Problem Set #3

Due Thursday, April 7 @ 11:59 pm
Submit as single pdf file to onCourse

*Remember to review the **Guidelines for Problem Sets** on the course webpage.*

1. In their presentation, Anthony, Findlay, and Zach mentioned that if New York's 2020 census count had been 89 residents higher, then they would have retained 27 seats in the House of Representatives rather than dropping to 26 seats. Verify this claim.

   Note that you can use your spreadsheet and calculations from Problem Set #1.

2. Refer to the vote totals and results of the 2015 Knesset election in Israel given at

   https://en.wikipedia.org/wiki/2015_Israeli_legislative_election

   Verify the distribution of seats to the parties. You will want to review the description of how seats are allocated, especially the details of surplus-vote agreements, given at

   https://m.knesset.gov.il/en/about/lexicon/pages/seats.aspx

3. Consider the profile

$$
\begin{array}{ll}
15 \quad A > B > C & \qquad 12 \quad C > B > A \\
5 \quad A > C > B & \qquad 7 \quad B > C > A \\
15 \quad C > A > B & \qquad 11 \quad B > A > C
\end{array}
$$

   (a) Calculate the rankings using plurality, plurality with runoff, antiplurality, and the Borda Count.

   (b) Calculate the pairwise election outcomes, and determine the Condorcet winner.

   (c) Sketch the procedure line for this profile.

   (d) What outcomes, including ties, are possible by using a weighted method for this profile?

   (e) For each outcome you specified in part (d), give a weighted method that determines the outcome.

4. Create examples of profiles with three candidates that have the following properties or explain why no such profile exists.

   (a) All weighted voting methods give an outcome of $B > A > C$.

   (b) B is the Condorcet winner, the plurality outcome is $A > B > C$, the Borda outcome is $C > A > B$, and the antiplurality outcome is $B > C > A$.