# Homework Questions of 24/02/2023

Q1 What is stable and unstable sorting algorithm?

A1 A sorting algorithm is said to be stable if 2 objects / elements with equal value appears in the same order in sorted output as they appear in the input data set.
If this does not happen then the algorithm is unstable.

10 1 2 (1)

Stable sorted o/p → 1 (1) 2 10

Unstable sorted o/p → (1) 1 2 10

1) Selection sort is the unstable sorting algorithm as in this minimum element is found & is placed at appropriate position.

2) Bubble sort and insertion sort are the stable sorting algorithms.

Q2 Table of time & space complexity of sorting algorithms.

| | Time Complexity | | | Space complexity | | |
|---|---|---|---|---|---|---|
| | N | B | W | N | B | W |
| Selection Sort | $O(n^2)$ | $O(n^2)$ | $O(n^2)$ | $O(1)$ | $O(1)$ | $O(1)$ |
| Bubble Sort | $O(n^2)$ | $O(n)$ | $O(n^2)$ | $O(1)$ | $O(1)$ | $O(1)$ |
| Insertion Sort | $O(n^2)$ | $O(n)$ | $O(n^2)$ | $O(1)$ | $O(1)$ | $O(1)$ |

Q3 Sort array using the inbuilt function.

```
int arr [ ] = {5, 4, 3, 2, 1};
int n = 5;

sort (arr, arr+n);
```

O/p → {1, 2, 3, 4, 5}

Q4 Which sorting algorithm is used to implement the inbuilt sort function?
Intro Sort is used to implement the inbuilt sort function which is the combination of Quick Sort, Heap Sort & Insertion Sort.