

Voting mini-paper

Guidelines

The goal of the voting mini-paper is to synthesize what we have learned about voting theory and use that knowledge to address a novel question. I will be looking for the following elements in any paper:

1. Recall and demonstrate understanding of the voting techniques we studied such as Borda, instant runoff, Copeland, Approval and others. Be able to compare and contrast these voting methods and apply them to specific examples.
2. Recall and demonstrate understanding of the voting criteria we studied such as monotonicity, Condorcet criteria, IIA and many others. Be able to apply these criteria to a voting technique and prove whether they are satisfied or give an example of them failing.
3. Think critically about the effectiveness and value of voting systems.
4. Ask questions and make conjectures about novel mathematical ideas.
5. Demonstrate an ability to think logically and to write a clear proof.

I think a rough goal for your paper is something like 1500 words, or three pages. More than length I am looking for clear, mathematically sophisticated, and thoughtful answers. I want to hear you talk about voting theory in your own voice while using the tools we have learned about. So if your paper is short but address the 5 points above that is fine. I encourage diagrams and pictures and mathematical computations to complement your written arguments.

The paper does not need to be proof based, but I would love for at least one proof to appear. For example, if you claim a voting system has some property I would love a proof. Or if you give an example I would love a careful explanation.

Essay prompts

Below are a few prompts that I think give ample opportunity to address all of the above points. There are a variety of different style you could write in, but the goal is clarity and readability. I think using one or two examples to emphasis and clarify your points might be a good way to help give focus. You should also try to develop a thesis that ties your paper together.

1. Consider the fallback voting system:
 - (a) Every voter gives a ranked list of approved candidates.
 - (b) First, we give each candidate a point for every first place ranking they received. If any candidate received a majority they win.

- (c) Next, add to every candidates score a point for each second place ranking. If any candidates received a majority the one with the highest score wins.
- (d) We continue in this manner moving down the lists. If no candidate ever receives a majority we elect the candidate with the most approvals.

Write an essay exploring this voting system and addressing some (but probably not all) of the following questions: What important criteria does this voting system pass and what does it fail? How does this voting system compare to other voting systems? Do you think this is a “fair” voting system, do you think it is a “good” voting system? How could you modify this voting system to be more effective and what can you say about the modified version? If you apply this voting system to a modern example what happens and what does this tell us about the voting system? What strange behavior can occur with this voting system? Are there any unique properties of this voting system that differ from previous voting methods? What other questions do you have about this voting system?

2. The same as the first prompt but use another sophisticated voting system like instant runoff via Borda count, or one of your own choosing. If you want to use your own method please check in with me so I can make sure you will have enough to say about it.
3. Pick a real life example of an interesting voting situation, such as College admissions or hiring job applicants. Discuss what methods are currently used to vote in your example. What other methods could be used and why would they be better or worse? Use voting criteria or make up your own to justify what choice you think fits the situation the best. What are the strangest things that could happen in your example and how do different voting systems handle these cases?
4. Write a mock letter to your local politician arguing why a certain voting system should be adopted. I say “mock” because your letter should be more mathematically sophisticated than a usual letter would be. Use tools we have learned in this class to make your case. Consider examples that either show pitfalls or virtues of your voting system. Compare your voting systems with others besides plurality to make a case for it. Feel free to bring up weakness of your chosen voting system too but discuss why they are a sacrifice worth making/the lesser of two evils.
5. For a more theoretical essay you could attempt to address some of the open questions we discussed at the last day we talked about voting theory. You could also answer another open ended question that you want addressed but we did not discuss in class. Lastly, some of the problems on the problem set can be generalized into what would be a full paper. If you choose this option please come talk to me to make sure your question will lead to a good paper.

6. I'm open to other ideas as well, just let me know and we can discuss if it will make a good paper.