Grouping Objects

T. M. Murali

Feb 2, 2004
Review: Object Interaction

- **Abstraction** and Modularisation
- Design issues in ClockDisplay class
- Java has two kinds of types
  - **Primitive types**: int, boolean, float
  - **Classes**: we can create instances of classes
- A class can use other classes (ClockDisplay uses NumberDisplay)
  - Use `new` to create an instance of a class
- **Class diagram** vs. **object diagram**
- A class can have multiple constructors (method **overloading**)
Groups of Objects: Overview

- Collections (ArrayLists)
- Loops
- Iterators
- Arrays
Need for Grouping Objects

Many applications involve collections of objects:

- Personal organisers.
- Library catalogs.
- Genes in an organism.
- Functions performed by a protein
Example Using BlueJ

- Notebook class (project called notebook1)
- Add notes.
- View a note.
- Can store unlimited number of notes.
- Count number of stored notes.
Java Class Libraries

- Sets of useful classes.
- We do not have to write every class from scratch.
- Java calls its libraries packages.
- Grouping objects is a very common task.
- The java.util package contains collections, which are classes for grouping objects.
import java.util.ArrayList;

Look at documentation for supported methods.

Increases capacity as we add items

Keeps a count of number of items (size() accessor)

Stores objects in order inserted.

Index numbering starts at 0.

Deleting an object may change numbering.

Abstraction in action: details of implementation are unknown to user.
Iteration

- Loop statements in Java: for and while
- General purpose iteration over the elements of a collection
  - Use an Iterator: an object that allows user to iterate over all the elements of a collection.
  - import java.util.Iterator;
  - Call the hasNext() and next() methods.
Fixed-Size Collections

- Use Java arrays when you know the maximum size of the collection.
- **Arrays in Perl are like ArrayLists in Java.**
- Java arrays can store objects or primitive types.
- Arrays use a special syntax.
Example Using BlueJ

- LogAnalyzer class
- Web server records details of each access.
- Supports a webmaster’s tasks.
  - Most popular pages.
  - Busiest periods.
  - How much data is being delivered.
  - Broken references.
- Analyse accesses by hour.
Homework 1

- Due by the beginning of class on Monday, February 9.
- Email the solutions to murali@cs.vt.edu