Announcements

- Exam 2 is now on Thursday, April 8
- No Reading for next time
- No Reading quiz next time
- Today—Sorting, Comparators
- Next Class—will review
- Practice the old exams handed on on 3/30

Selection Sort

- How does it work?

8 2 6 7 3 1 9 5

Goal: 1 2 3 5 6 7 8 9

Selection Sort

- How long does it take?
  - If there are N elements to sort

9 8 7 6 5 4 3 2 1
1 2 4 5 3 9 6 7 8

Consider sorting two sets of data, does one take longer than the other?
Binary Search

• Given a sorted array of names, how do you find a name?

• How does binary search work?
• Can you apply binary search to any array?

• How long does binary search take?

Problem

• Given data on books in a library
  – Title, author, year published
  – May have multiple copies of books

• Search for books
  – Sort by title
  – Sort by author
  – Sort by number of copies
  – (we will not focus on how to sort for this problem, just use Collections.sort();

Sort by Title

Sort by Count
How does one sort a type?

- ints, doubles: Compare with <, >, ==
- Strings: how do you compare?
- Book objects: how do you compare them?

Comparable interface

- public interface Comparable
- Classes must implement Comparable interface
- public class Book implements Comparable
- Book must have a compareTo method defined
- Which class do you use that already has compareTo?

How does compareTo work?

- Compares two objects of the same type
- Returns an int
  - returns -1 if first object < second object
  - returns 0 if objects are equivalent
  - returns 1 if first object > second object
- What does compare two Book types mean?
  - By author
  - by title
  - by counts and then author

Classwork today – Amazon Lite

- Library Class
  - Read in the data to create Book object and put them in the library
  - findBooks to return a list of books on some criteria
- Book class
  - Write the method equals to return true if two books have the same author and title
  - Write the method matches – finding a word in a string
Classwork today (more)

• We will compare books several ways
  – 1) We will create Specific Comparator classes
     and pass them to a sorter
     • TitleComparator (DONE)
     • Author.Comparator
     • Count.Comparator
  – 2) We will change the Book class to make it
     Comparable
     • Implement the compareTo method based on titles