Java P.P SECTION 4

PROGRAM -1

```
package sortpackage;

import java.util.Scanner;

public class sortandsearch {

    public static void main(String[] args) {
        int[] numbers = {40, 7, 59, 4, 1};
        System.out.println("Before sorting:");
        displayValues(numbers);
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number to search for: ");
        int searchNumber = scanner.nextInt();
        int position = linearSearch(numbers, searchNumber);
        if (position != -1) {
            System.out.println("Number " + searchNumber + " found at position " + position + " before sorting.");
        } else {
            System.out.println("Number " + searchNumber + " not found before sorting.");
        }
        bubbleSort(numbers);
        System.out.println("After sorting:");
        displayValues(numbers);
        position = linearSearch(numbers, searchNumber);
        if (position != -1) {
            System.out.println("Number " + searchNumber + " found at position " + position + " after sorting.");
        } else {
            System.out.println("Number " + searchNumber + " not found after sorting.");
        }

        scanner.close();
    }
    static void displayValues(int[] numbers) {
        for (int num : numbers) {
            System.out.print(num + " ");
        }
        System.out.println();
    }
    static void bubbleSort(int[] numbers) {
        for (int i = 0; i < numbers.length; i++) {
            boolean flag = false;
            for (int j = 0; j < numbers.length - 1; j++) {
                if (numbers[j] > numbers[j + 1]) {
                    int temp = numbers[j];
                    numbers[j] = numbers[j + 1];
                    numbers[j + 1] = temp;
                    flag = true;
                }
            }
            if (!flag) {
                return;
            }
        }
    }
    static int linearSearch(int[] numbers, int searchNumber) {
        for (int i = 0; i < numbers.length; i++) {
            if (numbers[i] == searchNumber) {
                return i;
            }
        }
        return -1;
    }
}
```

searching and sorting

PROGRAM – 2

```
public class Factorial {
    public static double factorial(double d) {
        if (d <= 1) {
            return 1;
        } else {
            return d * factorial(d - 1);
        }
    }
    public static void main(String[] args) {
        double d = 7.0;
        double result = factorial(d);

        System.out.println("The factorial of " + d + " is " + result);

    }

}
```

PROGRAM – 3

```
public class Linear {

    public static double factorial(double n) {

        if (n <= 1) {

            return 1; // base case

        } else {

            return n * factorial(n - 1); // recursive case

        }

    }


    public static void main(String[] args) {

        double d = 5.0;

        double result = factorial(d);

        System.out.printf("Factorial [%f] of [%f]%n", result, d);

    }

}
```

recursion-2