Lab 1 (8 Jan 2018)

Problem 1: Implement Gale-Shapley's Stable-Matching algorithm to output a stable matching of **n** men and **n** women. Your program should read in a file that specifies the men & women and their preferences. The first line in the input file gives the names of the **n** men; the second line gives the name of the **n** women; the next **n** lines give the men's preferences and the following **n** lines give the women's preferences. Each line in the preference list contains the name of a person(man/woman) followed by that person's list of preferred people in the decreasing order. For e.g. the attached file **"input.txt"** corresponds to the following input instance:

men's preference list

	1st	2nd	3rd	4th	5th
Victor	Bertha	Amy	Diane	Erika	Clare
Wyatt	Diane	Bertha	Amy	Clare	Erika
Xavier	Bertha	Erika	Clare	Diane	Amy
Yancey	Amy	Diane	Clare	Bertha	Erika
Zeus	Bertha	Diane	Amy	Erika	Clare

women's preference list

	1st	2nd	3rd	4th	5th
Amy	Zeus	Victor	Wyatt	Yancey	Xavier
Bertha	Xavier	Wyatt	Yancey	Victor	Zeus
Clare	Wyatt	Xavier	Yancey	Zeus	Victor
Diane	Victor	Zeus	Yancey	Xavier	Wyatt
Erika	Yancey	Wyatt	Zeus	Xavier	Victor

Your program should output the Stable Matching returned by the Gale-Shapley algorithm. For the above input your program should output:

Victor – Amy
Wyatt – Clare
Xavier – Bertha
Yancey – Erika
Zeus - Diane

Problem 2: Write a program to print **all** the possible stable matchings for a given input instance. *(Hint: There is no known efficient way to do this. So if your algorithm takes* $O(n^2 . n!)$ *time it is just fine!)*