Stable Marriage

The Problem

Given a number of men and an equal number of women, each with a list of preferences for the opposite sex, find a list of stables marriages.

The Input

The first line contains the number of test cases *K* (*K* <= 250). The first line of each test case contains the number of pairs that need to be matched *P* (1 <= *P* <= 100). This represents a number of men 0 – P-1 and a number of women 0 – P-1. The next P lines of input will contain the preferences for the men, where line x of those P lines of preferences represents the preferences for Man x. Each line of preferences will be a space separated list of numbers n (0 <= n < P) representing Man x's preference order for a wife. The following P lines will contain the preferences for the women represented in the same way.

The sample input shown below means that there is 1 test case with 3 men numbered from 0 to 2 and 3 women numbered from 0 to 2. Man 0's first preference for a wife is Woman 1, his second is Woman 0 and his final preference is Woman 2. Man 1's preference order is Woman 1, Woman 2 and Woman 0, and Man 2's preference order is Woman 2, Woman 1 and then Woman 0. Woman 0's first preference for a husband is Man 1, her second is Man 2 and her last choice is Man 0. Woman 1's preference order is Man 2, Man 0 then Man 1 and Woman 2's preferences are Man 1, Man 2 and lastly Man 0.

The Output

For each test case, output the message "Case x", where x is the case number. Test case numbers start at 1. The following lines should give the marriages in the format shown in the sample below.

Sample Input

```
1
3
1 0 2
1 2 0
2 1 0
1 2 0
2 0 1
1 2 0
```

Sample Output

```
Case 1:
Man 0 marries Woman 0
Man 1 marries Woman 2
Man 2 marries Woman 1
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