

Challenge 13 - Sparse randomness

Randall has recently enrolled in a cryptography course, where he's learning about encryption, security and randomness. In order to fully complete the course, he has to submit a project about any topic taught during the course, and due to his fascination with randomness and pseudo random number generators (PRNG) he decided to focus his project on it.

One of the ideas he has in mind for the project is to build his own simple PRNG, which will work in the following way: it will be initialized with a random seed which will also be used as the first number that the PRNG outputs. When generating the next one, it might happen that be a number greater than or equal to the previous one, depending on an internal algorithm.

In order to test the degree of randomness achieved by his PRNG, Randall has decided to generate a sequence of numbers with it and then measure the maximum number of repetitions found in some given subsequences.

Can you help Randall to calculate this metric?



Input

The input file starts with a single line containing the number of test cases, **T**. Each test case begins with 2 numbers in a single line:

- **N**, the length of the pseudo random number sequence to study
- **M**, the number of study cases Randall wants to analyze

The next line will contain **N** numbers representing the sequence generated by Randall's PRNG. Finally, **M** lines will follow, each one containing 2 numbers **s_m**, **e_m** representing a subsequence of the original sequence (1-based numbering).

Output

Each test case should start with the string "Test case #" followed by the number of the test case, starting at 1. For each interval that Randall is interested in, output one single line indicating the maximum number of repetitions found inside the subsequence given by that interval.

Limits

- $1 \leq T \leq 5$
- $1 \leq N \leq 10^6$
- $1 \leq M \leq 10^4$

- $1 \leq s_m \leq e_m \leq N$

All numbers will fit into a 32-bit signed integer.

Note: In the submit phase, the size of the input provided can be larger than 10MB. Keep this in mind when submitting.

Sample input

```
2
12 5
1 1 2 4 7 7 11 11 11 15 17 17
1 5
7 9
6 8
9 11
1 12
5 2
7 7 7 999 999
1 3
4 5
```

Sample output

```
Test case #1
2
3
2
1
3
Test case #2
3
2
```

Submit & test your code

To test and submit code we provide a set of tools to help you. Download [contest tools](#) if you haven't already done that. You will then be able to test and submit your solution to this challenge with the challenge token.

Challenge token: 2sHQRX9E2E73vhEfQrws

To test your program

```
./test_challenge 2sHQRX9E2E73vhEfQrws path/program
```

A nice output will tell you if your program got the right solution or not. You can try as many times as you need.

To submit your program to the challenge

```
./submit_challenge 2sHQRX9E2E73vhEfQrws path/source_pkg.tgz path/program
```

Note that you first need to solve the test phase before submitting the code. During the submit phase, in some problems, we might give your program harder questions, so try to make your program failsafe.

Important: In this phase, you must provide the source code used to solve the challenge and, if necessary, a brief explanation of how you solved it.

Remember **you can only submit once!** Once your solution is submitted you won't be able to amend it to fix issues or make it faster, so please be sure your solution is finished before submitting it.

If you have any doubts, please check the [info section](#).

Go ahead

I'm done! :)

Once you have submitted your code, hit refresh and continue to next challenge.

I'm stuck! :(

Be sure you follow the [Tuenti Engineering](#) twitter for updates and possible hints during the contest.

If this challenge is too hard and you are blocked, you will be able to skip it after two hours. Note that **you won't be able to complete it later**, and you have a limited number of challenges to skip.

Finally, if you run out of skips but are still really stuck with one problem, you will be able to skip it after 24 hours.

Challenge status:

| | |
|--------------------|---|
| Test case | Not done |
| Solution submitted | Not done |
| Skip | You still have to wait 24h, 0m and 0s to be able to skip this challenge |

Refresh status

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