Empirical Analysis of Sorting Algorithms

This report presents the empirical execution times of three sorting algorithms (Bubble Sort, Merge Sort, and Quick Sort) on datasets of sizes 10, 1000, and 10000 with various input types (random, sorted, reverse). Each experiment was conducted 3 times to average the results.

The goal is to compare their performance and draw conclusions about their time efficiency as data grows.

Average Execution Times:

BubbleSort (n=10): 0.000001 sec

BubbleSort (n=1000): 0.005550 sec

BubbleSort (n=10000): 0.557124 sec

MergeSort (n=10): 0.000003 sec

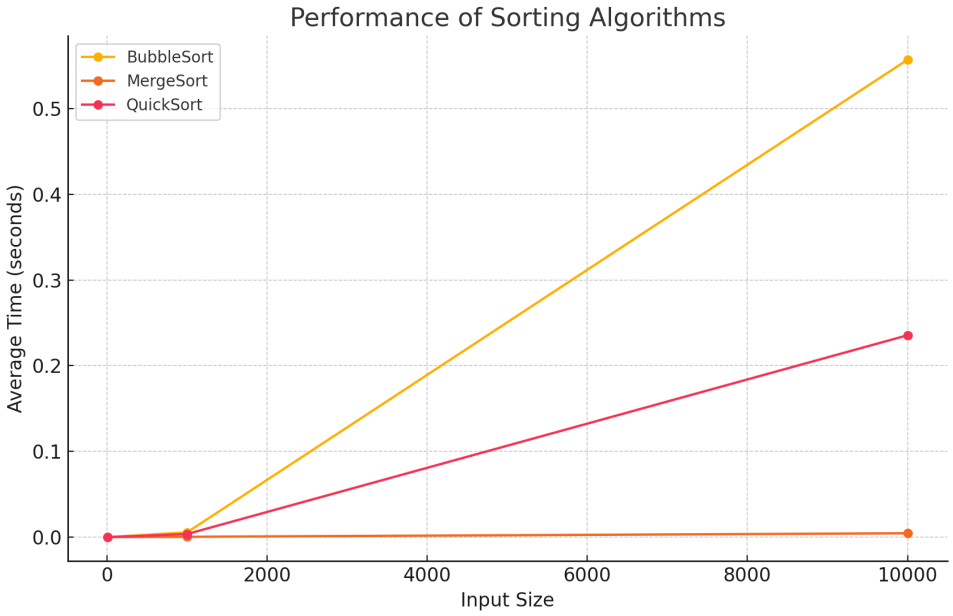
MergeSort (n=1000): 0.000368 sec

MergeSort (n=10000): 0.004465 sec

QuickSort (n=10): 0.000001 sec

QuickSort (n=1000): 0.003581 sec

QuickSort (n=10000): 0.235542 sec



Conclusion:

- Bubble Sort is the slowest, especially for large datasets.

- Merge Sort is consistently the fastest and most stable.

- Quick Sort performs well on small to medium data but varies based on input order.

Merge Sort is generally the best choice in terms of performance among the three.