Problem S3: Searching for Strings

Problem Description

You're given a string N, called the *needle*, and a string H, called the *haystack*, both of which contain only lowercase letters "a".."z".

Write a program to count the number of distinct permutations of N which appear as a substring of H at least once. Note that N can have anywhere between 1 and $|N|!$ distinct permutations in total – for example, the string "aab" has 3 distinct permutations ("aab", "aba", and "baa").

Input Specification

The first line contains N ($1 \leq |N| \leq 200\,000$), the needle string.

The second line contains H ($1 \leq |H| \leq 200\,000$), the haystack string.

For 3 of the 15 available marks, $|N| \leq 8$ and $|H| \leq 200$.

For an additional 2 of the 15 available marks, $|N| \leq 200$ and $|H| \leq 200$.

For an additional 2 of the 15 available marks, $|N| \leq 2000$ and $|H| \leq 2000$.

Output Specification

Output consists of one integer, the number of distinct permutations of N which appear as a substring of H.

Sample Input

```
aab
abacabaa
```

Output for Sample Input

```
2
```

Explanation of Output for Sample Input

The permutations "aba" and "baa" each appear as substrings of H (the former appears twice), while the permutation "aab" does not appear.

La version française figure à la suite de la version anglaise.