

# Summary

Method	MA	CO	MO	IIA
Plurality	Satisfy	Violate	Satisfy	Violate
Borda	Violate	Violate	Satisfy	Violate
PwE.	Satisfy	Violate	Violate	Violate
Pairwise	Satisfy	Satisfy	Satisfy	Violate

# No Perfect Method

Theorem (Arrow's Impossibility Theorem)

*It is **impossible** for a voting method to satisfy all four fairness criteria.*

# Summary

- ▶ The whole point behind fairness criteria is to not only **state** what a fair election should be like, but allow us to **test** whether a voting method satisfies or violates the criterion.

# Fairness Criteria Summary

- ▶ The majority criterion and Condorcet criterion involve candidates who are popular in some way:
  - ▶ The majority criterion wants a candidate **who has over 50% of the first place votes to win.**
  - ▶ The Condorcet criterion wants a candidate **who wins all their pairwise comparisons to win.**

# Fairness Criteria Summary

- ▶ The monotonicity criterion wants **every first place vote to be helpful, or at least not harmful.**
- ▶ The IIA criterion wants to **keep losers who quit (or are otherwise removed) from affecting the election results.**