Experiment8

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Branch:CSE **Section/Group:NTPP 603/B**
Semester:6 **DateofPerformance:21/03/25**
SubjectName:APLab2 **SubjectCode:22CSP-351**

1. Aim:

a. MaxUnitsonaTruck
b. MinimumOperationstoMakeArrayIncreasing
c. MaximumScorefromRemovingSubstrings
d. MinimumOperationstoMakeaSubsequence

2. Code:

a.
```
classSolution{
    publicintmaximumUnits(int[][]boxTypes,inttruckSize){
        Arrays.sort(boxTypes, (a, b) ->b[1] - a[1]);
        intmaxUnits = 0;

        for (int[] box : boxTypes) {
            if(truckSize<=0)break;
            intcount=Math.min(box[0],truckSize);
            maxUnits += count * box[1];
            truckSize -= count;
        }

        return maxUnits;
    }
}
```

b.
```
classSolution{
    publicintminOperations(int[]nums){ int
        operations = 0;

        for(inti=1;i<nums.length;i++){
```

```
                if(nums[i]<=nums[i-1]){
                    operations+=nums[i -1]-nums[i]+1;
                    nums[i] = nums[i - 1] + 1;
                }
            }

            return operations;
        }
    }
```

c.

```
classSolution{
    publicintmaximumGain(Strings,intx,inty){ int
        points = 0;

        //First,removethehigher-pointsubstring if (x
        >= y) {
            points+=removeSubstring(s,"ab",x);
            s=removeSubstringReturnString(s,"ab");
            points += removeSubstring(s, "ba", y);
        } else{
            points+=removeSubstring(s,"ba",y);
            s=removeSubstringReturnString(s,"ba");
            points += removeSubstring(s, "ab", x);
        }

        return points;
    }

    //Removesthetargetsubstringandreturnstheupdated string
    privateStringremoveSubstringReturnString(Strings,String target)
{
        StringBuildersb=newStringBuilder(s); int
        index = sb.indexOf(target);
        while(index!= -1){
            sb.delete(index,index+target.length());
            index = sb.indexOf(target);
        }
        return sb.toString();
    }
```

```
        //Countthenumberoftimesasubstringcanbe removedand adds
    points
        privateintremoveSubstring(Strings,Stringtarget,int points) {
            inttotalPoints=0;
            StringBuilder sb=newStringBuilder(s);

            intindex=sb.indexOf(target); while
            (index != -1) {
                sb.delete(index,index+target.length());
                totalPoints += points;
                index= sb.indexOf(target);
            }

            return totalPoints;
        }
    }
```

