Exercise 2 Report: *Dominance in the Winter Olympics*

Motivation:

The Olympics, by nature of being an international competition, has consistently been an ideal stage for nationalistic propaganda and political boasting. A prime example of this are the newscasts during and after the Olympics every two years which are filled with the medal counts of each country, attempting to show superiority or dominance of one country over the rest. In the end, however, the long-term performance of each country is rarely considered by the media, and if it is, it is usually just in the form of an overall medal count.

Tasks:

Given the full dataset of every medal awarded for the Winter Olympics over time, the following questions then come to mind: Which country or countries have dominated the winter Olympics by year? Which countries are consistently dominant across all years? How many medals does it actually take to dominate in a given year? Are the dominant countries really dominant across all medal types (Gold, Silver, Bronze), or are they just loading up on the 'easy' medals?

Visualization:

To effectively convey the concept of *dominance,* which as given by medal count is an ordered attribute, the magnitude channels of position on a common scale, length, and color saturation were employed in the following visualization:
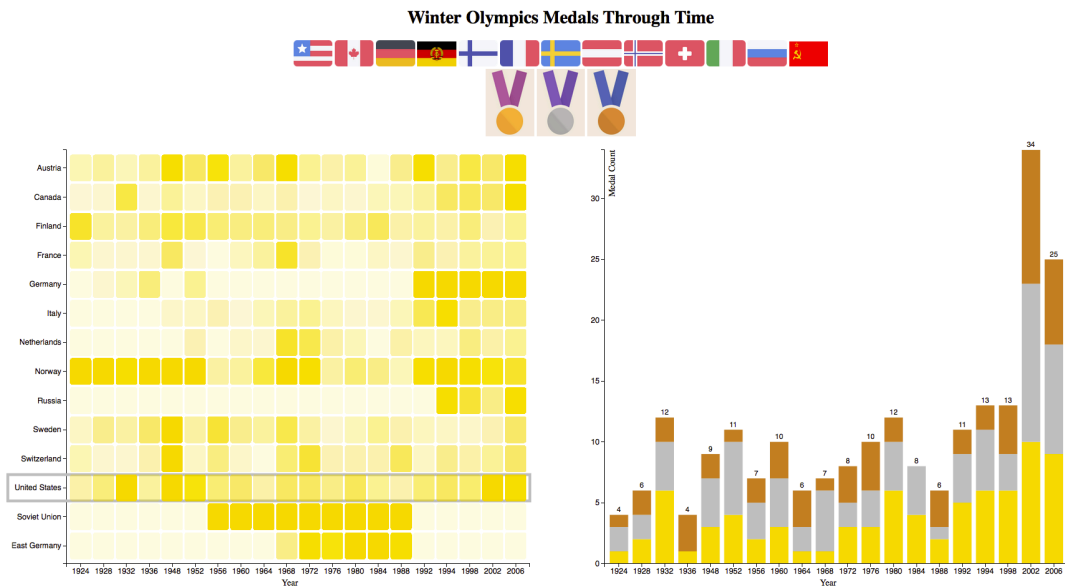

The visualization is composed of a heat-map showing the medal count of each country by year placed adjacent to a stacked bar chart showing the breakdown of the selected country's record over time. The gray box on the heat-map indicates the currently selected country.

Within the heat-map, each country is placed in a separate spatial region vertically, and aligned along the time axis with the other countries, as well as with the bar chart, to allow for easy comparison. The color saturation of each rectangle in the heat-map represents the number of medals won by the row country in the column year, divided by the maximum number of medals won by any country in that column year. In this way, the heat-map is essentially normalized by year (or column), allowing the dominant countries by year to immediately pop out despite the changing number of overall medals being awarded. This has the added benefit of showing streaks

of dominance by horizontal streaks of fully saturated yellows. If the chart were to instead be normalized by overall maximum (as is typically done with heat-maps) the most highly saturated rectangles would all be on the right of the chart, closer to the present, and would fade to the left. Although this would convey the information that more medals were being awarded overall in more recent Olympics, it detracts from answering the question of dominance since in reality medal counts are only compared between countries for a given Olympics, and not over time. Color saturation was chosen to represent the magnitude of the heat-map instead of an alternative ordered colormap due to its intuitive interpretation in relation to count, the ability to have zero counts which blend in with the background (or empty spaces), and the fact that it is interpretable without the need for an additional scale, legend, or reference.

