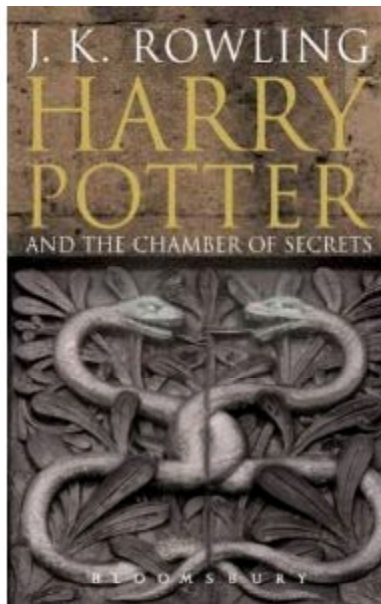


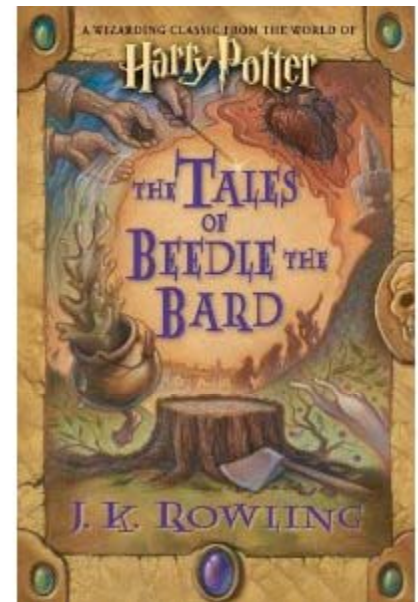
CompSci 6

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

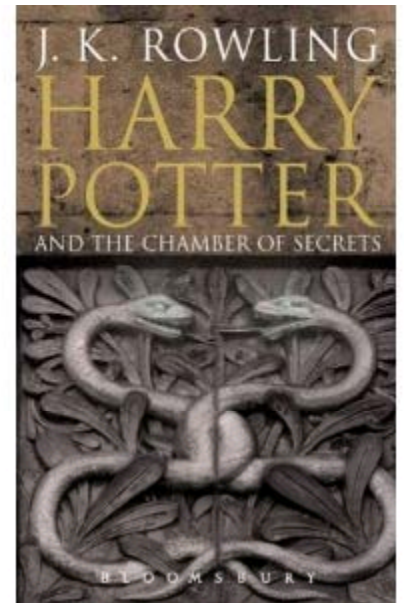
1 2 4 5 3 9 6 7 8

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
 - Sort by number of copies
 - (we will not focus on how to sort for this problem, just use `Collections.sort()`;



Sort by Title

 Amazon Lite

File

input

Search for:

