UNIVERSITY OF UTAH

CS 6630

VISUALIZATION

Proposal for Visualization of U.S. Congressional Relationships

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github.com/ntguardian/dataviscourse-pr-congressrelations

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UNIVERSITY OF UTAH SCHOOL OF COMPUTING

Project Proposal

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1 BACKGROUND AND MOTIVATION

The U.S. Congress is a complex entity, with 100 senators and 435 members of the House of Representatives, or 535 members total. While political party is certainly a very important factor in terms of how an individual congressman will vote, it is not a purely determining factor as in other countries where parties often vote as blocks and legislators merely occupy a seat for their political party. Congressmen, especially in the Senate, often act individually, and taking a position contrary to the party's position is not unheard of (although Congress is becoming more polarized and crossing party lines is less common). Thus, the political structure of Congress is much more complex than simply which party holds the majority.

This project aims to visualize congressional voting patterns in terms of how similarly congressmen vote. If two congressmen tend to vote the same on bills or tend to cosponsor the same legislation, they may be considered "similar". When thinking about relationships between members of Congress in this way, we would like to visualize these relationships. This may be useful to politically active individuals and organizations such as lobbyists or lobbying groups and firms (where I worked as an intern for over a year), where determining a strategy often requires understanding these kinds of relationships.

2 PROJECT OBJECTIVES

The project's overarching goal is to allow exploratory analysis of congressional relationships. A user of the app we create would be able to select a congressman or group of congressmen (say, a state's congressional delegation, members of a particular committee, or individuals who vote "Yay" in favor of a certain bill). The app would then use some visual idiom to show how that congressman (or the group) relates to the other members of Congress and show

how other members are "similar" to the selected individual or group. This could be used to answer a number of questions, such as:

- If an individual congressman is about to sponsor a bill, who are other congressman who may cosponsor it?
- Does a particular delegation (say, the Utah delegation) tend to vote similarly to the delegations from Utah neighbors? In other words, do we see strong regional voting blocks?
- Is Congress becoming more polarized? Do we see less crossover than we once saw before?
- Can we identify any "maveriks"? That is, can we find individuals who are largely marginalized? On the flip side, can we find individuals who vote very similarly to their party or the Congress as a whole?

These are interesting relationships and questions that the app created in this project could discover and answer.

3 Data

The Library of Congress website, along with the websites for the U.S. Senate and the House of Representatives, contain voting and sponsorship records. These are usually HTML or XML documents. The roll call votes are XML documents, so they are easier to read and process. Prof. Lex has directed us to a similar project done in a class at Harvard University that may already provide scrapers and data for use.

4 Data Processing

The data in the XML files would need to be read and processed. Also, it may be more efficient to process the data and creating the data structures used to calculate "similarity" (which, between two members of Congress, is the probability another member of Congress votes similarly to the selected member, or in another view, sponsor's the same legislation) prior to displaying that data visually. In other words, the relationships likely will not be determined dynamically, but from a file providing the relationships in a way that can be easily processed when the app is online.

5 Visualization Design

The visualization design needs to show the chance any legislator votes similarly to the selected legislator. It needs to show this at the regional level and in some other idiom. My visualization includes an (interactive) map and an (interactive) scatterplot, where the x-axis represents congressional members' ideological position (as determined by the DW-NOMINATE

score, which measures ideological extremity) and percentage of times of agreement is the y-axis. The x-axis scale is actually an adjustable power scale that allows for the user to make differences appear more or less extreme on the ends, which allows for easier identification of outliers.

The design of the visualization is attached to this document.

6 Must-Have Features

The features this app must have include:

- Roll call voting data for the Senate for the 114^{th} Congress.
- A scatterplot representing the percentage of time congressmen vote with the selected individual or group versus their ideological score.
- A map that shows via luminosity how frequently a congressman (or group) agrees with state delegations across the country, with hue indicating with which party this agreement frequently occurs (it is a continuous scale between blue and red).
- The ability to select a congressman from a side list, the scatterplot, or a congressional delegation from the map.