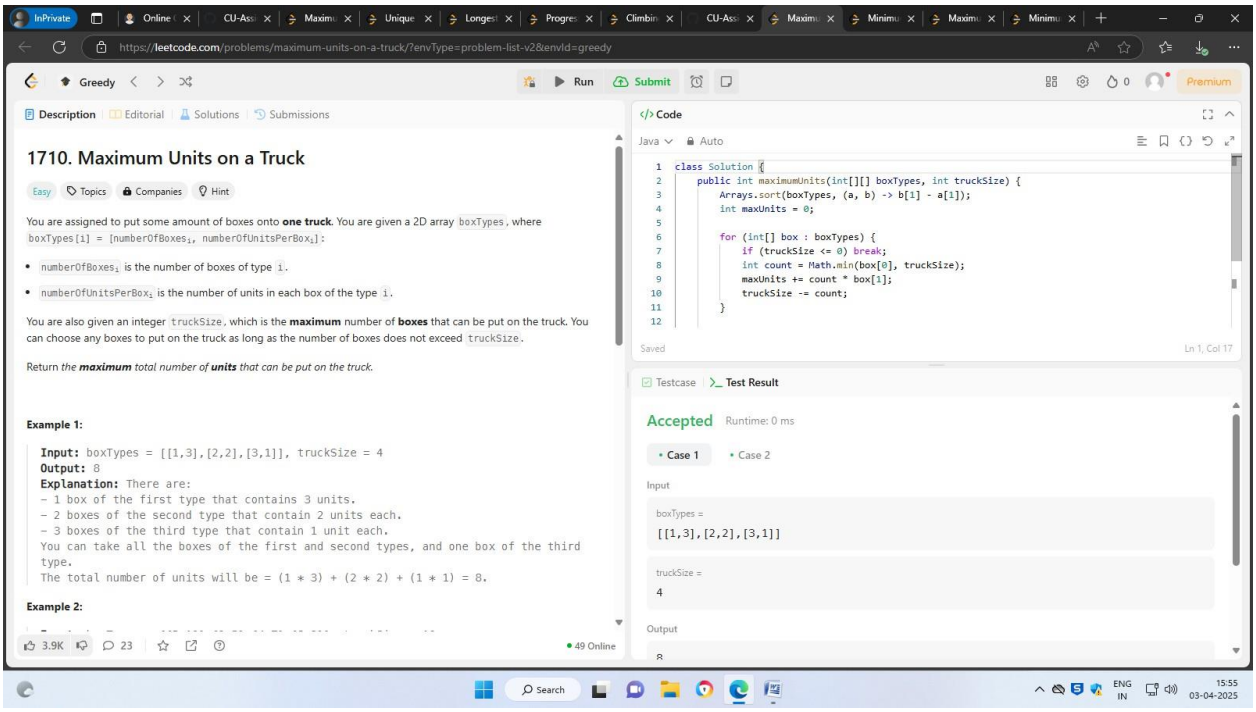
d.

```
classSolution{
        publicintminOperations(int[]target,int[]arr){

         Map<Integer,Integer>targetIndexMap=newHashMap<>(); for
         (int i = 0; i <target.length; i++) {
             targetIndexMap.put(target[i],i);
         }


         List<Integer>transformedArr=newArrayList<>(); for
         (int num : arr) {
             if (targetIndexMap.containsKey(num)) {
                 transformedArr.add(targetIndexMap.get(num));
             }
         }


         returntarget.length-lengthOfLIS(transformedArr);
     }

     privateintlengthOfLIS(List<Integer>nums){ if
         (nums.isEmpty()) return 0;

         List<Integer>lis=newArrayList<>();
```

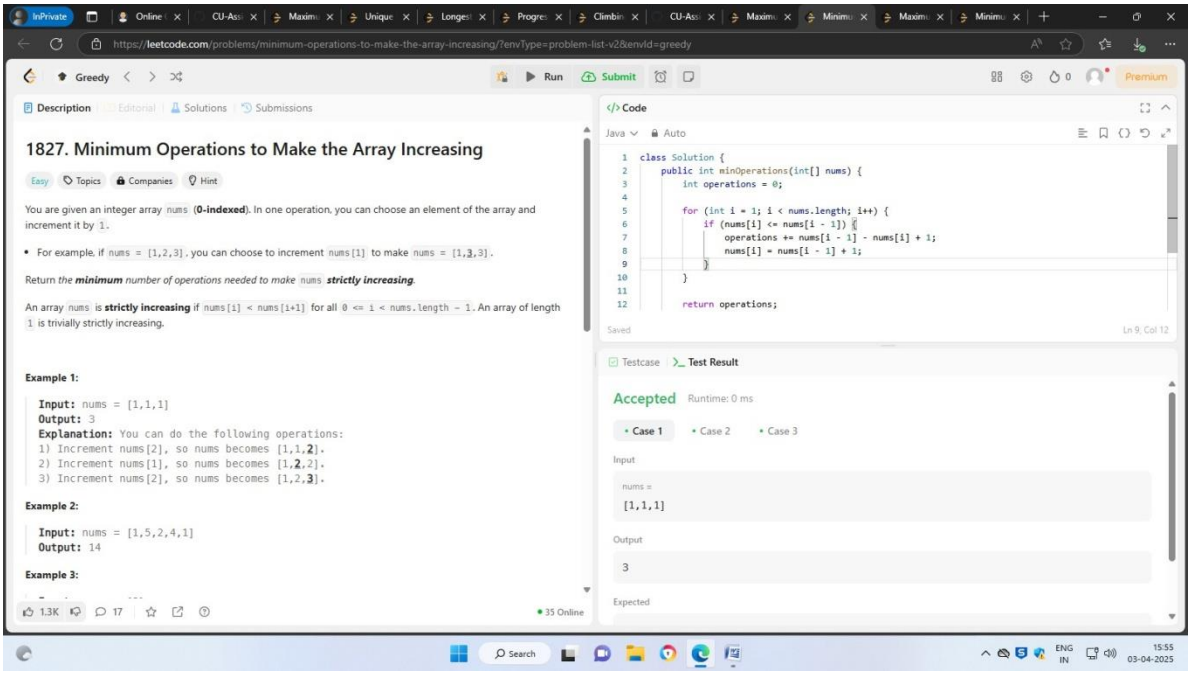
```
            for(intnum :nums){
                intpos=binarySearch(lis,num); if
                (pos <lis.size()) {
                    lis.set(pos,num);
                } else{
                    lis.add(num);
                }
            }

            return lis.size();
        }

        privateintbinarySearch(List<Integer>lis,inttarget){ int
            left = 0, right = lis.size();
            while(left<right){
                intmid=left+(right-left)/2; if
                (lis.get(mid) < target) {
                    left=mid+1;
                } else{
                    right=mid;
                }
            }
            returnleft;
        }
    }
```

