Final Exam
- Monday, December 19th, 5:05 PM to 7:05 PM
  - Lecture 1 (all students): Room 105 of Psychology Building
  - Lecture 2 (Last names A thru V): Room 2103 of Chamberlin Hall
  - Lecture 2 (Last names W thru Z): Room 103 of Psychology Building
  - Lecture 3 (all students): Room 113 of Psychology Building
- UW ID required
- See posted sample questions on exam information page

Program 5 due 10 pm Thursday, Dec 15th

Last Time
  Sorting Intro
  Basic Sorts
  • bubble sort
  • insertion sort
  • selection sort

Today
  Better Sorts
  • heap sort
  • merge sort
  • quick sort
  Stable Sorts
  Sorting in Java

(Last!) Next Time
Read: finish Sorting
Radix Sort
Sorting out Sorting
Course Overview Sheets
Final Exam Info
Evaluations: please bring web enabled device
  1. Log into www.aefis.wisc.edu using your netid
  2. Go to Notification Center
  3. Find course
  4. Click “Take Survey”
  5. Answer Questions
  6. When complete, choose “Finish and Submit” (and wait for confirmation)
Heap Sort

Idea (Naïve):
1. Insert items from unsorted array into a min heap
2. Remove the min from min heap and add it back into original array (ascending order)

What is the time complexity of both operations?
Is it better than the basic sorts achieved?

Analysis

_Is there an in-place algorithm?_
Merge Sort

Idea

Analysis
Quick Sort

Idea

Analysis
Quick Sort (cont.)

Choosing a Good Pivot

Quick Sorting the Array with Partitioning

6 1 5 9 3 5 4 3 7 6 2 8 2
## Stable Sorts

→ What do you notice about the sorting of the following three lists of names?

### UNSORTED!

<table>
<thead>
<tr>
<th>Jane Jetson</th>
<th>Barney Rubble</th>
<th>Stewie Griffin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elroy Jetson</td>
<td>Elroy Jetson</td>
<td>Elroy Jetson</td>
</tr>
<tr>
<td>Homer Simpson</td>
<td>George Jetson</td>
<td>George Jetson</td>
</tr>
<tr>
<td>Marge Simpson</td>
<td>Homer Simpson</td>
<td>Jane Jetson</td>
</tr>
<tr>
<td>Stewie Griffin</td>
<td>Jane Jetson</td>
<td>Judy Jetson</td>
</tr>
<tr>
<td>Judy Jetson</td>
<td>Judy Jetson</td>
<td>Barney Rubble</td>
</tr>
<tr>
<td>George Jetson</td>
<td>Marge Simpson</td>
<td>Homer Simpson</td>
</tr>
<tr>
<td>Barney Rubble</td>
<td>Stewie Griffin</td>
<td>Marge Simpson</td>
</tr>
</tbody>
</table>
Sorting in Java

In java.util

Collections.sort(List)  (works on any Collection)

Arrays.sort(array_to_sort)
(Arrays.sort(…) is overloaded – uses merge sort for primitives)
Online Course Evaluations
www.aefis.wisc.edu
Log In with your Net ID, find course, take survey.

Course evaluations are the primary way that we learn what students feel about the courses we teach.

Comments help us know what is and is not working for students.

Comments work best when hear the good and the bad (to make sure that we don’t accidently change something that was working in our effort to change what was not working)

(complete cs367 Course Evaluation at home or in-class on Thursday)

Thank you for taking your time to share your thoughts on cs367!

Questions to Consider

What was effective in helping you learn?

What wasn’t effective in helping you learn?

What would you use to evaluate the extent of your learning?

If you were instructor what would you do differently?