AGT: Guidelines for Class Presentations

For your presentation, you can either (i) give a lecture on the board on a somewhat broad topic, or (ii) give a more focused presentation on the results in a particular paper. In both cases, keep the following points in mind.

- Start from the basics: explain the problem clearly, and establish notation. Your lecture should be understandable by someone who has a basic understanding of algorithms and game theory.
- Don't try and cover everything that is known about the topic, or even everything in the reference given. Use your judgment. Pick some subset of results that are important and can be explained clearly.
- Include at least one proof in your lecture or presentation.
- Explain:
  - why the topic / paper appealed to you,
  - what is currently known about the problem / topic, and
  - what the interesting open questions are.
- If you are interested in and would like to present a topic or paper not given below, come talk to me.
- Your presentation counts for 25% of your grade, so do a good job!

Timeline

- By Friday, October 23, decide your topic / paper and let me know.
- By Friday, November 6, give me a rough sketch (about a page) of what you will be talking about in your lecture / presentation, including topics you will be covering and proofs.
- By Monday, November 23, show me a draft presentation or your lecture notes.
- The actual presentations will be done November 25th onwards.

Board lectures

If you would like to give a board lecture on a topic:

- Prepare for about a 1 hour 10 minute lecture on the board, with questions during and after the lecture.

- The suggestions below are starting points for the lecture. You should figure out the relevant references for the topic, understand them, and present them as necessary. Your lecture should present a complete picture of the topic.

- As an example, a lecture on Price of Anarchy would be incomplete without standard proofs, in particular the proof technique on smooth games and how it generalizes previous proofs; would include examples of games with large and small PoA; and would include a discussion on related concepts such as the Price of Stability.

Suggested topics for board lectures

- von Neumann-Morgenstern utility theory. Starting point: Chapter 8 from the book by Y Narahari.

  This utility theory explains why we use the utility functions we do, assigning a utility value for each player to each strategy profile. In particular, this explains why we can look at expected utilities, and ignore considerations of risk-sensitivity. A second, more historical, reference, is the book "Theory of Games and Economic Behavior", available in the library.

  A more modern and realistic look at utilities is through prospect theory (see the Wikipedia page, or the 1979 paper by Daniel Kahneman); it may be worthwhile to compare the two in your lecture.

- Prediction Markets. Starting point: Chapter 26 from the AGT book.

  Prediction markets are markets where you can place bets on or against an outcome. For example, will India win the next match against South Africa? There are numerous questions here: given some information, how should an agent bet in such a market? How should a market maker set prices? How should such markets be designed to prevent cheating? How good are the predictions obtained from such markets?

  Note that prediction markets is a *huge* topic, with a lot of recent work both in economics and algorithmic game theory; you will have to be careful in your selection of what to present.

- Repeated Games and the Folk Theorem. Starting point: Chapter 8 of "A Course in Game Theory" by Osborne and Rubinstein.

  The games we've studied so far are all one-shot games, where the players are intent on maximizing their utility in that game. What if the players knew that the game would be repeated multiple times? Think about the Prisoners' Dilemma game, played repeatedly. Would the equilibrium change? For example, would players consciously cooperate with each other, even though this is not a Nash equilibrium for the one-shot game? What would player strategies and equilibria even look like if a game is played repeatedly? These are questions that the study of repeated games tries to address.

Paper presentation

If you would like to give a presentation on a paper:

- Prepare for a 50 minute presentation using slides.
- Don't try and cover the entire paper. Focus on what's important. At the end of the talk, the audience should know why the paper was interesting!
- In this case, your talk will be more focused on the problem solved in the paper, and you don't have to present a comprehensive view of the topic.
- Your presentation must do a good job of explaining the results and proofs in the paper, rather than just reproducing them. Some ways of doing this: present results and proofs pictorially; explain why simpler approaches fail; give a high level idea of the technique used; present small examples.

Suggested papers

- "Multi-unit auctions with budget limits", by Dobzinski, Lavi, and Nisan. In GEB 2012.

  The paper studies auctions when agents have budget limits, something we will not be able to discuss in class. It also introduces Ausubel's clinching auction, which is of a different flavour than those seen in class.

- "Circumventing the Price of Anarchy: Leading Dynamics to Good Behavior", by Balcan, Blum, and Mansour. In Siam J. Comput. 2013.

  While the dynamics we studied in class focused on convergence to equilibria, this work tries to address the question of converging to *good* equilibria, quantified by the efficiency.

- "Simple Auctions with Simple Strategies", by Devanur, Morgenstern, Syrgkanis, and Weinberg. In EC 2015.

  Instead of insisting of truthful mechanisms, this paper looks at bidding strategies that are an equilibrium for the players. By an extension of the smooth games (which we've seen in class) to smooth mechanisms, the paper obtains a bound on the price of anarchy for social welfare. The paper focuses on simple bidding strategies, where each bidder submits a single real number as its bid.