DSA THEORY Exercise 3

**Q3) Sorting Customer Orders: Theory**

**1. Sorting Algorithms**

* **Bubble Sort: Simple, compares and swaps adjacent elements; O(n²) time complexity.**
* **Insertion Sort: Builds sorted array incrementally; O(n²) time complexity.**
* **Quick Sort: Divide-and-conquer, partitions array around a pivot; O(n log n) average time complexity.**
* **Merge Sort: Divide-and-conquer, sorts and merges halves; O(n log n) time complexity.**

**4. Analysis**

* **Bubble Sort**: Inefficient for large datasets, O(n²) time complexity.
* **Quick Sort**: More efficient, O(n log n) average time complexity.

**Preference for Quick Sort**: Faster for large datasets, adaptable, and uses less memory compared to other sorting algorithms.