7 Optional Features

Optional features include:

- Roll call voting data for the House of Representatives (this is more complex because the House has many more members).
- Ability to look at patterns for different Congresses (in other words, the ability to look back in time).
- A power scale slider that allows for exageration of differences, making outliers easier to spot.
- Name, state, party, committee, tenure, and bio information for a selected legislator.
- When no one is selected, the visualization shows who is often voting on the winning side of issues.
- An additional visualization that shows who frequently cosponsors legislation sponsored by the selected congressman (this is difficult to do because the data is difficult to obtain, requiring scraping, and it is difficult to apply this when more than one congressman is selected).

8 PROJECT SCHEDULE

The data should be collected and processed by November 6th. The visualizations should be in a working state by November 20th. Sliders and selectivity should be completed by November 27th, and the overall app structure should be completed by December 4th. At this point, the app will be completed and ready to be deployed. Optional features may be added after the required features are present.

Vis Project
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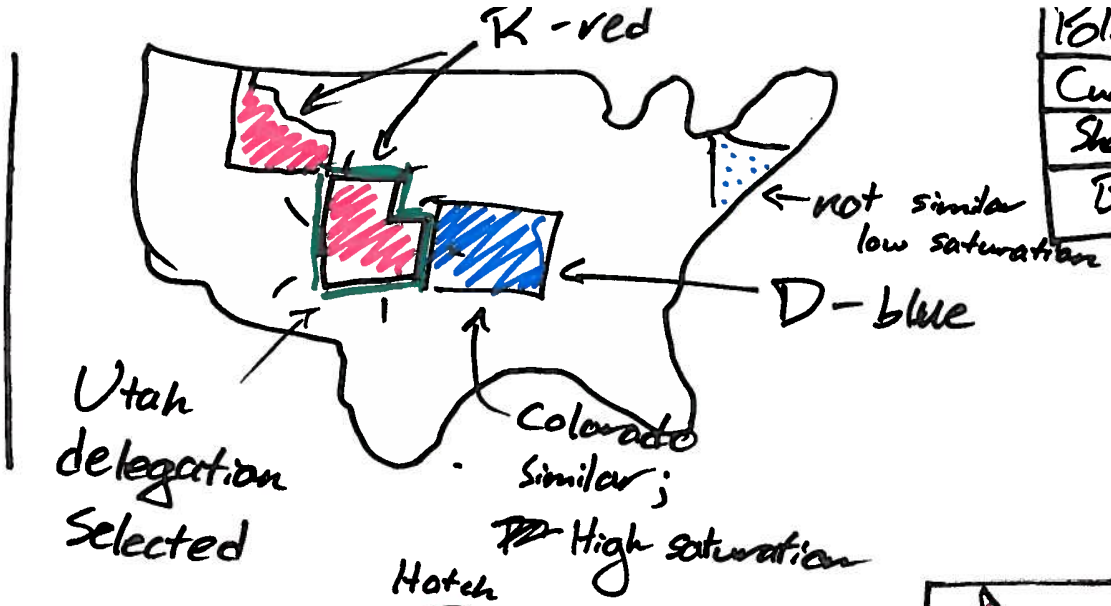
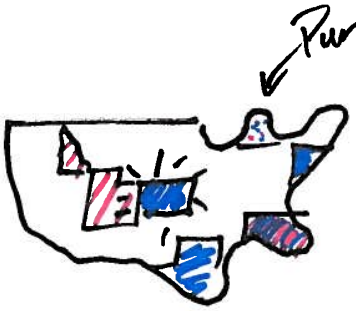
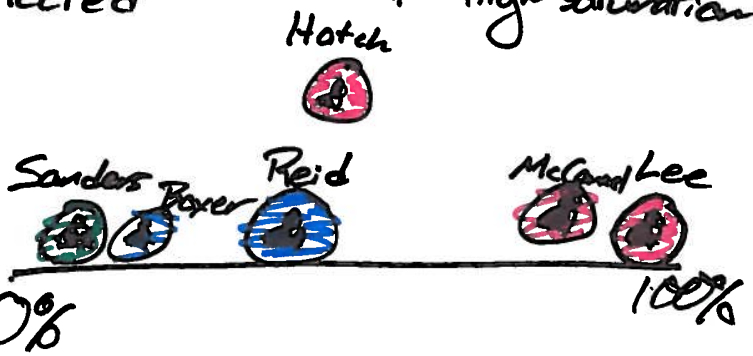
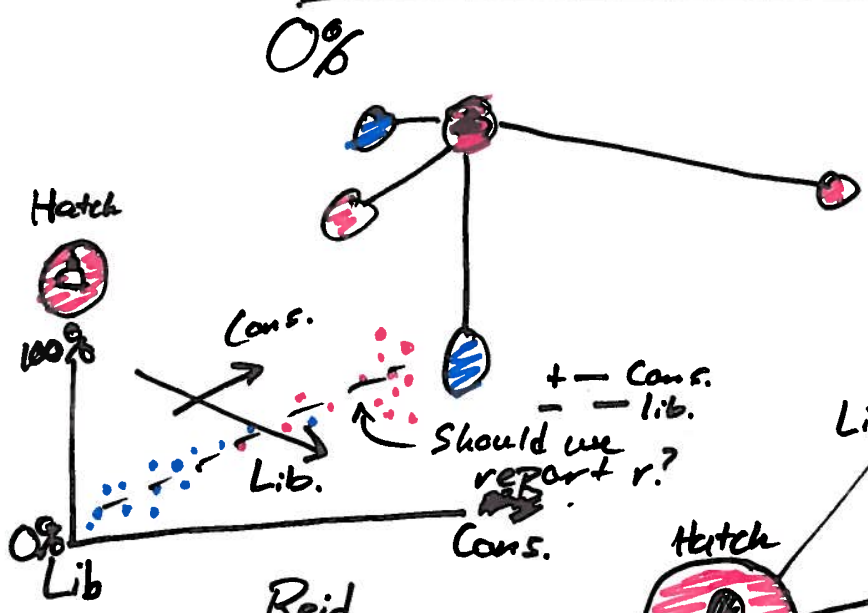
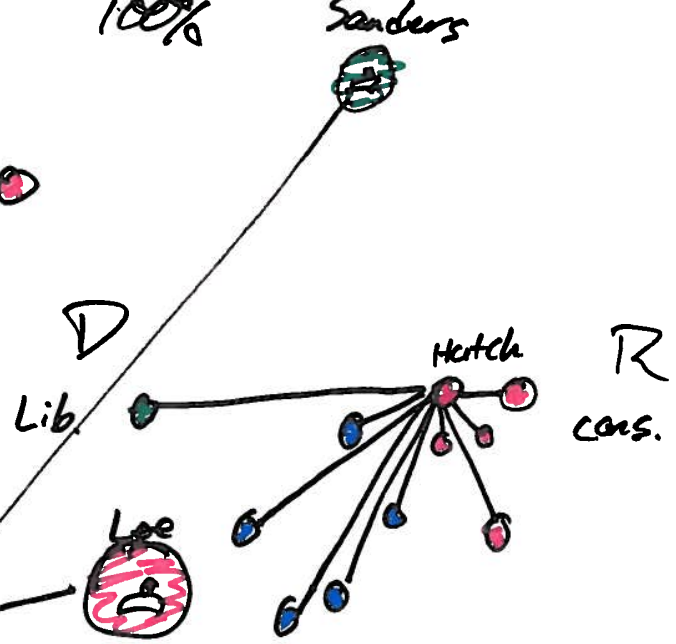
Sheet 1
Brainstorm