output

We have 1 copy of 1421 : The Year China Discovered America by

We have 1 copy of Abraham : A Journey to the Heart of Three E

We have 1 copy of Balzac and the Little Chinese Seamstress by

We have 1 copy of Bias : A CBS Insider Exposes How the Media

We have 1 copy of Bush at War : Inside the Bush White House B

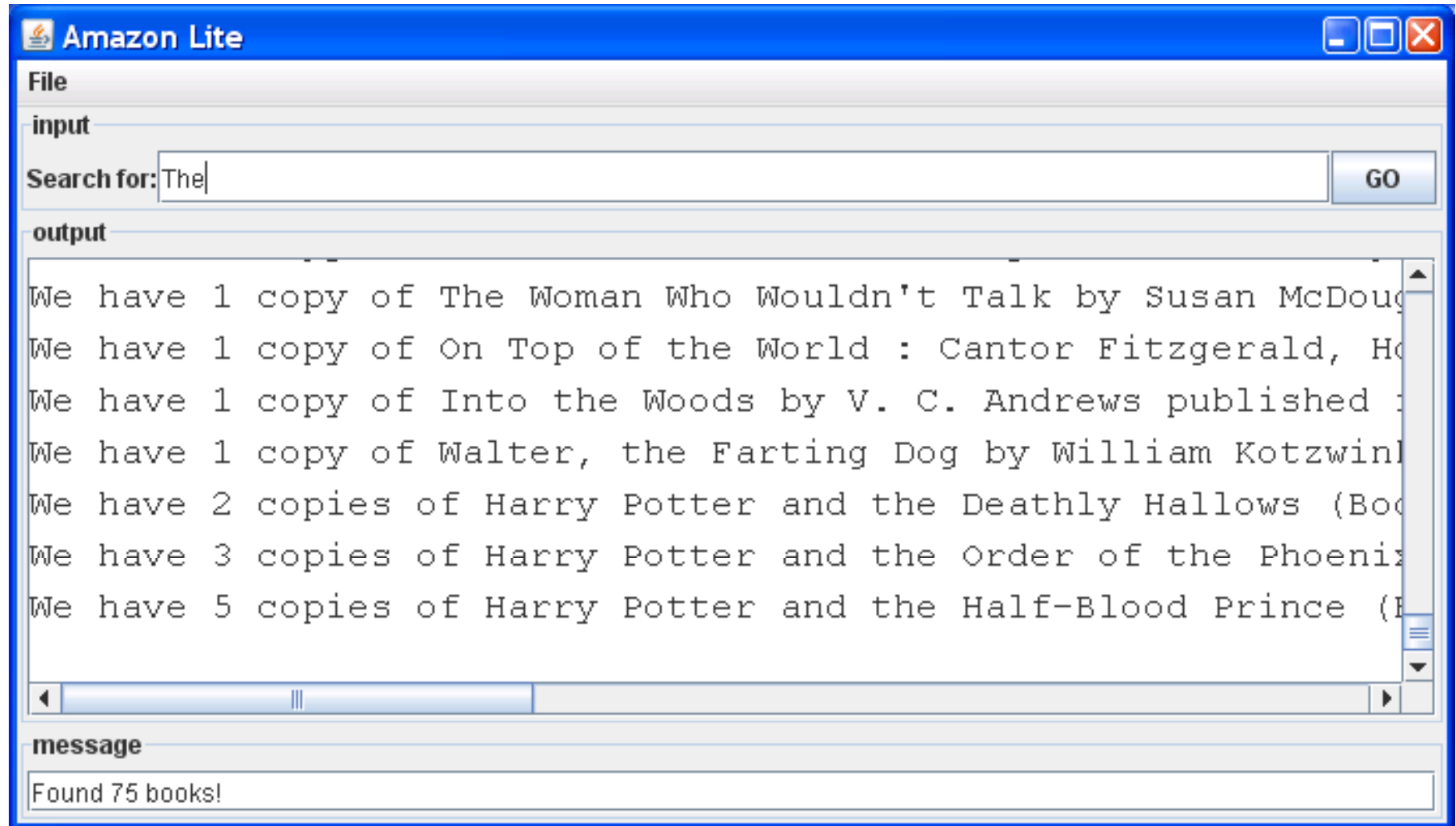
We have 1 copy of By the Light of the Moon by Dean R. Koontz

We have 1 copy of Fast Food Nation : The Dark Side of the All

We have 1 copy of For Spacious Skies : The Uncommon Journey o

message

Sort by Count



The screenshot shows a window titled "Amazon Lite" with a blue title bar. Inside, there is a "File" menu bar. Below it is an "input" section with a "Search for:" label, a text box containing "The", and a "GO" button. Below the input section is an "output" section, which is a large text area displaying search results. The results are sorted by count, showing books with 1, 2, 3, and 5 copies. At the bottom of the window is a "message" section with a text box containing "Found 75 books!".

File

input

Search for: The GO

output

We have 1 copy of The Woman Who Wouldn't Talk by Susan McDougall
We have 1 copy of On Top of the World : Cantor Fitzgerald, Ho
We have 1 copy of Into the Woods by V. C. Andrews published :
We have 1 copy of Walter, the Farting Dog by William Kotzwinn
We have 2 copies of Harry Potter and the Deathly Hallows (Boo
We have 3 copies of Harry Potter and the Order of the Phoenix
We have 5 copies of Harry Potter and the Half-Blood Prince (P

message

Found 75 books!

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