3. Output:

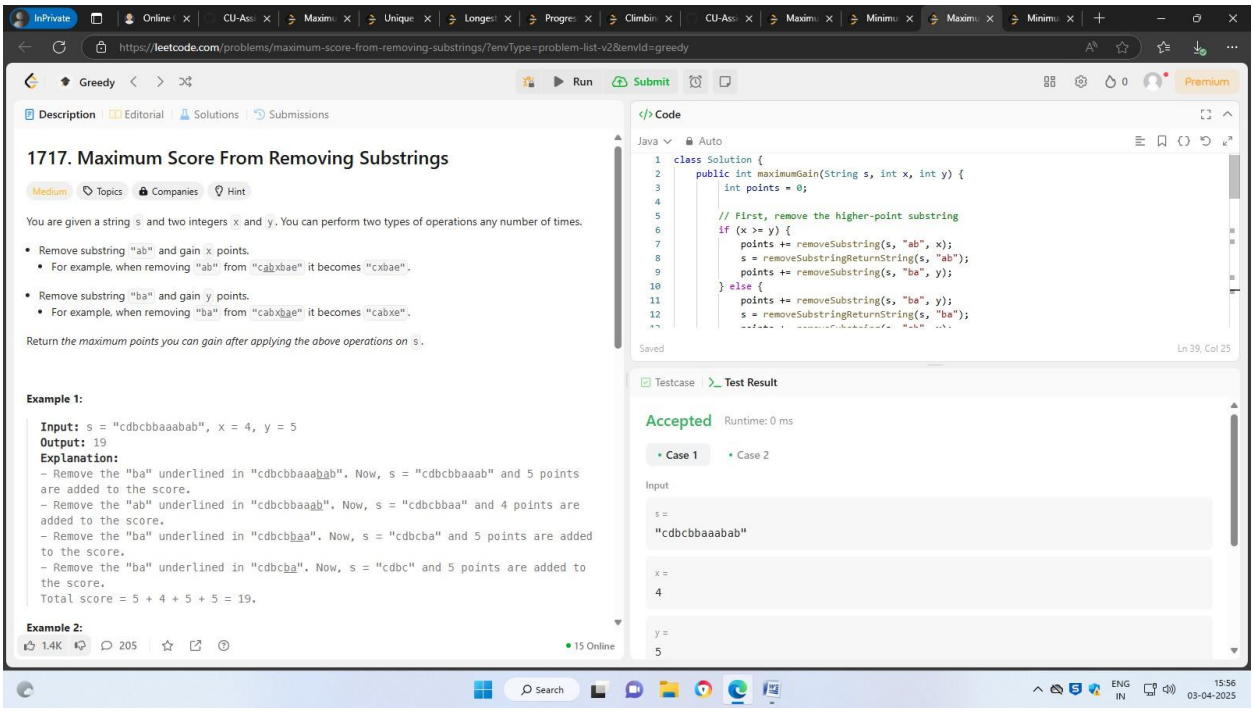
a.


