

# Begin

Begin a sequence of distinct natural numbers  $N_i$ ,  $i = 0, 1, 2, \dots$ , with the number  $B (= N_0)$ ; generate numbers  $N_i$ ,  $i = 1, 2, \dots$ , recursively and end the sequence with the last generated number  $E$ . The characteristic of numbers and the process for generation are stated below:

\* Each number in the sequence contains an even number of decimal digits and is of the form  $f_1d_1f_2d_2f_k\dots d_k$  where  $d_1, d_2, \dots, d_k$ , are  $k$  distinct digits in increasing order and each  $f_j$  is a non-zero digit.

\* For  $i = 0, 1, 2, \dots$ , if  $N_i = f_1d_1f_2d_2\dots f_kd_k$  then  $N_{i+1} = F_1D_1F_2D_2\dots F_KD_K$ , where  $K \geq k$ ;  $D_1, D_2, \dots, D_K$ , are distinct digits that occur in  $N_i$  and appear in increasing order in  $N_{i+1}$ ; and  $F_J$  is the frequency of  $D_J$  in  $N_i$ , for  $J = 1, 2, \dots, K$ . For example if  $N_i = 102335$  then  $N_{i+1} = 1011122315$ .

Write a program to find for a given  $E$ , the longest sequence of numbers that ends with  $E$  and begins with the smallest  $B$ .

Again consider an example; if  $E = 1011122315$  then the required sequence of numbers is 303355 103325 1011122315.

## Input

The input may contain multiple test cases.

Each test case contains only one input, viz.,  $E$ .

The input terminates when a line containing 0 appears as a test case.

## Output

For each test case, print the longest sequence of numbers that ends with  $E$  and begins with the smallest  $B$ . Use space to separate two consecutive numbers in the sequence.

## Example

### Sample Input

```
1011122315
22
112213
0
```

### Sample Output

```
303355 103325 1011122315
22
13 1113 3113 2123 112213
```