Locked Doors (12pts, 26pts)

Practice Submissions

You have not attempted this problem.

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PROBLEM	ANALYSIS

Problem

Bangles is preparing to go on a tour of her local museum. The museum is made up of **N** rooms in a row, numbered from 1 to **N** from left to right. The rooms are connected by **N**-1 locked doors, each connecting a pair of adjacent rooms. Each door has a *difficulty level* indicating how difficult it is for Bangles to open the door. No two doors will have the same difficulty level. The door between the i-th room and (i+1)-th room has difficulty level D_i.

Bangles will pick one of the rooms to start in, and visit each of the rooms in the museum one at a time, taking pictures as she goes. She takes a picture in her starting room, then she repeats the following procedure until she has taken a picture in all the rooms: Of the two locked doors available to her, she will open the door with the lower difficulty level and take a picture in the newly unlocked room. If there is only one locked door available to her, then she will unlock that door. Once a door is unlocked, it remains unlocked.

Bangles is not yet sure which room she would like to start in, so she needs you to answer **Q** queries. For the i-th query, she would like to know: What is the K_i-th room that she will take a picture in if she starts in the S_i-th room?

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow. The first line of each test case contains the two integers **N** and **Q**. The second line contains **N**-1 integers, describing the locked doors. The i-th integer (starting from 1) is D_i. Then, **Q** lines follow, describing the queries. The i-th of these lines contains the two integers S_i and K_i.

Output

For each test case, output one line containing `Case #x: y`, where x is the test case number (starting from 1) and y is a list of the answers for the **Q** queries in order, separated by spaces.

Limits

Time limit: 40 seconds per test set.
Memory limit: 1GB.
$1 \le T \le 100$.
$1 \le D_i \le 10^5$, for all i.
All D_i are distinct.
$1 \le S_i \le N$, for all i.
$1 \le K_i \le N$, for all i.

Test set 1

$2 \le N \le 1000$.
$1 \le Q \le 1000$.

Test set 2

$2 \le N \le 10^5$ and $1 \le Q \le 10^5$ for at most 20 test cases.
For the remaining cases, $2 \le N \le 1000$ and $1 \le Q \le 1000$.

Sample

Input	Output
2	
5 4	
90 30 40 60	
3 4	
3 1	
1 5	Case #1: 5 3 5 2
4 3	Case #2: 8 8
10 2	
6 2 4 5 9 30 7 1 8	
6 8	
6 8	

In sample case #1, there are four queries:

- In the first query, Bangle takes pictures in the rooms in the order 3, 2, 4, 5 and 1, so the answer is 5.
- In the second query, Bangle takes pictures in the rooms in the order 3, 2, 4, 5 and 1, so the answer is 3.
- In the third query, Bangle takes pictures in the rooms in the order 1, 2, 3, 4 and 5, so the answer is 5.
- In the fourth query, Bangle takes pictures in the rooms in the order 4, 3, 2, 5, and 1, so the answer is 2.

In sample case #2, there are two queries:

- In the first query, Bangle takes pictures in the rooms in the order 6, 5, 4, 3, 2, 1, 7, 8, 9 and 10, so the answer is 8.
- The second query is the same as the first, so the answer is also 8.