

Part One: [GH 1.R.6] *Community Theater*

The members of a community theater organization must vote to decide which play they would like to put on. The preference rankings of the members are as follows:

	Number of Votes							
	2	1	4	1	1	3	1	2
<i>The Fantasticks</i>	1	1	2	3	4	2	3	4
<i>Romeo and Juliet</i>	3	4	1	1	1	4	2	3
<i>Our Town</i>	4	3	3	4	2	1	1	2
<i>Death of a Salesman</i>	2	2	4	2	3	3	4	1

1. Which play would win a plurality vote?
2. Which play would win a plurality vote with a runoff between the top two finishers?
3. Which play would win under Borda's method?
4. Could the three voters who ranked *Our Town* first and *The Fantasticks* second achieve a preferable outcome in an election decided by the plurality method with a runoff between the top two by voting strategically if the others voted as shown in the table?
5. Could the three voters who ranked *Our Town* first and *The Fantasticks* second achieve a preferable outcome in an election decided by Borda's method by voting strategically if the others voted as shown in the table?

Part Two: *Modifying Borda's Method*

Recall that Borda's method assigns the lowest ranked candidate 1 point, the second lowest ranked candidate 2 points, the third lowest ranked candidate 3 points, and so on.

1. Suppose instead the lowest ranked candidate is assigned 0 points, the second lowest ranked candidate 1 point, the third lowest ranked candidate 2 points, and so on, with the winner being the candidate with the highest Borda count. Will the outcome always be the same? If yes, why? If not, construct an example with different outcomes.

2. Suppose instead the highest ranked candidate is assigned 1 points, the second highest ranked candidate 2 points, the third highest ranked candidate 3 points, and so on, with the winner being the candidate with the lowest Borda count. Will the outcome always be the same? If yes, why? If not, construct an example with different outcomes.

3. Suppose instead the lowest ranked candidate is assigned 1 points, the second lowest ranked candidate 2 points, the third lowest ranked candidate 4 points, and so on (continuing 8, 16, 32, etc.), with the winner being the candidate with the highest Borda count. Will the outcome always be the same? If yes, why? If not, construct an example with different outcomes.