

## [K] The Most Secure PIN

Time limit: 1 second  
Memory limit: 65535 kBytes

### Description

The Bank of Kaprekar City has asked its customers to provide new PIN codes for their bank accounts.

PIN codes are nonnegative integers (without leading zeros) consisting of 1, 2, 3, 4, 5, or 6 decimal digits. A customer may propose multiple PIN codes and the bank will select the first strongest one using its own algorithm, which will then become the customer's new PIN code.

To determine the strength, the bank uses an iterative algorithm. In each iteration, the algorithm takes the given number (the PIN code in the first step), rearranges its digits first in descending and then in ascending order, and calculates the difference between the two resulting numbers. The algorithm then continues by processing this difference in the next iteration. This process repeats until the differences begin to form a repeating pattern.

The strength of a PIN code is the number of integers (including the starting PIN) processed by the bank's algorithm up to and including the first occurrence of a difference that will later repeat in the sequence.

Let us select the strongest PIN code from those provided by customers!

### Input

A customer's input file contains the PIN codes they have listed, one per line.

### Output

The output should contain one line: the strongest PIN code and its strength (the number of iterations), separated by a space.

### Constraints

Each test file contains at most 5000 PIN codes.

PIN codes may consist of 1, 2, 3, 4, 5, or 6 decimal digits.

### Examples

Input	Output
8	6584 8
12	
6584	
54274	
185	

## Explanation

PIN	Strength
8	2
12	3
6584	8
54274	5
185	4

For example, for 6584, the bank's algorithm proceeds as follows:

Step 1: 6584

Step 2:  $8654 - 4568 = 4086$

Step 3:  $8640 - 468 = 8172$

Step 4:  $8721 - 1278 = 7443$

Step 5:  $7443 - 3447 = 3996$

Step 6:  $9963 - 3699 = 6264$

Step 7:  $6642 - 2466 = 4176$

Step 8:  $7641 - 1467 = 6174$

Step 9:  $7641 - 1467 = 6174$

On step 9, the result from step 8 repeats, so the strength is 8.