1710. Maximum Units on a Truck
Example 1:
Input: boxTypes = [[1,3],[2,2],[3,1]], truckSize = 4
Output: 8
Explanation: There are:
- 1 box of the first type that contains 3 units.
- 2 boxes of the second type that contain 2 units each.
- 3 boxes of the third type that contain 1 unit each.
You can take all the boxes of the first and second types, and one box of the third type.
The total number of units will be = (1 * 3) + (2 * 2) + (1 * 1) = 8.
Example 2:
Accepted
Runtime: 0 ms
Case 1
Case 2
boxTypes =
[[1,3],[2,2],[3,1]]
truckSize =
4
Output

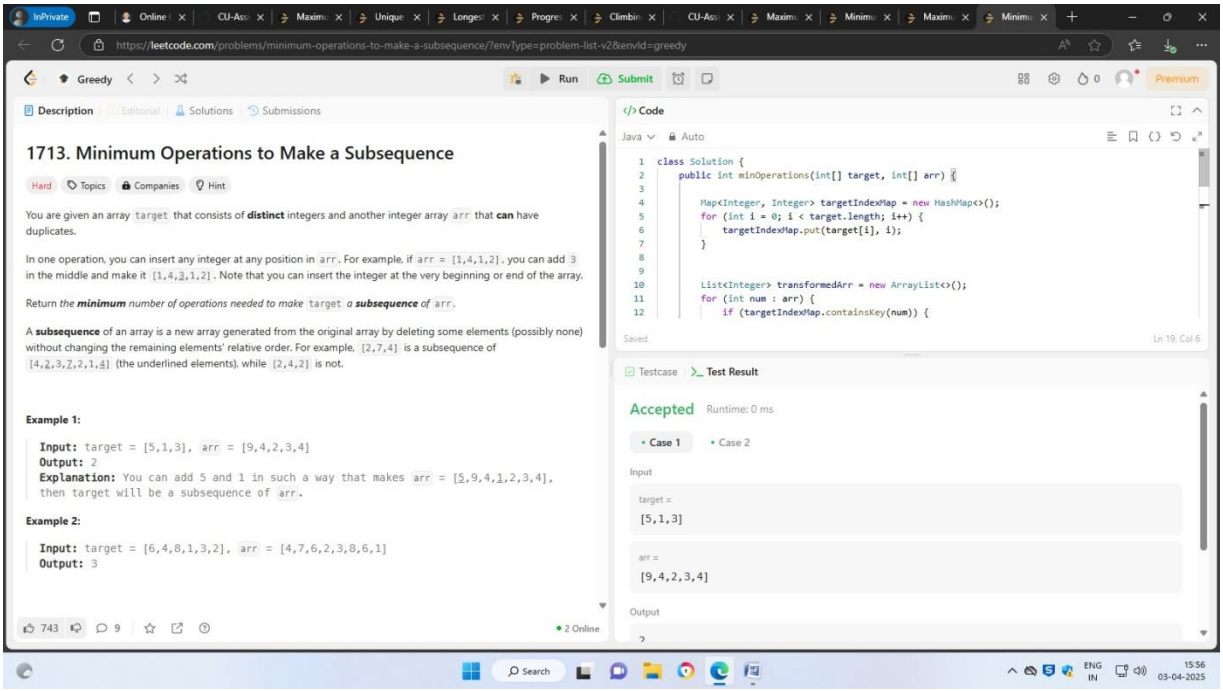
b.


