

Problem G. Quick Sort

Input file: standard input
Output file: standard output
Time limit: 5 seconds
Memory limit: 512 megabytes

When Prof. Pang was young, he wrote the following code for quick sort. Please calculate how many swaps are performed when calling `QUICKSORT($A, 1, n$)`. A is a given permutation with length n .

Algorithm 2 An implementation of quick sort

```
1: procedure QUICKSORT( $A, lo, hi$ )
2:   if  $lo \geq 0$  and  $hi \geq 0$  and  $lo < hi$  then
3:      $p \leftarrow$  PARTITION( $A, lo, hi$ )
4:     QUICKSORT( $A, lo, p$ )
5:     QUICKSORT( $A, p + 1, hi$ )
6:   end if
7: end procedure
8: procedure PARTITION( $A, lo, hi$ )
9:    $pivot \leftarrow A[\text{floor}((hi + lo)/2)]$ 
10:   $i \leftarrow lo - 1$ 
11:   $j \leftarrow hi + 1$ 
12:  while True do
13:    repeat
14:       $i \leftarrow i + 1$ 
15:    until  $A[i] \geq pivot$ 
16:    repeat
17:       $j \leftarrow j - 1$ 
18:    until  $A[j] \leq pivot$ 
19:    if  $i \geq j$  then
20:      return  $j$ 
21:    end if
22:    Swap  $A[i]$  with  $A[j]$ 
23:  end while
24: end procedure
```

Input

The first line contains one integer T ($1 \leq T \leq 10^5$), the number of test cases.

For each test case, the first line contains one positive integer n ($1 \leq n \leq 5 \times 10^5$). The next line contains n integers a_1, \dots, a_n ($1 \leq a_i \leq n$) denoting the permutation A . It is guaranteed that a_1, \dots, a_n form a permutation, i.e. $a_i \neq a_j$ for $i \neq j$.

It is guaranteed that the sum of n over all test cases is no more than 5×10^5 .

Output

For each test case, output one line containing the number of swaps performed when calling `quicksort($A, 1, n$)`.

Example

standard input	standard output
3	1
3	4
3 2 1	7
5	
2 4 5 3 1	
10	
7 2 4 6 1 9 10 8 5 3	