



The Tree Hotel

Module 2 - Data Structures IUP 2023
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Description

Today is the grand opening of the Tree Hotel. The hotel is build around a really big tree, and every room is located on every branch of the tree, which interestingly always branch into two. There is already a few guest who are interested in the unique concept of the hotel and booked there, although there is one problem: some of the guest is a bit confused when they are heading to their room, because apparently the room numbering of this hotel is unlike most hotel, due to the unique structure of it.

The hotel manager decided to hire you as the hotel IT support to solve this problem. You know that it is entirely out of your scope as an IT support, but the manager offers you a very high bonus, which you gladly accept. Your task is very simple: **write a program that can show the path from the hotel lobby to the guest's room**. The guest needs to go through several other rooms before entering their own. You remember you have learnt about binary search tree, and that the knowledge is applicable to solve this problem.

Input Format

The first line contains two integers n and g , where n is the number of rooms in the hotel and g is the number of guest.

The next line will contain n integers r_i , the room numbers in the hotel (including the lobby)

Finally, each of the next g lines will contain an integer d_j , the room number of the j -th guest

Output Format

If there's a path for the j -th customer to their room, then print the customer number and the path from the lobby (root) to the room number as follows, j : $x \ x \ \dots \ x$ (see **Example** for more detail)

Otherwise, print j : path not found

Constraints

$$1 \leq n, g, i, j \leq 30$$

$$1 \leq r_i, d_j \leq 100$$

Example

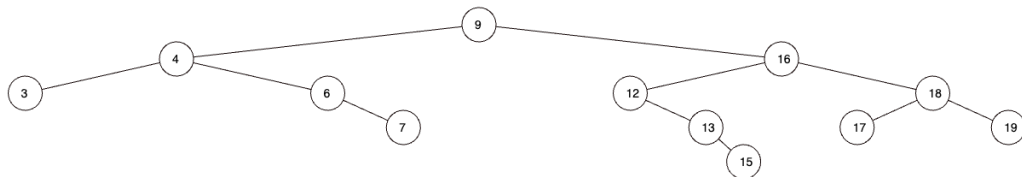
Input 1

```
12 4
9 4 3 6 7 16 12 13 15 18 17 19
3
7
13
20
```

Output 1

```
1: 9 4 3
2: 9 4 6 7
3: 9 16 12 13
4: path not found
```

Explanation



There are 12 rooms in the hotel including the lobby. The 1st guest wants to go to room 3. The lobby will always be located in the root and in this case, the node 9. So the path from 9 to 3 is 9 4 3. The 2nd guest must go through room 4 and 6 to get to room 7, so the full path is 9 4 6 7. The path for the 3rd guest to room 13 is 9 16 12 13, and as for the 4th guest, print 4: path not found since room 20 doesn't exist