

2591 The Tree Movers

Given two binary search trees, A and B, with nodes identified by (that is, having keys equal to) positive, non-zero integers, and the use of commands “delete K ” and “add K ” (defined below), what is the smallest number of commands that can be used to transform tree A into tree B?

Recall that in a binary search tree, the keys of all nodes in the left subtree of a node with key K must be less than K . Similarly, the keys of all nodes in the right subtree of a node with key K must be greater than K . There are no duplicate nodes.

The “delete K ” command will delete the tree (or subtree) with its root at the node with the key K . Deleting the root of the entire tree leaves an empty tree. The “add K ” command will add a new node identified by the integer K . This node will naturally be a leaf node.

Since we seek to transform tree A into tree B, it follows that commands will be applied only to tree A; tree B is “read only”.

It is easy to see that it should never require more than $N+1$ commands to achieve the transformation of A into B, since deletion of the root node of tree A followed by the addition of one node for each of the N nodes in B (in the proper order) will achieve the desired goal. Equally easy to determine is the minimum number of commands required: if A and B are identical, then zero commands are required.

Input

There will be multiple input cases. For each case, the input contains the description of tree A followed by the description of tree B. Each tree description consists of an integer N that specifies the number of nodes in the tree, following by the keys of the N nodes in an order such that N “add” commands would create the tree. The last case is followed by the integer ‘-1’.

Note: No node will have a key larger than 10^9 , and N will be no larger than 100.

Output

For each case, display a single line containing the input case number (1,2,...) and the number of commands required to transform tree A into tree B, formatted as shown in the examples below.

Sample Input

```
4 5 2 7 4 6 5 3 7 1 4 9
0 0
1 100 0
0 1 100
3 100 49 37 2 200 152
-1
```

Sample Output

```
Case 1: 5 commands.
Case 2: 0 commands.
Case 3: 1 command.
Case 4: 1 command.
Case 5: 3 commands.
```