

CS 360 100P

Quicksort in Guaranteed Log-Linear Time

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Topics to learn

Please read up on the following subjects:

- quicksort
- finding the median in $O(n)$ time

Tasks to perform

Implement two versions quicksort. One such that its worst case behavior is $O(n \log n)$ time. and one such that sorted input causes is $O(n^2)$ time complexity. Use a command-line switch so that a single executable exhibits both behaviours.

Provide a main function that tests both quicksort and the median finding code in a way that your Mentor can easily ascertain the correctness of your solution. That is, one should be able to test the median finding code separately from the quicksort code. Moreover, one should be able to select the n^{th} smallest/largest element as well as the median. Finally, one should be able to generate an arbitrary number of random integers for which to test both the selection and quicksort algorithms. Your testing code should implement a mini-interpreter so that all tests and number generation can be performed interactively.

You must program this assignment using the C programming language. You must also provide a makefile.

Other concepts

Be able to describe to your mentor the complexity of each operation in the public interface of your classes using big Oh notation.