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Lab Manual: 03
Course Code: CSE207
Topic: Search
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 search element of an integer array using C/C++ programming. At the end of the lab, students are able to know:

- How to search an element of the array.

Lab Task

Exercise 1:
Write a program to find a specific element in an array using **binary search algorithm**. If the searched element is found, then delete that element from the array and print the updated array else print not found. Suppose the array is unsorted initially. Sort the array using selection sort algorithm before executing binary search operation.

Sample Input	Sample Output
Input array elements: 12,45,78,2,7,10.-7 Key: 12	Sorted array elements: -7,2,7,10,12,45,78 Key is found Updated array elements: -7,2,7,10,45,78
Input array elements: 12,45,78,2,7,10.-7 Key: 34	Not found

Exercise 2:
Write a program to find and print the smallest 3 elements from an unsorted array using selection sort. Use **binary search** or **linear search** to determine the index of the last element among the smallest 3 elements (Consider indexing from 0).

Sample Input	Sample Output
Input array elements: 12,45,78,2,7,10.-7	Smallest 3 elements: -7,2,7, Index of last element among the smallest 3 elements is: 4.

Exercise 3:

Write a program in C to find a specific element using linear search in an array. If found then swap the element with the first element of the array. If not found, then insert that specific key element in the middle index of that array. Print the modified array.

Sample Input	Sample Output
Input array elements: 13,1,79,22,7,12,24 Key: 79	Key is found Array elements are: 79,1,13,22,7,12,24
Input array elements: 13,1,79,22,7,12,24 Key: 80	Not found Array elements are: 13,1,79,80,22,7,12,24

Exercise 4:

You are managing a library where the books are arranged in alphabetical order by title. Given a list of book titles and a specific book to search for, use **Binary Search** to quickly find the book's position in the list.

Task:

Given a sorted list of book titles, use **Binary Search** to find the index of a specific book. If the book is not in the list, return **not found**.

Input:

- An integer n, the number of books in the library.
- A sorted array books of size n, where each element is a book title (string).
- A string target, representing the title of the book to search for.

Sample Input	Sample Output
n: 5 **Books**: "A Tale of Two Cities", "Harry Potter", "Moby Dick", "The Magicians", "Kill to Death" **Target:** "Moby Dick"	2
n: 5 **Books:** "A Tale of Two Cities", "Harry Potter", "Moby Dick", "The Magicians", " Kill to Death " **Target:** "The Rabbit "	Not found