Number Chain

(Time Limit: 1 sec, Memory Limit: 512 MB)

Description

Given a number, we can form a number chain by

1. arranging its digits in descending order
2. arranging its digits in ascending order
3. subtracting the number obtained in (2) from the number obtained (1) to form a new number
4. and repeat these steps unless the new number has already appeared in the chain

Input

The input consists of a sequence of positive numbers, all less than 109, each on its own line, terminated by ‘0’. The input file contains at most 5000 numbers.

Output

原本的數字及中間計算的過程，鏈長總長度，有可能將包含超過 1000 個不同的數字。

Constraints

- $2 \leq n \leq 2 \cdot 10^5$

Sample Input/Output

Input	Output
123456789	Original number was 123456789 987654321 - 123456789 = 864197532 987654321 - 123456789 = 864197532 Chain length 2
1234	Original number was 1234 4321 - 1234 = 3087 8730 - 378 = 8352 8532 - 2358 = 6174 7641 - 1467 = 6174 Chain length 4
444	Original number was 444 444 - 444 = 0 0 - 0 = 0 Chain length 2
0	