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Humboldt State University
Fall Semester 2017


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## Question

What is an election?

## Question

What is the difference between a war and an election?

## Question

A prime goal of democracy is to replace wars with elections by replacing bullets with ballots.

## An Election

The Electorate

Voters

Suffrage: Who can vote?

## An Election

## Ballots

One person - one vote?

## An Election

## Who wins?

Ballots

## The 2016

Presidential Election

## The Electorate



## What do you see?



## Two Models

## $>$ States Model

> Electoral College Model

## The States Model

In a presidential election the electorate consists of the 50 states plus the District of Columbia.

The ballot is not one-state, one-vote. Each state's ballot is weighted as described by the electoral system in the Constitution.

## Electoral College Model



## The Electoral College

The College consists of a slate of electors from each state. The number of electors equals the number of members of Congress-the number of representatives and senators.

Amendment XXIII (ratified 1961) allows the District of Columbia three electors.

## The Electoral System

The electoral system is a process.

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$\checkmark$ National Election Day 10 November 2016.
In a presidential election when you vote for candidate $X$ you are voting for the slate of elector's pledged to candidate $X$.

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$\checkmark$ Electors Day 19 December 2016

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$\checkmark$ Electors Day 19 December 2016
$\checkmark$ Submission Day 28 December 2016


Certificates of Vote by State

## The Electoral System

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$\checkmark$ Decision Day 6 January 2017

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$\checkmark$ Decision Day 6 January 2017
> Inauguration Day 20 January 2017

## CONGRESSIONAL SEATS


http://www.census.gov/2010census/data/apportionment-data.php
Note: $50 \leq h \leq 10306$ by constitutional constraints.

# Distributing 435 seats among 50 states according to their respective populations is a math problem. 

## A Math Skill

How do I average two nonnegative whole numbers?

What is the average of 8 and 12 ?

## The Average

Example: ave $(8,12)=$

$$
\begin{array}{ll}
\text { Maximum } & >\max (8,12)=12 \\
\text { Minimum } & >\min (8,12)=8 \\
\text { Arithmetic Mean } & >\operatorname{AM}(8,12)=10 \\
\text { Harmonic Mean } & >\operatorname{HaM}(8,12)=\frac{2}{\frac{1}{8}+\frac{1}{12}}=9.6
\end{array}
$$

Geometric Mean $>\operatorname{GeM}(8,12)=\sqrt{8 \times 12} \approx 9.8$

## Apportionment by Priority

Step 1. Give one seat to each state.
Step 2. Attach a priority number to each state.
Step 3. Award seats one at a time by priority until the desired House size is reached.

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Priority number<br>for a state with<br>$n$ seats

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$$
\begin{gathered}
\text { Priority number } \\
\text { for a state with } \\
n \text { seats }
\end{gathered}=\frac{\text { state population }}{\text { ave }(n, n+1)}
$$

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$$
\begin{gathered}
\text { Priority number } \\
\text { for a state with } \\
1 \text { seat }
\end{gathered}=\frac{\text { state population }}{\text { ave }(1,2)}
$$

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$$
\begin{gathered}
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1 \text { seat }
\end{gathered}=\frac{\text { state population }}{\text { ave }(1,2)}
$$

$$
\begin{gathered}
\text { Priority number } \\
\text { for a state with } \\
2 \text { seats }
\end{gathered}=\frac{\text { state population }}{\text { ave }(2,3)}
$$

## Five Averages

## ave

- Greatest Divisors max
- Harmonic Means HM
- Equal Proportions GM
- Major Fractions AM
- Smallest Divisors min


## The Last Seat

## Who got the $435^{\text {th }}$ seat?

ave 435

- Greatest Divisors max IL
- Harmonic Means HM MN
- Equal Proportions GM MN
- Major Fractions AM NC
- Smallest Divisors min WA


## The Last Seat

If one increases the size of the House to 436 , then who gets the $436^{\text {th }}$ seat?

$$
435 \quad 436
$$

- Greatest Divisors max IL WA
- Harmonic Means HM MN CA
- Equal Proportions GM MN NC
- Major Fractions AM NC MO
- Smallest Divisors min WA PA


## The 2016 Presidential Election

The popular vote:

| Hillary Clinton: | $65,853,516$ | $48.18 \%$ |
| :--- | ---: | ---: |
| Donald Trump: | $62,984,825$ | $46.09 \%$ |
| Others: | $7,850,896$ | $5.73 \%$ |



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Donald Trump: 304
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## The Popular Vote

Arguably, on 4 other occasions in U. S. history the electoral and popular systems produced different results.

1. John Quincy Adams vs. Andrew Jackson 1824
2. Rutherford B. Hayes vs. Samuel Tilden 1876
3. Benjamin Harrison vs. Grover Cleveland 1888
4. George Bush vs. Al Gore 2000

Source: http://www.factcheck.org/2008/03/presidents-winning-without-popular-vote/

## 1876

| Candidate | Party | Popular Vote | Electoral Vote |
| :--- | :---: | :---: | :---: |
| Rutherford B. Hayes (OH) | Republican | $4,034,142$ | 185 |
| Samuel J. Tilden (NY) | Democratic | $4,286,808$ | 184 |
| Peter Cooper (NY) | Greenback | 83,726 | --- |

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Lesson: Hayes' Electoral College victory was an artifact of the method used for congressional apportionment.

The original apportionment from the 1870 census uses one method.
The 1872 supplement act adds nine seats but uses a different method.
The methods agree except for two seats.
Original method: IL and NY;
Supplement method: NH and FL.

