CS 312: Algorithms
Homework 1

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Instructions

Complete all problems and submit by the beginning of class on Thursday, Jan 31. You may work together with other students, but *your written work must be your own.* I highly encourage you to attempt the problems first on your own, especially the simpler ones.

Please make sure to:

- Write your name on your submission

- Write the name of all students with whom you collaborated

- Cite any sources you used other than the textbook or course notes.

Problems

1. (10 points) Use the Gale-Shapley algorithm (p. 6 of the text) to find a stable matching for the following set of four men, four women, and their preference lists.

Man	Preference list
Adam	Eve, Greta, Hannah, Faith
Ben	Eve, Faith, Greta, Hannah
Caleb	Greta, Eve, Faith, Hannah
David	Faith, Eve, Hannah, Greta

Woman	Preference list
Eve	Ben, Caleb, David, Adam
Faith	Adam, Ben, Caleb, David
Greta	Caleb, David, Adam, Ben
Hannah	Ben, David, Adam, Caleb

   Note that the men in the textbook's description of the algorithm correspond to the colleges from our description in class, and the women correspond to the students.

2. (10 points) Chapter 1, Exercise 2

3. (10 points) Chapter 1, Exercise 5. If your answer is "yes, there is always a perfect matching with the desired property", then you must give an algorithm to find the matching *and prove that it is correct.*

4. (10 points) Chapter 2, Exercise 1

5. (10 points) Chapter 2, Exercise 2

6. How much time did you spend on this homework?