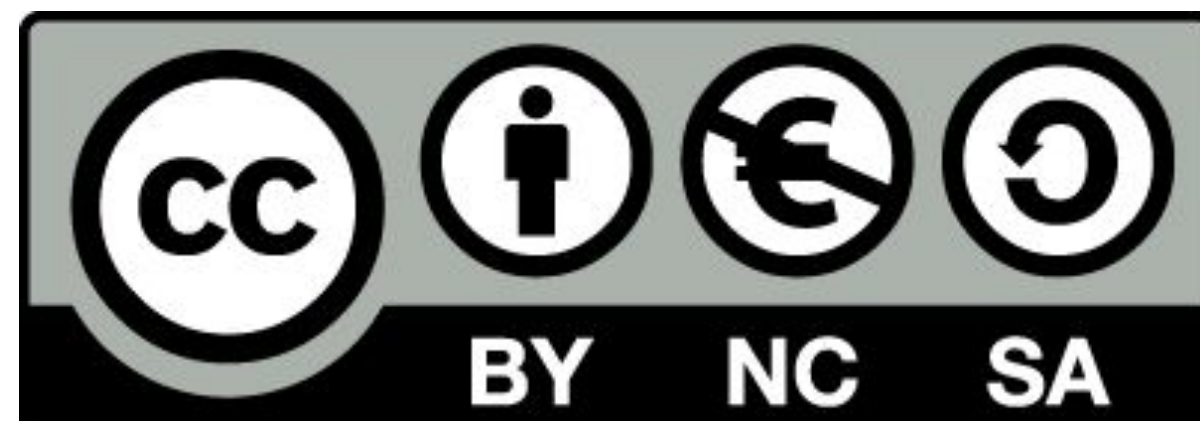# Please use our materials!

These workshop slides and any accompanying activities were developed at Olin College in the course Mathematics/Engineering Outreach for Adolescent Learners, spring 2021, taught by Sarah Spence Adams. The slides and materials are licensed under the Creative Commons Attribution-NonCommercial_ShareAlike 4.0 International license, except where outside resources (such as pictures or websites) are otherwise noted.

We encourage you to use these materials, editing and modifying them as appropriate for your students! When you use, share, incorporate, or modify these materials, please keep the license notice "**Creative Commons Attribution-NonCommercial_ShareAlike 4.0 International license**" and logo (below) and credit "**Olin College's course on Mathematics/Engineering Outreach for Adolescent Learners.**"

We also humbly request that you email sarah.adams@olin.edu if you use these materials, as we are tracking their impact and how far they travel!

REPRESENTATION
The Math Behind Our Democracy

"… a government of the people, by the people, for the people…"
-Abraham Lincoln

Direct VS Representative
The Forms of Democracy

- Direct Democracy: the people always vote on policy initiatives directly

  - Ex: every person in your family always votes on what is for dinner

- Representative Democracy: the people vote for representatives who then vote for policy initiatives

  - Ex: your family votes for 1 member who chooses what's for dinner

- America is a Representative Democracy

Equal VS Proportional
The Kinds of Representation

- Equal Representation: when each state has the same number of representatives

- Proportional representation: when the amount of representatives is based on population

- The American Government has both. The Senate has equal representation and the House has proportional representation.

Today we'll use google sheets & cartograms to visualize data on the Senate, House, & Electoral College.

