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IT334 Algorithms

Four-Way Merge Sort Analysis

The main difference between my four-way sort and the standard two-way is that instead of being log2n, the four-way is log4n. Since essentially all we did was speed the algorithm up by a constant factor, it is still O(nlogn). Apart from splitting the array up, there are way more comparisons being done per iteration and this was a lot more confusing than just the regular merge sort. Space complexity remains the same since there is still only one auxiliary array being used with O(n) for the one array.

In the code, a big difference was the complexity of keeping track of pointers and incrementing them and knowing when they were done. Maybe if I had started sooner I could’ve made it cleaner but the if statements were so confusing and too easy to get lost in. Most of what I read said that the savings in time were negligible unless the input size was ridiculously large. Until the actual merging though, the dividing step was very similar to the two-way merge. Recursively call the function and just pass in what the starting points to the sub-array are.