Material for the Final Exam

The final exam will consist of multiple choice and short answers (to test your basic knowledge of the voting methods, voting paradoxes and fair division algorithms discussed this semester) and a number of longer essay questions.

- Voting methods: Plurality rule, Borda count, Plurality with Runoff, Approval Vote, Majoritarian Judgement
- Voting Paradoxes: Condorcet's Paradox, Doctrinal/Discursive Paradox, Condorcet's Other Paradox, Anscombe's Paradox, Multiple Districts Paradox, No-Show Paradox
- Social Choice Theorems: Arrow's Theorem (the statement of the theorem, including how the intuitive interpretation of each axiom)
- Concepts: Unanimity, Pareto Efficiency, Neutrality, Independence of Irrelevant Alternatives, Fairness (Proportionality), Envy-Freeness, Equitability
- Fair Division Algorithms: Adjusted Winner, Cut and Choose, Banach-Knaster, Dubins-Spanier

On the final exam, you will be asked to answer any two of the 20 point questions and one of the 10 point questions. of the following questions (so you must answer 3 total questions—2 from among 1., 2., and 3. and one from 4. and 5.). You may think about the questions before hand, but you must write your answers during the exam (your answer should not be longer than 1 - 1.5 pages).

1. (20 pts) Condorcet argued that if candidate A beats every other candidate in a pairwise election (i.e., A is the Condorcet winner), then A should be declared the winner. Give an example where the Borda count does not select the Condorcet winner. What is the argument in favor of the candidate selected by the Borda count?
2. (20 pts) Explain the majoritarian judgement voting method. Given one argument in favor of adopting the method and one argument against adopting the method.
3. (20 pts) Balinski and Laraki argue that in the traditional model of voting (i.e., the Arrovian model), there is a fundamental incompatibility between electing a winner and ranking the candidates. Explain why they think that this is the case.
4. (10 pts) Explain May's Theorem. (State the theorem and give a short explanation of each of the axioms).
5. (10 pts) Explain the Gibbard-Satterthwaite Theorem. (State the theorem and give a short explanation of each of the axioms).