

## Comparison of Voting Methods

Here are four ways to determine a single winner for an election:

- The **plurality** winner is the candidate who is the first choice of the most voters.
- The **approval** winner is the candidate who is acceptable to the most voters.
- The **Condorcet** winner is the candidate who is preferred over each other candidate by a majority of voters.
- The **instant runoff** winner is the candidate who is ranked highest by a majority of voters after repeatedly eliminating the candidate who is ranked highest by the fewest voters.

	Plurality	Approval	Condorcet	Instant Runoff
1. Is every vote counted?	yes	yes	yes	no
2. Do voters get to rank the candidates?	no	no	yes	yes
3. Do voters get to express that they like some candidates equally well?	no	yes	yes	no
4. Can increasing support for a candidate cause that candidate to lose?	never	never	never	sometimes
5. Can voters support minor candidates without risk of spoiling the election?	no	always	always	sometimes
6. Does the system favor candidates with extreme positions or moderate positions?	extremists	moderates	moderates	extremists
7. How hard is it to explain?	simple	simple	moderate	moderate
8. How costly is it to put in practice?	cheap	cheap	moderate	expensive

See the other side of this page for an explanation of these comparison factors.

Ranked ballots are more expressive than the ballots we use today. But the renaming of instant runoff as “Ranked Choice” is misleading, since there are many ways to count ranked ballots and instant runoff is only one. Just as the term “pro-life” misuses a general word to describe opponents of abortion, the term “Ranked Choice” co-opts a general concept for a single option, leading people to dismiss alternatives or not to recognize that alternatives exist.

For more information, see <http://zesty.ca/voting/> or contact me at ping@zesty.ca.

—Ka-Ping Yee

1. In the plurality, approval, and Condorcet methods, every voter's entire ballot contributes to the result of the election. In instant runoff, only one of your rankings counts, and which one depends on the other voters.
2. In plurality and approval, you only get to say thumbs-up or thumbs-down. In Condorcet and instant runoff, you can put a number beside each candidate to rank them in your order of preference.
3. In approval, you can approve of more than one candidate. In instant runoff, you must give each candidate a different rank. In Condorcet, you can give some candidates the same rank if you think they are about equally good.
4. Instant runoff is the only method in which a shift of public opinion *toward* a candidate can cause that candidate to lose.
5. A big problem with our current method is that if you choose to vote your true preference for a minor candidate, you don't get to express which major candidate you prefer. So lots of people who like minor candidates don't vote for them on election day.

Instant runoff lets you safely vote for a minor candidate only if the candidate is certain to lose. Once the candidate has enough support to influence the election, you are back to choosing the lesser of two evils.

In the approval method, your yes/no decision on each candidate is completely independent, so expressing your support for a minor candidate can never hurt a major candidate.

In Condorcet, all that matters are the pairs of relative preferences, which are unaffected by the addition of more candidates.

6. Both plurality and instant runoff place a premium value on the first-place rankings, disregarding the rest of the rankings for many or all voters. Thus these methods benefit candidates who have fervent but narrow support over candidates who have broad support. Approval and Condorcet tend to choose candidates that have the broadest appeal.

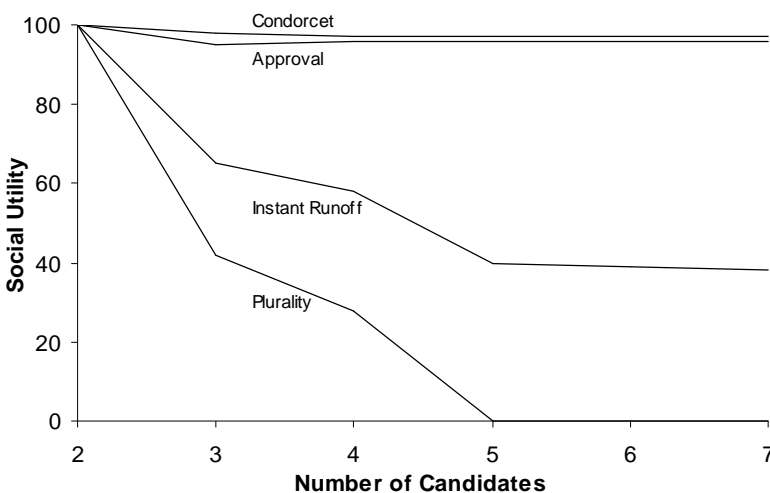
7. Plurality and approval are trivial to describe in one sentence. It takes a few more words to explain Condorcet and instant runoff, though people usually get it after a couple of minutes.

8. To run a plurality or approval election, each precinct can simply add up the total number of votes for each candidate. If there are  $n$  candidates, there are  $n$  totals. Those totals can be collected and added up to determine the winner.

To run a Condorcet election, each precinct makes a table of the round-robin match-ups between each pair of candidates. If there are  $n$  candidates, there are roughly  $n^2$  pairings. These totals can be collected and added up to determine the winner.

To run an instant runoff election, the results cannot be tallied at any level except centrally. That's because there are over  $n!$  ways to fill out a ballot—with 20 candidates, that's over 2 quintillion possible ballots. So the only way to run the election is to send every single ballot to a central location where they are all counted at once.

