UVa Online Judge

2609 Gene Blues

It is the 23rd century. You are currently employed at the leading interstellar hospital, where scientists are conducting genetic research on all of the various species encountered during space travel. Each species has a specific number of nucleic acids that make up their genes. For instance, humans have 4. Some species have as many as 8, some as few as 1.

One interesting characteristic of some species is that they have "duplicate" nucleic acids. That is, in most cases, a species with 4 nucleic acids would have them identified as '`abcd`', but some species with 4 would have them labeled '`abcc`'.

Scientists at the hospital are able to determine the nucleic acids that make up each species' genes, but need a listing of all UNIQUE permutations, in order to search the genome for specific targets.

Input

Write a program that reads in a series of strings, one per line.

Each string represents the nucleic acids which make up the genes of one species. Each nucleic acid will be represented by a letter of the alphabet. Note that a gene named '`A`' is NOT a duplicate of a gene named '`a`'.

Input will be terminated by a string containing a single, lower-case '`x`'.

Output

For each string the program outputss the total number of UNIQUE permutations followed by an ASCII-ordered listing of the permutations

Output format is as shown below.

Sample Input

```
abc
abb
Bab
x
```

Sample Output

```
There are 6 permutations for abc:
abc
acb
bac
bca
cab
cba
There are 3 permutations for abb:
abb
bab
bba
There are 6 permutations for Bab:
Bab
```

```
Bba
aBb
abB
bBa
baB
```