DAVP Week 7

Designed by: Pranjal Khare & Aditya Nambiar

Ques1: Given a sequence of n numbers a1, a2, ..., an :

1> Given a pair (i,j), return the number of distinct elements in the subsequence ai, ai+1, ..., aj.
2> Given a triplet (i, j, k), return the number of elements greater than k in the subsequence ai, ai+1, ..., aj.
3> If sequence is in non-decreasing order, given a pair (i,j), determine the most frequent value among the integers ai , ... , aj.
4> Given a pair (x,y), return Max { a[i]+a[i+1]+...+a[j] ; x ≤ i ≤ j ≤ y }.

Ques2:
A computer processor is given N tasks to perform (1 ≤ N ≤ 50,000). The i-th task requires Ti seconds of processing time (1 ≤ Ti ≤ 1,000,000,000). The processor runs the tasks as follows: each task is run in order, from 1 to N, for 1 second, and then the processor repeats this again starting from task 1. Once a task has been completed, it will not be run in later iterations. Determine, for each task, the total running time elapsed once the task has been completed.

Ques3:
An n-element permutation is an n-element sequence of distinct numbers from the set {1, 2, ...,n}. For example the sequence 2,1,4,5,3 is a 5-element permutation. We are interested in the longest increasing subsequences in a permutation. In this exemplary permutation they are of length 3 and there are exactly 2 such subsequences: 2,4,5 and 1,4,5. We will call a number belonging to any of the longest increasing subsequences a supernumber. In the permutation 2,1,4,5,3 the supernumbers are 1,2,4,5 and 3 is not a supernumber. Your task is to find all supernumbers for a given permutation.

Ques4:
Given a sequence of N (1 ≤ N ≤ 10,000) integers S1, ..., SN (0 ≤ Si < 100,000), compute the number of increasing subsequences of S with length K (1 ≤ K ≤ 50 and K ≤ N); that is, the number of K-tuples i1, ..., iK such that 1 ≤ i1 < ... < iK ≤ N and Si1 < ... < SiK.

Ques5:
Let A[0...n - 1] be an array of n distinct positive integers. If i < j and A[i] > A[j] then the pair (i, j) is called an inversion of A. Given n and an array A your task is to find the number of inversions of A.

Ques6:
You have k lists of sorted integers. Find the smallest range that includes at least one number from each of the k lists. DAVP Week 7
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You have k lists of sorted integers. Find the smallest range that includes at least one number from each of the k lists.

For example,

List 1: [4, 10, 15, 24, 26]

List 2: [0, 9, 12, 20]

List 3: [5, 18, 22, 30]

The smallest range here would be [20, 24] as it contains 24 from list 1, 20 from list 2, and 22 from list 3.

http://www.careercup.com/question?id=16759664

Q7)
Given an unsorted array of integers, you need to return maximum possible n such that the array consists at least n values greater than or equals to n. Array can contain duplicate values.

Sample input : [1, 2, 3, 4] -- output : 2

Sample input : [900, 2, 901, 3, 1000] -- output: 3

http://www.careercup.com/question?id=5094709806497792

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