Ranjith R 22IT085 Day 4 DSA Practice

1)String Anagram

Given two strings S1 and S2 . Return "1" if both strings are anagrams otherwise return "0" .

Note: An anagram of a string is another string with exactly the same quantity of each character in it, in any order.

Example 1:

Input: S1 = "cdbkdub" , S2 = "dsbkcsdn"

Output: 0

Explanation: Length of S1 is not same

as length of S2.

Program:

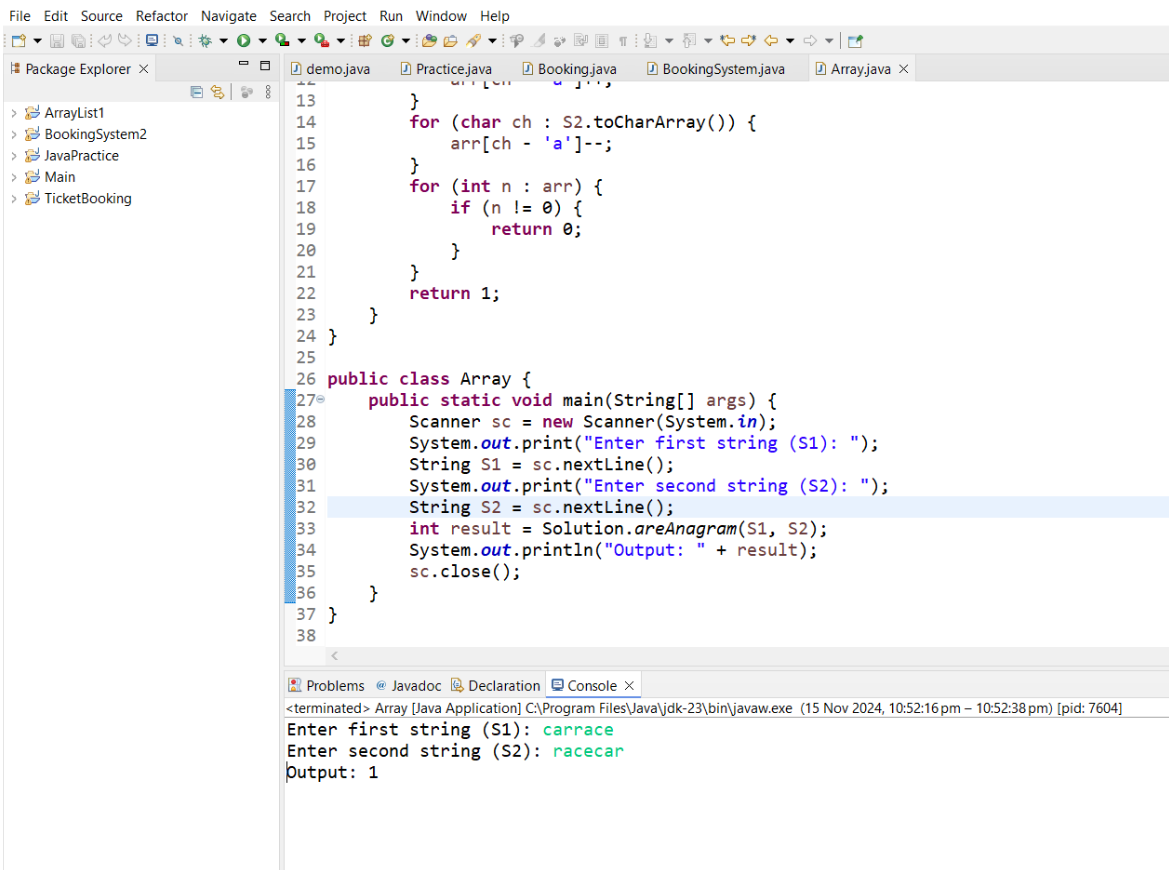
```
package JavaPractice;


import java.util.Scanner;


class Solution {

    static int areAnagram(String S1, String S2) {

        if (S1.length() != S2.length()) {

            return 0;

        }

        int[] arr = new int[26];

        for (char ch : S1.toCharArray()) {
```

```java
            arr[ch - 'a']++;
        }
        for (char ch : S2.toCharArray()) {
            arr[ch - 'a']--;
        }
        for (int n : arr) {
            if (n != 0) {
                return 0;
            }
        }
        return 1;
    }
}

public class Array {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter first string (S1): ");
        String S1 = sc.nextLine();
        System.out.print("Enter second string (S2): ");
        String S2 = sc.nextLine();
        int result = Solution.areAnagram(S1, S2);
        System.out.println("Output: " + result);
        sc.close();
    }
```

