A close-up of a sign

Description automatically generated

**Lab Manual: 02**

**Course Code: CSE207**

**Topic: Sort**

**Course Title: Data Structures**

**Instructor: Md. Manowarul Islam, Adjunct Faculty, Department of CSE**

**Objective:**

The objective of this lab is to provide a fundamental idea about the sorting element of

an integer array using C/C++ programming. At the end of the lab, students are able to know:

• How to take input into an array.

• How to sort the element of the array.

**Lab Task**

**Exercise 1:**

Write a program to modify the **bubble sort algorithm** to sort the array in descending order rather than ascending order.

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| **Sample Input** | **Sample Output** |
| Input array elements: 13 1 79 22 7 12 24 | Sort elements are: 79,24,22,13,12,7,1 |

**Exercise 2:**

Write a program using **insertion sort algorithm** to sort the array where user will input the number of elements in the array. Print the highest and the lowest element of the array.

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| **Sample Input** | **Sample Output** |
| Number of elements: 6  Input array elements: 30 50 10 20 100 1 | Sort elements are: 1, 10, 20, 30, 50, 100  Highest element: 100  Lowest element: 1 |

**Exercise 3:**

Two departments are merging, and you need to combine their sorted salary lists into one. Use **Merge Sort** to merge the lists in **ascending order**.

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| **Sample Input** | **Sample Output** |
| Number of 1st dept elements: 4  1st dept salaries: 10000, 30000, 33000, 55000  Number of 2nd dept elements: 2  2nd dept salaries: 12000, 31000 | Sort salary list: 10000, 12000, 30000, 31000, 33000, 55000 |

**Exercise 4:**

You are organizing a music concert and need to rank bands based on their number of songs using **any kind of sort algorithm**.

**Task:**

Given a list of bands names and their number of songs, sort them in **descending order.** If two bands have the same number of songs. keep their original order (stability).

**Input:**

* An integer n (number of bands).
* An array names of size n (bands names).
* An array scores of size n (number of songs).

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| **Sample Input** | **Sample Output** |
| **Number of participants:** 5  **Input names:** LRB, Shironamhin, Warfaze, Artcell, Aurthohin  **Input number of songs:** 30, 25, 10, 26, 27 | 1. LRB (30)  2. Aurthohin (27)  3. Artcell (26)  4. Shironamhin (25)  5. Warfaze (10) |