CS 124 Problem Set 6

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Due: Wednesday, April 01, 2015 11:59 pm EDT (**deadline passed**)

Problems

Problem A

The Infinite Monkey Theorem states that a monkey hitting keys at random on a typewriter for an infinite amount of time will almost surely type a given text. In this problem, you are given a string S of length N that a monkey has typed, along with a string T of length M.

Your goal is to count the number of times that T appears as a substring of S.
You may assume that S and T only contains lowercase alphabetic characters.

Hint: If Alice and Bob each hold n-bit integers, how might they determine whether x = y with much fewer than n bits of communication?

CONSTRAINTS
1 <= M <= N <= 5000000

TEST CASES & TIME LIMITS
Test 1 is the sample input / output.

Tests 2-6 have N <= 100000.
2000 ms

Tests 7-11 have N <= 500000.
2000 ms

Tests 12-16 have N <= 5000000.
2000 ms

(3x for Java, 10x for Python)

INPUT FORMAT
Two lines, the first containing string T and the second containing string S.

OUTPUT FORMAT
Print a single integer representing the number of times T appears as a subtring of S.

SAMPLE INPUT
bab
ababab

SAMPLE OUTPUT
2

DETAILS
The string bab appears twice, once as a[bab]ab and once as aba[bab].

Based on the "Ultra Cool Programming Contest Control Centre" v1.7b by Sonny Chan
Modified for CS 124 by Neal Wu, with design help from Martin Camacho