}

Time Complexity:O(n)

OUTPUT:



```java
        }
        for (char ch : S2.toCharArray()) {
            arr[ch - 'a']--;
        }
        for (int n : arr) {
            if (n != 0) {
                return 0;
            }
        }
        return 1;
    }
}

public class Array {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter first string (S1): ");
        String S1 = sc.nextLine();
        System.out.print("Enter second string (S2): ");
        String S2 = sc.nextLine();
        int result = Solution.areAnagram(S1, S2);
        System.out.println("Output: " + result);
        sc.close();
    }
}
```

```
<terminated> Array [Java Application] C:\Program Files\Java\jdk-23\bin\javaw.exe (15 Nov 2024, 10:52:16 pm – 10:52:38 pm) [pid: 7604]
Enter first string (S1): carrace
Enter second string (S2): racecar
Output: 1
```

2)Row with max 1s

You are given a 2D array consisting of only 1's and 0's, where each row is sorted in non-decreasing order. You need to find and return the index of the first row that has the most number of 1s. If no such row exists, return -1.

Note: 0-based indexing is followed.

Examples:

Input: arr[][] = [[0, 1, 1, 1],

[0, 0, 1, 1],

[1, 1, 1, 1],

[0, 0, 0, 0]]

Output: 2

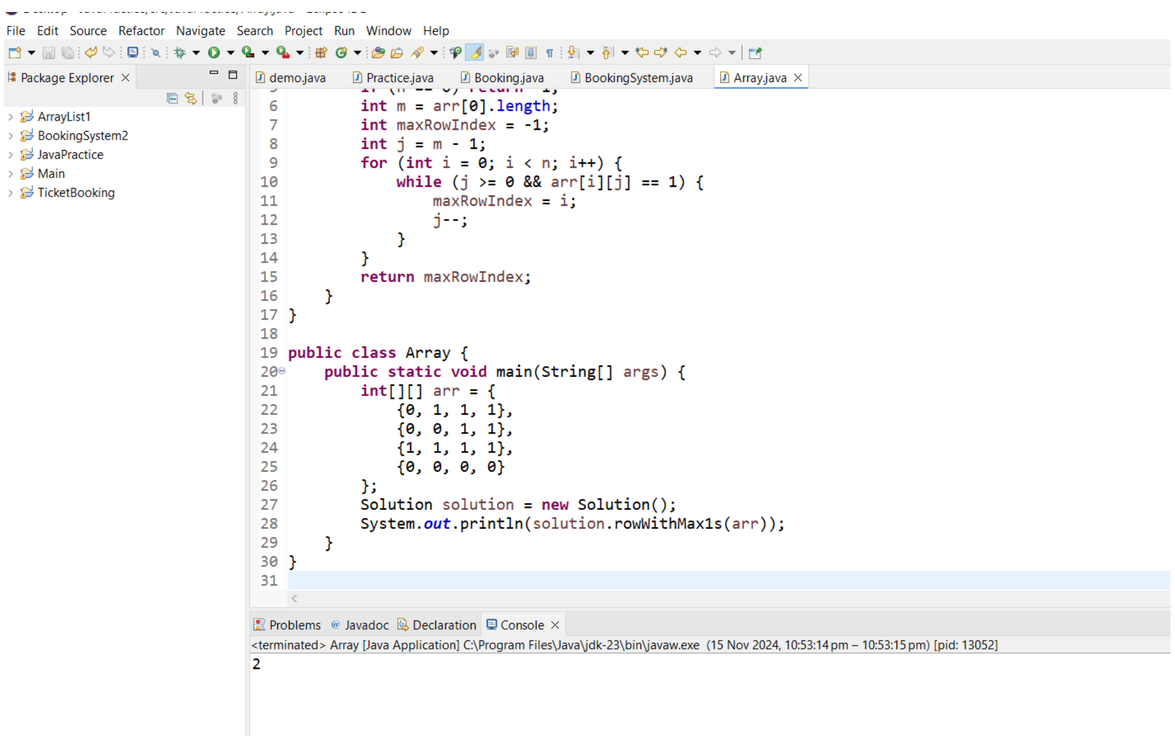
Explanation: Row 2 contains 4 1's.

