ISCI 330 Final Project

Report Due Date: Thursday **April 12**, 2007 (electronic submission by midnight)
Peer review Due Date: Friday **April 27**, 2007 (hardcopy submission by 5:00 pm)
Note: late days **cannot** be applied to the final project.

ISCI 330 will culminate with a final project that allows students to explore material beyond what was covered in class and to share that material with other students. The project involves students writing a paper on a topic of interest within Game Theory, and then reading and evaluating each other's papers. Here is the "pipeline":

* submit a one-page outline of the paper you intend to write to the instructors (this step is only necessary if you pick a topic other than those suggested below)
* let us know by next Thursday (March 29) which topic area you are working on (if not one of the choices below, you will need to get your topic approved by the instructors)
* investigate the topic and write your paper (~8-10 pages double spaced, 1 inch margins and 12pt font, and referenced as appropriate)
* hand in your paper, which will be sent out to other students for peer review (see grading criteria below)
* perform peer review of papers from other students in the class

The topic of the final project need not be too ambitious; if you don't take one of our suggested topics it's fine to perform a survey of a subarea in game theory or a compare-and-contrast study of two or more influential papers. If you plan to do more work in the area, you can also use the project to develop your own ideas. Below are three suggested topic areas. Please note that assignment late days cannot be applied to the final project.

3 Suggested Topic Areas

Game Theory and Canadian Politics
Political science is a discipline in which game theory is widely used. If you do a project on this topic, you'll examine some recent, very accessible examples of how this is done. Get the book *Game Theory and Canadian Politics* by Thomas Flanagan. (A copy is on reserve at Koerner library, call number JA72.5.F53 1998. Hopefully the CS library will also have a copy available within a few days.) Read the preface and chapter 1. You may also want to look at chapter 2, though it basically just summarizes material we've covered in class. Chapters 3-9 each describe an event in Canadian political history. Pick one of these chapters to study. (You should also read the appropriate section of chapter 10, which offers a few paragraphs of summary discussion about each of the chapters.) Then (1) summarize the problem studied, the argument made and the model given; (2) give a critical analysis of the argument. Do you believe that the model is appropriate? Do you believe the right game theoretic tools were used to analyze the model? Would you draw different conclusions or make different assumptions? Etc. Feel free to refer to other papers or books to support your arguments or to discover contrasting points of view.

Experimental Game Theory Project
In the lab of Michael Doebeli an internet program is being developed to test some theoretical predications from game theory by having humans play repeated games over the internet. Payoff matrices (e.g. what game), how players are grouped in their interactions (population structure), the amount of information about previous actions and payoffs for other players can all be manipulated in this software. There will be two trial runs of this software with students from ISCI 422 (Monday March 26) and ISCI 330 (Thursday March 29) participating. A potential project is to get involved in helping to decide what hypotheses to explore, how to set up the game to test this hypotheses, and how to analyze the results. This project would include some background reading from the literature, familiarizing yourself with the software, helping design the experiments, coming up with your own concrete predictions, and then analyzing the results and discussing any differences between results and your predictions.

Altruism or Just Showing Off?
Among the many debates in the evolution of altruism literature is one concerning the "handicap principle." Simply put, the idea behind this principle is that a costly display by an organism advertises its high fitness to others (e.g. "I can afford the handicap of being nice because I'm so fit"). From this viewpoint costly acts of altruism (the advertisement) bring other direct fitness benefits to the actor such as more matings or less pursuit by predators. (This is similar to the costly display of the peacock's beautiful but useless feathers or gazelles jumping up and down to show a predator how fit they are.) Opponents of this view argue that altruism can evolve without advertising the fitness status of the actor via one of the more traditional mechanisms (e.g. group selection, reciprocal altruism, or kin selection). The original paper putting forth the handicap principle concerned cooperatively breeding birds and was authored by Amotz Zahavi in the *Journal of Avian Biology* 26:1 (1995). Using the Web of Science website to select papers that have cited this original work, you will choose at least one paper on each side of this debate (in addition to the original paper). Using these papers you will analyze the underlying game-theoretic assumptions on each side and form and defend your own opinion in this debate.

Criteria to be used in instructor grading and peer review:
1. The paper has a clear thesis and motivates the problem being addressed.
2. The paper shows an understanding of existing work in the literature and presents this work in the context of the author's thesis.
3. The paper supports its thesis well. Some examples of such support: a synthesis of different papers into a clear survey; new theoretical results; new arguments for or against claims made in the literature; attempts to either reconcile or contrast different approaches. The paper was clear; technical ideas and arguments were easy to follow.
4. The paper had intellectual depth. Arguments made about existing work showed insight; a survey paper was not overly narrow; analysis of any new results were well thought out.
5. The paper was well-organized. General claims were made before specific details were given. A reader who quickly skimmed the paper would understand the general ideas.
6. The quality of the writing (e.g., use of language, grammar, etc.) was high.
7. Overall impression.