Lab 4 Exercise

**Note: Attempt at least 1 to 5 Tasks in the Lab**

**Task#1** Given an array arr[] of N integers and an index range [a, b]. The task is to sort the array in this given index range i.e., sort the elements of the array from arr[a] to arr[b] while keeping the positions of other elements intact and print the modified array.

Note: There is no relation between a and b i.e., a can be less than, equal to or greater than b. use selection sort for sorting.

**Input:** arr[] = {7, 8, 4, 5, 2}, a = 1, b = 4

**Output:** 7 2 4 5 8

For the index range [1, 4] we get the elements 8, 4, 5 and 2

On sorting these elements we get 2, 4, 5 and 8.

So the array is modified as {7, 2, 4, 5, 8}

Input: arr[] = {20, 10, 3, 8}, a = 3, b = 1

Output: 20 3 8 10

**Task#2:** Let arr[9] = { 20, 12, 15, 2, 10, 1, 13, 9, 5} now sort the array in such a way that maximum element must be at middle of the array and rest of array must be sorted in ascending order do this using insertion sort.

**Sorted array:** 1 2 5 9 **20** 10 12 13 15

**Task#3**: Given an array of strings arr[]. Sort given strings using Bubble Sort and display the sorted array.

Input: string arr[] = {"banana", "apple", "cherry", "date", "grape"};

Output: apple banana cherry date grape

**Task#4:** Given an unsorted array that may contain duplicates. Write a function that returns true if the array contains duplicates.

**Task#5:** Given an array with birth years of children born in 2022, 2023, and 2024, the task is to sort the array so that all children born in 2022 come first, followed by those born in 2023, and finally those born in 2024.

Input: {2022, 2023, 2024, 2022, 2023, 2024}

Output: {2022, 2022, 2023, 2023, 2024, 2024}

Explanation: {2022, 2022, 2023, 2023, 2024, 2024} shows that all the 2022 birth years come first, followed by the 2023 , and then all the 2024 birth years at the end.

**Task#6:** . Implement the array given in the heading of binary search topic, sort it and find the value corresponding to to your last two digits of the roll number

(if its not in the array add a value somewhere in between the array) and find it via binary search.

**Task#7:** From array mentioned below find the following names and their index using binary search as well as linear search and count the number of steps on each finding element by using both techniques and analyze which technique is getting more time:

* Aftab
* Rizwan
* Tariq