PROGRAM:

```
package JavaPractice;

class Solution {

    public int rowWithMax1s(int arr[][]) {

        int n = arr.length;

        if (n == 0) return -1;

        int m = arr[0].length;

        int maxRowIndex = -1;

        int j = m - 1;

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

            while (j >= 0 && arr[i][j] == 1) {

                maxRowIndex = i;

                j--;

            }

        }

        return maxRowIndex;
    }
}

public class Array {
    public static void main(String[] args) {
        int[][] arr = {
            {0, 1, 1, 1},
            {0, 0, 1, 1},
            {1, 1, 1, 1},
            {0, 0, 0, 0}
        };
        Solution solution = new Solution();
        System.out.println(solution.rowWithMax1s(arr));
    }
}
```

TIME COMPLEXITY:O(m+n)

OUTPUT:



```
        int m = arr[0].length;
        int maxRowIndex = -1;
        int j = m - 1;
        for (int i = 0; i < n; i++) {
            while (j >= 0 && arr[i][j] == 1) {
                maxRowIndex = i;
                j--;
            }
        }
        return maxRowIndex;
    }
}

public class Array {
    public static void main(String[] args) {
        int[][] arr = {
            {0, 1, 1, 1},
            {0, 0, 1, 1},
            {1, 1, 1, 1},
            {0, 0, 0, 0}
        };
        Solution solution = new Solution();
        System.out.println(solution.rowWithMax1s(arr));
    }
}
```

```
<terminated> Array [Java Application] C:\Program Files\Java\jdk-23\bin\javaw.exe  (15 Nov 2024, 10:53:14 pm – 10:53:15 pm) [pid: 13052]
2
```

3. Longest consecutive subsequence

Given an array of non-negative integers. Find the length of the longest subsequence such that elements in the subsequence are consecutive integers, the consecutive numbers can be in any order.

Examples:

Input: arr[] = [2, 6, 1, 9, 4, 5, 3]
Output: 6
Explanation: The consecutive numbers here are 1, 2, 3, 4, 5, 6. These 6 numbers form the longest consecutive subsquence.

