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Sorting Algorithm Report

There are 5 sorting algorithms in the assignment and each of them takes different approach to sort the elements. There is no “best” sorting algorithms because each sorting algorithms is good in specific area.

From playing around with the sorting algorithm, I found that the runtime of the quick sort had usually be the shortest one. Theoretically speaking, the quick sort should work better with smaller dataset but from changing the number generated each time, I found out the quick sort actually works well with larger datasets (more than 5000 elements.) However, the performance of quick sort in larger datasets is very unstable. Sometimes it can have very short runtime and sometimes it have relatively longer runtime. The merge sort works find with larger datasets, but when the dataset is small, (less than 100 elements) the merge sort does not perform as well as the quick sort, the insert sort, and selection sort. The merge sort requires one dynamic array to store the stored elements so it would not be recommend if the memory space is limited. As for the selection sort, it does not perform well in large datasets. The performance is also unstable for selection sort which it sometimes have a relatively short runtime and sometimes have a relatively long runtime with similar size of datasets. The insert sort performs better when the size of the dataset is relatively small. The memory space required by insert sort, bubble sort, and selection sort is smaller compare to quick sort and merge sort. The overall performance of insert sort is mediocre which is it never the fastest sorting algorithm or the slowest one. The performance of bubble sort is very similar to the insert sort which I have been expected before running my program. The implementation of those two algorithms are similar and they are both very simple.

Overall, the performance of each sorting algorithms is expected since I have read a lot about each sorting algorithms. One thing I did not expect is the quick sort algorithm did work well in large dataset but it is very unstable.