Welcome to

CSE 326
Data Structures

University of Washington
Summer 2004

Slides Based On Those of...

Tami Tamir primarily, and many others,
including Raj Rao, Ashish Agarwal,
and their many predecessors

Staff

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  See web page for office hours

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Web Page

- All info is on the web page for CSE 326
  › http://www.cs.washington.edu/326
  › also known as
    • http://www.cs.washington.edu/education/courses/326/04su

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CSE 326 E-mail List

- Based on Registrar's class list
- Uses your UWNetID
- No need to subscribe or unsubscribe

Textbook

- *Data Structures and Algorithm Analysis in Java*, by Weiss

- See Web page for errata and source code

- An excellent book
  - › Java version and style is slightly outdated...

Grading

- See grading weights in syllabus

Class Overview

- Introduction to many of the basic data structures used in computer software
  - › Understand the data structures
  - › Analyze the algorithms that use them
  - › Know when to apply them
- Practice design and analysis of data structures.
- Practice using these data structures by writing programs.

Goal

- You will understand
  - › what the tools are for storing and processing common data types
  - › which tools are appropriate for which need
  - › how to use Java with these tools
- So that you will be able to
  - › make good design choices as a developer, project manager, or system customer

Major Course Topics

- Introduction to Algorithm Analysis
- Lists, Stacks, Queues
- Trees
  - › Especially for searching
  - › Lots of different types!
- Heaps and Priority Queues
- Hashing
  - › Just one topic, but one of the most useful!
- Sorting
- Disjoint Sets (time permitting)
- Graph Algorithms

Course Activities

- Lectures
- Discussions
- Exercises
- Pencil-and-paper homework
- Programming homework
  - › Routine programming
  - › Explorations
- Plus: quizzes, tests, etc.

First Reading

- Chapters 1 and 2, *Data Structures and Algorithm Analysis in Java*, by Weiss
  - › Chapter 1 should be mostly review
  - › Most of Chapter 2 will be seen in class next week.

Data Structures: What?

- Need to organize program data according to problem being solved
- Abstract Data Type (ADT) - A data object and a set of operations for manipulating it
  - › List ADT with operations `insert` and `delete`
  - › Stack ADT with operations `push` and `pop`
- Note similarity to Java classes
  - › private data structure and public methods

Data Structures: Why?

- Program design depends crucially on how data is structured for use by the program
  - › Implementation of some operations may become easier or harder
  - › Speed of program may dramatically decrease or increase
  - › Memory used may increase or decrease
  - › Debugging may be become easier or harder

Terminology

- Abstract Data Type (ADT)
  - › Mathematical description of an object with set of operations on the object. Useful building block.
- Algorithm
  - › A high level, language independent, description of a step-by-step process
- Data structure
  - › A specific family of algorithms for implementing an abstract data type.
- Implementation of data structure
  - › A specific implementation in a specific language