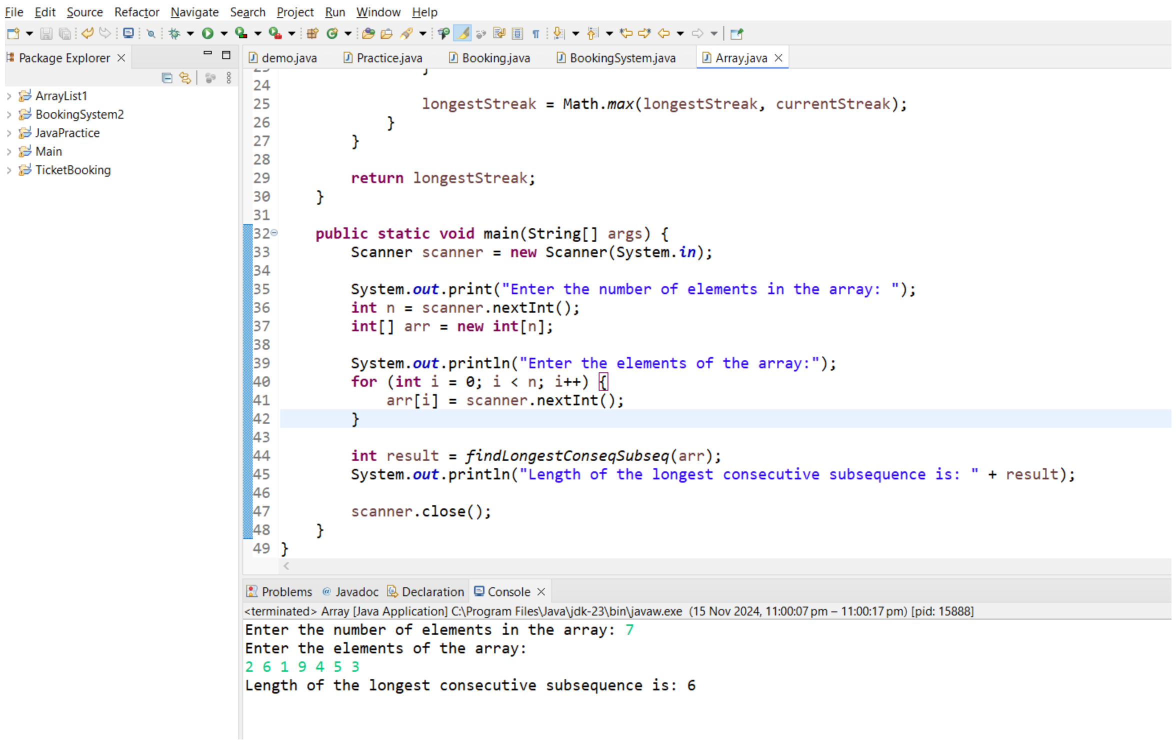
PROGRAM:

```
package JavaPractice;

import java.util.HashSet;

import java.util.Scanner;
```

```
public class Array {
    public static int findLongestConseqSubseq(int[] arr) {
        HashSet<Integer> set = new HashSet<>();

        for (int num : arr) {
            set.add(num);
        }

        int longestStreak = 0;

        for (int num : arr) {
            if (!set.contains(num - 1)) {
                int currentNum = num;
                int currentStreak = 1;

                while (set.contains(currentNum + 1)) {
                    currentNum++;
                    currentStreak++;
                }

                longestStreak = Math.max(longestStreak, 
currentStreak);
            }
        }

        return longestStreak;
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the number of elements in the array: 
");
        int n = scanner.nextInt();
        int[] arr = new int[n];

        System.out.println("Enter the elements of the array:");
        for (int i = 0; i < n; i++) {
            arr[i] = scanner.nextInt();
        }

        int result = findLongestConseqSubseq(arr);
        System.out.println("Length of the longest consecutive 
subsequence is: " + result);

        scanner.close();
    }
}
```

Time Complexity: O(n)

OUTPUT:



```java
                longestStreak = Math.max(longestStreak, currentStreak);
            }
        }

        return longestStreak;
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the number of elements in the array: ");
        int n = scanner.nextInt();
        int[] arr = new int[n];

        System.out.println("Enter the elements of the array:");
        for (int i = 0; i < n; i++) {
            arr[i] = scanner.nextInt();
        }

        int result = findLongestConseqSubseq(arr);
        System.out.println("Length of the longest consecutive subsequence is: " + result);

        scanner.close();
    }
}
```

```
<terminated> Array [Java Application] C:\Program Files\Java\jdk-23\bin\javaw.exe (15 Nov 2024, 11:00:07 pm – 11:00:17 pm) [pid: 15888]
Enter the number of elements in the array: 7
Enter the elements of the array:
2 6 1 9 4 5 3
Length of the longest consecutive subsequence is: 6
```

4. Longest palindrome in a string

Given a string S, find the longest palindromic substring in S. Substring of string S: S[i . . . . j] where 0 ≤ i ≤ j < len(S). Palindrome string: A string which reads the same backwards. More formally, S is palindrome if reverse(S) = S. Incase of conflict, return the substring which occurs first (with the least starting index).

Example 1:

Input:S = "aaaabbaa"

Output:aabbaa

Explanation: The longest palindrome string present in the given string is "aabbaa".

