The stable marriage problem consists of matching members of two different sets according to the member's preferences for the other set's members. The input for our problem consists of:

- a set M of n males;
- a set F of n females;
- for each male and female we have a list of all the members of the opposite gender in order of preference (from the most preferable to the least).

A marriage is a one-to-one mapping between males and females. A marriage is called stable, if there is no pair (m, f) such that $f \in F$ prefers $m \in M$ to her current partner and m prefers f over his current partner. The stable marriage A is called male-optimal if there is no other stable marriage B, where any male matches a female he prefers more than the one assigned in A.

Given preferable lists of males and females, you must find the male-optimal stable marriage.

Input

The first line gives you the number of tests. The first line of each test case contains integer n ($0 < n < 27$). Next line describes n male and n female names. Male name is a lowercase letter, female name is an upper-case letter. Then go n lines, that describe preferable lists for males. Next n lines describe preferable lists for females.

Output

For each test case find and print the pairs of the stable marriage, which is male-optimal. The pairs in each test case must be printed in lexicographical order of their male names as shown in sample output. Output an empty line between test cases.

Sample Input

```
2
3
a b c A B C
a:BAC
b:BAC
c:ACB
A:acb
B:bac
C:cab
3
a b c A B C
a:ABC
b:ABC
c:BCA
A:bac
B:acb
C:abc
```

Sample Output

```
a A
b B
c C

a B
b A
c C
```