

Introduction to Sorting

- Sorting entails arranging data in order
- Familiarity with sorting algorithms is an important programming skill
- Commonly used area for job interview questions
- The study of sorting algorithms provides insight into
 - problem solving techniques such as *divide and conquer*
 - the analysis and comparison of algorithms which perform the same task

Using Java Sorting Methods

- The Java API provides a class `Arrays` with several overloaded sort methods for different array types
- The `Collections` class provides similar sorting methods for Lists
- Sorting methods for arrays of primitive types are based on the quicksort algorithm
- Sorting methods for arrays of objects and Lists are based on the merge sort algorithm
- Both algorithms are $O(n \log n)$

Implementing Sorts

- We seek algorithms to arrange items such that
entry 1 ≤ entry 2 ≤ . . . ≤ entry n
- Sorting an array is usually easier than sorting a chain of linked nodes
- Efficiency of a sorting algorithm is significant
- Correctness of the algorithm is paramount, we will focus on $O(n^2)$ algorithms

“Bubble Sort would not be the way to go”

- https://www.youtube.com/watch?v=k4RRi_ntQc8. (2008)
- Bubble sort is $O(n^2)$
- Two slightly better $O(n^2)$ algorithms are Selection Sort and Insertion Sort.

Look on visualgo

<https://visualgo.net/en/sorting>

1. bubble sort
2. selection sort
3. insertion sort

Overview

(always cross check references)

<https://www.bigocheatsheet.com/>