

APS Assignment 3

Note: This assignment is a bit difficult. It may take more time than usual. You are **not** allowed to discuss the logic of any questions with your friends. If you discuss we will know..:). If you are stuck you may ask the TA's. These questions will be uploaded on mooshak by Tuesday.

Deadline for this assignment is Saturday(28th September) Midnight.

1) Let A be an array of n positive integers. All the elements are distinct. If $A[i] > A[j]$ and $i < j$ then the pair (i, j) is called a special pair of A. Given n find the number of special pairs of A.

Input

The first line contains t, the number of testcases. Each of the t tests start with a number n ($n \leq 100000$). Then the next line will contain n + 1 space saperated numbers. $A[i] \leq 10^7$.

Output

For each case output one line containing the number of special pairs of A.

Example

Input:

```
2
5
2 3 8 6 1
3
3 1 2
```

Output:

```
5
2
```

2) Having taken APS course and attended 4 labs already, you soon relaized that you need more luck in addition to problem solving skills :). The astrologer you met in Indranagar told you that 3, 7, and 9 are your lucky digits. A lucky number for you is a number that contains only your lucky digits in it. For eg: 3, 79, 933 etc., are lucky, where as 372, 91, 70 are not. Given a large integer N, count the number of lucky numbers in $[1, \dots, N]$

Input

Multiple lines having an integer N ($1 \leq N \leq 10^{14}$).

Output

Number of lucky numbers in $[1, \dots, N]$ followed by a '\n' (just print '\n', no need to display on screen)

Time Limit : 2s

Example

Input:

78
1000

Output:

8
39

Explanation:

The lucky numbers not more than 78 are 3, 7, 9, 33, 37, 39, 73, 77

3) You all know what a palindrome is. Its a number which is same when it is read from left or right. For a given number N of D digits where $D < 1000000$, find the smallest palindrome larger than N.

Input

There will be T testcases (given in first line of the input). Next T lines contain the number N.

Output

For each input, output the next higher palindrome of N.

Example**Input:**

2
123
121

Output:

131
131

4) Pankaj and Rishit has to send encrypted messages to each other. So Pankaj decides on a simple scheme, where A is assigned code 1, B is assigned 2, and so on. (Z is assigned 26). But Rishit argues that the scheme will be ambiguous, as 111 can be decoded as AAA or AK or KA. So your task is to tell Pankaj how many different decodings are possible for a given number.

Input

There will be many testcases. Each number will be of atmost 5000 digits. The first digit of input will never be a zero. The last line will contain a 0 which would indicate end of input.

Output

For each number, output in a single line the number of possible decodings.

Example

Input:

2614
111
333
0

Output:

4
3
1

5) Given two different permutations A and B from 1 to n, your task is to convert A into B in minimum possible moves.

You can only do one type of move i.e. Pick a number from A and insert it in the front.

Eg. if A = {3 5 1 2 4} and B = {4 2 3 5 1} then you will need two moves, the first one will be to pick 2 and put it in the front so A will become {2 3 5 1 4} and then pick 4 and put it in the front. So A will be {4 2 3 5 1}.

Input

Each input will have multiple testcases. Each test cases will have three lines. The first line will have one number N denoting the number of numbers. The next line will have N numbers representing A which will be some permutation of n. The next line will be some other permutation representing B. A zero at the end will indicate end of input. $2 \leq N \leq 1000000$. $T < 10$.

Ouput

For each test case output the minimum steps required to convert set A to B.

Example

Input:

5
3 5 1 2 4
4 2 3 5 1
5
3 2 1 4 5
5 2 3 1 4

Output:

2
2