Lexicographically Least Substring (Hard)

Brute Force Practice 2 — Hard Version

You have a string (indexed from 0) with no more than 10^6 lowercase characters. Find the lexicographically least substring with a length of at least K. A string S is said to be lexicographically smaller than a string T if \(|S|

Input

The first line will have the string.

The second line will have K.

Output

Print the lexicographically least substring of length at least K.

Sample Input

```
iloveprogramming
4
```

Sample Output

```
ammi
```