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| **LAB FILE (CAF 613)**  *A report submitted in partial fulfillment of the requirement for the course*    **Data Structure and Algorithm**  Part of the degree of  Master’s  **In**  **Computer Applications**    **SUBMITTED TO:**  Ms. Sudhani Verma  Assistant Professor  School of Computing    **SUBMITTED BY:**  Mohit Kumar  1000021153    **SCHOOL OF COMPUTING**    **DITUNIVERSITY,DEHRADUN**  (StatePrivateUniversitythroughStateLegislatureActNo. 10of2013ofUttarakhand and approvedbyUGC)  **MussoorieDiversion Road,Dehradun,Uttarakhand-248009,India.**  **2024-25**  1 |

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**EXPERIMENT**- 1

**Write a JAVA program for 1d array and perform insertion, deletion, bubble sort and linear search using switch**

**Source Code:**

import java.util.Scanner;

public class ArrayOperations {

    public static void main(String[] *args*) {

        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the size of the array: ");

        int size = scanner.nextInt();

        int[] array = new int[size];

*// Initialize the array*

        System.out.println("Enter " + size + " elements:");

        for (int i = 0; i < size; i++) {

            array[i] = scanner.nextInt();

        }

        int choice;

        do {

            System.out.println("\nArray Operations:");

            System.out.println("1. Insertion");

            System.out.println("2. Deletion");

            System.out.println("3. Bubble Sort");

            System.out.println("4. Linear Search");

            System.out.println("5. Display Array");

            System.out.println("0. Exit");

            System.out.print("Enter your choice: ");

            choice = scanner.nextInt();

            switch (choice) {

                case 1:

                    System.out.print("Enter the element to insert: ");

                    int elementToInsert = scanner.nextInt();

                    System.out.print("Enter the index to insert at: ");

                    int insertIndex = scanner.nextInt();

                    insertElement(array, elementToInsert, insertIndex);

                    break;

                case 2:

                    System.out.print("Enter the index to delete: ");

                    int deleteIndex = scanner.nextInt();

                    deleteElement(array, deleteIndex);

                    break;

                case 3:

                    bubbleSort(array);

                    System.out.println("Array after Bubble Sort:");

                    displayArray(array);

                    break;

                case 4:

                    System.out.print("Enter the element to search: ");

                    int searchElement = scanner.nextInt();

                    int searchIndex = linearSearch(array, searchElement);

                    if (searchIndex != -1) {

                        System.out.println("Element found at index: " + searchIndex);

                    } else {

                        System.out.println("Element not found in the array.");

                    }

                    break;

                case 5:

                    displayArray(array);

                    break;

                case 0:

                    System.out.println("Exiting program. Goodbye!");

                    break;

                default:

                    System.out.println("Invalid choice. Please enter a valid option.");

                    break;

            }

        } while (choice != 0);

        scanner.close();

    }

    private static void insertElement(int[] *array*, int *element*, int *index*) {

        if (index < 0 || index > array.length) {

            System.out.println("Invalid index for insertion.");

            return;

        }

*// Shift elements to make space for the new element*

        for (int i = array.length - 1; i > index; i--) {

            array[i] = array[i - 1];

        }

        array[index] = element;

        System.out.println("Element inserted successfully.");

        displayArray(array);

    }

    private static void deleteElement(int[] *array*, int *index*) {

        if (index < 0 || index >= array.length) {

            System.out.println("Invalid index for deletion.");

            return;

        }

        for (int i = index; i < array.length - 1; i++) {

            array[i] = array[i + 1];

        }

        System.out.println("Element deleted successfully.");

        displayArray(array);

    }

    private static void bubbleSort(int[] *array*) {

        int n = array.length;

        for (int i = 0; i < n - 1; i++) {

            for (int j = 0; j < n - i - 1; j++) {

                if (array[j] > array[j + 1]) {

*// Swap array[j] and array[j + 1]*

                    int temp = array[j];

                    array[j] = array[j + 1];

                    array[j + 1] = temp;

                }

            }

        }

    }

    private static int linearSearch(int[] *array*, int *target*) {

        for (int i = 0; i < array.length; i++) {

            if (array[i] == target) {

                return i;

            }

        }

        return -1;

    }

    private static void displayArray(int[] *array*) {

        System.out.print("Array: ");

        for (int element : array) {

            System.out.print(element + " ");

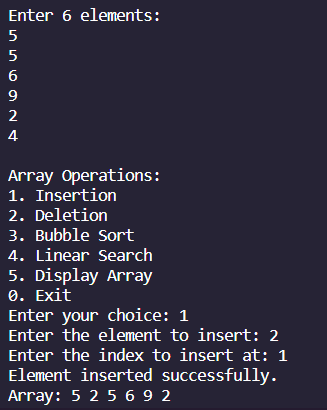
        }

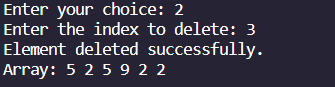
        System.out.println();

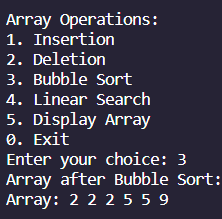
    }

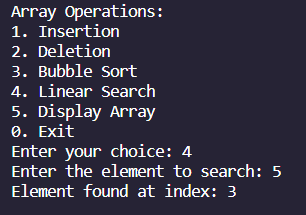
}

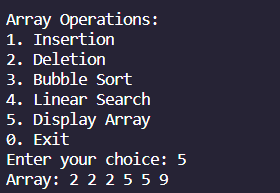
**Output:**

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