Problem J
Puzzle Game

Time limit: 3 seconds

Memory limit: 1024 megabytes

Problem Description

For a string S, define $Adjacency(S)$ to be the *multiset* of *unordered* pairs $(S[i], S[i+1]), i = 1, 2, ..., |S| - 1$, and define $\Sigma(S)$ to be the multiset of $S[i], i = 1, 2, ..., |S|$, where $|S|$ is the length of S and $S[i]$ is the ith character of S. For example, for $S =$ ABADDADCAB, we have $Adjacency(S) = \{$AB, BA, AD, DD, DA, AD, DC, CA, AB$\} = \{$AB, AB, AB, AC, AD, AD, AD, CD, DD$\}$ and $\Sigma(S) = \{$A, A, A, A, B, B, C, D, D, D$\}$.

John is playing a puzzle game, in which two strings P and Q, $|P| > |Q|$, over the character set $\{$A, B, C, D$\}$ are given and the goal is to insert characters into Q to obtain a string Q' such that $\Sigma(Q') = \Sigma(P)$ and $Adjacency(Q') = Adjacency(P)$. For example, given $P =$ ABADCAB and $Q =$ CBB, by inserting A, D, A, A into Q, we can obtain a string $Q' =$ <u>AD</u>C<u>A</u>B<u>A</u>B, in which inserted characters are underlined. It is easy to check that $\Sigma(Q') = \Sigma(P) = \{A, A, A, B, B, C, D\}$ and $Adjacency(Q') = Adjacency(P) = \{AB, AB, AB, AC, AD, CD\}$. Thus, Q' is a solution for $P =$ ABADCAB and $Q =$ CBB. As another example, for $P =$ ABA and $Q =$ CB, there is no solution.

Please write a program to help John. More specifically, given two strings P and Q, your program computes a string Q' such that Q' is obtained from Q by inserting some characters, $\Sigma(Q') = \Sigma(P)$, and $Adjacency(Q') = Adjacency(P)$.

Input Format

The first line of the input is an integer t, indicating that there are t test cases. Each test case consists of three lines: the first gives two integers, indicating the lengths $|P|$ and $|Q|$, the second gives the string P, and the third gives the string Q.

Output Format

For each case, output a solution string Q'. If there are multiple solutions, you can output any of them. If there is no solution, output "NO".

Technical Specification

- The number of test cases is at most 15.
- The length of P, $|P|$, is an integer between 2 and 10^3.
- The length of Q, $|Q|$, is an integer between 1 and 10^3 and $|P| - 18 \leq |Q| \leq |P| - 1$.
- Both P and Q are over the character set $\{$A, B, C, D$\}$.

Sample Input 1

```
3
7 3
ABADCAB
CBB
11 7
ABACCDBADAC
AADCDAC
3 2
ABA
CB
```

Sample Output 1

```
ADCABAB
ABABDCCADAC
NO
```