E. Little Elephant and Strings

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

The Little Elephant loves strings very much.

He has an array a from n strings, consisting of lowercase English letters. Let's number the elements of the array from 1 to n, then let's denote the element number i as a_i. For each string a_i $(1 \le i \le n)$ the Little Elephant wants to find the number of pairs of integers l and r $(1 \le l \le r \le |a_i|)$ such that substring $a_i[l... r]$ is a substring to at least k strings from array a (including the i-th string).

Help the Little Elephant solve this problem.

If you are not familiar with the basic notation in string problems, you can find the corresponding definitions in the notes.

Input

The first line contains two space-separated integers — n and k $(1 \le n, k \le 10^5)$. Next n lines contain array a. The i-th line contains a non-empty string a_i, consisting of lowercase English letter. The total length of all strings a_i does not exceed 10^5.

Output

On a single line print n space-separated integers — the i-th number is the answer for string a_i.

Please, do not use the %lld specifier to read or write 64-bit integers in C++. It is preferred to use the cin, cout streams or the %I64d specifier.

Examples

input
3 1 abc a ab
output
6 1 3

input
7 4 rubik furik abab baba aaabbbababa abababababa zero
output
1 0 9 9 21 30 0

Note

Let's assume that you are given string $a = a_1 a_2 ... a_{|a|}$, then let's denote the string's length as $|a|$ and the string's i-th character as a_i.

A substring $a[l... r]$ $(1 \le l \le r \le |a|)$ of string a is string $a_l a_{l+1} ... a_r$.

String a is a substring of string b, if there exists such pair of integers l and r $(1 \le l \le r \le |b|)$, that $b[l... r] = a$.