If voters are limited to ranking only three choices, as in the San Francisco elections, then an instant runoff election can be conducted by tallying roughly  $n^3$  numbers in each precinct, which can be summed up at a central location to determine the winner.



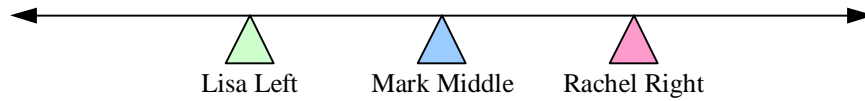
The chart at left is from the book "Making Multicandidate Elections More Democratic" by Samuel Merrill (Princeton University Press, 1988). It depicts the average satisfaction of the electorate with the winner selected by a particular voting system, in terms of how closely the winner agrees with each voter. 100 represents the highest achievable satisfaction, and 0 represents choosing a winner at random.

For more information on this chart and the comparison table above, contact me at ping@zesty.ca.

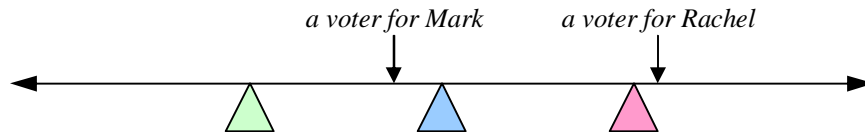
— Ka-Ping Yee

## Modeling What Voting Methods Do

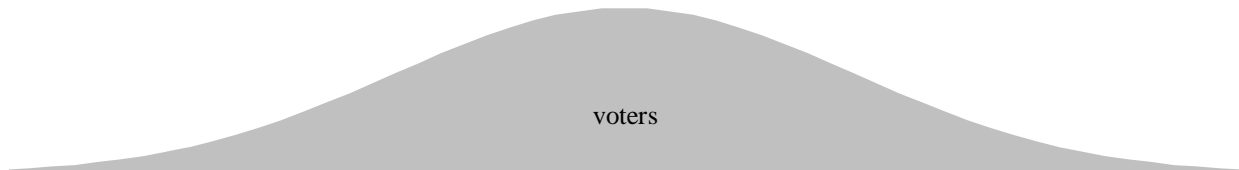
Suppose there are three candidates in an election: Lisa Left, Mark Middle, and Rachel Right.



Which one do you vote for? It depends where you stand. If your opinions are closest to Rachel, you would probably vote for her. If your opinions are closest to Mark, you might vote for him.

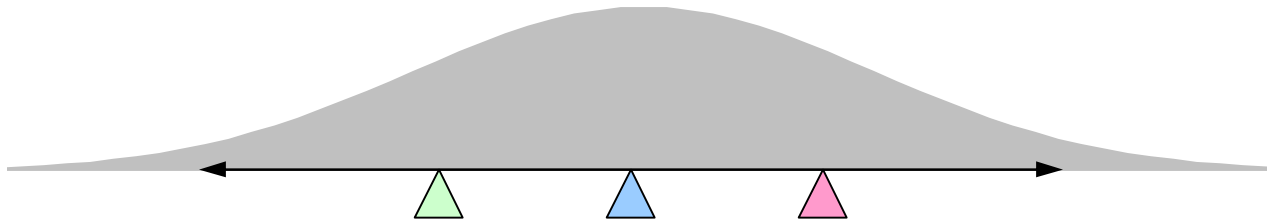


Now look at a whole group of voters. They will have a range of different political positions, but in most common statistical distributions, there will be a main group of voters with fewer off to both sides. Most people are moderate.

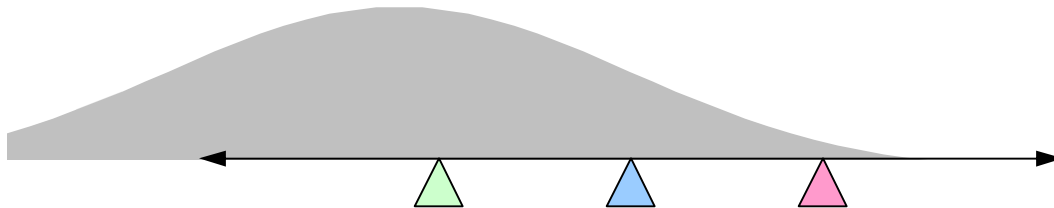


Let's put the voters and the candidates together. The winner of the election should reflect the overall political opinion of the voters, right? So the outcome should depend on the political position of the main group.

For example, who do you think should win this election?



What about this election?



Now suppose you try all the possible positions for the voters—move the hump all the way from left to right, and look at who wins. For what positions does Lisa win, or Mark win, or Rachel win? Intuitively, what should happen is that when the center of opinion is close to a candidate, that candidate should win. But what really happens depends on the voting method.

The other side of this page plots the winners for the four voting methods in a variety of situations. The candidates are positioned in a two-dimensional space instead of a one-dimensional spectrum. See <http://zesty.ca/voting/> for a more detailed explanation and more results from these simulations.

