

Easy Probability

Problem ID: easyprobability

As a Hunter, you will undoubtedly face difficult obstacles during your journey. At such time, a Hunter is expected to model the situation using Mathematical models, and apply probability and statistics knowledge to overcome the situation.

Thus, the third round of the Hunter Exam is based on the following game with coins:

- Before the game starts, Gon selects a string g and Killua selects a string k . The two strings must contain only characters 'H' and 'T'.
- A game master will flip a coin an infinite number of times. After each flip, the result (either 'H' or 'T' — representing head or tail) is appended into a string s .
- After some coin flip:
 - If both g and k become a substring of s , the game ends in a draw.
 - If only g becomes a substring of s , Gon wins, and the game ends.
 - If only k becomes a substring of s , Killua wins, and the game ends.
- Gon and Killua only have finite amount of time. They will stop the game in a draw after 10^{100} turns.

Please calculate the probability that Gon wins.

Input

The input contains exactly three lines:

- The first line contains the string g .
- The second line contains the string k .
- The third line contains a real number p with exactly one digit after the decimal point — the probability that a coin flip will result in head ($0 < p < 1$).

The length of g and k are at most 20. g and k are non-empty, and contain only characters 'H' and 'T'.

Output

The output must contain a single number — the probability that Gon wins.

Your answer will be considered correct if its relative or absolute error doesn't exceed 10^{-6} .

Namely: let's assume that your answer is a , and the answer of the jury is b . The checker program will consider your answer correct, if $\frac{|a-b|}{\max(1,b)} \leq 10^{-6}$.

Sample Input 1

H T 0.5	0.5
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Sample Output 1

Sample Input 2

HH TH 0.5	0.25
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Sample Output 2