Verifying Arrow’s Impossiblity Theorem using Behavioral Subtyping

1. What is arrows?
   1. Every electoral system is provably terrible
   2. Intuition for why conditions are interesting/useful
      1. IIA formalizes no spoilers
      2. Transitivity is just … how we rank things, nec to be useful
      3. Pareto
   3. Every real world system just has spoilers basically
2. Why arrows
   1. Natural choice for behavioral subtyping
      1. Also a natural choice for constructive logic since in some sense we “construct” a dictator
   2. Not a lot of work in formal verification of social sciences
   3. Rich basis for expansions
3. What’s interesting about this strategy
   1. All previous proofs are tactic mode proofs
      1. Which makes sense! Those people all were math people
      2. And they were probably way easier
      3. I couldn’t get tactic mode to work on my computer ☹
   2. This approach is basically wholly on the program side of the curry-howard isomorphism
4. How does the proof work?
   1. Combo of border notes and sen strategy
5. Lessons learned
   1. Lots of proofs are bad!
      1. Conflations between product types and functions
      2. Products carry state and functions do not
6. Future work
   1. Gibbard satterwaite
   2. Alt strategies to finish the proof
   3. Do it in a real programming language and execute the code (don’t just compile it)