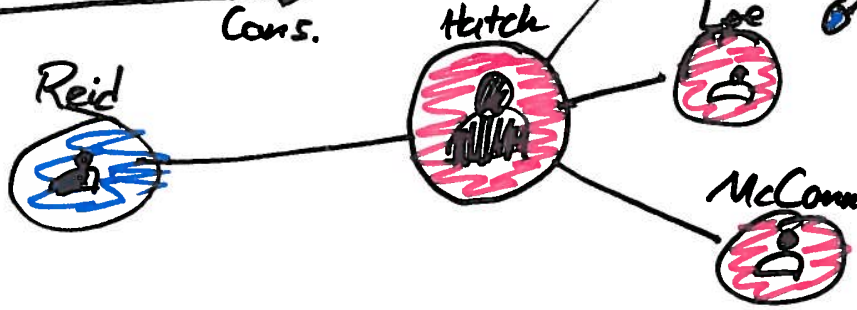


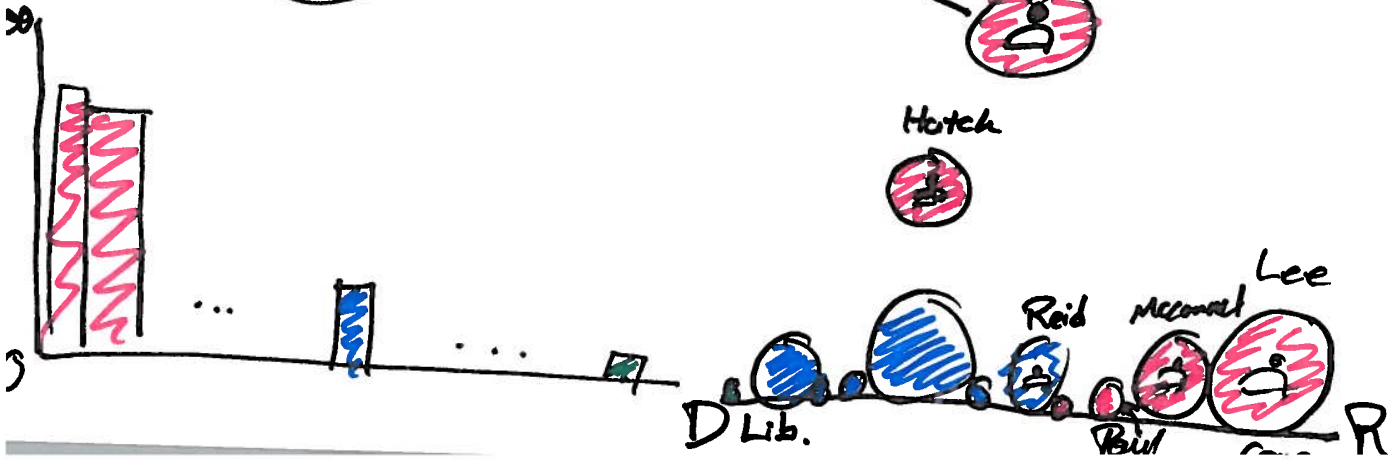












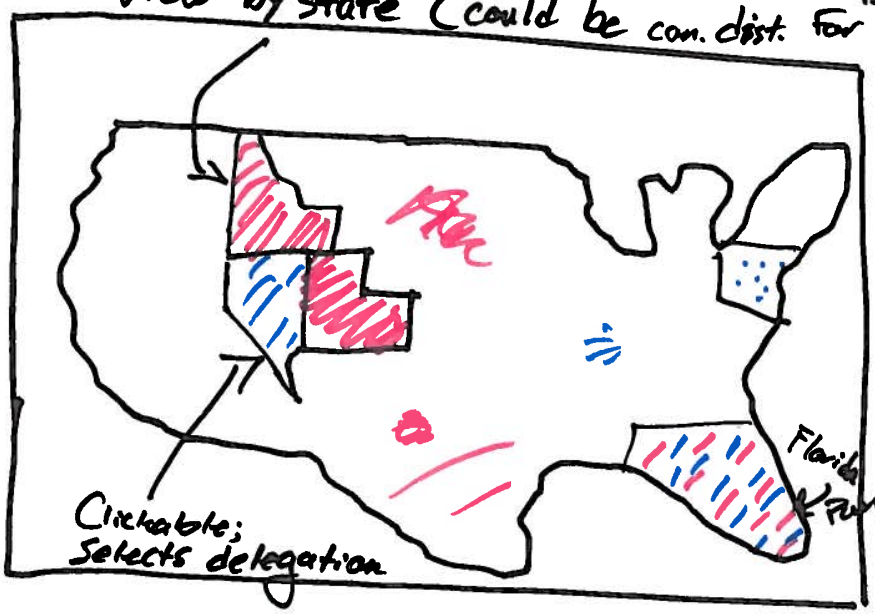
Select:

House | Senate | Joint ← ?

Name: [ ] Select | Add

Used to easily look up

View by state (could be con. dist. for House)



Clear Sel.

Pros:

(+) Map shows commonly understood relations in terms of regio

(+) Dot Plot can show both ideology and who is very similar

Hatch

Could be Cons:

(-) For House, lots of points in plots

(-) How to show D/R split in map?