DEMO

Activity Time

The Senate
Equal Representation

- 2 Senators for each state

- 2 X the 50 states = 100 senators

- The 50 Democrats represent 41,549,808 more people than the 50 republicans.
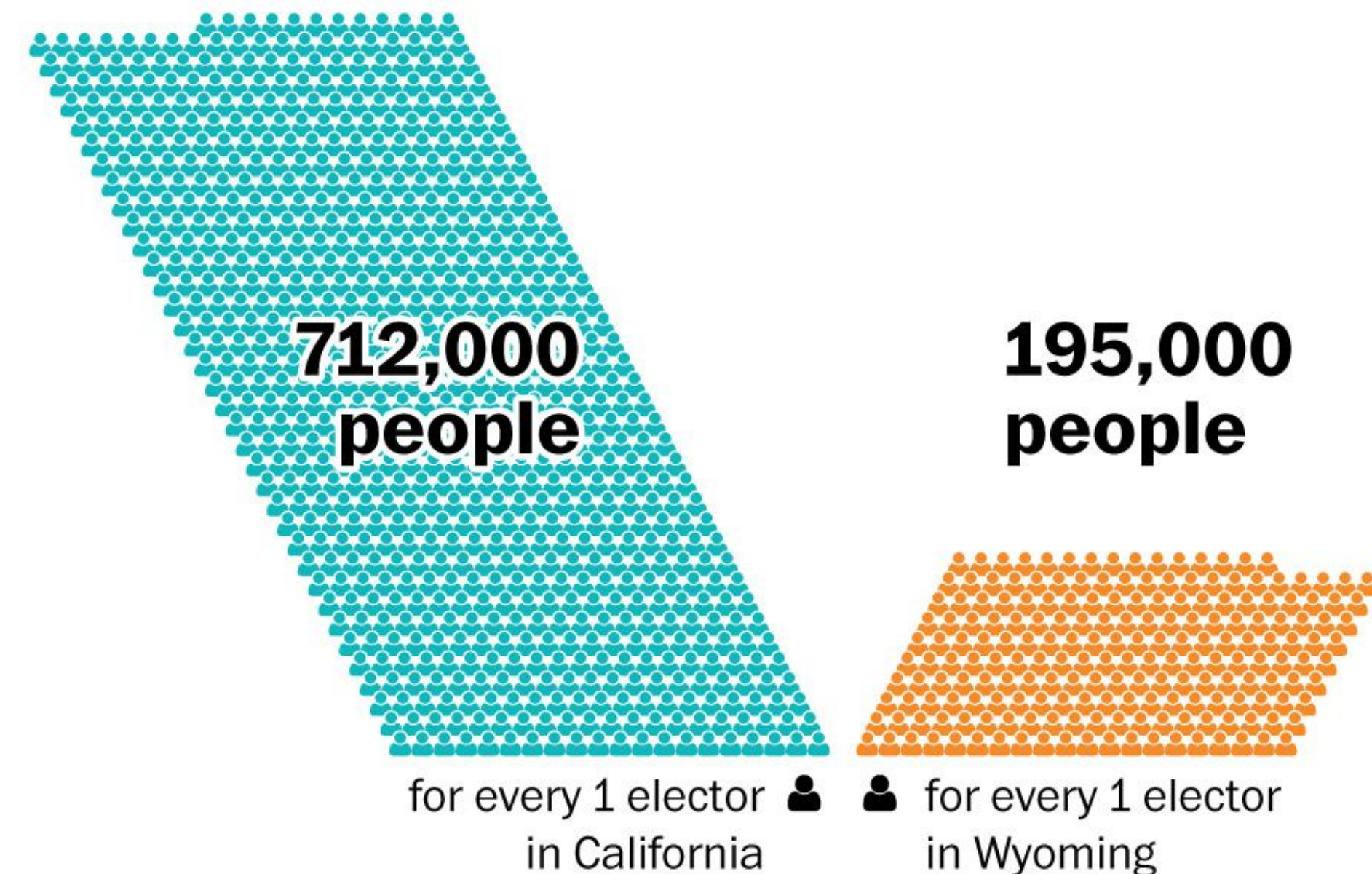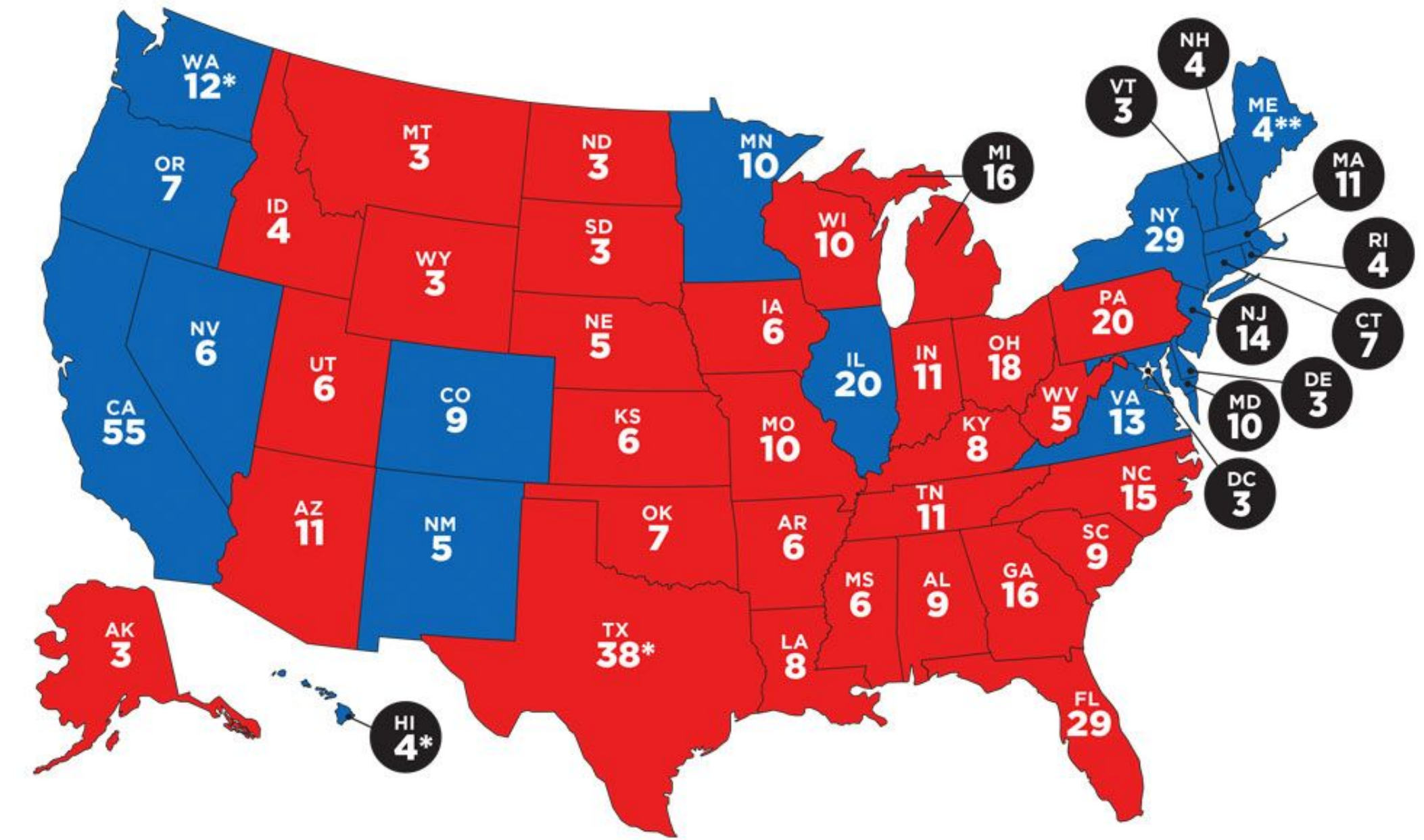
The House of Representatives
Proportional Representation

