Problem Set #1

Due Thursday, February 10 @ midnight
Submit as single pdf file to onCourse

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

1. Consider a Small Nation with five states, A, B, C, D, and E, whose apportionment populations are:

State	Population
A	100,790
B	235,000
C	78,000
D	438,000
E	192,310

   (a) Compute the apportionment using Hamilton's method and Lowndes's method for a house size of 47. Show enough detail that I could recreate your calculations.

   (b) Discuss *why* any differences occur. Do you see any bias towards large or small states in these methods?

2. (a) Using same Small Nation from #1, compute the apportionment using Jefferson's, Adams's, Webster's, Dean's, and Hill's methods for a house size of 47. As above, show enough detail that I could recreate your calculations, and be sure to indicate the divisor used in each calculation.

   (b) Discuss *why* any differences occur. Do you see any bias towards large or small states in these methods?

   (c) Look at your apportionment using Hill's method. What is the population per representative in State A? in State D? Using the definition of Hill's method in terms of seat transfers, explain why Hill's method would not transfer one seat from State A to State D.

3. Download the 2020 apportionment data given in Table 1 at the Census Bureau's site:
   https://www.census.gov/data/tables/2020/dec/2020-apportionment-data.html

   (a) Apply Hill's method to the apportionment populations to verify the apportionment of Representatives given in Table 1. What is the divisor that you used to apportion the 435 seats?
   You should include an image of the spreadsheet you used to perform your calculation with your solution.

   (b) Apply Hamilton's method to the 2020 data.
   You should include an image of the spreadsheet you used to perform your calculation with your solution.

   (c) Identify any differences in your answers between (a) and (b), and thoroughly discuss *why* these differences occur.