

Today's Word

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

You have accepted an offer at VortaroEnMano Inc., a company committed to creating the most comprehensive Esperanto dictionary. Esperanto estas tre mojosa lingvo, so you work really hard to do your best – mostly to keep your job in the depression of employment.

Today, you're assigned to refactor the function called "Hodiaŭa Vorto", i.e. "Today's Word" in English. This word is generated from a string, denoted as S_k .

Here's how S_k is generated:

1. The process begins with an initial string, S_0 , which is given. This string contains only lowercase English letters and has an even length.
2. For $n \geq 1$, S_n is generated in the following way: $S_n = S_{n-1}[0 \dots \frac{l}{2} - 1] + S_{n-1} + \text{next}(S_{n-1}[\frac{l}{2} \dots l - 1])$, where l is the length of S_{n-1} and $+$ is used to concatenate the strings. Note that the index of the string starts from 0.

The function $\text{next}(S)$ increments each character in the string S to the next letter in the alphabet, i.e., **a** changes to **b**, **b** to **c**, and so on, with **z** changing to **a**. For instance, $\text{next}(\text{abz}) = \text{bca}$.

Your task is to determine the suffix of $S_{10^{100}}$ with a length of m .

Input

The first line contains two integers n and m ($1 \leq n, m \leq 10^5$), representing the length of S_0 and the length of the desired suffix, respectively. It is guaranteed that n is an even number.

The second line contains a string, S_0 , composed of n lowercase English letters.

Output

Output a string of length m , which represents the suffix you are tasked to determine.

Example

standard input	standard output
6 10 bocchi	wrwxrwxxy

Note

In the provided example, $S_1 = \text{boc } \underline{\text{bocchi}} \text{ dij}$.