# Week 03: Intermediate Level Data Structures

## 문제 **07:** 최소값 찾기 **[**백준 **11003**번**]**

https://www.acmicpc.net/problem/11003

## Problem 08: Substring

Given a string of uppercase alphabets of length N, find the length of the longest substring in which no alphabet appears more than K times. For an example, let the input string be

ABCACBDEFABC

Then, if K=1, the answer is 6 since ACBDEF is the longest substring without duplication of any alphabet. If K=2, then the answer is 9 since no alphabet appears more than twice in ABCACBDEF.

Both N and K is at most 1,000,000. Your program should terminate in 2 seconds.

**Input**

Your program is to read from `input08.txt` file. The input consists of T≤20 test cases. The number of test cases T is given in the first line of the input file. Each test case consists of two lines. The first line of each test case contains two integers N and K. The next line contains a string of uppercase alphabets of length N.

**Output**

Your program is to write to the standard output. Print the length of the longest substring in one line for each test case.

The following shows sample input and output for two test cases.

| Sample Input | Output for the Sample Input |
|---|---|
| 4<br>12 1<br>ABCACBDEFABC<br>12 2<br>ABCACBDEFABC<br>6 1<br>ABCDEF<br>4 3<br>AAAA | 6<br>9<br>6<br>3 |

## Problem 09: Subsequence

Given a sequence of N integers, find the length of the longest contiguous subsequence whose elements are all distinct. For an example, suppose that the input sequence is as follows:

-2, 4, 11, 3, -2, 4, -2, 10

The output is 4 since either 11, 3, -2, 4 is the longest subsequence without duplications. The number of integers N is at most 1,000,000 and each integer is between -1,000,000,000 and 1,000,000,000. Your program should terminate in 2 seconds.

**Input**

Your program is to read from `input09.txt` file. The input consists of T≤20 test cases. The number of test cases T is given in the first line of the input file. Each test case consists of two lines. The first line of each test case contains an integer N which is the number of integers in the test case. The next line contains N integers of the test case.

**Output**

Your program is to write to the standard output. Print the length of the longest subsequence in one line for each test case.

The following shows sample input and output for two test cases.

| Sample Input | Output for the Sample Input |
|---|---|
| 3<br>8<br>-2 4 11 3 -2 4 -2 10<br>6<br>1 2 3 4 5 6<br>2<br>10 10 | 4<br>6<br>1 |

## Problem 10: Subsequence2

Given a sequence of N integers and another integer K, find the length of the longest contiguous subsequence in which no integer appears more than K times. For an example, suppose that the input sequence is as follows:

-2, 4, 11, 3, -2, 4, -2, 10

If K=1, the answer is 4 since either -2, 4, 11, 3 is the longest subsequence without duplications. If K=2, the answer is 7 since no integer appears more than twice in sequence 4, 11, 3, -2, 4, -2, 10 . Both N and K are at most 1,000,000 and each integer is between -1,000,000,000 and 1,000,000,000. Your program should terminate in 10 seconds.

**Input**

Your program is to read from `input10.txt` file. The input consists of T≤20 test cases. The number of test cases T is given in the first line of the input file. Each test case consists of two lines. The first line of each test case contains two integers N and K. The next line contains N integers of the test case.

**Output**

Your program is to write to the standard output. Print the length of the longest subsequence in one line for each test case.

The following shows sample input and output for two test cases.

| Sample Input | Output for the Sample Input |
|---|---|
| 4<br>8 1<br>-2 4 11 3 -2 4 -2 10<br>8 2<br>-2 4 11 3 -2 4 -2 10<br>6 3<br>1 1 1 1 1 1<br>4 1<br>10 11 12 13 | 4<br>7<br>3<br>4 |