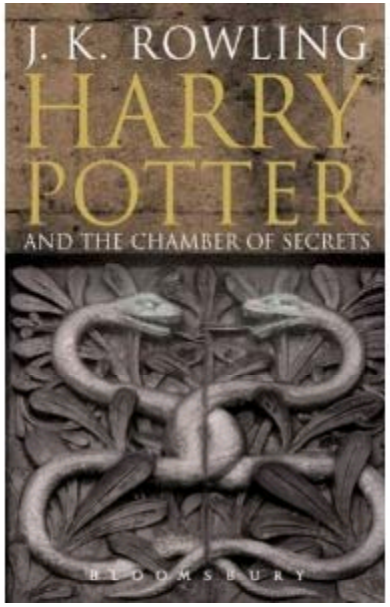
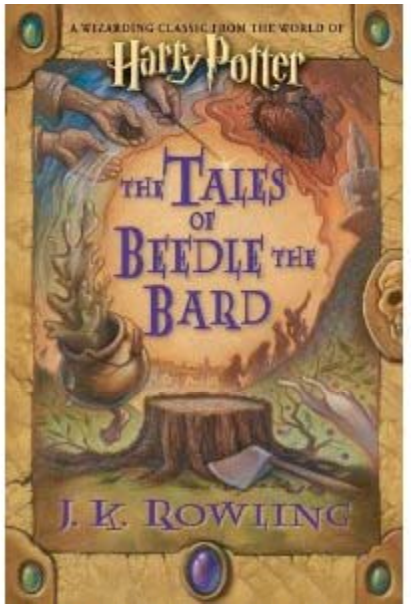
CompSci 6
Programming Design and Analysis



April 1, 2010

Prof. Rodger



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

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

  9 8 7 6 5 4 3 2 1

  1 2 4 5 3 9 6 7 8

Binary Search

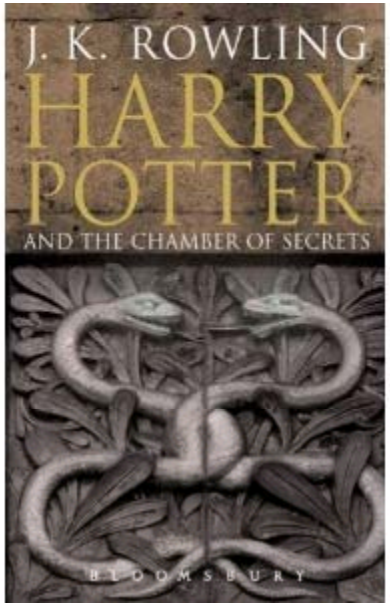
- Given a sorted array of names, how do you find a name?

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

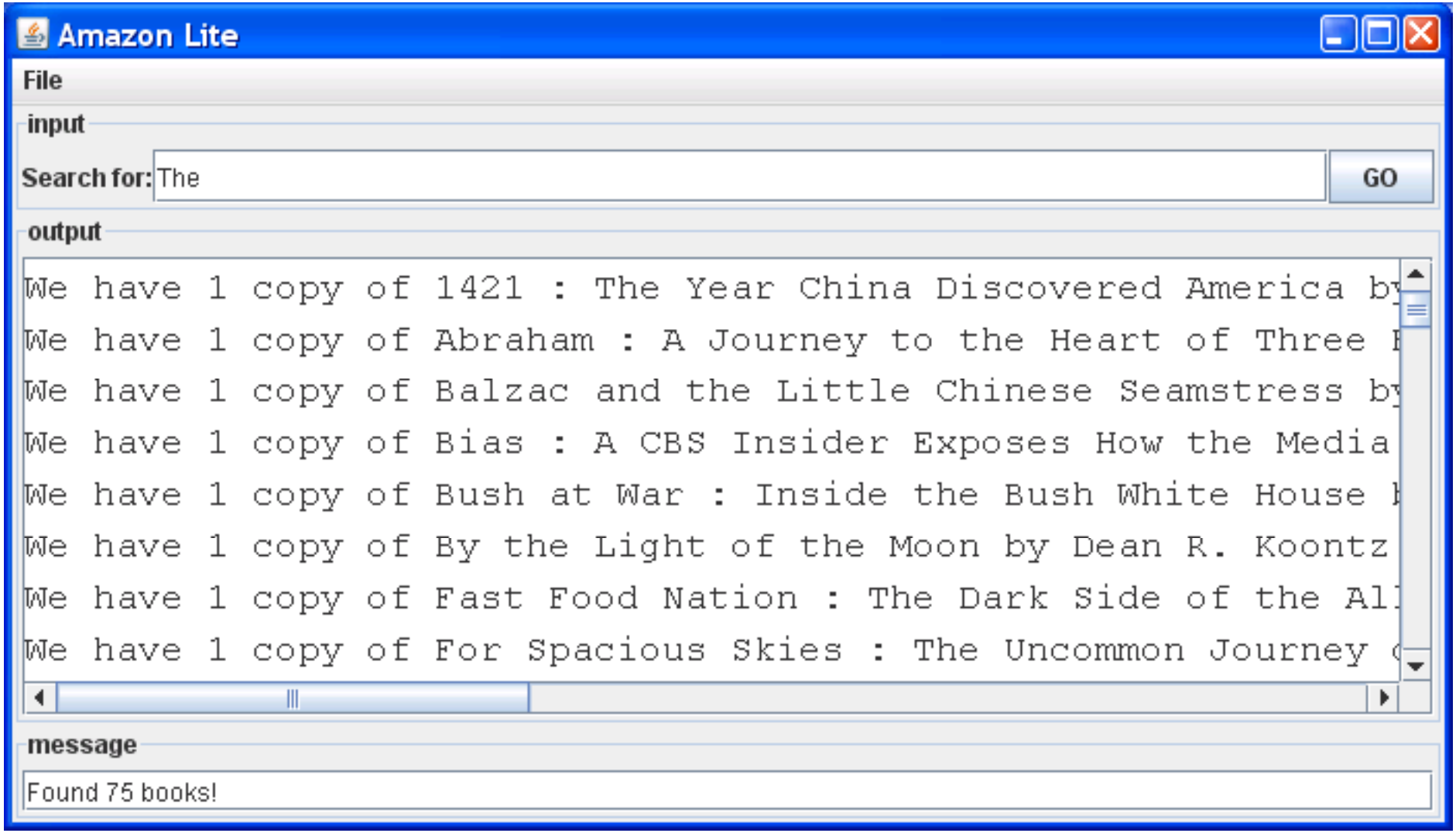
- How long does binary search take?

