Wordplay

Ivana made up a long word of N letters. Then she wrote down all K-letter-substrings of that word. For example, if the original word is BANANA and K=3, Ivana writes down the words BAN, ANA, NAN, ANA. The number of these words is, obviously, N-K+1.

Ivana sorted these words in lexicographic order (in the given example, that would be ANA, ANA, BAN, NAN).

But the sad thing happened: Ivana forgot the original word! Your task is to reconstruct it. A unique solution will exist in all of the test data.

Constraints: $3 \leq N \leq 100\,000$, $2 \leq K \leq 15$, $K < N$.

Input

[integers N, K]

[N-K+1 words in lexicographic order, each consisting of capital English letters]

Output

[the required word]

Example

Input:

6 3
ANA
ANA
BAN
NAN

Output:

BANANA