Still Ranking Liberal Senators....
Last Class

Redefine Problem

Find Data

Modify existing instructions

Solution

Use Senator X’s votes to compare how liberal other senators are

Vote on bills only!

Computer (Excel)

XML Format

CSV Format

Make a HUGE Excel table

CSCI 0931 - Intro. to Comp. for the Humanities and Social Sciences
Baseball problem

A

B

C

D

A

D
From D: A, B, C
HW1-2

From C: B, A, D
• **Take away:** If C is farthest from D, D is not necessarily farthest from C
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  – In baseball example (and in previous slides), 2 dimensions (X and Y coordinates in a plane)
  – In senate data, how many dimensions?
    • ~35 different votes per senator in the session
The big “Aha!”

• Perhaps trying to represent high-dimensional data as if it were one-dimensional is a mistake!
• Maybe we were *asking the wrong question*
• Computation enabled us to discover this
Goals for Today’s Class

• Pick up where we left off last time
  – ACT1-4: Rank all senators relative to all others
  – Figure out what to do with all that data
## Activity 1-4

### What We Have:

<table>
<thead>
<tr>
<th></th>
<th>1:101</th>
<th>1:115</th>
<th>1:129</th>
<th>1:138</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akaka</td>
<td>Yea</td>
<td>Yea</td>
<td>Yea</td>
<td>Yea</td>
</tr>
<tr>
<td>Alexander</td>
<td>Yea</td>
<td>Yea</td>
<td>Yea</td>
<td>Yea</td>
</tr>
<tr>
<td>Ayotte</td>
<td>Nay</td>
<td>Yea</td>
<td>Yea</td>
<td>Yea</td>
</tr>
<tr>
<td>Barrasso</td>
<td>Yea</td>
<td>Yea</td>
<td>Yea</td>
<td>Yea</td>
</tr>
</tbody>
</table>

### What We Want:

<table>
<thead>
<tr>
<th></th>
<th>Akaka</th>
<th>Alexander</th>
<th>Ayotte</th>
<th>Barrasso</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akaka</td>
<td>1</td>
<td>0.314285714</td>
<td>0.085714286</td>
<td>0.117647059</td>
</tr>
<tr>
<td>Alexander</td>
<td>0.314285714</td>
<td>1</td>
<td>0.657142857</td>
<td>0.647058824</td>
</tr>
<tr>
<td>Ayotte</td>
<td>0.085714286</td>
<td>0.657142857</td>
<td>1</td>
<td>0.764705882</td>
</tr>
<tr>
<td>Barrasso</td>
<td>0.117647059</td>
<td>0.647058824</td>
<td>0.764705882</td>
<td>1</td>
</tr>
</tbody>
</table>
ACT 1-4

• Work with your neighbor
• Ask lots of questions
• Let us know when you’re done with the 4-senator version
What can we do with similarity table?

• Look for very similar people
  – Use color to help!

• Reorder the list to move similar people near each other

• If A is similar to B, and B similar to C...
  – Is A similar to C?

• Results
Discoveries

• Two major blocks
  – Democrats
  – Republicans

• Some oddballs
  – Democrat In Name Only (DINO)
  – ... (RINO)

• Substructure
  – Blue Dog Democrats
  – Mountain-state republicans?
Conclusion

• What matters isn’t liberal vs conservative...
• It’s the network structure in the senate!
  – Who is in what group, what subgroup, etc.
  – Who are connectors between groups?
• Computation enabled this insight.
What about the House?

• Lots more members
• Lots less agreement
• SLOOOOWWWW!
  – How come? It’s only 4.3 times as large?
All that grouping had to be done by hand...

- Isn’t there some way to do that automatically?
  - CS157, “Clustering”; esp. “Spectral Clustering”