

# Sorting is not easy

An  $N$ -element permutation is an  $N$ -element sequence of distinct numbers from the set  $\{1, 2, \dots, n\}$ . For example the sequence 2,1,4,5,3 is a 5-element permutation.  $P$  is an  $N$ -element permutation. Your task is to sort  $P$  in ascending order. But because it is very simple, I have a new rule for you. You have two sequences  $P$  and  $Q$ .  $P$  is an  $N$ -element permutation and  $Q$  is initially empty and formed by sorting  $P$  (i.e. finally  $Q = 1, 2, 3, \dots, N$ ). You have to implement  $N$  steps to sort  $P$ . In the  $i$ -th step,  $P$  has  $N-i+1$  remaining elements,  $Q$  has  $i-1$  elements and you have to choose some  $x$ -th element (from the  $N-i+1$  available elements) of  $P$  and put it to the left or to the right of  $Q$ . The cost of this step is equal to  $x * i$ . The total cost is the sum of costs of individual steps. After  $N$  steps,  $Q$  must be an ascending sequence. Your task is to minimize the total cost.

## Input

The first line of the input file is  $T$  ( $T \leq 10$ ), the number of test cases. Then descriptions of  $T$  test cases follow. The description of each test case consists of two lines. The first line contains a single integer  $N$  ( $1 \leq N \leq 1000$ ). The second line contains  $N$  distinct integers from the set  $\{1, 2, \dots, N\}$ , the  $N$ -element permutation  $P$ .

## Output

For each test case your program should write one line, containing a single integer - the minimum total cost of sorting.

## Example

$N = 4$

$P = \{4, 1, 3, 2\}$

Step 1, Choose 3-rd,  $P = \{4, 1, 2\}$ ,  $Q = \{3\}$ , Cost=3

Step 2, Choose 1-st,  $P = \{1, 2\}$ ,  $Q = \{3, 4\}$ , Cost=2

Step 3, Choose 2-nd,  $P = \{1\}$ ,  $Q = \{2, 3, 4\}$ , Cost=6

Step 4, Choose 1-st,  $P = \{\}$ ,  $Q = \{1, 2, 3, 4\}$ , Cost=4

The total cost is 15.

Another way to sort:

Step 1, Choose 4-th,  $P = \{4, 1, 3\}$ ,  $Q = \{2\}$ , Cost=4

Step 2, Choose 2-nd,  $P = \{4, 3\}$ ,  $Q = \{1, 2\}$ , Cost=4

Step 3, Choose 2-nd,  $P = \{4\}$ ,  $Q = \{1, 2, 3\}$ , Cost=6

Step 4, Choose 1-st,  $P = \{\}$ ,  $Q = \{1, 2, 3, 4\}$ , Cost=4

The total cost is 18.

**Input:**

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

**Output:**

```
15
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