Within the stacked bar chart, the bars were placed on a common scale, and the length channel was used to express the count of medals for that year. This again helped to convey dominance by overall size on the screen. Additionally, to display the category of the medals, the color most closely related to the medal color was used to avoid having to clutter the chart with an additional legend. The bars were stacked on top of each other for a given year to allow totals to be easily seen. By showing a given country's medal count over time, their individual histories can be more closely inspected to answer just how and when their dominance began or fell off.

The interactivity of the chart allows the user to quickly switch between countries as well as medal types by clicking on a country-row of the heat-map, or selecting one of the country flags or medal icons at the top. This allows the user to answer questions of medal-specific dominance, and inspect the breakdown of a given country's record. The heat-map additionally updates with medal sub-selections to allow overall dominance comparisons for given medal types. An example of selecting Norway, and displaying Gold & Silver medals only, is shown below:
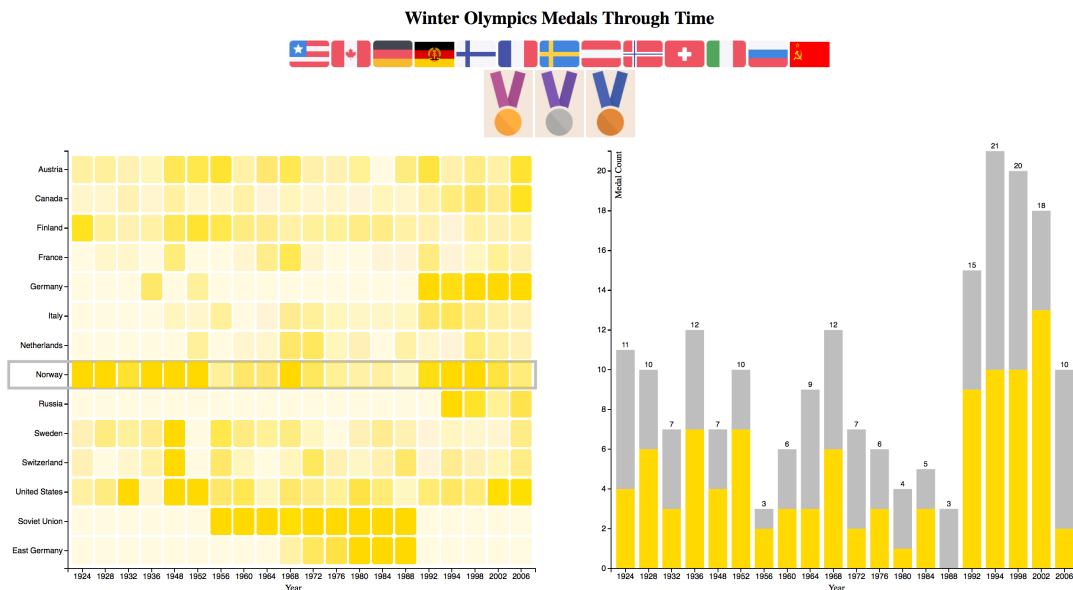
Omitted Data:

The dataset for this visualization also included information about the gender of the medal winners, the sport each medal was awarded for, and the location that the Olympics was held in. Gender and Sport were omitted from the visualization since a further sub-division of the data by sport or gender would take away from the effectiveness of the visualization to convey *overall* dominance of a country. Similarly, the location of the Olympic event was not considered since this would raise additional questions about the data that were not central to the initial 'dominance' query.