1. (30 marks) Write a program that takes in a list of strict preference orders over n items, one for each of n agents, and prints some out. This question is just to get used to the automarker interface and ensure that input and output do not prevent you from working on the main problem. You do not need to check that the input is in the right format, because all files we generate will be correctly formatted.

The input file will have several instances of the problem and the output file should print out only the **second** instance.

2. (70 marks) Write a program to implement the Gale-Shapley algorithm for finding a stable maximum matching in a complete bipartite graph. Your program should take as input a list of preference orders for each blue node and a list of preference orders for each pink node. It should return a list giving the pink partner of each blue node. For definiteness, use the version in which blue nodes do the proposing and pink nodes the accepting. You may assume that the numbers of blue and pink nodes will be the same, and do not need to check for incorrectly formatted input.

The input file will have several instances of the problem.

Sample input and output files are available on Canvas.

Dates and Marks

This assignment is marked out of 100 and is worth 5% of your course grade. You should submit, via the automarker at `www.cs.auckland.ac.nz/automated-marker`, the following:

- A source file for each instance of each problem.

Questions involving programming

- Java, Python, C, C++ or C# may be used.
- Your answer to each question should be a single file (containing all nonstandard classes you use). You can assume that input will come from standard input (i.e. console) in a stream that represents one string per line. Output should be sent to standard out (i.e. console). You may assume that the markers have access to all standard libraries.
- A sample input and output file for each question will be available. The markers may check the output with a text comparison program, so it must be in EXACTLY the right format. Pay attention to line breaks and beware of nonstandard software such as anything made by Microsoft. For best results, use a Linux/Unix environment (the automarker does).
- The automated feedback and submission system ("automarker") is available. You must submit your answer via this system. You may take account of the feedback given by the automarker, and resubmit before the deadline without penalty. There is a limit of 10 submissions per person for each question.
- Your program(s) may be tested on randomly generated input files, some of which may be very large. Marks will be allocated for correctness and speed of the programs. Simply "passing" the largest input on the automarker may not always guarantee maximum marks, but it will guarantee full marks for correctness. If full marks for correctness are not obtained, then the marks for speed are automatically set to zero.
- No marks will be awarded for comments, but you must at least include comments with the name of the author, UPI, and the purpose of the code.