

# Math of Elections #3

## Borda Count Method

### Definitions

- The **Borda Count Method** for elections works as follows. Each place on the ballot is assigned a point value: 1 point for last place, 2 points for second-to-last place, and so on; this means first place is awarded  $N$  points where  $N$  is the total number of candidates. The points for each candidate are then tallied from all ballots, and candidates are ranked according to the number of total points they received. The winner is the candidate with the most points.

### Exercise

Suppose that there is an election with 9 voters and 3 candidates: Brittany (B), Chris (C), and Tristan (T). Here are the ballots.

Ranking	Ballot								
1st	T	C	B	C	B	C	C	B	T
2nd	B	B	T	B	T	B	B	C	C
3rd	C	T	C	T	C	T	T	T	B

1. Is there a majority candidate? Is there a Condorcet candidate?
2. Use a Borda count to rank all of the candidates. Who is the winner?
3. Which of the IIA and Condorcet criterion does this show the Borda count method might violate? (See [Handout 02](#).)

## Exercise

Back to the Club Election Example. The preference schedule is below. We saw that Candy is the winner using the Plurality Method. Use a Borda count to rank all of the candidates and determine the winner.

Number of Voters	14	10	8	4	1
1st	C	L	N	E	L
2nd	E	E	L	N	N
3rd	L	N	E	L	E
4th	N	C	C	C	C

## Exercise

There is an election with 9 voters and 3 candidates: Amber (A), Bernard (B), and Crystal (C). Find a way to fill in the 9 ballots so that Amber is the majority candidate but Bernard wins by the Borda count method. Does this seem like an issue? Why?

Ranking	Ballot								
1st									
2nd									
3rd									

## Exercise

There is an election with 9 voters and 3 candidates: Amber (A), Bernard (B), and Crystal (C). Find a way to fill in the 9 ballots so that Amber wins with a Borda count, but if Crystal drops out, then Bernard wins with a Borda count. Which of the IIA and Condorcet criterion does this show the Borda count method might violate?

Ranking	Ballot								
1st									
2nd									
3rd									

We learned about the IIA and Condorcet criteria last time. Another desirable criterion for a voting method is given below, but we saw that the Borda Count method might violate all three criteria.

- The **Majority criterion** states: if there is a majority candidate, they should be the winner.