

CURATOR CATASTROPHE

As the curator of your local art museum, Madam Tsill has tasked you with exhibiting her latest art piece. Her work consists of N pedestals in a row, numbered 1 to N from left to right, where the i th pedestal has a height h_i . Madam Tsill also produced N paintings, numbered from 1 to N , and you have placed one on top of each pedestal.

It's an hour before the grand opening, and you just discovered that there are labels on the paintings, each a distinct integer between 1 to N . To your horror, you realise that these labels describe the order that Madam Tsill intended the paintings to be displayed.

The painting on pedestal i has the label a_i , which means that you must move this painting to pedestal a_i . To achieve this, you can ask your assistant to do the following:

- Pick two pedestals and swap the paintings on them. Due to technical restrictions, your assistant **can only swap paintings that are on pedestals of different heights**.

You do not wish to delay the grand opening of this new masterpiece, and so you must reorder the paintings using the minimum number of swaps. What is the minimum number of swaps required to reorder the paintings, or is it impossible? Additionally, if it is possible, you should output a corresponding sequence of swaps. Partial marks will be awarded if you do not output a valid sequence of swaps. See the scoring section for details.

Subtasks and Constraints

For all subtasks:

- $2 \leq N \leq 200\,000$.
- $1 \leq a_i \leq N$ for all i .
- $a_i \neq a_j$ for all $i \neq j$.
- $1 \leq h_i \leq 200\,000$ for all i .

Additional constraints for each subtask are given below.

Subtask	Points	Additional constraints
1	10	$N \leq 2\,000$ and $h_i = i$ for all i .
2	10	$h_i = i$ for all i .
3	15	$h_1 = 1$ and $h_i = 2$ for all $i > 1$
4	15	$N \leq 2\,000$ and $h_i \leq 2$ for all i . Additionally, $a_1 = N$ and $a_i = i - 1$ for all $i > 1$.
5	30	$h_i \leq 2$ for all i .
6	15	$N \leq 2\,000$.
7	5	No additional constraints.

Input

- The first line of input contains the integer N .
- The second line contains N integers a_1, a_2, \dots, a_N .
- The third line contains N integers h_1, h_2, \dots, h_N .

Output

If there does not exist a way to correctly reorder the paintings, you should output -1 .

Otherwise, your program should output the minimum number of swaps required to reorder the paintings (call this M). The following M lines should each contain two integers: the indices of two pedestals that should have their paintings swapped.

If there are multiple possible solutions, you may output any of them.

Scoring

You will receive 50% if you determine the minimum number of swaps but do not output a valid sequence of swaps:

- If your output is correct, you will receive 100% for that test case. Otherwise,
- If your first line of output is correct, you will receive 50% for that test case. Otherwise,
- You will receive 0% for that test case.

Your score for a subtask will be the **minimum** score of all test cases in the subtask, multiplied by the number of points you can score in the subtask.

Sample Input 1

```
4
2 1 4 3
1 2 3 4
```

Sample Output 1

```
2
3 4
1 2
```

Sample Input 2

```
4
2 1 4 3
1 1 1 1
```

Sample Output 2

```
-1
```

Sample Input 3

```
3
1 2 3
1 2 2
```

Sample Output 3

```
0
```

Explanation

In the first sample case, the paintings can be reordered using two swaps, as shown in Figure 1.

In the second sample case, all pedestals are the same height. It is impossible to reorder the paintings because no swaps can be done.

In the third sample case, the paintings are already ordered correctly and so no swaps are required.

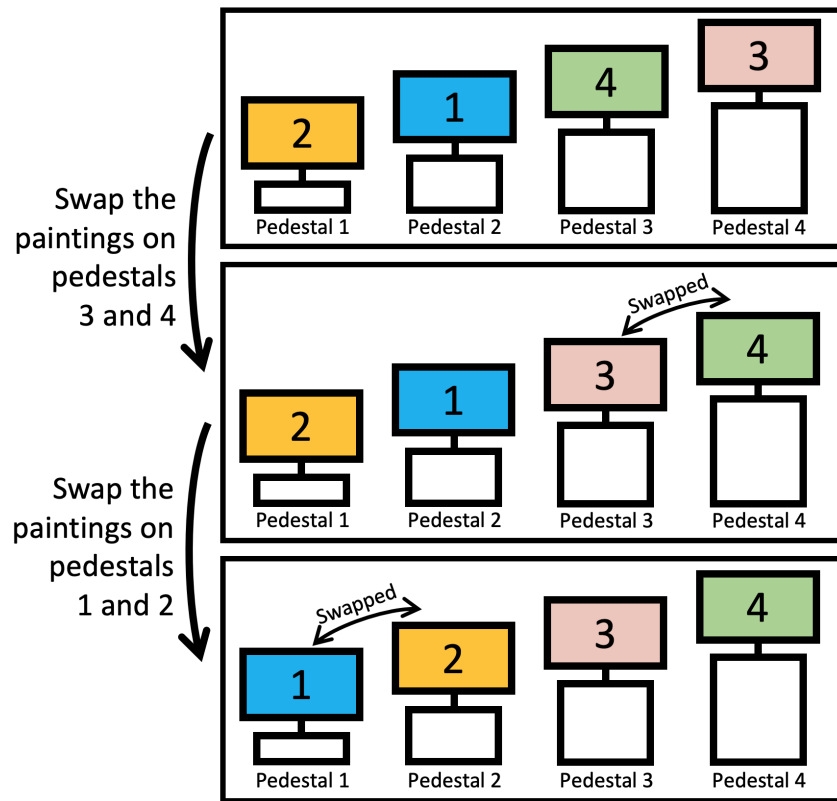


Figure 1: Sample Case 1