Problem

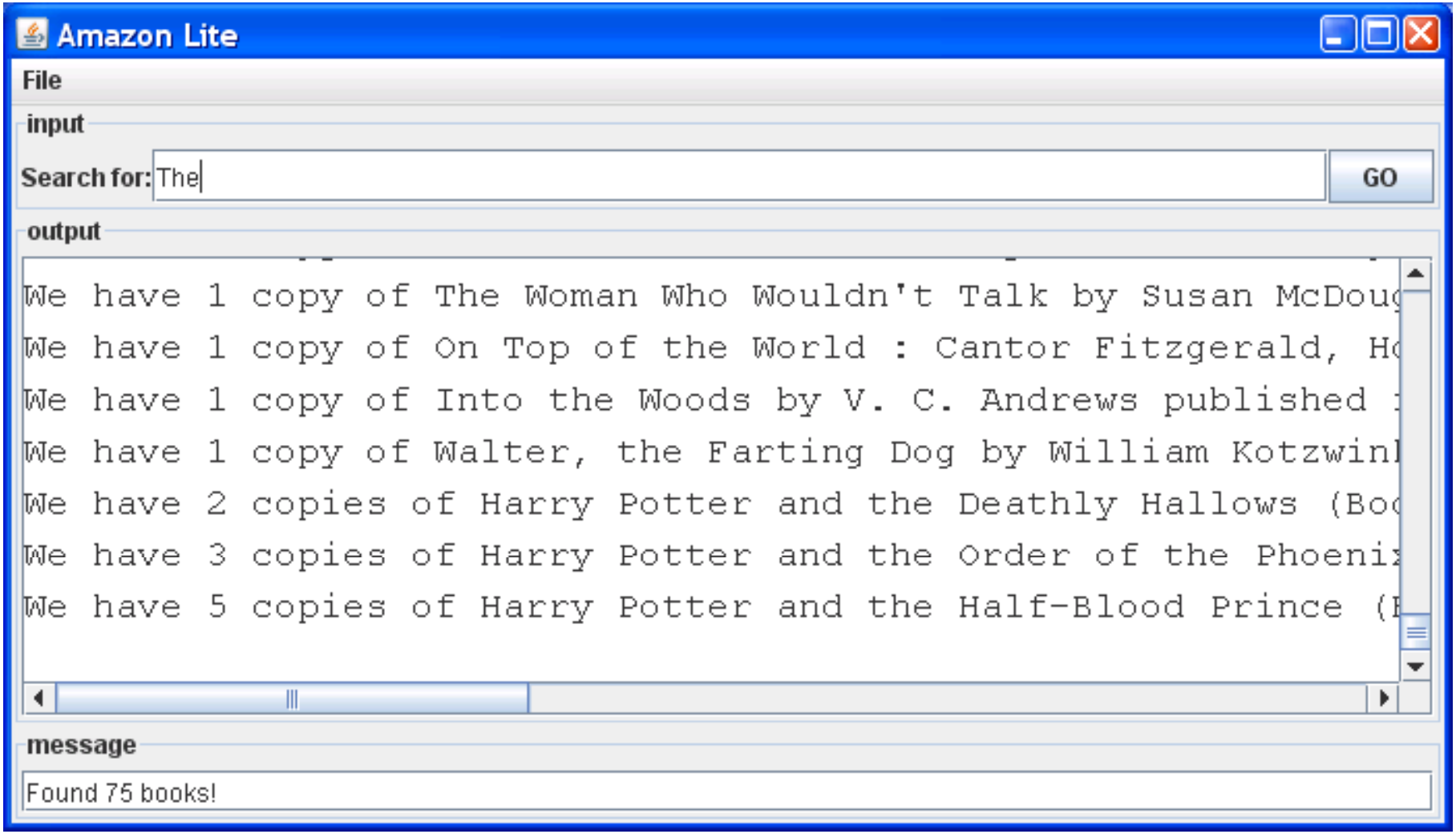
- Given data on books in a library
  - Title, author, year published
  - May have multiple copies of books
- Search for books
  - Sort by title
  - Sort by author
  - Sorty by number of copies
  - (we will not focus on how to sort for this problem, just use Collections.sort();



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)
    - AuthorComparator
    - CountComparator
  - 2) We will change the Book class to make it Comparable
    - Implement the compareTo method based on titles