Problem I. Phone Numbers

Time limit 2000 ms
Mem limit 262144 kB

And where the are the phone numbers?

You are given a string s consisting of lowercase English letters and an integer k. Find the lexicographically smallest string t of length k, such that its set of letters is a subset of the set of letters of s and s is lexicographically smaller than t.

It's guaranteed that the answer exists.

Note that the set of letters is a set, not a multiset. For example, the set of letters of `abadaba` is $\{a, b, d\}$.

String p is lexicographically smaller than string q, if p is a prefix of q, is not equal to q or there exists i, such that $p_i < q_i$ and for all $j < i$ it is satisfied that $p_j = q_j$. For example, `abc` is lexicographically smaller than `abcd` , `abd` is lexicographically smaller than `abec`, `afa` **is not** lexicographically smaller than `ab` and `a` **is not** lexicographically smaller than `a`.

Input

The first line of input contains two space separated integers n and k ($1 \le n, k \le 100\,000$) — the length of s and the required length of t.

The second line of input contains the string s consisting of n lowercase English letters.

Output

Output the string t conforming to the requirements above.

It's guaranteed that the answer exists.

Examples

Input	Output
3 3 abc	aca

Input	Output
3 2 abc	ac

Input	Output
3 3 ayy	yaa

Input	Output
2 3 ba	baa

Note

In the first example the list of strings t of length 3, such that the set of letters of t is a subset of letters of s is as follows: `aaa`, `aab`, `aac`, `aba`, `abb`, `abc`, `aca`, `acb`, ... Among them, those are lexicographically greater than `abc`: `aca`, `acb`, ... Out of those the lexicographically smallest is `aca`.