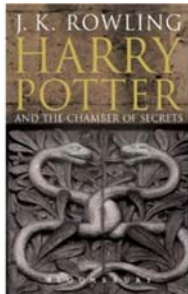


CompSci 100e

Program Design and Analysis II



February 17, 2011

Prof. Rodger

Announcements

- Test 1
 - Closed book, closed notes
 - Except can bring 4 sheets of paper written front/back
- Test 1 Topics
 - Strings, Sets, Maps - hashing, arrays and ArrayLists, Classes, Inheritance, Comparable, Files, Scanner, Analysis
- Will review in Lab Fri/Mon with old test questions
 - Try test questions before coming to lab, don't look at solutions
 - Practice writing code on paper!

Analysis

- ArrayList – elements not in order
 - Assume n items already in the ArrayList
 - How long does it take to put one new item in?
 - `myList.add(value)`
 - Worst case?
 - Average case?
- ArrayList – elements in sorted order – maintain property
 - Assume n items in ArrayList
 - How long does it take to put one new item in?
 - `myList.add(value)`
 - Worst case?
 - Average case?

Analysis

- HashMap
 - Assume n items already in the map
 - How long does it take to put one new item in?
 - `myMap.put(key, value)`
 - Worst case?
 - Average case?

Analysis

- TreeMap
 - Assume n items already in the map
 - How long does it take to put one new item in?
 - `myMap.put(key, value)`
 - Worst case?
 - Average case?

Analysis

- TreeSet
 - Assume n items already in the set
 - How long does it take to put one new item in?
 - `mySet.add(value)`
 - Worst case?
 - Average case?

Binary Search

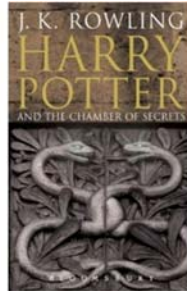
- Given a sorted array of n names, how do you find a name?
- How does binary search work?
- Can you apply binary search to any array?
- How long does binary search take?
 - Worst case?
 - Average case?

Markov

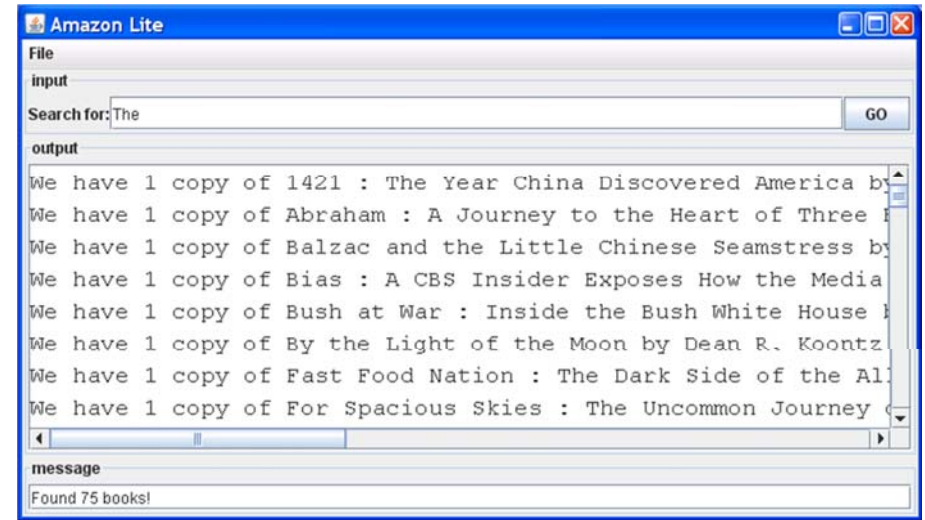
- Be sure to include analysis
 - Can put in your README file
 - OR include in another document (mention in README file if it is in another document)
- Read the assignment carefully after completing the coding part

Problem

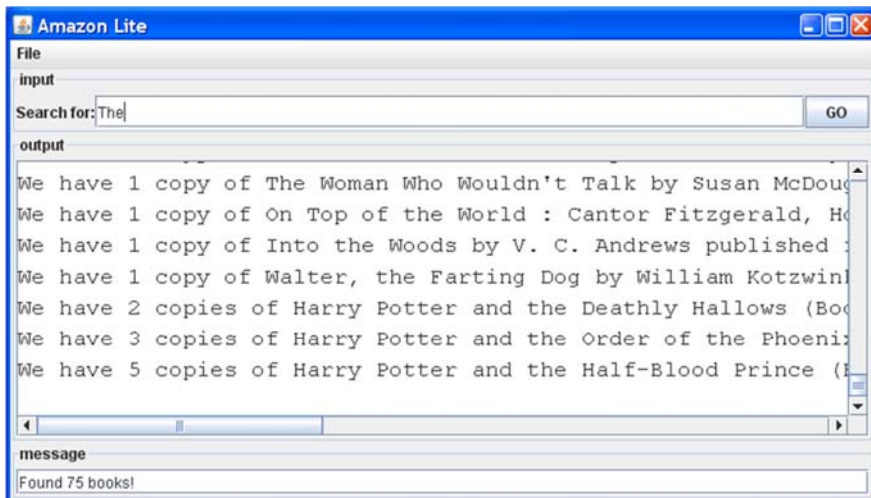
- Given data on books in a library
 - Title, author, year published
 - May have multiple copies of books
- Search for books
 - Sort by title
 - Sort by author
 - Sort by number of copies
 - (we will not focus on how to sort for this problem, just use `Collections.sort()`;



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
- Another Example:
 - WordNgram implements Comparable to compare two WordNgrams

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