01/24 Notes

Consider a situation with n voters and k candidates.

A strict preference list is an ordering of candidates. Ex: A>C>B (no ties)
A preference list is the same but allows ties.

We should begin to conceptualize election systems in the form of functions, with inputs and outputs.

Social Welfare Function: A function whose input is the strict preferences of all voters and whose output is a preference list of the candidates.

Vs.

Social Choice Function: A function whose input is the strict preferences of all voters and whose output is a single winner.

Review of voting systems we've talked about in class:

Plurality, Anti-Plurality, Point System, Weighted Voting, Bracket method, Emily's pairwise, Pairwise + how much you won by, Spectrum (Range), Instant Runoff, Coombs, Dictatorship, Pineapple/Monarchy, and All-ties.

Expanding on the ideas we came up with:

The Point System is typically called the Borda Count where first place gets n points and second gets n-1. The one who has the most points wins. This may be the same function as our point system.

An agenda is how you set up the bracket in the bracket method. Within this method we also questioned how we might deal with ties and how to order those who don't win. There were no easy answers to these questions.

Emily's Pairwise is called Copeland. Again, we ran into the question how we might deal with ties here. A possible solution may be to give half points to the candidates that tie in any given race. Finally, we called pairwise + how much you won by "Weighted Copeland"

Given we have just two candidates, what are possible voting systems?

Plurality, Super-Majority, Dictatorship, Super Affirmation (A if greater than ¾ vote and B if otherwise), and Pineapple.

Imagine a situation where we have 3 voters and two candidates. How many ways can they vote, and how many functions exist?

On the input side, we need to find how many ways they can vote. This can be easily calculated by taking two (the number of options they have) and raising it to the power of three (the number of voters). Thus, there are 8 possible ways this group can vote. These 8 inputs could map to 3 possible outputs (A wins, B wins, they tie). So, we felt that three to the eighth was an adequate answer to how many functions exist.

What are the qualities that make a voting system "good"?

Anonymous: all votes are equal
Near decisive: always a winner except when votes are tied
Agrees with plurality: most people get their first choice
Neutral: all candidates are equal
Monotone: if you get more votes you aren't ranked lower

Conjecture: A two candidate voting system that it near-decisive, neutral, anonymous, and monotone is the Plurality system.