Book Sorting

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

You have n books arranged from left to right on a bookshelf. These books are uniquely labeled from 1 to n. The i-th book from the left is labeled p_i. You want to sort the books so that their labels are in ascending order from left to right.

In one step, you can perform one of the following actions:

- Choose two adjacent books and swap them.
- Choose one book and move it to the leftmost position.
- Choose one book and move it to the rightmost position.

Compute the minimum number of steps required to sort the books.

Input

The first line of input contains an integer n ($2 \leq n \leq 500\,000$). The second line contains n pairwise distinct integers $p_1, p_2, \ldots, p_n$ ($1 \leq p_i \leq n$).

Output

Output the minimum number of steps to sort the books in ascending order from left to right by their labels.

Examples

standard input	standard output
6 6 2 1 4 3 5	3
9 9 2 4 3 7 5 1 8 6	5

Note

Explanation for the sample input/output #1

You can do the following three steps in order: swap the books labeled 2 and 1, swap the books labeled 4 and 3, and move the book labeled 6 to the rightmost position.

$$6\ 2\ 1\ 4\ 3\ 5 \to 6\ 1\ 2\ 4\ 3\ 5 \to 6\ 1\ 2\ 3\ 4\ 5 \to 1\ 2\ 3\ 4\ 5\ 6$$

It can be shown that two or fewer steps are insufficient to sort the books.

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