Final Project Information

CO 456 Final Project, Fall 2008

October 16, 2008

In the final project, you will select and investigate some aspect of game theory in further detail, and share your findings with the class. The main motives for this project are: to extend the number of topics that everyone will see in our introductory class; to allow you some time to research independently and apply your creativity; and to sharpen your expository skills. The final project will include two components, a short paper and a short in-class presentation. The schedule of the project is as follows:

- November 6 or earlier: each team (of 1 or 2 students) will submit a topic proposal, about 1/2 a page long — you will get feedback on these and revise if needed
- November 18, 20, 25, 27: each team will make a 15-20 minute in-class presentation on their topic
- December 1: each team submits their writeup, which must be 4-5 pages long (using standard font size and margins; you can include extra pages with auxilliary figures or tables if this helps make your point)

Within this project, 20% of the marks will be for submitting a proposal on time, 40% will be for the presentation, and 40% will be for the writeup. Specific evaluation criteria are given on the reverse side of this handout. **All presentations should have distinct topics; you "reserve" your topic of choice as soon as you submit your proposal.** The proposal does not have to be very polished, but you should have an idea of the "key take-home message" of your presentation.

Requirements

Your project should meet the following criteria:

- it should be understandable by anyone who is taking CO 456
- it should introduce something new
- it should be interesting!

Examples

Any proposal that meets the above criteria will be accepted. Some broad examples of what would be okay are: a game model or equilibrium concept not covered in class, a report on recent research, or original analysis of a gamelike situation; but this is not an exhaustive list. E.g. if you are interested in economic applications, or computational aspects, try to come up with a project that has that flavour. There are a number of sections of the textbook which would probably make suitable topics: Coalitional Games (Chapter 8), Bayesian Games (Chapter 9), Extensive Games with Imperfect Information (Chapter 10), Evolutionary Equilibrium (Chapter 13), Bargaining (Chapter 16).

Some other ideas I can suggest are as follows; items marked with * are described to some extent in the free online textbook called Algorithmic Game Theory, which you can download at

`www.cambridge.org/journals/nisan/downloads/Nisan_Non-printable.pdf`

- Arrow's Theorem* (impossibility of voting systems satisfying certain axioms)
- The Vickrey-Clarke-Groves auction* (a truthful mechanism for arbitrary combinatorial auctions)
- Routing Games, Potential Games, and Nash Dynamics*
- Braess' Paradox and Cost of Anarchy in Routing Games*
- Correlated Nash Equilibria
- Non-impartial Combinatorial Games (e.g. various books by John Conway)
- Periodicity in Grundy's Game
  `http://www.msri.org/publications/books/Book42/files/landman.pdf`
- One-dimensional Go (you would formulate and analyze such a game)
- Computational game theory as applied to poker `http://www.cs.ualberta.ca/~games/poker/`

I encourage you to discuss potential topics with me (Dave) as soon as you have one, either by email or at my office hours. I am happy to help sharpen vague ideas or act as a resource by supplying more references for you to look at.

Evaluation Criteria

The weight of the presentation will be distributed evenly over the following four factors:

- content: did you convey some novel information to the class?
- clarity/organization: was the content of your presentation clear?
- pacing: did you finish within the required time limit and present information at a reasonable speed?
- impact: did your presentation draw the audience's attention? was it interesting?

The weight of the writeup will be distributed evenly over the following four factors:

- content: is your information correct and interesting?
- clarity: is your writeup easy to follow? does it have an introduction? does it use figures or equations, where appropriate, to elucidate some facts?
- language: does the paper use correct grammar and spelling?
- organization: is your paper structured into appropriate sections? does the paper cite all references properly?

Note, we are giving you a relatively limited amount of space (5 pages, 15-20 minutes) with which to work. Hence, part of the challenge is fitting your ideas into this space without compromising them. In general, we don't require your paper and presentation to be exactly the same; you can give them each a different focus if you like, or omit parts of one from the other, in order to fit the size limits.

Once I know how many teams there are (which should be shortly after November 6) I will announce the presentation time limit and start scheduling the presentations.