

Voting Methods (Chapter 1)	Dr Kim ClassNotes	Text
Plurality: Look at "1 st -place votes" only. Winner is the one with the most (1 st -place) votes.	Class #1 p.2	Pp 10- 12
Borda Count: Give points to ranked votes. Last place gets 1 point, next-to-last gets 2 points. With "n" candidates, 1 st place gets "n" points. Add up all the points each candidate gets. Winner is the one with the most points. (It may help to arrange the votes and their points in a "multiplication-table"-like format.)	Class #1 p.3	Pp 12- 14
Plurality with Elimination: Look at 1 st -place votes first. Remove the candidate with the fewest votes, and, for "Round 2," "give" their votes to the candidate <i>that those voters chose as next-ranked</i> . In each "Round," remove the candidate with the fewest votes and give those votes to the next-ranked candidate that those voters chose. For "n" candidates, there are "n-1" rounds. Winner is the candidate that never gets eliminated.	Class #2 p.5	Pp 15- 19
Pairwise Comparisons: Consider each pair of candidates; for those two candidates count how many votes favor one over the other, and how many favor them in the opposite ranking order (note: in each pair-wise count, the total of the two numbers should equal the total number of votes). For example, compare candidate "A" to candidate "B" – count how many voters ranked "A" above "B" and then count how many voters ranked "B" higher than "A." In each pairwise comparison, the winner of the pair gets 1 point; if they tie, they each get ½ point. Winner is the candidate with the most points (i.e., the candidate who wins the most pairwise comparisons). For "n" candidates, the number of pairwise comparisons is: $n(n - 1)/2$	Class #2 p. 6	Pp 19- 22

Fairness Criteria (Chapter 1)	Dr Kim ClassNotes	Textbook
If a fairness criterion is met, then that election is considered "fair." If there is a winner but a criterion is violated, then the election is considered not to be "fair." Note: None of the voting methods above satisfy all of these fairness criteria.	p.9	p.22

- **majority criterion:** IF a candidate gets the majority ($> \frac{1}{2}$) of the (first-place) votes, THEN that candidate should be the winner of the election
- **Condorcet criterion:** IF one candidate beats all the others in pairwise comparisons, THEN that candidate should be the winner of the election
- **monotonicity criterion:** IF some **voters change** their votes (in a way that supports the candidate who would have been the winner before they changed their votes), THEN the outcome should not change – Yoon Kim said, "The wind should blow monotonically" (Think of monotone increasing functions, rather than monotone voices.). In other words, the "winner" should not end up losing if some voters switch their votes in favor of that "winner" (which happens in real life – see Example 1.21).
- **"IIA" – independence of irrelevant alternatives criterion** – IF an "irrelevant" candidate (a loser) **drops out** of the race, THEN that should not change the outcome (should be same winner either way).

Some comments on fairness criteria:

- NOTE that "monotonicity" has to do with **VOTERS changing** how they vote, whereas IIA has to do with a **CANDIDATE dropping** out.
- A criterion is a good thing; violating a criterion is not good.
- IF the majority criterion is violated, THEN the Condorcet criterion is automatically also violated. (But not necessarily the other way around, in part because there might not even be a majority winner.)

Language:

- Do not say "Condorcet Method" --- the **method** is called "**Pairwise Comparisons**" and we refer to the "**Condorcet Criterion**" and the "Pairwise Method"