

Lexicographically Least Substring (Hard)

Time limit: 1.8s **Memory limit:** 256M

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 $|S| < |T|$ and S is a prefix of T or $S_k < T_k$ and $S_i = T_i$ ($0 \leq i < k, 0 \leq k < \min(|S|, |T|)$). Here, $|X|$ denotes the length of the string.

Input Specification

The first line will have the string.

The second line will have K .

Output Specification

Print the lexicographically least substring of length at least K .

Sample Input

```
iloveprogramming
4
```

Sample Output

```
ammi
```