

CS 136 Project Proposal

Roommate Matching OR Tutoring Matching OR Combinatorial Auction Interface

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We have three ideas and would love feedback on which seems best to pursue.

Roommate Matching. Freshmen roommates are an important influence on one's college experience. Sacerdote (2000) even finds that rooming with a higher-achieving roommate can increase student's GPA.¹ Currently at Harvard, the Freshman Dean's Office (FDO) matches entering freshman by hand, while a number of other similar universities automate the matching.² We propose to investigate the details of these different mechanisms and design a superior mechanism. This extends our in-class discussion of matching, as we have assumed there two distinct groups (students and teachers) that needed to be paired, while matching roommates relates to another well-studied problem called the Stable Roommates Problem.³ In addition to discussing the theoretical properties of our mechanism, we will write a program that takes Harvard freshmen rooming questionnaire responses and returns a matching. If possible, we will acquire sanitized rooming questionnaire data from the FDO and use this to as the input for our program.

Tutoring Matching. It be difficult to find good class tutors at Harvard. Most tutoring transactions go through the Bureau of Study Council (BSC), which may not have the most optimal ways of incentivizing tutors or matching tutors to students. We are interested in modeling this system and in proposing improvements. Currently at the BSC, there is a standard fee for a one-on-one session, but we could have a sliding scale based on urgency and qualifications. We hope to gain access to BSC data, but were not sure if thats feasible or legal. Alternatively, we could survey students to determine how many people qualified to tutor actually do tutor and the average wait time after asking for a tutor and receiving one.

Combinatorial Auction Interface. We propose to write a program that makes implementing and running combinatorial auctions easy. We will learn more about the bound-and-branch solver and think through UX difficulties such as how to represent the combinatorial auction options to an uninformed user.

¹Sacerdote, Bruce, "Peer Effects with Random Assignment: Results for Dartmouth Roommates." *The Quarterly Journal of Economics* (2001) 116 (2): 681-704.

²<http://www.thecrimson.com/article/2005/8/12/freshman-roommates-meet-your-makers-it/>.

³https://en.wikipedia.org/wiki/Stable_roommates_problem