Example Ch 3 & Ch 4

## Question 1:

Apply **selection sort** and **insertion sort**, respectively, to the following sequence:**18, 7, 150, 2, 35, 8**. In each pass give the number of comparisons.

**Selection sort:**

| Start Loc | Small number Loc | A[0] | A[1] | A[2] | A[3] | A[4] | A[5] | Number of comparison | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 3 | 18 | 7 | 150 | 2 | 35 | 8 | N-1 | 5 |
| 1 | 1 | 2 | 7 | 150 | 18 | 35 | 8 | N-2 | 4 |
| 2 | 5 | 2 | 7 | 150 | 18 | 35 | 8 | N-3 | 3 |
| 3 | 3 | 2 | 7 | 8 | 18 | 35 | 150 | N-4 | 2 |
| 4 | 4 | 2 | 7 | 8 | 18 | 35 | 150 | N-5 | 1 |
| | | 2 | 7 | 8 | 18 | 35 | 150 | Sorted | |

**Insertion sort:**

| A[0] | A[1] | A[2] | A[3] | A[4] | A[5] | Number of comparison | Number of shifting |
|---|---|---|---|---|---|---|---|
| 18 | 7 | 150 | 2 | 35 | 8 | 1 | 1 |
| 7 | 18 | 150 | 2 | 35 | 8 | 1 | 0 |
| 7 | 18 | 150 | 2 | 35 | 8 | 3 | 3 |
| 2 | 7 | 18 | 150 | 35 | 8 | 2 | 1 |
| 2 | 7 | 18 | 35 | 150 | 8 | 4 | 3 |
| 2 | 7 | 8 | 18 | 35 | 150 | Sorted | |

**Question 2:** Choose the correct answer:

**What is the time complexity of Insertion Sort in the worst case?**

a. O(n)

**b. $O(n^2)$**

c. O(log n)

d. O(n log n)

**In Selection Sort, how many comparisons are made in the best case for an array of size n?**

**a. $O(n^2)$**

b. O(log n)

c. O(n)

d. $O(n^3)$

**In Selection Sort, how many comparisons are made in the second pass for an array of size N?**

a. N

b. N-1

**c. N-2**

d. Log N

**Which sorting algorithm is best suited for sorted data?**

a. Merge Sort

b. Selection Sort

**c. Insertion Sort**

**Which sorting algorithm is the simplest sorting techniques?**

a. Merge Sort

**b. Selection Sort**

c. Insertion Sort