

Math 1015: Homework #2

Question 1. I'm voting with my friends about the best local dog salon. (These are all real names of dog salons in Fairfield county. Unfortunately Snip Doggy Dog has closed.) The votes are like this:

Me	Friend 1	Friend 2	Friend 3	Friend 4
Snip Doggy Dog	Ruff Cut	Waggies	Ruff Cut	Woof
Woof	Woof	Snip Doggy Dog	Snip Doggy Dog	Snip Doggy Dog
Waggies	Waggies	Woof	Waggies	Ruff Cut
Ruff Cut	Snip Doggy Dog	Ruff Cut	Woof	Waggies

Please determine the results if we are using:

- a) Condorcet's method
- b) Borda Count

Question 2. In the 1980 US senate race in New York, the candidates were D'Amato (D), Holtzman (H), and Javits (J). Based on polling people's opinions between the three, the population's preferences were something like this:

22%	23%	15%	29%	7%	4%
D	D	H	H	J	J
H	J	D	J	H	D
J	H	J	D	D	H

Please determine the results if we are using:

- a) Condorcet's method
- b) Borda Count

Question 3. Here is a speculative version of the August 2022 election in Alaska, filling in choices based on the simple political spectrum (M is left, N is center, S is right). This election might have looked like this:

76	59	27	15	11
M	S	N	N	N
N	N	S	M	
S	M	M	S	

(This is partially speculative: the actual voting data was not fully released by the state of Alaska. You can see the official numbers here: <https://www.elections.alaska.gov/results/22SSPG/RcvDetailedReport.pdf>)

- a) Please determine the results if we are using the Borda Count. (The last column should give no points to either M or S.)
- b) If the first column of voters instead voted simply "M" (with no rankings for second or third place), would this change the result? (still using Borda)

Question 4. Here is a twitter thread by Senator Tom Cotton, Republican from Arkansas, in response to the August 2022 ranked choice election in Alaska. (This is <https://twitter.com/tomcottonar/status/1565139542000246784>.)



Mathematically speaking, the first tweet is just plain false. Ranked choice voting is not a “scam”, and does not “rig” the election. The second tweet is more interesting.

- Looking at the data from the votes cast (you can use the chart from Question 3)¹ is Cotton correct that 60% “voted for a republican”? (M is a democrat, S and N are republicans.) Write a few sentences explaining why or why not (or maybe a little of both).
- Does Cotton have a valid point here about the 60% voting republican? Is it actually undemocratic if 60% ranked a republican first and then the democrat won? Write a few sentences explaining why or why not.²
- What if the plurality system had been used instead? In that case, would Cotton’s “60%” objection have been less of an issue? Write a few sentences.
- “Ballot exhaustion” is when a person didn’t list a second choice, and so their vote is thrown out in the second round. (Like the last column in the chart from Question 3.) “Disenfranchising voters” is making laws or systems which prevent people from voting. Do you agree that ballot exhaustion disenfranchises voters? Write a few sentences.

¹or see the official vote totals here: <https://www.elections.alaska.gov/results/22SSPG/RcvDetailedReport.pdf>

²This and the next parts might involve you talking about your own political opinions a bit. I have already made clear in class that I more or less like ranked choice voting, so I personally think that Cotton is wrong here, although I do think his 60% figure is worth considering. I will not be grading your responses based on whether or not you agree with me, so please feel free to come to your own conclusions. I only want to see that you have thought about it carefully.