Selection Sort – Practice Set

Basic Questions

1. Dry run Selection Sort on the array **[7, 4, 5, 2]** (Ascending order).
2. Show how Selection Sort sorts the array **[20, 10, 30, 40, 50]** step by step.
3. Apply Selection Sort on **[5, 1, 4, 2, 8]** and write down the array after each pass.
4. Sort the array **[9, 8, 7, 6, 5]** using Selection Sort. How many swaps occur?
5. What will be the final sorted array if we apply Selection Sort on **[3, 3, 2, 1]**?

Medium Level Questions

6. Implement Selection Sort in C++ and sort an array of **10 integers** entered by the user.
7. Modify Selection Sort to sort an array in **descending order**. Dry run it on **[15, 12, 18, 6, 3]**.
8. How many comparisons will Selection Sort make in the **worst case** for an array of size n = 6?
9. Apply Selection Sort on **[100, 25, 35, 20, 80, 50]** and show the result after **each pass**.
10. Suppose you have an array of student marks **[40, 20, 10, 60, 30]**. Sort it using Selection Sort and count the number of swaps.

Hard/Conceptual Questions

11. Prove that Selection Sort always makes **n(n-1)/2 comparisons** regardless of the input order.

12. Why is Selection Sort considered **not stable**? Give an example with duplicate elements.

13. If Selection Sort is applied on a **linked list** instead of an array, what challenges arise?

14. Compare Selection Sort and Bubble Sort:

- Which one performs fewer swaps?
- Which one can stop early if the array is already sorted?

15. Given array **[64, 25, 25, 12, 22, 11, 11, 90]**, dry run Selection Sort and check if duplicate elements preserve their relative order.