

CMPSCI 187: Programming With Data Structures

Lecture 1: Course Overview

What are we doing?

- Developing programming maturity in Java
- Studying some important data structures
- Beginning computer science thinking -- analysis of algorithms

Programming Maturity in Java

- Write programs using multiple classes and inheritance
- Write classes that can be reused in future programs
- Write longer programs that can't fit in your head all at once
- Learn software engineering techniques to make those work
- See more Java features like generics
- Develop an idea of the entire Java language (e.g., *Java Precisely*)

The Data Structures Idea

- Standard problems have standard solutions -- ways to arrange data
- Separate the specification from the implementation (information hiding)
- Specification given by a Java **interface**
- Learn details of implementations, different ones have different advantages
- Collections package in Java has code for many implementations
- See examples of how to apply each data structure

Computer Science Thinking: Algorithm Analysis

- Analyze general situations, not specific ones
- Different (from calculus) mathematics needed
- Basic idea -- how do resources needed increase with input size?
- Example -- finding an object in a linear array (constant, log, linear)
- Families of functions (constant, linear, quadratic) treated as single objects
- We don't prove anything now but revisit the subject in CMPSCI 311

Administrative Stuff

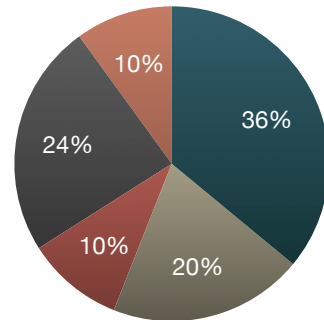
- Web site: www.cs.umass.edu/~barring/cs187
- Three TA's, contact info for all of us
- Course requirements and grading
- Course blog -- mass email only for crises
- Assignments (and solutions as given)

Course requirements and grading

- Components: Exams, HW, Projects, Discussions
- Three evening midterms (12% each) and a final (56%)
- One HW for each quarter of course (10%)
- Seven projects, last one double-size (24%)
- Discussions every Wednesday, in random groups of 3-4, graded A/B/F (10%)

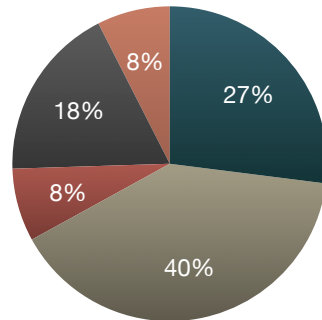
Special Feature: Choice of Weighting

- Basic Weighting has a low-stakes final
- Each component is on a 4.0 scale



Special Feature: Choice of Weighting

- If you do well on the final, I reward that
- You don't have to choose in advance



Academic Honesty Policy

- Exams -- you cheat, you die
- Projects and HW's -- talk it over, write it up **yourself**, two identical solutions means a problem, document sources
- Discussions -- help from TA's, the point is the experience of working the problem

187's Place in the World

- We want the basic understanding of Java from CMPSCI 121
- Math won't come up much explicitly but calculus-ready is good
- 187 prepares for the four CMPSCI cores: 220, 230, 240, 250
- Pass 187 and you are three courses from a CMPSCI minor
- ECE 242 is a roughly equivalent course to 187
- Virtually everything later in CMPSCI depends on 187