Stable Marriage Problem: There are n men and n women, where each person has ranked all members of the opposite sex in order of preference. You want to pair them up to create a stable matching that there are no two people of opposite sex who would both rather have each other than their current partners.

Write a Java program using **Gale–Shapley algorithm** which will receive an instance of the marriage problem and return a stable matching when:

a) men propose to women

b) women propose to men

Input Format: Create **input1.txt** file in the same directory as the java and class files. "**input1.txt**" will be entered as a command line argument. The first line will be n(the number of women or men). The next n lines will be the preference lists of the men and the fallowing n lines will be the preference lists of the women with a whitespace separated list from best to worst.

Output Format: Your program will output a stable matching for when men propose to women and another stable matching for when women propose to men.

Examples:

If input1.txt contains:

2

1 2

2 1

2 1

1 2

Then output will be:

Output when men propose:

{(1,1), (2,2)}   → It means {(m1, w1), (m2, w2)}

Output when women propose:

{(1,2), (2,1)}   → It means ((w1, m2), (w2, m1)}

If Input1.txt contains:

3

1 2 3

2 1 3

1 2 3

2 1 3

1 2 3

1 2 3

Then output will be:

Output when men propose:

{(1,1), (2,2), (3,3}   → It means {(m1, w1), (m2, w2), (m3, w3)}

Output when women propose:

{(1,2), (2,1), (3,3)}   → It means ((w1, m2), (w2, m1), (w3, m3)}

Note:

Your Java program should be **commented**, **indented**, and **structured**. Output should be sent to **System.out**. The program should be named project1. Please place all your files (.java, .class, .txt) in a directory named after you, zip them and submit them to canvas. Don't include any extra files and directories from IDE environment. The program must compile with the command **javac *.java** and run with the command **java project1 input1.txt**. Remember input1.txt is the command line argument.

Don't place the classes in a package (use default package).