

MA 1015: Homework #1

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.) 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:

- Plurality
- Condorcet's method
- The 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:

- Plurality
- Condorcet's method
- The Borda Count

Question 3. My stupid buddy says that nobody uses the Borda count in real world politics because you can get a tie when you add up the points. How would you respond? (Help my friend understand that this isn't really such a big deal in the real world.)

Question 4. Please invent your own example where the plurality winner is different from the Borda winner. (Hint: someone with a lot of 2nd place votes can get more points than a plurality winner.)

Question 5. The Condorcet paradox example we discussed in class was this:

3	3	3
A	B	C
B	C	A
C	A	B

Build a similar example using 4 candidates A, B, C, D where A is above B in $3/4$ of the ballots, B is above C in $3/4$ of the ballots, C is above D in $3/4$ of the ballots, and D is above A in $3/4$ of the ballots.

Question 6. For this example election:

5	5	4
A	B	C
B	C	A
C	A	B

- a) Show that there is no Condorcet winner.
- b) Find the Borda Count winner
- c) Show how you can change *one vote* to change the Borda Count winner. (Make sure you are changing one single vote, not a whole column of voters— your answer will involve removing one voter from one of the columns and reassigning them to another column, or creating a brand new column.) Show the full chart of votes for your changed election, in which the Borda winner is different.