

Quicksort comparisons

Maria Halvarsson, mahalv@kth.se

Here we compare the difference in execution time between quicksort where the first element in the array is selected as partitioning element, and quick sort where the partitioning item is selected through median of threes. The average times are calculated using random integer array inputs.

The execution time for quicksort where the first element is the pivot is slightly faster than if it is selected through median of threes (see figure 1). The difference could be due to that it takes a little bit of extra time to calculate the median of the three elements. Since random integer arrays are used and the fact that the array is being shuffled before being sorted could also play a significant role in the test results. Using median of threes could be good to avoid worst case scenarios from picking a bad pivot element. If the array is not shuffled or shuffled poorly, where the elements are partially sorted, it would probably be likely that the execution time for quicksort where the first element is picked as pivot would be worse.

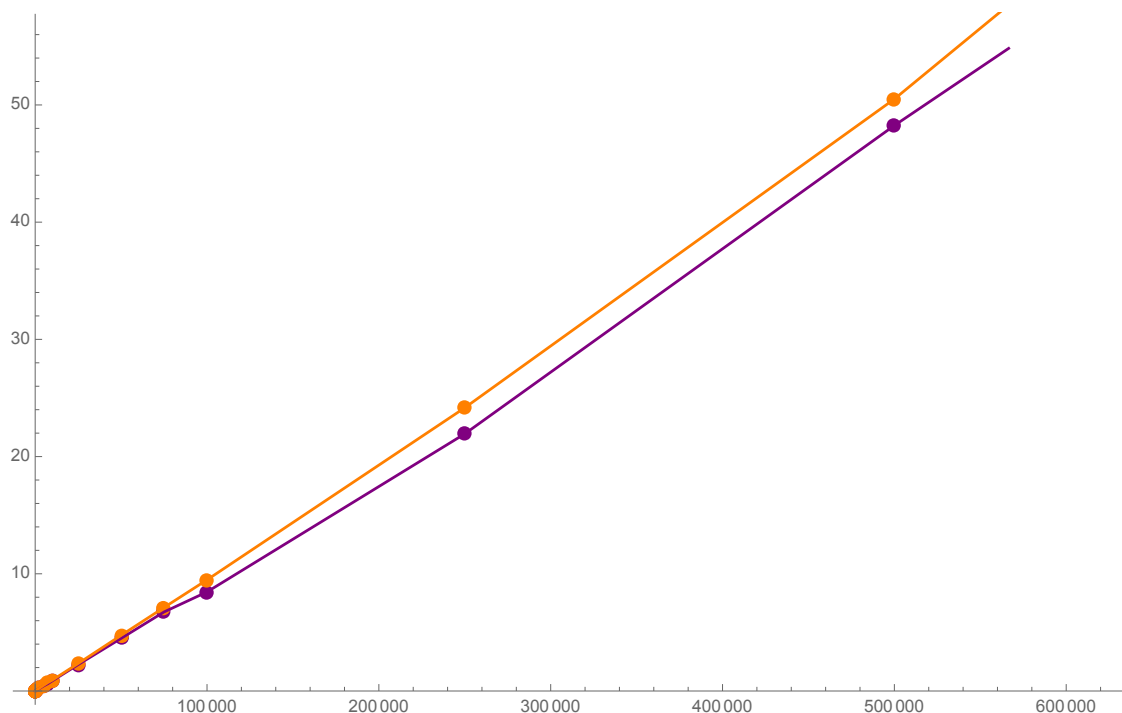


Figure 1: Comparison between quicksort (purple) and quicksort with median of three (orange)

Number of elements	Quicksort (ms)	Quicksort with median of three (ms)
10	0.008831	0.01019
100	0.01802	0.01981
1 000	0.09349	0.1029
10 000	0.8682	0.9318
100 000	8.454	9.482
1 000 000	115.2	115.8
10 000 000	1570	1577
100 000 000	17271	17090

Table 1: Quicksort and quicksort with median of three execution times