Aya the new contestant

A new year has started, and for Hoda this means only one thing: New acmASCIS contests will take place. This year Hoda wishes that her younger sister -Aya- would be allowed to participate with her in the contests as well. Unfortunately the higher acmASCIS council refuses this (they consider Aya too young to participate). Menna and Nour –Hoda's friends– negotiate with the council who finally agrees that Aya can participate if and only if they give her a certain problem and she solves it without the help of Hoda, Menna or Nour. As you can see your name wasn't mentioned by the council so please try to help Aya with her problem.
It's a usual encryption problem.
The problem starts with some words. For every word you are considered to count the number of vowels (a, e, i, o, u) and the number of the rest of characters. After that you will match the character represented by the number of vowels with the character represented by the other number. For example, in the word 'rozzy', the number of vowels = 1 and the rest = 4 so b will match with e (a = 0, b = 1, …., z = 25).
If the number of vowels or the other number exceeds 25 consider their modulus only by 26. After that you will be given a text where you will change each character with its corresponding match (if it exists). If a char matches more than one character, then for every occurrence of the char it will be assigned one of its matches. For example, if c matches d then matches f and the message was 'cycling, cycling' then the encrypted message will be 'dyfling, dyfling'.

Note:
Description of 2nd input:
smart: b matches with e
Empty word: a matches with a
why: a matches with d

Input

Your program will be tested on one or more test cases. The first line of input contains a single integer T (1<=T<=100) indicating the number of test cases. Each test case starts with a line L containing words separated by '-'. A word is defined as a set of consecutive lower case letters (it can be empty too) and its size won't exceed 50. The next line contains the message that Aya is asked to encrypt. Message size won't exceed 10000.
You may assume that a character won't match another character more than once.

Output

For each test case, print "Case_#i:_X" where "X" is the encrypted message, "i" is the number of the test case (starting with 1) and "_" is a white space. Each output should be printed in a separate line.

Example

Input:
2
smooth-cake-rhythm
acmascis council
smart--why

a baby-hat!!

Output:
Case #1: gemgscis eouncil
Case #2: a edey-hat!!