IOITC 2022 Practice Contest 1

Constrained Comparisions

You have $2n$ boxes indexed $0, 1, \ldots 2n-1$. Each box i has a type T_i and height H_i. The heights $H_0, H_1, \ldots H_{2n-1}$ are all distinct. The types are either A or B, such that n of the boxes have type A and the other n have type B. Also, if you sort the boxes according to the heights, any two adjacent boxes have a different type. You are given the string $T = T_0 T_1 \ldots T_{2n-1}$ denoting the types, and an index i. You want to find all the boxes with a smaller height than the box i.

For any (u, v) with $T_u \neq T_v$, You can compare the values H_u and V_v using the function:

```
int compare(int u, int v)
```

which returns 0 if $H_u < H_v$ and 1 otherwise. Note that, if $T_u = T_v$, you instantly get a wrong answer verdict.

You need to implement the function:

```
vector<int> getLessThan(string T, int i)
```

that makes queries and returns a vector containing all the distinct indices with smaller value than that of the index i. If no such index exists, you should return an empty vector. Note that any permutation of the correct output is accepted as the return value.

Test Data and Scoring

There are multiple testfiles. In each file, $1 \leq n \leq 250$. Following is the scoring method for one file:

- If you make an invalid query (either of u, v out of the range $[0, 2n-1]$, or if $T_u = T_v$), you get a score of 0.
- If you ask more than 10^5 queries, or if your output is incorrect, you get a score of 0.
- Otherwise, if you ask Q queries, you get a score of $100\sqrt{\frac{1000}{\max(1000, Q)}}$. In particular, you get 100 points if $Q \leq 1000$.

The overall score is the minimum score among all the testfiles.

Local testing

You are provided with a dummy grader with the name `dummy_grader.cpp`. You should compile your solution (assumed to be in the file `solution.cpp`) as:

```
g++ solution.cpp dummy_grader.cpp -o grader
```

Then you can run `./grader`, and give input of the form as given in the sample input:

- The first line contains T, the number of testcases.
- The first line contains n
- The second line contains the heights $H_0, H_1, \ldots, H_{2n-1}$.

- The third line contains T and i, separated by a space.

Do NOT read anything from stdin or write something to stdout/stderr.

Limits

Time: 2 seconds

Memory: 256 MB