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Experiment-2

Aim: Experiment based on divide & conquer approach

Theory: In this experiment we learnt about Merge Sort & Quick Sort.

Merge Sort: It recursively divides an unsorted array into smaller sub-arrays until each sub-array contains a single element, & then merges the sub-arrays back together in a sorted manner.

Quick Sort: It selects a pivot element & helps partioning the list about that pivot & recursively sorts resulting 2 sub-lists.

Conclusion: Merge sort can be slower than quick sort for small lists or partially sorted data, but can be fast for large unsorted data. Quick sort can be faster than merge sort in practice due to its cache efficiency & in-place sorting. Merge sort is more stable than Quick sort but requires more memory & has a guaranteed worst case time-complexity. Merge Sort is used for External sorting & parallel processing whereas Quick Sort is used due to Cache efficiency & in-place sorting.

	Time complexity	Space complexity
Merge Sort	$O(n \log n)$	$O(n)$
Quick Sort	$O(n \log n)$ Avg. $O(n^2)$ Worst	$O(\log n)$