Sorting Part 2.

Merge Sort and Quicksort

Leap@CMU 2016 Intermediate

Recursive Sorting Algorithms

Quicksort and merge sort are both recursive sorts that break up the problem, solve, then recombine, making the process more efficient.

Recursive methods are "divide and conquer" and can be run in parallel.

Merge Sort

Merge sort breaks up the array to be sorted into two halves, calls merge sort on the two halves, then recombines the two (now sorted) arrays into a sorted array.

The base case should be an array of size 1, which is guaranteed to be sorted.

6 5 3 1 8 7 2 4

Quicksort

Official definition:

Quicksort (sometimes called partition-exchange sort) is an efficient sorting algorithm, serving as a systematic method for placing the elements of an array in order. Developed by Tony Hoare in 1959, with his work published in 1961, it is still a commonly used algorithm for sorting. When implemented well, it can be about two or three times faster than its main competitors, merge sort and heapsort.

Quicksort has a worse worst-case time complexity but is often faster for smaller lists

6 5 3 1 8 7 2 4

Implementing QuickSort

To implement quicksort:

- Choose a pivot value
- Move other values to left or right of pivot depending on size
- Quicksort on the left and the right lists until the list size is trivially small