



## Problem H

### The Stable Marriage Problem

Input File: H.IN

Output File: standard output

Program Source File: H.C, H.CPP, H.JAVA

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
```