**MONICA B (SUPERSET ID - 5008627)**

**Exercise 3: Sorting Customer Orders**

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

1.**Bubble Sort**: Repeatedly compares adjacent elements and swaps them if the order is incorrect. This method is repeated until the array is completely sorted.

2.**Insertion Sort**: Builds the sorted array one item at a time, selecting the next element and inserting it into the appropriate location in the already sorted portion of the array.

3.**Quick Sort**: The divide-and-conquer strategy is used by selecting a 'pivot' element, splitting the array into elements less than and greater than the pivot, and sorting the partitions recursively.

4.**Merge Sort**: Divides the array into smaller sub-arrays, recursively sorts each sub-array, and then combines the sorted sub-arrays to form the final sorted array.

1. Compare the performance (time complexity) of Bubble Sort and Quicksort.

BUBBLE SORT : O(n2) in both average and worst cases.

(O) in Best case.

QUICK SORT : O(nlog⁡n) on average

O(n2) in the worst case

O(n2) in the Best case

1. Discuss why Quicksort is generally preferred over Bubble Sort.

Quicksort is better than Bubble Sort because of its faster average time complexity of O(n log n)over Bubble Sort's (O(n^2). Quicksort sorts huge datasets efficiently using a divide-and-conquer strategy, whereas Bubble Sort is inefficient due to the repetitive swapping of neighboring components.