(-) How to compare time?

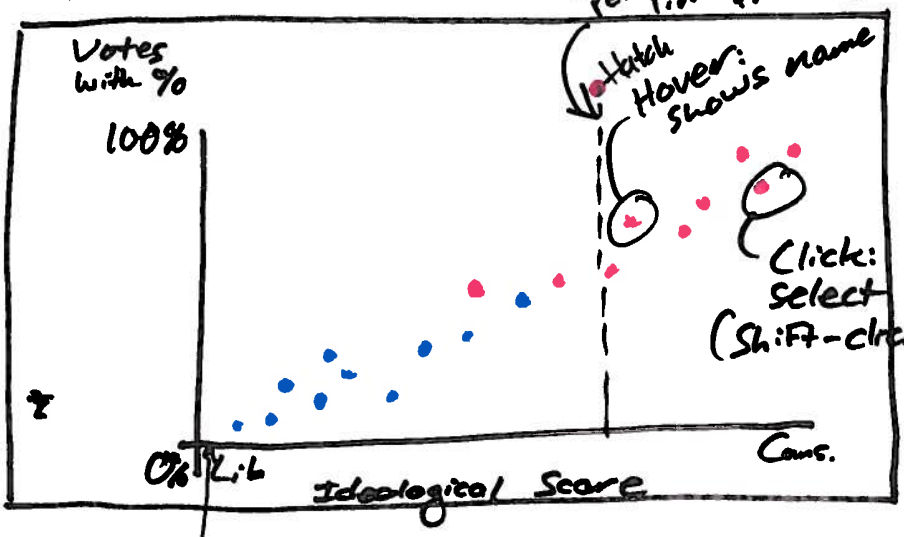
(-) What if no one is selected?

(-) What if there is polarization? Or little variation?

(-) Can't show house/senate together

Pt+UT

Perhaps a multiple line shows the selected's score?



What is 0?

Poli Vis

○ House
◉ Senate

Congress: 115

Members:

- ☑ Ayotte
- ☑ Hatch
- ☐ Boxer
- ☑ Lee
- ☐ Reid

select people in selection

Clear

#5 ← Becomes number if too large

Name:
Term:
State:
Party:
Bio:

(+) When no one selected, organize by how much voted for winning
(+) Better org.
(+) Power scale exaggerates

(-) It's very loaded; how about by state?
(-) Distortion could lead to dishonesty
(-) Does empty selection get interpreted right?
(-) Multiple box?

- By State
- By Congressional dist.

PoliVis Project
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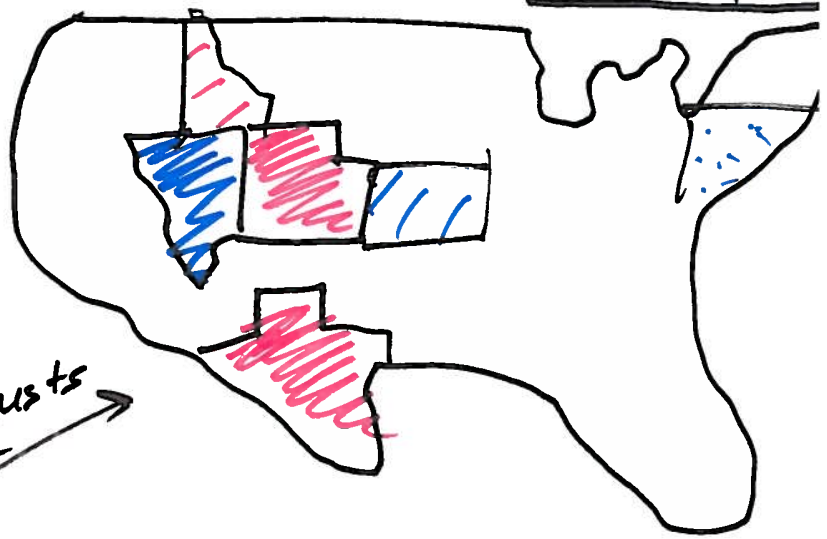
Sheet 3
Possible Layout



Adjusts both

100%

0%

Make a power scale so differences can be exaggerated with slider

Lib

Cons.

What is 0? Can we always use same scale?

