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Sorting Algorithms

Merge Sort:

Chart, line chart

Description automatically generated

The Big O of the merge sort is O(n). The increments of the times are linear as you can see in the graphs. The amount it would take for an array to be sorted with the merge sort is very consistent. It should be a sorting algorithm that most people pick for the speed that it takes.

Bubble Sort:

Chart, line chart, scatter chart

Description automatically generated

Chart, line chart

Description automatically generated

The Big O of bubble sort is O(n^2). From trying to print the graphs you can see how close this algorithm is. I believe it is the slowest out of the rest of the algorithms that I coded. People should stay away from this sorting algorithm due to the fact of the speed that it takes.

Insertion Sort:

Chart, scatter chart

Description automatically generated

Chart, scatter chart

Description automatically generated

For the Big O of insertion sort there are two cases worst case is O(n^2) and best case is O(n). The beginning of the increments the time is a constant speed but the greater the increment the greater the time. Depending on the size of the array should decide whether to use this sorting algorithm or not.

Shell Sort:

Chart, scatter chart

Description automatically generated

Chart, line chart

Description automatically generated

The Big O for shell sort also have two cases, best case being O(n(log(n))) and average/worst is O(n(log(n))^2). From what I’ve seen the algorithm is a little better than insertion sort but not by much. The problem is what the size of the array is. Small arrays will be ok with the algorithm, but the larger size arrays will take awhile to sort.

Quick Sort:

Chart, scatter chart

Description automatically generated

Chart, scatter chart

Description automatically generated

The Big O of quick sort is O(log(n)). Which is a pretty good time. Quick sort is usually recommended no matter the size of the array. Due to the speed at which it will sort the array.

Selection Sort:

Chart, scatter chart

Description automatically generated

Chart, line chart, scatter chart

Description automatically generated

The Big O of selection sort is O(n^2) so is the same as Insertion sort. I have no idea why my graph for the 10,000 increments showed up the way it did. I think it was a glitch in my pc because it is old. Selection sort is one of the fastest for a small size array but doesn’t scale well the greater the size of the array.