## 2000

| Candidate | Party | Popular Vote | Electoral Vote |
| :--- | :---: | :---: | :---: |
| George W. Bush (TX) | Republican | $5,443,633$ | 271 |
| Albert Gore (TN) | Democratic | $5,538,163$ | 266 |
| Ralph Nader (DC) | Green | 250,017 | --- |
| Patrick Buchanan (VA) | Reform | 149,115 | --- |

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Lesson: Bush's Electoral College victory was an artifact of the size of the House of Representatives.

## House Size Effects

Consider the Electoral College vote based on House sizes 50-1000 using the current method of congressional apportionment.

For all House sizes smaller than 492 Bush wins, larger than 597 except 655 Gore wins.

Between 492-597 there are 24 ties, Bush wins 53 times, and Gore wins 29 times.
http://www.thirty-thousand.org/pages/Neubauer-Zeitlin.htm
Also, Michael Neubauer and Joel Zeitlin, Apportionment and the 2000 Election, The College Mathematics Journal 34(1), January 2003: 2-10.

## 2000

The 2000 election showed another potential problem. The number of electoral votes each state gets is tied to the decennial census. Although the election was in 2000, apportionment of the House was based on the 1990 census. An election held in a census year is based on a population that is ten years old.

What would have been the result of Bush vs. Gore if the Electoral College were based on the 2000 census?

## 2000

In comparison with the 1990 census the 2000 census shifted 12 House seats affecting 18 states.

Accordingly, the electoral vote would have changed from
Bush 271 and Gore 266 to
Bush 277 and Gore 259.

## Reform

Over the past 200 years, over 700 proposals have been introduced in Congress to reform or eliminate the Electoral College. There have been more proposals for Constitutional amendments on changing the Electoral College than on any other subject.

## Today's Debate

Resolved: The electoral system should be replaced by the popular vote system.

What's the Popular Vote System?

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## Fairness

Individual Sovereignty:
Each voter gets the same
ballot with the same
instructions and is free to
vote as they choose
within these constraints.
One Person - One Vote

## Question 1

## Should there be a uniform national presidential ballot?

Ballots differ among states. GA, IN, OK listed 3 candidates; CA 5; TN 7; UT 10; CO 22.

http://www.politico.com/2016-election/results/map/president

## Question 1

Should there be a write-in provision?

Today 9 states do not allow a write-in.

## Question 2

Should there be uniform suffrage for a national popular vote?

## A National Popular Vote

- Abolishing the electoral system requires a constitutional amendment.
- A uniform national vote procedure requires federal legislation concerning ballot access, suffrage, ballot structure, and election mechanics.


# A <br> Moderate <br> Alternative 

## State Sovereignty

Keep voting as a state's rights matter.
Ballot access, ballot structure, suffrage, voting mechanics are left up to each state. Then count the certified popular vote in each state as is currently done.

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This is the approach of the National Popular Vote Bill.

## National Popular Vote Bill

A State Act ratifying an interstate compact to elect the President and Vice-President of the United States by national popular vote.
> A state's slate of electors will be awarded to the candidate with a plurality of the national (instead of statewide) popular vote.
$>$ The law will take effect in each of the states that has ratified the compact when the compact has at least 270 electoral votes.


Should the electoral system be replaced by a popular vote system?

Should the U. S. move to a national popular vote for President and Vice-President?

## Democracy

## What is an Election? <br> One Person - One Vote

We the People of the United States, . . .
http://www.theconstitutionproject.com/portfolio/one-person-one-vote/

How many seats in the U. S. House of Representatives does each stateged
An answer is presented as an historical narrative with relevant and timely applications in an upcoming book, The History of Congressional Apportionment.

Chapter 1. Congressional Apportionment Based on the Census: 1790.
Chapter 2. Congressional Apportionment Based on the Census: 1800-1840. Chapter 3. Congressional Apportionment Based on the Census: 1850-1890. Chapter 4. Congressional Apportionment Based on the Census: 1900-1930. Chapter 5. Congressional Apportionment Based on the Census: 1940-2010. Chapter 6. An Historical Overture.

# Charles M. Biles, Ph.D. <br> Congressional Apportionment <br> <br> Constitutional Congregressional Apportionment Problem 

 <br> <br> Constitutional Congregressional Apportionment Problem}


## Thank You

http://www.nia977.wix.com/drbcap

| U.S. Census Bureau |  |  |  |
| :---: | :---: | :---: | :---: |
| PRIORITY VALUES FOR 2010 CENSUS |  |  |  |
| HOUSE | PRIORITY | STATE | STATE |
| SEAT | VALUE | ABBREVIATION | SEAT |
| 51 | 26404774 | CA | 2 |
| 52 | 17867470 | TX | 2 |
| 53 | 15244803 | CA | 3 |
| 54 | 13732760 | NY | 2 |
| 55 | 13364865 | FL | 2 |
| 56 | 10779704 | CA | 4 |
| 57 | 10315788 | TX | 3 |
| 58 | 9096490 | IL | 2 |
| 59 | 9004938 | PA | 2 |

## Gerrymandering

| $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ |
| $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ |  |
| $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ |  |  |

Apportion into five districts.

## Gerrymandering

## $\bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet$ $\bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet$ <br> $\bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \quad 0$ <br> 

## Gerrymandering



## Gerrymandering

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\bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \ddots & \bullet \\
\hline
\end{array}
$$