- 435 voting members who each represent a specific district in their state

- The Permanent Apportionment Act of 1929 set 435 as the number of representatives

  - Established the formula for apportionment of those 435 seats after each census.

- Due to the fixed number of members and the rule that each state gets at least 1 representative we have to do some fancy math to get to exactly 435 House reps

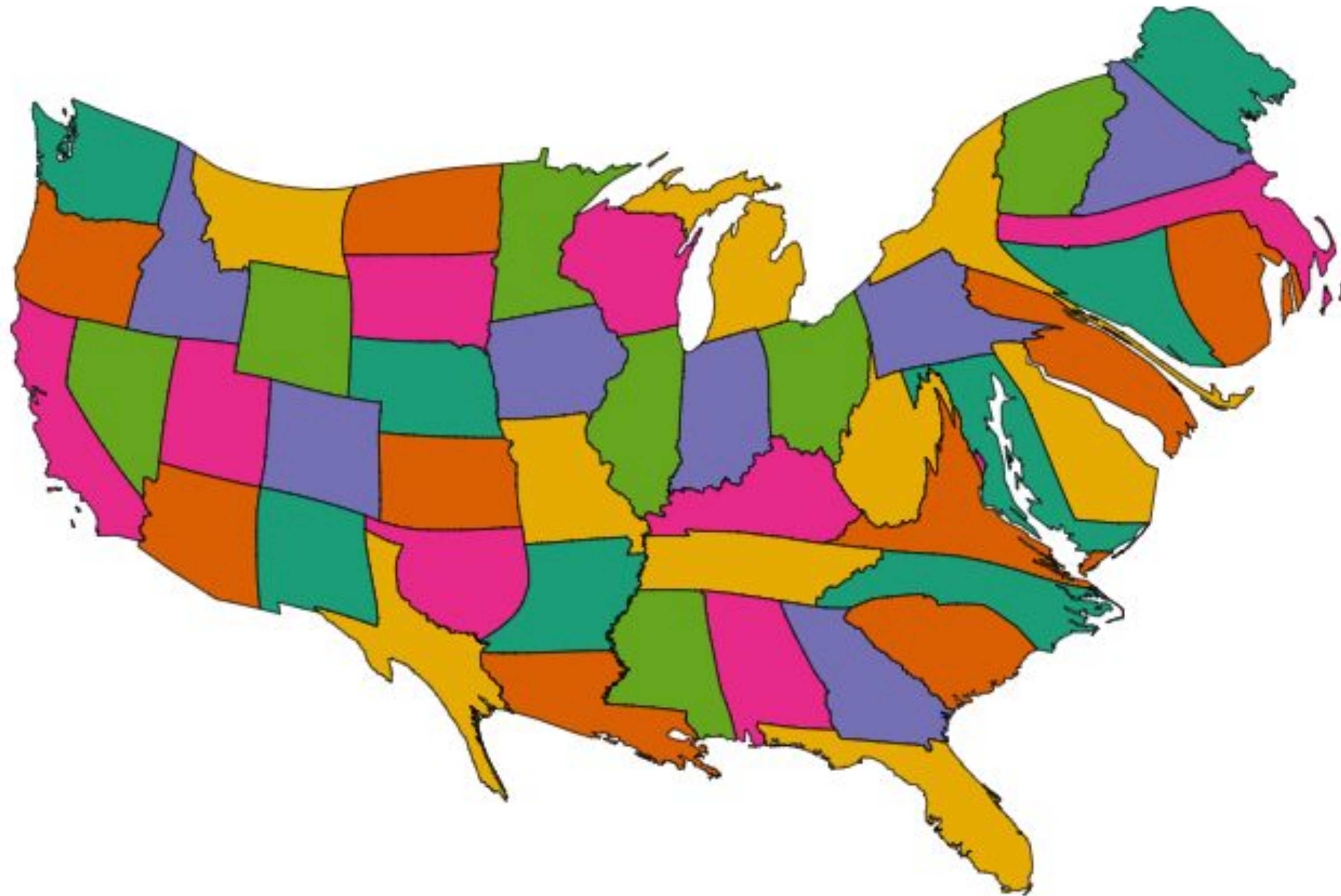# The Electoral College
Representation in the Executive Branch

- How we elect our President and Vice President

- 538 electors, one for each House representative, each senator, and 3 for DC
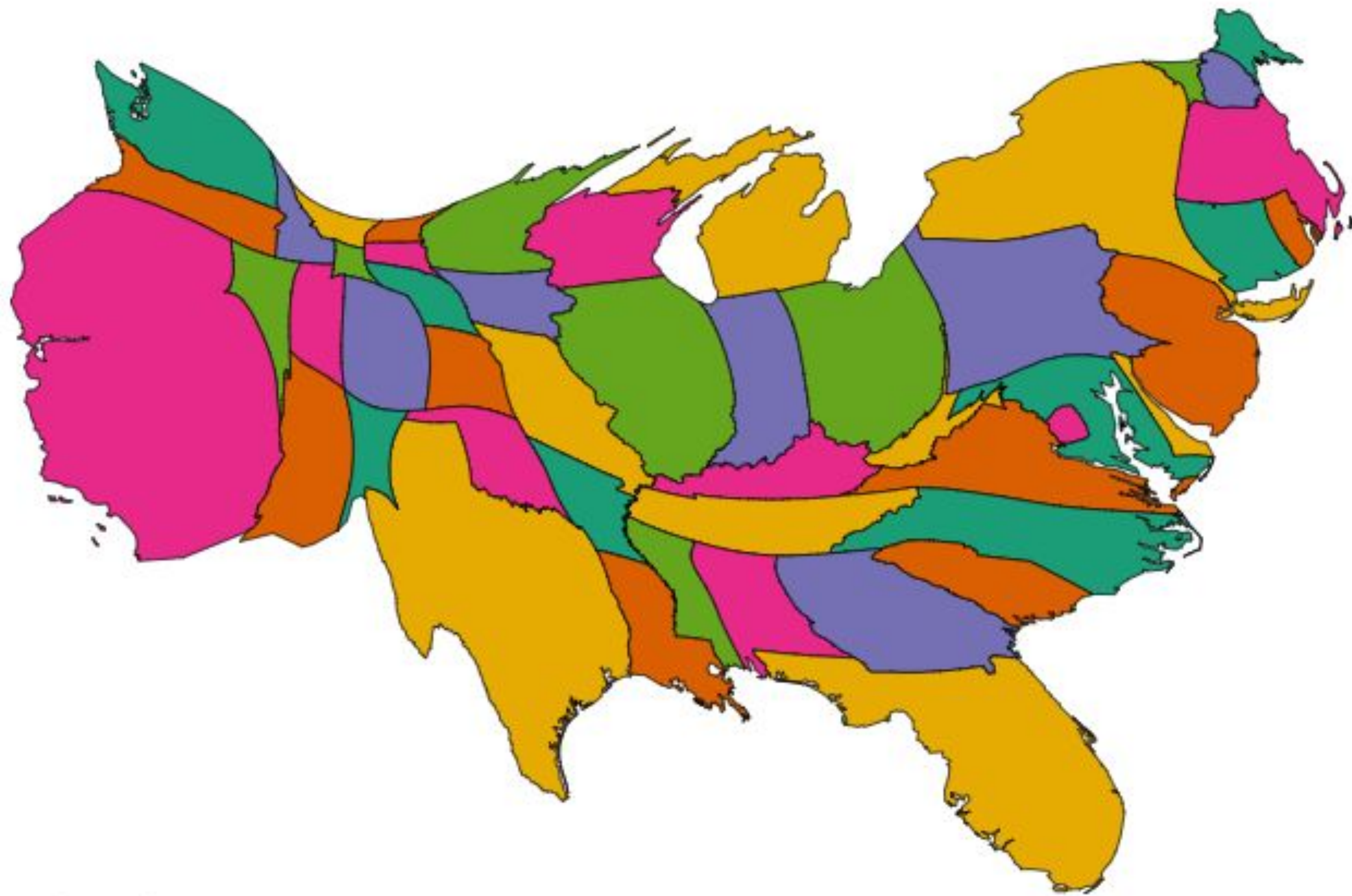
- 435 + 100 + 3 = 438

