

Research Project

CO 456 Project, Fall 2015

Due Date: Dec 3, 2015, before class

Note: These instructions are for students who have opted out of participating in the Prisoner's Dilemma tournament.

If you wish to opt out of the Prisoner's Dilemma tournament, then you must e-mail the instructor (g3gauthiershalom@uwaterloo.ca) by Friday November 13 at 3:00pm, with a proposed research project title and a short description (later submissions may be considered.) The research projects will be done individually, and topics cannot be repeated, so you must send an e-mail to get priority on a topic.

1 Project Overview

You must submit a research proposal before class on Thursday November 19. It should be at most one page. You should outline the topic of your project, and give the main bibliographical sources. You will receive comments on your proposal, and you may need to make modifications.

The final project is due in class in Thursday, December 3. It should be five to ten pages long, with reasonable font and spacing. Your research could be either expository or simulation-based, or you are free to propose other formats.

1.1 Grading

You will receive a grade out of 20 for your project. You will receive 1 additional point for submitting your research proposal, if the grader deems it to be reasonable. The grade will be based on the grader's impression of the quality of your work. Marks will be deducted for errors/carelessness (e.g. typos.) The project grades will be adjusted so that the average is similar to that of the students participating in the Prisoner's Dilemma tournament. That is, unless the grader is strongly impressed/disappointed by the overall quality...

1.2 Example Topics

Ideas marked with an asterisk will only be accepted if the proposal is very convincing.

- Expository project: give a report on a known result for a topic of interest in Game Theory.
 - Routing in the Real World: Expand on our discussion of routing problems. Talk about the relevance in the real world, and give examples where this theory would apply.
 - Voting: Discuss various voting systems, with a focus on the game theoretic aspects.

- Mechanism Design: How can the rules of a game be designed if the designer has a particular outcome in mind?
- Stable Matchings: In 2012, Lloyd Shapley and Alvin Roth received the Nobel Prize in economics for the development and application of the theories of stable matchings. Give a summary of the results, and relate this to situations in the real world.
- Simulation-based: run simulations, and discuss the outcome. Some exposition should be included as well.
 - Routing in Waterloo: Talk about the transit that is being constructed in Waterloo. Make a computer model and run simulations to see how this will affect transit times.
 - Collusion in Tournaments: Discuss situations where tournaments have been tainted by collusion. Run simulated tournaments, and discuss the outcome.
 - Finding Nash Equilibria: Discuss different algorithms for finding mixed Nash Equilibria. Run some calculations, and discuss the merits of various algorithms.
 - Auctions: Discuss different systems for auctions (thought of as strategic games.) Run simulations, and discuss the relative merits.
- Other
 - Game Theory Rap*: Compose a rap song that could be used to educate our youth about Game Theory.
 - Acid Trip*: What if the whole universe is a game? Whoa...
 - Anything else! Be sure to discuss your idea with the instructor if it does not fit into one of the above categories.