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Climbing the Leaderboard 🔖

by Shafaet

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Alice is playing an arcade game and wants to climb to the top of the leaderboard. Can you help her track her ranking as she beats each level? The game uses Dense Ranking, so its leaderboard works like this:

- The player with the highest score is ranked number 1 on the leaderboard.

- Players who have equal scores receive the same ranking number, and the next player(s) receive the immediately following ranking number.

For example, four players have the scores 100, 90, 90, and 80. Those players will have ranks 1, 2, 2, and 3, respectively.

When Alice starts playing, there are already n people on the leaderboard. The score of each player i is denoted by s_i. Alice plays for m levels, and we denote her total score after passing each level j as $alice_j$. After completing each level, Alice wants to know her current rank.

You are given an array, $scores$, of *monotonically decreasing* leaderboard scores, and another array, $alice$, of Alice's cumulative scores for each level of the game. You must print m integers. The jth integer should indicate the current rank of alice after passing the jth level.

Input Format

The first line contains an integer, n, denoting the number of players already on the leaderboard.
The next line contains n space-separated integers describing the respective values of $scores_0, scores_1, \ldots, scores_{n-1}$.
The next line contains an integer, m, denoting the number of levels Alice beats.
The last line contains m space-separated integers describing the respective values of $alice_0, alice_1, \ldots, alice_{m-1}$.

Constraints

- $1 \leq n \leq 2 \times 10^5$

- $1 \leq m \leq 2 \times 10^5$

- $0 \leq scores_i \leq 10^9$ for $0 \leq i < n$

- $0 \leq alice_j \leq 10^9$ for $0 \leq j < m$

- The existing leaderboard, $scores$, is in *descending* order.

- Alice's scores are cumulative, so $alice$ is in *ascending* order.

Subtask

For 60% of the maximum score:

- $1 \leq n \leq 200$

- $1 \leq m \leq 200$

Output Format

Print m integers. The jth integer should indicate the rank of alice after passing the jth level.

Sample Input 1   Copy Download

| 100 | 100 | 50 | 40 | 40 | 20 | 10 |

Array: scores

```
7
100 100 50 40 40 20 10
4
5 25 50 120
```

| 5 | 25 | 50 | 120 |

Array: alice

Sample Output 1

```
6
4
2
1
```

Explanation 1

Alice starts playing with **7** players already on the leaderboard, which looks like this:

Rank	Name	Score
1	Emma	100
1	David	100
2	Caroline	50
3	Ritika	40
3	Tom	40
4	Heraldo	20
5	Riley	10

After Alice finishes level **0**, her score is **5** and her ranking is **6**:

Rank	Name	Score
1	Emma	100
1	David	100
2	Caroline	50
3	Ritika	40
3	Tom	40
4	Heraldo	20
5	Riley	10
6	**Alice**	**5**

After Alice finishes level **1**, her score is **25** and her ranking is **4**:

Rank	Name	Score
1	Emma	100
1	David	100
2	Caroline	50
3	Ritika	40
3	Tom	40
4	**Alice**	**25**
5	Heraldo	20
6	Riley	10

After Alice finishes level **2**, her score is **50** and her ranking is tied with Caroline at **2**:

Rank	Name	Score
1	Emma	100
1	David	100
2	Caroline	50
2	**Alice**	**50**
3	Ritika	40
3	Tom	40
4	Heraldo	20
5	Riley	10

After Alice finishes level 3, her score is 120 and her ranking is 1:

Rank	Name	Score
1	**Alice**	**120**
2	Emma	100
2	David	100
3	Caroline	50
4	Ritika	40
4	Tom	40
5	Heraldo	20
6	Riley	10

Medium
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Current Buffer (saved locally, editable) ⑂ 🕓   C++14 ⌄   ⤢ ⚙

```
 8 ▾ #include <stack>
 9   #include <iostream>
10   typedef long long int int64;
11
12   int main()
13 ▾ {
14       int64 n, m, tmp;
15       std::cin >> n;
16
17       std::stack<int64> scores;
```

```
18      for (int64 i = 0; i < n; ++i)
19      {
20          std::cin >> tmp;      // save only different scores
21          if (scores.empty() || scores.top() != tmp) scores.push(tmp);
22      }
23
24      std::cin >> m;
25      for (int64 i = 0; i < m; ++i)
26      {
27          std::cin >> tmp;
28          // pop until the finds Alce' scores >= leaderbord
29          while (!scores.empty() && tmp >= scores.top())  scores.pop();
30          std::cout << (scores.size() + 1) << std::endl;
31      }
32      return 0;
33  }
```

Line: 33 Col: 2

⬆ Upload Code as File   ☐ Test against custom input   Run Code   Submit Code

Congrats, you solved this challenge!

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✔ Test Case #0   ✔ Test Case #1   ✔ Test Case #2

✔ Test Case #3   ✔ Test Case #4   ✔ Test Case #5

✔ Test Case #6   ✔ Test Case #7   ✔ Test Case #8

✔ Test Case #9   ✔ Test Case #10

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