- A hybrid system of representation

712,000 people for every 1 elector in California

195,000 people for every 1 elector in Wyoming

How does this system based on a hybrid form of representation models impact the power of a vote in each state?

Activity Time

Senators

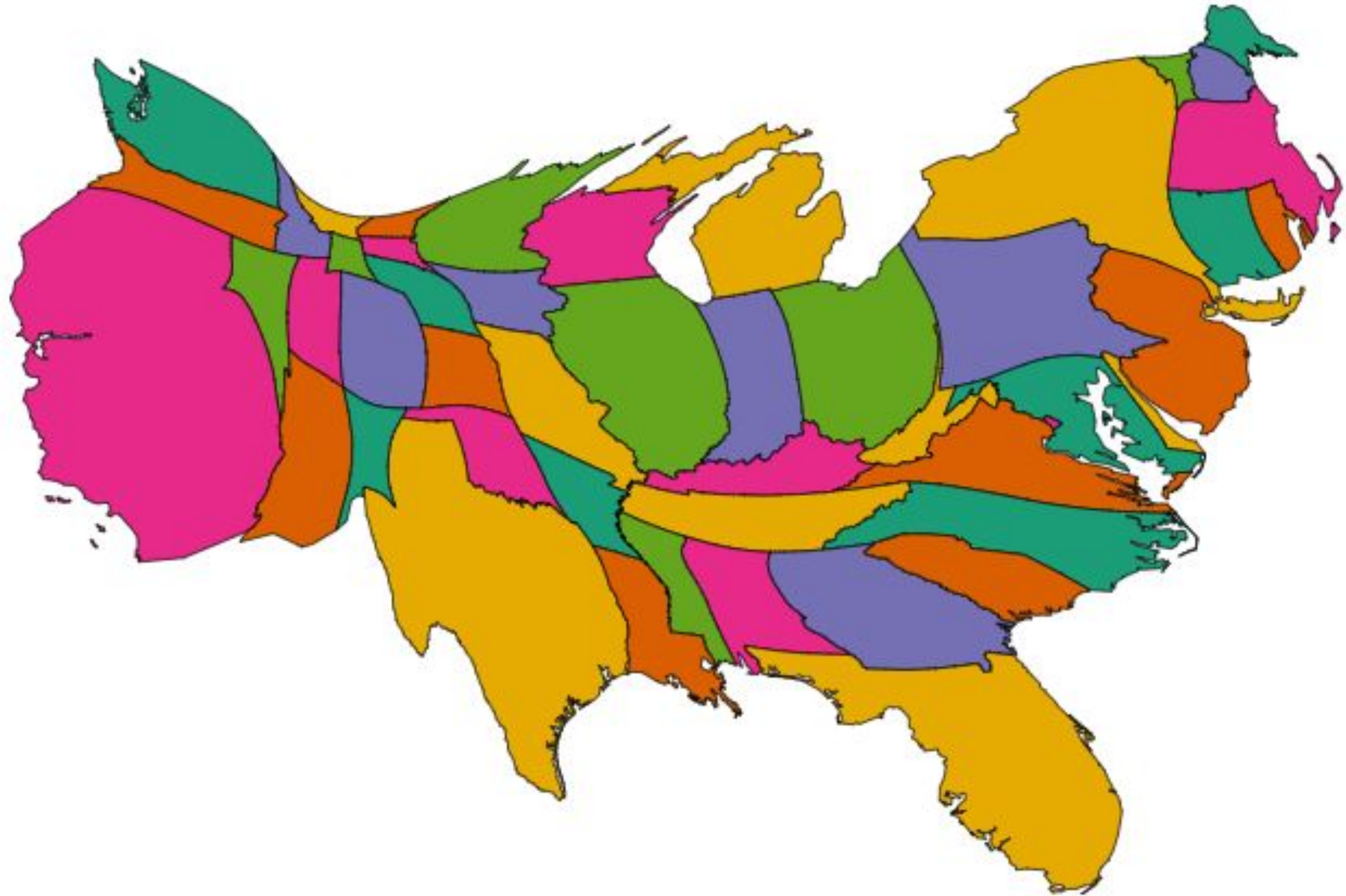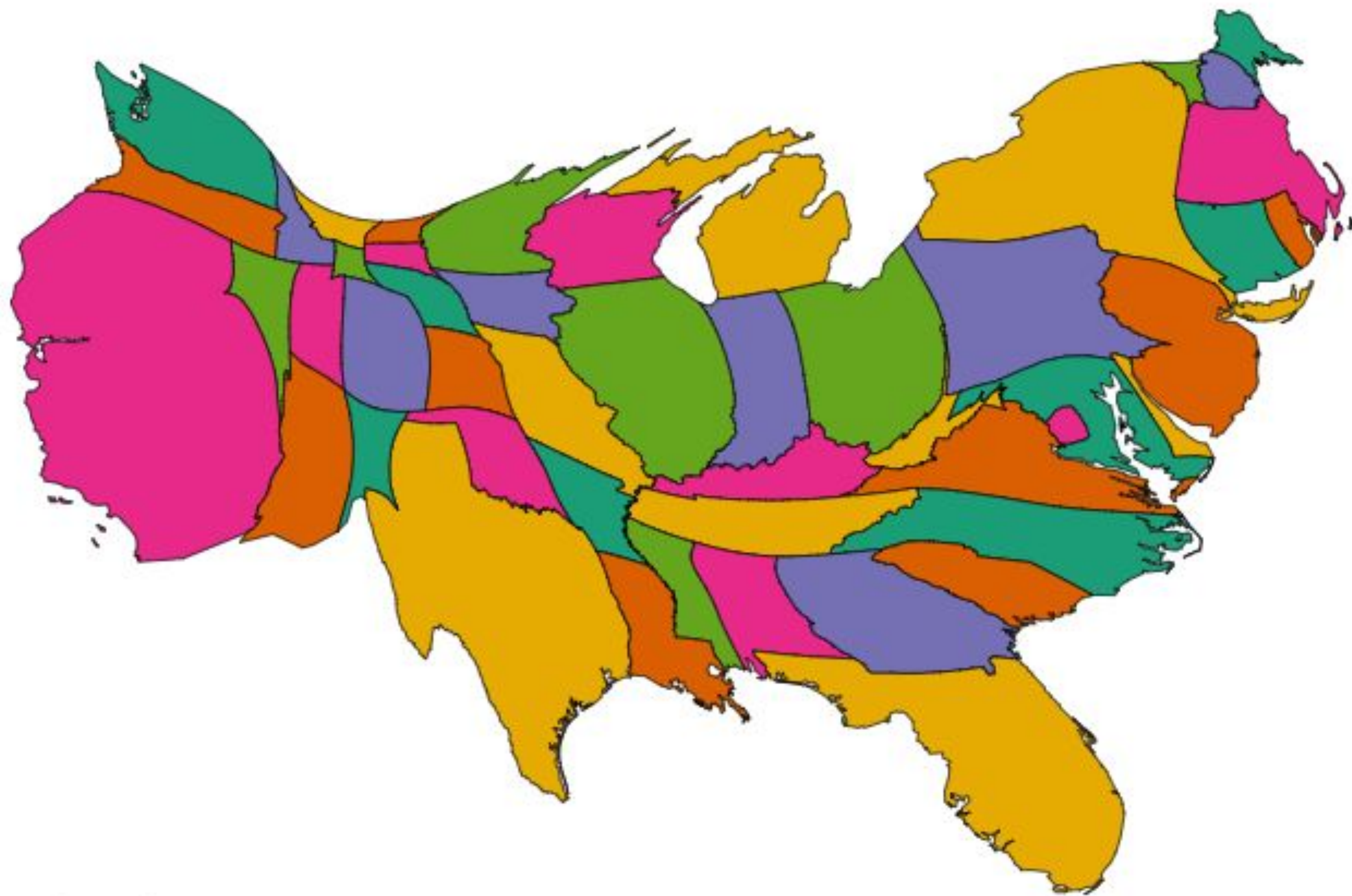