1827. Minimum Operations to Make the Array Increasing
Example 1:
Input: nums = [1,1,1]
Output: 3
Explanation: You can do the following operations:
1) Increment nums[2], so nums becomes [1,1,2].
2) Increment nums[1], so nums becomes [1,2,2].
3) Increment nums[2], so nums becomes [1,2,3].
Example 2:
Input: nums = [1,5,2,4,1]
Output: 14
Example 3:
Accepted
Runtime: 0 ms
Case 1
Case 2
Case 3
nums =
[1,1,1]
Output
3
Expected

c.


https://leetcode.com/problems/maximum-score-from-removing-substrings/?envType=problem-list-v2&envId=greedy
Greedy
Run
Submit
Premium
Description
Editorial
Solutions
Submissions
1717. Maximum Score From Removing Substrings
Medium
Topics
Companies
Hint
You are given a string s and two integers x and y. You can perform two types of operations any number of times.
Remove substring "ab" and gain x points.
For example, when removing "ab" from "cabxbae" it becomes "cxbae".
Remove substring "ba" and gain y points.
For example, when removing "ba" from "cabxbae" it becomes "cabxe".
Return the maximum points you can gain after applying the above operations on s.
Example 1:
Input: s = "cdbcbbaaabab", x = 4, y = 5
Output: 19
Explanation:
- Remove the "ba" underlined in "cdbcbbaaabab". Now, s = "cdbcbbaaab" and 5 points are added to the score.
- Remove the "ab" underlined in "cdbcbbaaab". Now, s = "cdbcbbaa" and 4 points are added to the score.
- Remove the "ba" underlined in "cdbcbbaa". Now, s = "cdbcba" and 5 points are added to the score.
- Remove the "ba" underlined in "cdbcba". Now, s = "cdbc" and 5 points are added to the score.
Total score = 5 + 4 + 5 + 5 = 19.
Example 2:
1.4K
205
15 Online
Code
Java
Auto
class Solution {
public int maximumGain(String s, int x, int y) {
int points = 0;
// First, remove the higher-point substring
if (x >= y) {
points += removeSubstring(s, "ab", x);
s = removeSubstringReturnString(s, "ab");
points += removeSubstring(s, "ba", y);
} else {
points += removeSubstring(s, "ba", y);
s = removeSubstringReturnString(s, "ba");
Saved
Ln 39, Col 25
Testcase
Test Result
Accepted
Runtime: 0 ms
Case 1
Case 2
Input
s =
"cdbcbbaaabab"
x =
4
y =
5
Search
ENG
IN
15:56
03-04-2025

d.


https://leetcode.com/problems/minimum-operations-to-make-a-subsequence/?envType=problem-list-v2&envId=greedy
Greedy
Run
Submit
Premium
Description
Editorial
Solutions
Submissions
1713. Minimum Operations to Make a Subsequence
Hard
Topics
Companies
Hint
You are given an array target that consists of distinct integers and another integer array arr that can have duplicates.
In one operation, you can insert any integer at any position in arr. For example, if arr = [1,4,1,2], you can add 3 in the middle and make it [1,4,3,1,2]. Note that you can insert the integer at the very beginning or end of the array.
Return the minimum number of operations needed to make target a subsequence of arr.
A subsequence of an array is a new array generated from the original array by deleting some elements (possibly none) without changing the remaining elements' relative order. For example, [2,7,4] is a subsequence of [4,2,3,7,2,1,4] (the underlined elements), while [2,4,2] is not.
Example 1:
Input: target = [5,1,3], arr = [9,4,2,3,4]
Output: 2
Explanation: You can add 5 and 1 in such a way that makes arr = [5,9,4,1,2,3,4], then target will be a subsequence of arr.
Example 2:
Input: target = [6,4,8,1,3,2], arr = [4,7,6,2,3,8,6,1]
Output: 3
743
9
2 Online
Code
Java
Auto
class Solution {
public int minOperations(int[] target, int[] arr) {
Map<Integer, Integer> targetIndexMap = new HashMap<>();
for (int i = 0; i < target.length; i++) {
targetIndexMap.put(target[i], i);
}
List<Integer> transformedArr = new ArrayList<>();
for (int num : arr) {
if (targetIndexMap.containsKey(num)) {
Saved
Ln 19, Col 6
Testcase
Test Result
Accepted
Runtime: 0 ms
Case 1
Case 2
Input
target =
[5,1,3]
arr =
[9,4,2,3,4]
Output
Search
ENG
IN
15:56
03-04-2025