Improve RCV with Condorcet Minimax

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Compared with plurality voting, ranked-choice voting (RCV) can potentially result in the election of candidates more representative of voter preferences. However, the usual successive elimination procedure for determining the winning candidate is a poor method for processing ranked-choice ballots. I have prepared, in easy-to-read outline form, an explanation of the flaws of the successive elimination method, results of an actual election demonstrating these flaws, and a proposal for improving RCV by using the method best supported by academic research.

❖ Typical Ranked-Choice Voting (RCV) Election:

- **Voters rank candidates in order of preference.**
  - Ballots can be spoiled by tied or skipped rankings.
  - Voters are unlikely to rank more than three or four candidates.
- **Successive elimination (default for "RCV" or "instant runoff voting (IRV)"):**
  - Starting with voters' 1st choices, candidates with the fewest votes are eliminated in rounds. This requires information from all ballots to be on hand before the vote tabulation process can begin. Long delays are common.
  - Ballots supporting eliminated candidates have the next choice counted as 1st in the next round if and only if that choice has not been eliminated. This requires all ballot preferences to be stored at the vote tabulation location.
  - Lacks transparency: hand audits and recounts are extremely cumbersome since ballots need to be accessed multiple times.
- **When only two candidates remain, the winner is the one with the most votes in that round.**
  - Ballots supporting the final eliminated candidate do not have the next choice counted. Thus, ballots are not all treated equally.
- **This method often yields unsatisfactory outcomes:**
  - "Vote splitting" can eliminate a candidate who would have won if a "spoiler" candidate were eliminated sooner.
  - A majority of voters may prefer one of the losing candidates to the winning candidate.

❖ Example: Alaska 2022 Special House Election

- **Top vote recipients in the open primary were:**
  - Sarah Palin (R) 27.0%
  - Nick Begich (R) 19.1%
  - Al Gross (I) 12.6%
  - Mary Peltola (D) 10.1%
- **Palin and Peltola would presumably have won closed party primaries.**
- **Al Gross dropped out of the race.**

- **General Election Ballot Ranking Distribution**

% of Ballots →	14.3%	8.2%	6.0%	18.1%	1.9%	11.3%	25.1%	2.5%	12.6%
1st choice →	Begich	Begich	Begich	Palin	Palin	Palin	Peltola	Peltola	Peltola
2nd choice →	Palin	Peltola	–	Begich	Peltola	–	Begich	Palin	–

- **Successive Elimination Rounds:**
  - Results were announced 15 days after the August 16th election.

	Begich	Palin	Peltola	Total	Notes
Round 1	28.5%	31.3%	40.2%	100.0%	Begich eliminated
Round 2	N/A	45.6%	48.4%	94.0%	Peltola wins

  - Begich is eliminated in Round 1. Voters who selected Begich first have their second choices counted.
  - Palin is eliminated in Round 2. Voters who selected Palin first do not have their second choices counted.
  - Peltola wins with a relative majority of votes versus Palin (not an absolute majority).

- **Final Result**
  - 42.1% of voters expressed a preference for Peltola over Begich.
    (1.9% + 25.1% + 2.5% + 12.6%)
  - 46.6% of voters expressed a preference for Begich over Peltola.
    (14.3% + 8.2% + 6% + 18.1%)
  - **A relative majority of voters prefers a losing candidate (Begich) to the winner (Peltola). This is a poor election result.**
  - "Vote splitting" between Begich and Palin caused Begich to be prematurely eliminated. Palin is a "spoiler" candidate.
  - The Republican National Committee adopted a Resolution to Officially Oppose Ranked Choice Voting Across the Country.

❖ Improving RCV with Condorcet Minimax:

- **Voters rank candidates in order of preference.**
  - Ballots should not be spoiled by tied or skipped rankings.
  - Limit the number of general election candidates by advancing three to five candidates from an inclusive single-ballot primary election.
- **For each pair of candidates, determine who is ranked higher on each ballot.**
  - Ignore tied rankings. Count unranked candidates as ranked worst.
  - Each precinct keeps running totals as ballots are processed.
  - Summarize all ballot information in a list of pairwise results or as a table of the number of voters preferring each candidate to each opponent.
  - Ballot tabulation is fast and transparent.
- **Determine the winning candidate using the Condorcet Minimax (or Simpson–Kramer) method:**
  - If one candidate is preferred to each opponent by a relative majority of voters (as is true in nearly all elections), then that candidate is elected.
  - Otherwise, elect the candidate requiring the fewest additional 1st-choice rankings to attain relative majority preference over each opponent.
  - Compared with other election methods, Condorcet Minimax minimizes voter preference for the runner-up relative to the winner.
  - Alternative methods such as Approval or STAR voting incentivize voters to "bullet vote" for a single candidate, thereby reducing the influence of voters who indicate support for multiple candidates.

Election Result Table for AK 2022 Special House Election
(% of Voters Preferring Candidate to Opponent)

	Opponents:	Begich	Palin	Peltola
Candidates:	Begich	-------	53.7%	46.6%
	Palin	33.7%	--------	45.6%
	Peltola	42.1%	48.4%	--------

Pairwise election results:
Begich 53.7% versus Palin 33.7%
Begich 46.6% versus Peltola 42.1%
Peltola 48.4% versus Palin 45.6%

Begich should be elected as the "Condorcet winner" preferred by voters to each of the other candidates.

❖ Summary

- **RCV with Successive Elimination:**
  - Voids ballots with tied rankings.
  - Requires all ballot information to be accessible at a central tabulation center.
  - Requires all ballots to be processed before beginning tabulation.
  - Counts second choices for some ballots but not others, depending on when the first choice is eliminated.
  - Hand audits and recounts are difficult.
  - Subject to vote-splitting and "spoiler" candidates.
  - A losing candidate is often preferred by voters to the winning candidate.

- **Condorcet Minimax:**
  - Allows ballots with tied rankings.
  - Allows ballot data to be compiled at each precinct.
  - Allows immediate tabulation of ballots as they are processed.
  - Counts all rankings on all ballots. No voter preferences are lost.
  - Easy to perform hand audits or recounts.
  - Pairwise comparisons not affected by other candidate rankings.
  - Guarantees election of any candidate who is preferred by voters to each opponent (i.e. any candidate who would defeat each opponent head-to-head).
  - Minimizes the likelihood of voters preferring a losing candidate to the winning candidate.
  - Supported by rigorous academic research.

Notes:
Academics at Princeton University explain the advantages of Condorcet methods: https://www.princeton.edu/~cuff/voting/theory.html, https://www.princeton.edu/~cuff/publications/wang_allerton_2012.pdf
Richard Darlington of Cornell University has performed simulations demonstrating the superiority of Condorcet Minimax methods over other election methods: https://arxiv.org/abs/1606.04371, https://arxiv.org/pdf/1807.01366, https://doi.org/10.1007/s10602-022-09390-w
(Other academic research supporting Condorcet Minimax is cited in these papers.)
Andrew Meyers of Cornell University developed the Condorcet Internet Voting Service, for which a version of Minimax is the default method for reasons explained here: https://civs1.civs.us/rp.html