Title

⊙ House
○ Senate

Congress: 115

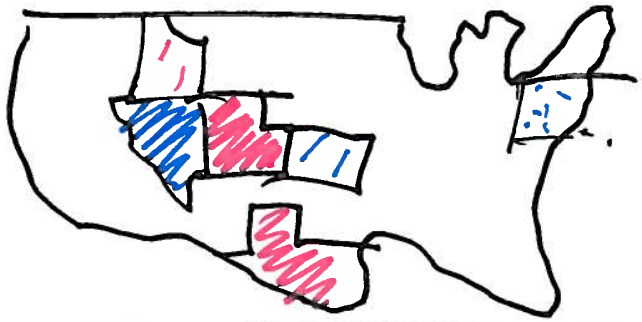
Members

- ☐ Ayotte
- ☑ Hatch
- ☐ Baker
- ☐ Lee

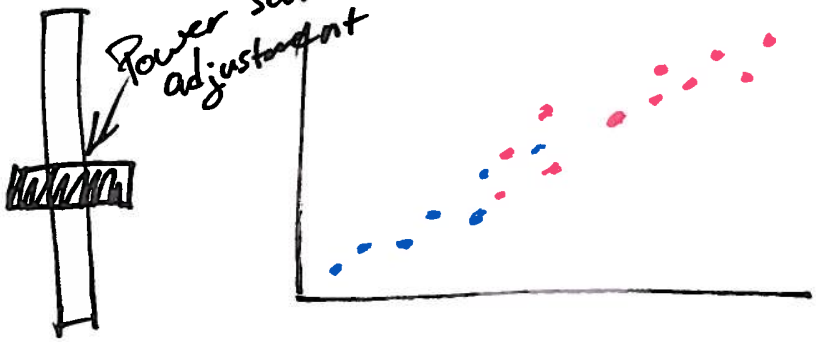
Name
State
Party
Time in Office
Committees
Bio

(+) Cosponsorship shows alliances
(+) Useful info

(-) Area not great rep.
(-) How to efficiently compute cosponsorship influence for groups?



YaliVis Proje
Curtis Miller
Sheet 4
Possible Layout



Cosponsors

This vis shows who often cosponsors legislation the individual sponsors

PoliVis

○ House
◉ Senate

Congress: 115

Members:

- ☐ Ayotte (R-ME)
- ⋮
- ☑ Hatch (R-UT)
- ☐ Boxer (D-CA)
- ☐ Lee (R-UT)
- ☐ Reid (D-NV)

Name: Orrin Hatch
State: Utah
Party: Republican
Committees: Finance, Justice, ...
Length in Office: 99 years (it seems)
Bio: Sen. Hatch is a Republican tool..

Power scale allows for adjustment to exagerate differences.

Lib/Cons split pos. determined by DW-NOMINATE + care

"Similar" means % same vote on issues, which is determined using pre-calculated file

State shade the "sum" of sheets that are transparent with transparency determined by agreement with legislator, and the hue by party. This also depends on power slider.

Clickable; selects state delegation, deselects rest

PoliVis Project
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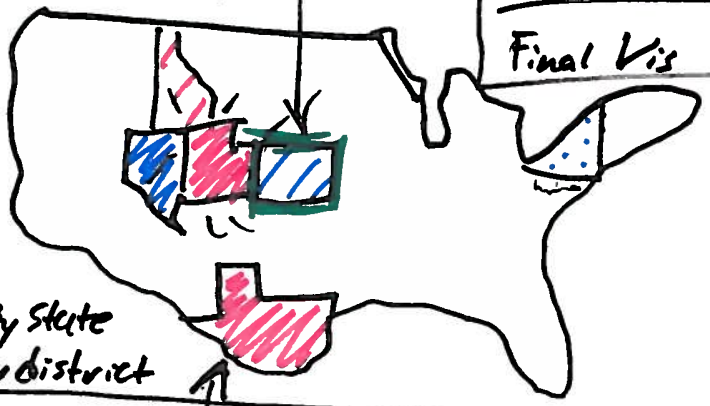
Sheet 5
Final Vis



○ By State
○ By district

100%

0%

Lib

Cons

Clickable; selects member, deselects rest

DW-Nominate pre-determined