**MergeSort.**

Firstly, according to stability, divide 6 sorters into 2 groups. There are 3 stable sorters, MergeSort, BubbleSort and InsertionSort. For BubbleSort and InsertionSortbest, best case is o(n) with o(n^2) worst, only MergeSort both o(nlogn). In the stable group (A, C, F), A is the only sorter whose running time on the best cases and worst cases is similar. What’s more, we can see from the line chart in the Excel file uploaded, with the size growing bigger, A always owns the minimum running time. In lecture6, prof also showed us a similar actual running time graph.

Text

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**Dr.Evil**

When the array size is bigger( me using 10000+), trying some times, we could see from the output of the checkSort function that result of SorterB always goes False, which means it doesn’t do the sorting work.

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**BubbleSort**

According to the conclusion of q4, C is in the stable group. Although it is hard to differentiate BubbleSort with InsertionSort because some properties are the same, it is obvious in the line chart that it uses the longest time to do the sorting work which is consistent with the actual running time graph showed by the prof in lec6.

**SelectionSort**

In the unstable group (B, D, E), B has already been diagnosed as Dr.evil, then we can see the time difference between D and E in a line chart in the Excel file uploaded. As the size of the array grows bigger, the difference also grows bigger, E is always lower than D. Knowing that the time complexity of QuickSort is o(nlogn) and of SelectionSort is o(n^2), we can simply conclude that D is SelectionSort. What’s more, this analysis is consistent to the true running time analysis.

**QuickSort**

Actually, we can know D and E at the same time from the line chart in the excel file. Moreover, the true running time of QuikSort is always low, which best explains why we tend to use QuickSort in daily sorting work.

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**InsertionSort**

Actually, we can know C and F at the same time from the line chart in the excel file. Also as mentioned above in q1, the running time difference between best cases and worst cases is one clue to find InsertionSort. Due to the high similarity of InsertionSort and BubbleSort, I directly measured their true running time. Their order has been shown in lec6’s graph.