Final exam: Please do not work together. You can use your textbook and notes, but no other outside resources. The exam is designed to take three hours but you can take as long as you like with it. I'll need the exam by Friday 12/12/08. Hand it in in person to either me or Victoria Mason.

1. Recall the Chernoff condition: For all $A, B \in 2^X \setminus \{\varnothing\}$, if $A \subset B$, then $c(B) \cap A \subset c(A)$.

a) Show that a choice function defined on $2^X \setminus \{\varnothing\}$ which satisfies the Chernoff condition satisfies $c(c(A)) = c(A)$ for all A. Interpret the latter property.

b) Give an example of a choice function satisfying the Chernoff which is not rationalizable by *any* binary relation.

2. Demonstrate a simple rule and a profile of single-peaked preferences for which the social preference is not transitive. Make the example as simple as possible.

3. Give an example of a PAR which is P-acyclic, satisfies IIA, and Pareto but which is *not* oligarchic. (this obviously depends on the number of alternatives)

4. Let $\Delta(X)$ be the set of lotteries over some finite set X. Let $(R_1, ..., R_n)$ be a set of expected utility preferences over $\Delta(X)$. Now consider the resulting social preference when these preferences are aggregate according to a simple rule. Does the resulting social preference satisfy the independence axiom?