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Assignment 4

Sorting Results

All my conclusions below are drawn from patterns seen from the graphs in Results.xlsx, with the exception of a few errors in timing seen on the plot as outliers.

Sorted Data:

When the data is sorted, most of the sorts are fairly similar in time, with the exception of Simple QuickSort. Simple QuickSort is at it’s worst when the data is already sorted and that can be seen obviously by the graphs. The best sort was InsertionSort, and the best out of the QuickSorts was the Median of 3(base 20). This is because InsertionSort starts earliest in this QuickSort so the time is shortest in this case. MergeSort also did very well when the data was sorted.

Random Data:

When the data is randomized, most of the sorts are fairly similar in runtime, with the exception of InsertionSort. The best performer seemed to be the Simple QuickSort, although median of 3(base 5) was extremely similar to this one. So I would say it is a tie. I think median of 3(base 5) did well because the insertionSort started later, since InsertionSort is bad on random data, this hurt the other median of 3’s with higher bases.

Reversed Data:

When the data is reversed, both Simple QuickSort and Insertion Sort do very poorly, the rest, are fairly similar. Out of the QuickSorts I would say, median of 3(base 20) did the best, but they are extremely similar. MergeSort obviously does worse than all the Median of 3 quickSorts even though there is a major outlier at 64000 trial. I think the median of 3(base 20) did best since if it is reverse sorted, insertionSort does ok when it is close to being in the correct place, so when this starts earlier it is better for the sort, only in the case that the data is almost completely sorted.

Overall:

Overall I would say it is very hard to pick a best sort. I will say that if you know what you are sorting it helps immensely, which is something I learned during this assignment. I had no idea InsertionSort could be easily the best in Sorted data, then easily the worst in another data set. I would say if pressed to pick Median of 3(base 10) QuickSort. It will not be the fastest in any one sort, but it is never even close to last in any of the sorts as well. In sorting I have learned that you don’t really have to get the best results, just make sure you stay as far away from N2 runtime as much as you can, and any Median of 3 will do that.