**Alien Numbers**

**Problem**

The decimal numeral system is composed of ten digits, which we represent as "0123456789" (the digits in a system are written from lowest to highest). Imagine you have discovered an alien numeral system composed of some number of digits, which may or may not be the same as those used in decimal. For example, if the alien numeral system were represented as "oF8", then the numbers one through ten would be (F, 8, Fo, FF, F8, 8o, 8F, 88, Foo, FoF). We would like to be able to work with numbers in arbitrary alien systems. More generally, we want to be able to convert an arbitrary number that's written in one alien system into a second alien system.

**Input**

The first line of input gives the number of cases, N. N test cases follow. Each case is a line formatted as

alien\_number source\_language target\_language

Each language will be represented by a list of its digits, ordered from lowest to highest value. No digit will be repeated in any representation, all digits in the alien number will be present in the source language, and the first digit of the alien number will not be the lowest valued digit of the source language (in other words, the alien numbers have no leading zeroes). Each digit will either be a number 0-9, an uppercase or lowercase letter, or one of the following symbols !"#$%&'()\*+,-./:;<=>?@[\]^\_`{|}~.

**Output**

For each test case, output one line containing the string "X: Y" where X is the number of the test case, starting from 1, and Y is the alien number translated from the source language to the target language.

**Limits**

1 ≤ N ≤ 100

Small dataset

1 ≤ num digits in alien\_number ≤ 4

2 ≤ num digits in source\_language ≤ 16

2 ≤ num digits in target\_language ≤ 16

Large dataset

1 ≤ alien\_number (in decimal) ≤ 1000000000

2 ≤ num digits in source\_language ≤ 94

2 ≤ num digits in target\_language ≤ 94

**Sample**

Input

4  
9 0123456789 oF8  
Foo oF8 0123456789  
13 0123456789abcdef 01  
CODE O!CDE? A?JM!.

Output

1: Foo  
2: 9  
3: 10011  
4: JAM!