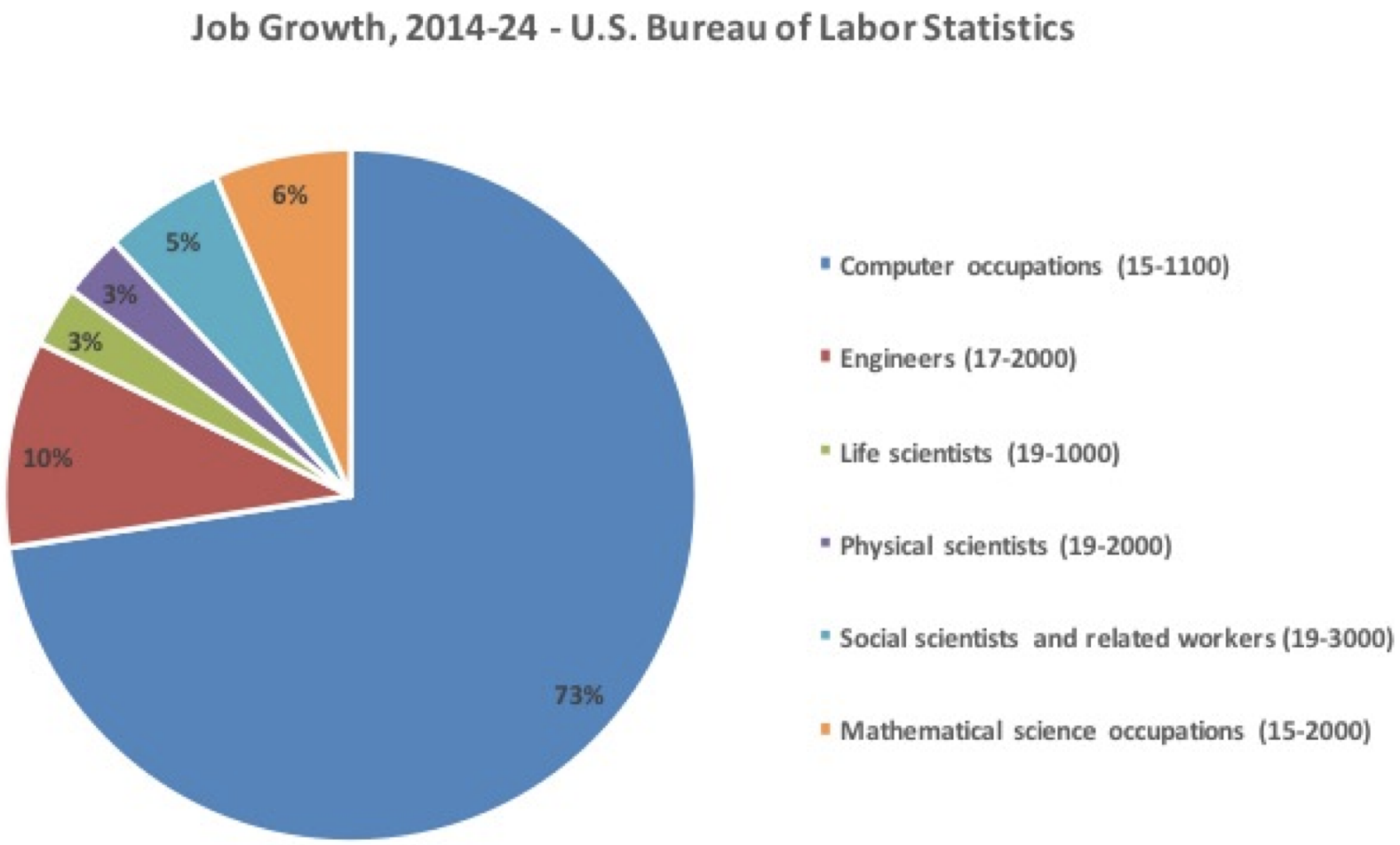
Leveraging existing code

- Processing language
  - http://nlp.stanford.edu/software/
- Building games
  - http://lwjgl.org/
  - http://jbox2d.org/ (with physics!)
- Processing biological data
  - http://biojava.org/wiki/Main_Page
- Accessing Facebook data
  - http://restfb.com/
- Making music
  - http://www.jfugue.org/

Courses?

- CSE non-majors
  - CSE 154: Web Programming
  - CSE 163: Intermediate Data Programming (Python)
  - CSE 373: Data Structures and Algorithms
  - CSE 374: Programming Concepts and Tools (C/C++, Linux, ...)
  - CSE/STAT 416: Machine learning (requires STAT 311 or 390)
  - CSE 131: Digital Photography
  - CSE 460: Animation Capstone (open to all majors)
- 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
- INFO, AMATH, HCDE, DXARTS, ...

Computing & Jobs



Data from the spreadsheet at http://www.bls.gov/emp/ind-occ-matrix/occupation.xlsx

Internships

- Various career fairs around campus.
- Start looking early!
- Cast a broad net and interview lots of places
- For those just starting out
  - Microsoft Explorer Program
  - Google Engineering Practicum

Roles in Industry

- Software Developer/Software Engineer
  - Builds and designs software
  - Includes designing and engineering architecture of a software system as well as programming
- Product Manager (PM)
  - Designs and makes decisions regarding the overall product
  - Works with people across disciplines at the company
  - Role can be different at different companies
- Test/QA
  - Write and design tests of the product
- Site Reliability Engineer (SRE)
  - Responsible for ensuring that systems and services are available and responsive

Small vs Big Company?

- Small Company
  - Lots of autonomy and impact within the company
  - Often move quickly
  - Breadth – get to work on many projects and with many types of people
- Large company
  - Large data sets, impact many users
  - Lots of support and infrastructure to do your job well
  - Depth – get to focus on specific areas of a project

What Do I Do?

- I'm lecturer in the Paul G Allen Center for Computer Science. My job is to teach and get you all excited about computing!
- Topics in CS that interest me:
  - Data Science
    - Machine Learning and Data Visualization
  - Computer Science Education
    - Introductory programming and introductory data science
    - Scaling classes to handle increased enrollments

Where Have I worked?

- **Redfin**
  - Job: Full-stack engineer (worked on frontend and backend)
  - Languages: Java + Javascript
- **Socrata** (Seattle City Data)
  - Job: Mostly data science, a little of backend work on search
  - Machine Learning: Python
  - Search Backend: Scala + ElasticSearch
- **Sift Science**
  - Job: Machine learning infrastructure
  - Language: Java + Python
  - Libraries: Spark

AMA
(ask me anything)