

# Quiz 2, Math of Democracy

Fall 2019, Dr. Adam Graham-Squire

Name: \_\_\_\_\_

The Bucklin method of voting works as follows: All first-place votes are tabulated. If any candidate has a majority of the vote, that candidate wins. If no candidate has a majority, then the second-place votes are added to the first-place votes. If one candidate has a majority, that candidate wins. If multiple candidates have a majority, then whichever candidate has the most votes wins the election. If no candidate has a majority, then third-place votes are included, and the process continues.

Here is an example election:

Number of voters	8	2	4	4	3
1st choice	A	B	C	D	D
2nd choice	C	A	D	B	C
3rd choice	D	D	B	A	B
4th choice	B	C	A	C	A

In this election, no candidate has a majority of first-place votes (11 or greater). When second-place votes are included,  $C$  has 15 votes total and  $D$  has eleven. Both have a majority, but  $C$  has more, so  $C$  wins the Bucklin method election.

It should be clear that the Bucklin method satisfies the Majority criterion.

Now consider the following list of other fairness criteria: Monotonicity (upward or downward), Independence of Irrelevant Alternatives, Clone-proof, No-show, Condorcet (winner or loser). The Bucklin method *violates* at least one of those criteria and *satisfies* at least one. Do the following:

- 1) Choose one criterion that you believe the Bucklin method *fails*, and explain why you think Bucklin fails that criterion.
- 2) Choose one criterion that you believe the Bucklin method *satisfies*, and explain why you think Bucklin satisfies that criterion.