F: Finding Common Passwords

Source file name: `find.c`, `find.cpp`, `find.java`, *or* `find.py`
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As a Security Engineer, one of your main responsibilities is to ensure that employees in the company use passwords that are uncommon and hard to guess. Unfortunately, you suspect that your colleagues are not adhering to this idea: several email accounts, with confidental company information, have been recently compromised by a hacking group known as the International Common Password Connoisseurs (ICPC).

To protect against future attacks, you started an audit of an anonymized sample of passwords, and have discovered that people frequently include common words like `admin` or `secret` in their passwords. It turns out, for instance, that `qwerty` appeared in at least 60% of the passwords! You have decided to systematically look for long strings appearing often in the list of passwords. Specifically, given a list of N passwords and a positive integer K, you are looking for the longest string in the N passwords appearing at least in K of them.

For instance, consider the following list of $N = 5$ passwords:

```
monkey   monk   money   motorcycle   recycle
```

In the case $K = 2$, the longest such (sub)string is `cycle`. In the case $K = 3$, the longest substring is `mon`. However, in the case $K = 5$, the longest substring is the empty one.

Recall that a substring is defined as a contiguous sequence of characters within a string. For example, `monk`, `onke`, and `key` are substrings of `monkey` but `money` is not. By definition, a string is always a substring of itself. Note that, in some cases, there may be multiple answers. In this problem, in such cases, the interest is in the substring lexicographically smallest (i.e., the one appearing first in a dictionary). For example, `aac` is lexicographically smaller than `aacb`, `ab`, and `aad`, but `aac` is not lexicographically smaller than `aab`.

Given a list of N passwords and an integer K, what is the longest string in the N passwords appearing at least in K of them?

Input

The input consists of several test cases. Each test case starts with a line with two integers N and K ($1 \leq N \leq 100\,000$ and $1 \leq K \leq N$). The next N lines contain the password list, one per line. The passwords are non-empty and only contain lowercase English letters (`a-z`). The sum of the lengths of all passwords in the list does not exceed 100 000. The last line of the input contains two blank-separated zeros and should not be processed.

The input must be read from standard input.

Output

For each test case output a single line with the longest string that is a substring of at least K passwords. If there are multiple possible options, output the one that is lexicographically smallest. If such a string is the empty one, output a single asterisk (*).

The output must be written to standard output.

Sample Input

```
5 1
monkey
monk
money
motorcycle
recycle
5 2
monkey
monk
money
motorcycle
recycle
5 3
monkey
monk
money
motorcycle
recycle
5 4
monkey
monk
money
motorcycle
recycle
5 5
monkey
monk
money
motorcycle
recycle
3 1
security
security
insecure
3 2
security
security
insecure
3 3
security
security
insecure
0 0
```

Sample Output

```
motorcycle
cycle
mon
mo
*
insecure
security
secur
```