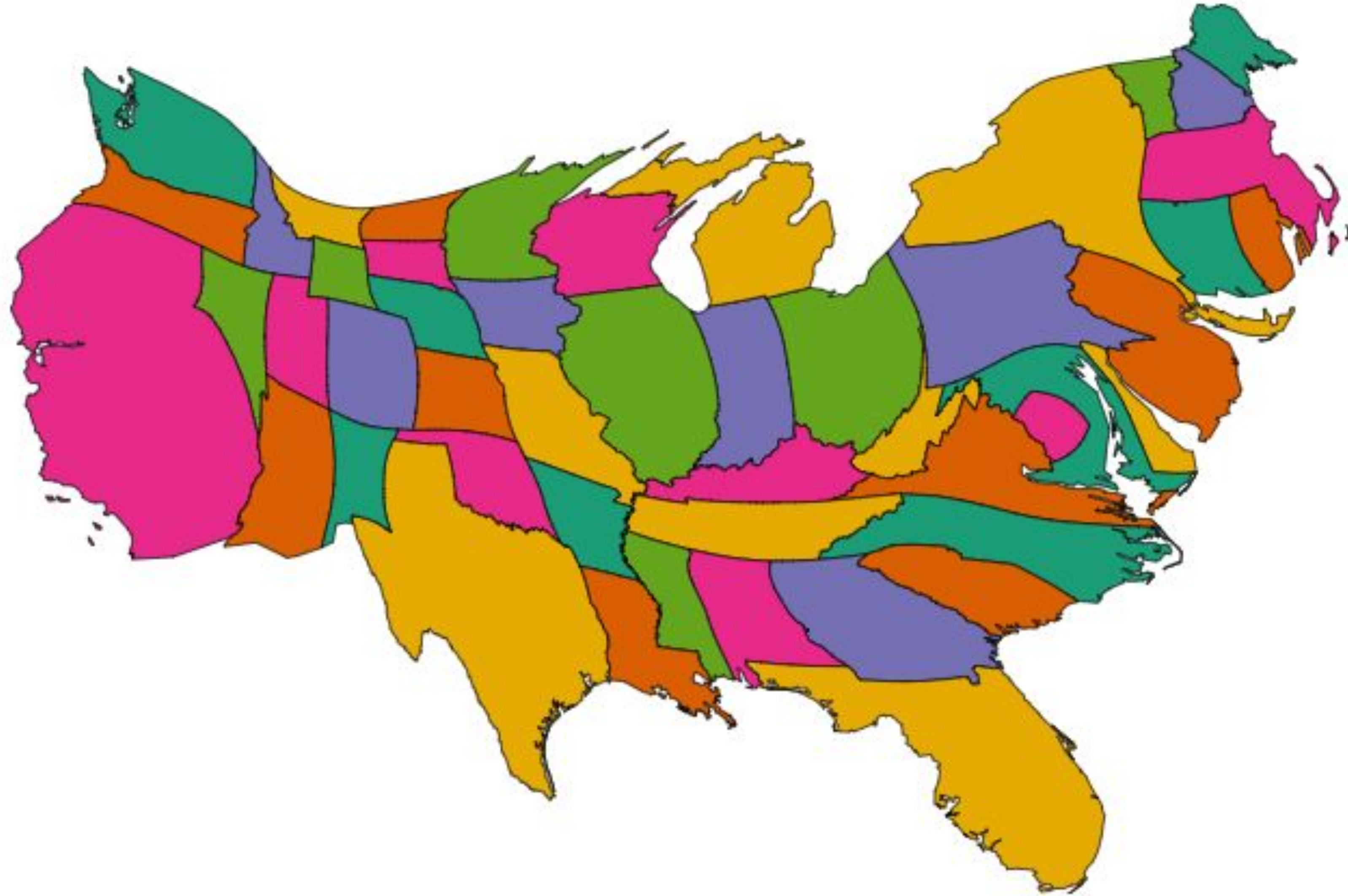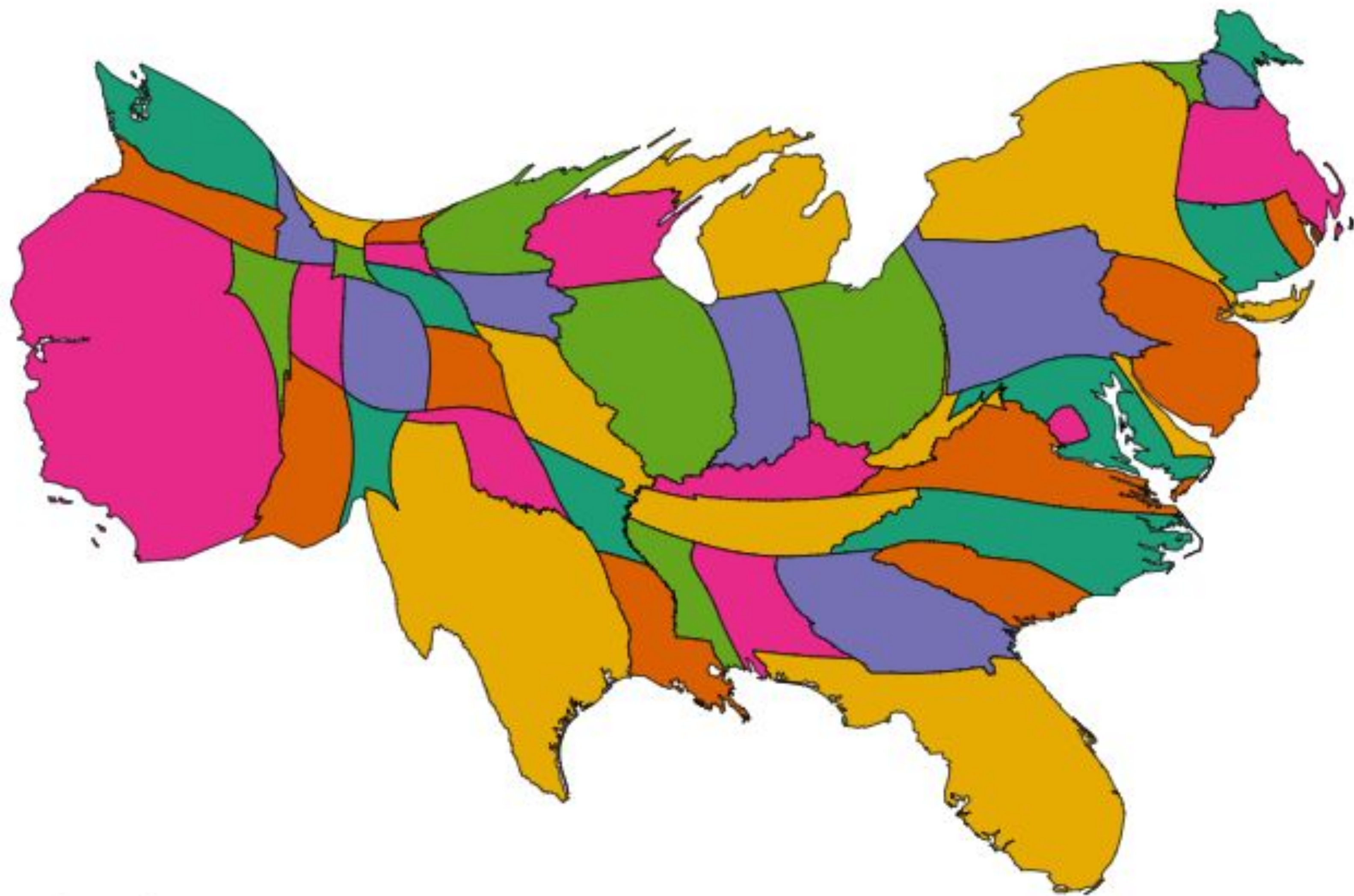# Population

Representatives

Population

Electors

Population

Activity Time