Sorting Customer Orders - Analysis

4. Analysis

Time Complexity Comparison:

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1. Bubble Sort:

   - Best Case: O(n) (when array is already sorted)
   - Average Case: O(n^2)
   - Worst Case: O(n^2)
   - Explanation: Repeatedly compares and swaps adjacent elements. Simple but inefficient for large datasets.

2. Quick Sort:

   - Best Case: O(n log n)
   - Average Case: O(n log n)
   - Worst Case: O(n^2) (when pivot selection is poor)
   - Explanation: Uses divide-and-conquer to partition the array and sort recursively. Much faster on average than Bubble Sort.

Why Quick Sort is Preferred:

- Quick Sort performs significantly better than Bubble Sort for large data sets due to its average-case time complexity of O(n log n).
- It is also in-place and generally faster than other O(n log n) algorithms like Merge Sort in practice.
- While Bubble Sort is easier to implement and understand, it's only suitable for educational purposes or very

small datasets.