Gerrymandering
Example of Massachusetts Voters Protesting Gerrymandering in 1812

Image Source
Examples of Gerrymandering Today
Drawing Districts

- Each state’s population warrants some number of Congress people
- How do you draw their districts?
  - One of the oldest problems in our democracy
  - Mandated that districts be redrawn after every census
Gerrymandering

- Drawing districts unfairly to benefit one party
- Goal: maximize victories given a distribution of voters
- More about boxing in your opponent than selecting areas entirely favorable to you
  - E.g., in 201?, Democrats won 13/15 “most gerrymandered” districts
How to Steal an Election

50 Precincts
60% Blue
40% Red

5 Districts
5 Blue
0 Red
Blue Wins

5 Districts
3 Red
2 Blue
Red Wins
Concrete Example (One district in LA encompasses all the cities!)
Compact Clustering

North Carolina

CURRENT CONGRESSIONAL DISTRICTS

DISTRICTS REDRAWN TO OPTIMIZE COMPACTNESS

SOURCE: U.S. Census Bureau (top), Brian Olson (bottom)
Compact Clustering

Current congressional district map

Computer-drawn map to optimize compactness

Source: U.S. Census Bureau (top); Brian Olson (bottom)
Compactness

- Measure of non-gerrymandered-ness
- Area of district / Area of a circle (or square) with the same perimeter
Compact Clustering Algorithm

- Possible goals
  - To find a maximally-compact clustering
  - To find a clustering that minimizes error, where error is measured in the usual way
    - Sum of all distances from points to their centers
- Points are actually census blocks: the smallest geographic unit in a census
  - Preserves natural boundaries
  - No districts running through homes!
- Now, how do you cluster census blocks?