Problem E. Job interview

Input file: standard input
Output file: standard output
Time limit: 3 seconds

Your friend Omar applied for a job at Xhub, a prestigious IT company in Morocco. To join this company, you have to be good at problem-solving.
While preparing for the job interview, he found this problem:

A string S is said to be periodic if it can be formed by repeating a string more than once, and its period k is the largest $k > 1$ such that S could be written as A^k (k repetitions of A) where A is a string. For example:

-“abcdabcd” is a periodic string because it can be formed by repeating “abcd” two times and its period is 2
-”abdabc” is not a periodic string

You are given a string S containing lowercase Latin alphabet. Find all periodic prefixes of S and their periods.

Help him solve this problem.

Input

The first line contains n $(2 \leq n \leq 10^6)$ the length of S.
The second line contains S, a string of lower case Latin alphabet.

Output

For each periodic prefix of S, print its length and its period on a separate line.
The prefixes should be printed in ascending order of their lengths.

Example

Standard input	Standard output
3 aaa	2 2 3 3
12 aabaabaabaab	2 2 6 2 9 3 12 4