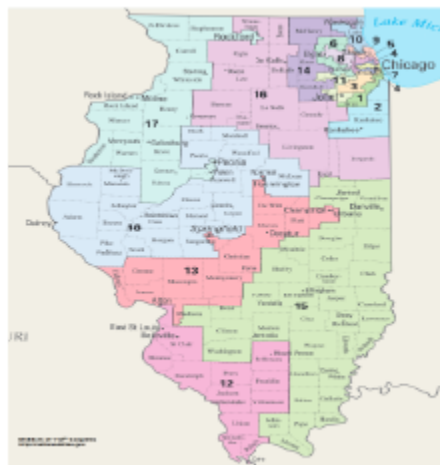
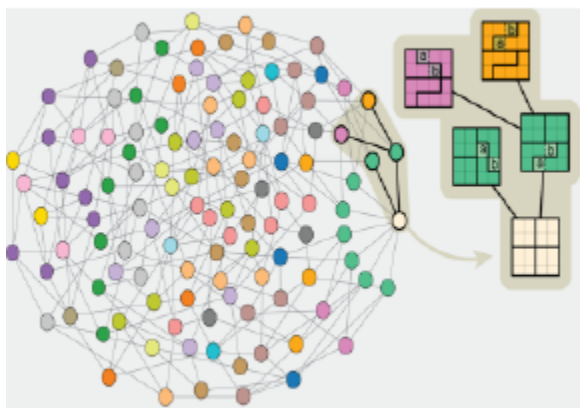




Mathematics of Gerrymandering



Project Supervisor: Kevin Whyte

The ways in which voters are divided in districts can dramatically affect the results of elections – amplifying or suppressing the representation of different groups. However deciding whether a given districting plan is fair is a difficult problem. For example, adults in Illinois identify themselves as 48% democrat, 33% republican, and 19% with no preference. The current 18 congressional districts are divided with 13 democratic and 5 republican representatives. Is that a fair result? How is it affected by the concentration of voters in Chicago? Does it matter that these are located along the border of the state? In order to explore such a question we would want to look at predicted election results for a “typical” or “random” district map. Defining what that means is not so simple, and even in the most basic models there are far too many possible maps to examine all of them. We will learn about the mathematics of random walks and what different models say about the expected results in various scenarios.

Prerequisites: Some probability/statistics and programming experience would be helpful.

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