# **Exercise 3: Sorting Customer Orders**

## **Understand Sorting Algorithms:**

### **Explain different sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Merge Sort).**

Sorting algorithms are fundamental to computer science and are used to arrange data in a specific order, typically in numerical or lexicographical order. Here's an overview of four common sorting algorithms: Bubble Sort, Insertion Sort, Quick Sort, and Merge Sort.

1. Bubble Sort

* Process: Repeatedly swap adjacent elements if they are in the wrong order.
* Complexity:
  + Time: O(n^2)
  + Space: O(1)

2. Insertion Sort

* Process: Build the sorted array one element at a time by comparing and shifting elements.
* Complexity:
  + Time: O(n^2)
  + Space: O(1)

3. Quick Sort

* Process: Select a pivot, partition the array around the pivot, and recursively sort the sub-arrays.
* Complexity:
  + Time: O(nlogn) average, O(n^2)worst
  + Space: O(logn)

4. Merge Sort

* Process: Divide the array into halves, recursively sort each half, and merge the sorted halves.
* Complexity:
  + Time: O(nlogn)
  + Space: O(n)