

Project 1: Implementing Stable Matching
MCS 375
Due 9/16/19

For this project, you will complete the implementation the Gale-Shapley algorithm for stable matching that achieves $O(n^2)$ running time. You may use any approaches, pseudocode, or code given in class, as well as the textbook, but should not consult other sources (except possibly for syntax questions). **There is a template file posted on moodle, which you may use to get started. Feel free to change anything in this template, to suit the needs of your own implementation.**

Your submission for this project will consist of the following:

- A file of type `.py`, containing your implementation. Your implementation should read a `.txt` file containing preference lists, and it should print text clearly describing the matching to the console. There is no required format for this output, as long as the matching is clearly described.

Format of text file: The preference list for job applicants will be listed first, with the preferences for each applicant written on a line, separated by spaces. The preference lists for employers then follows after an extra empty line. Preferences for employers and applicants are both given using the numbers $1, 2, \dots, n$. Several sample files are provided for you to use for testing. **You may assume the preferences are given in either ascending or descending order, depending on which you prefer, as long as you indicate this in your report, and are consistent throughout the project.**

- A 1-2 page document of type `.pdf`, containing an explanation of your implementation. This should include explanation of how the pseudocode from class translates into your implementation, as well as an explanation of how your implementation achieves the desired running time. This should include discussion of the specific data structures used in the implementation, and why these are chosen.

These files should be submitted via moodle, by midnight on Monday, September 16th. I recommend submitting the project early, to avoid any connection issues.

If you prefer to complete this project in a language other than python, you should discuss this with me prior to starting the project.