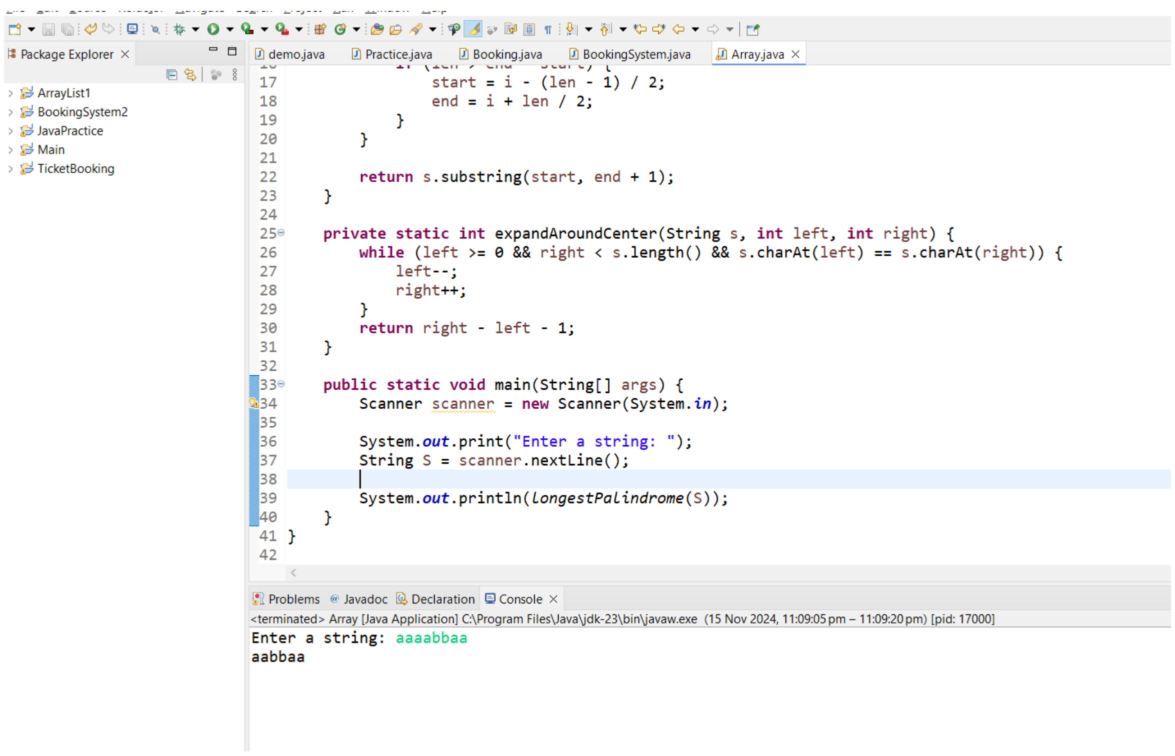
PROGRAM:

```java
package JavaPractice;


import java.util.Scanner;
```

```
public class Array {

    public static String longestPalindrome(String s) {

        if (s == null || s.length() < 1) return "";


        int start = 0, end = 0;


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

            int len1 = expandAroundCenter(s, i, i);

            int len2 = expandAroundCenter(s, i, i + 1);

            int len = Math.max(len1, len2);


            if (len > end - start) {

                start = i - (len - 1) / 2;

                end = i + len / 2;

            }

        }


        return s.substring(start, end + 1);

    }


    private static int expandAroundCenter(String s, int left, int 
right) {

        while (left >= 0 && right < s.length() && s.charAt(left) == 
s.charAt(right)) {

            left--;

            right++;

        }

        return right - left - 1;
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a string: ");
        String S = scanner.nextLine();

        System.out.println(longestPalindrome(S));
    }
}
```

Time Complexity: O(n^2)

OUTPUT:



```
                start = i - (len - 1) / 2;
                end = i + len / 2;
            }
        }

        return s.substring(start, end + 1);
    }

    private static int expandAroundCenter(String s, int left, int right) {
        while (left >= 0 && right < s.length() && s.charAt(left) == s.charAt(right)) {
            left--;
            right++;
        }
        return right - left - 1;
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a string: ");
        String S = scanner.nextLine();

        System.out.println(longestPalindrome(S));
    }
}
```

```
<terminated> Array [Java Application] C:\Program Files\Java\jdk-23\bin\javaw.exe (15 Nov 2024, 11:09:05 pm – 11:09:20 pm) [pid: 17000]
Enter a string: aaaabbaa
aabbaa
```