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Competitive Programming

Homework #0

My main observation during this assignment was the performance difference when using different sorting algorithms and the implications of this. I implemented bubble sort and quick sort from scratch. Bubble sort expectedly was the slowest, especially when the size of n scaled up. The fastest algorithm was C++ STL sort() by a large margin. This exercise goes to show that the standard libraries in-built functions are highly optimized and will likely provide the best performance in the vast majority of cases compared to someone implementing a sorting algorithm from scratch.

I did a little research into beating STL sort(), and found some interesting material. It's a proven theorem that no comparison-based sorting algorithm can perform better than O(nlogn), included STL sort(). However, a computer scientist named Malte Skarupke developed an improved version of radix sort, called ska_sort() that he claims is nearly twice as fast as STL sort(). This would also mean that ska_sort() performs better than O(nlogn).

Here is some of his research:

https://probablydance.com/2016/12/27/i-wrote-a-faster-sorting-algorithm/

https://www.youtube.com/watch?v=zqs87a_7zxw&t=4608s

Here is his github repository of the ska sort implementation and testing:

https://github.com/skarupke/ska_sort