Exercise 1 Report: *Subregion Representation in the Winter Olympics*

Motivation:

The Olympics is meant as an international competition to allow all countries to demonstrate the sporting achievements of their populace. However, because of the nature of achieving high level sporting excellence the Olympics is often dominated by specific regions of the world. This is especially pronounced in the Winter Olympics where the sports are weather dependent and usually more expensive to engage in. This visualization intends to view how subregion, defined by the United Nations, representation has changed over time.

Data Augmentation:

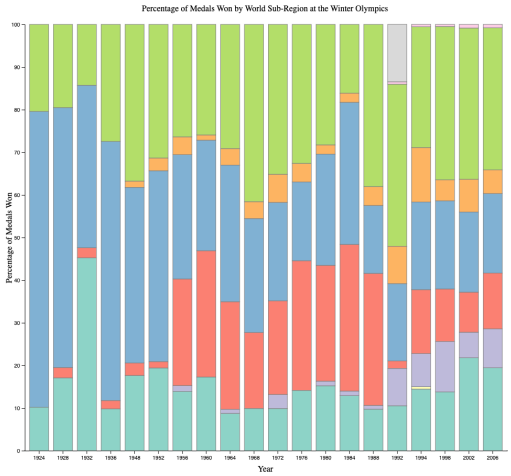
The provided dataset includes all medal winners for the Winter Olympics by country and sporting discipline. To make a clearer picture of how inclusive the Winter Olympics are, the total medals won by world sub-regions, as defined by United Nations geoscheme, will be visualized since the start of the games. The data needs to be adjusted to map winning countries to their respective sub-region. The count of gold, silver, and bronze medals for each sub-region for each games was conducted to create the plotted data.

Tasks:

Given a listing of all the medal winners by country for the Winter Olympics the following questions arise: are there specific subregions of the world that dominate medal totals? Have underrepresented sub-regions gained more representation in Winter Olympics competitions?

Expressiveness of Design:

Sub-region representation in the Winter Olympics is demonstrated with the ordered attribute of medal count. This is visualized using the magnitude channels of position on a common scale and length along with the identity channel of color hue. The created visualization is shown below:



The visualization is a stacked bar chart that shows the percentage of total medals won by a defined sub-region for a given Olympic year. The length of a given bar expresses how well a different region did a certain games and the colors allow identification of different sub-regions at different years.

Effectiveness of the Solution:

By stacking medal counts for a given year on a common axis using length it becomes immediately obvious which subregions won the most medals in a single Olympics. Aligning the stacked bars for each year against each other on a single axis instead of separate graphs for each year allows for showing the change in medal winning representation as time moves forward. A viewer is able to quickly determine how the medal representation of different sub-regions changes over time very rapidly.

The data was adjusted to show the percentage of medals won by a sub-region rather than actual medal count. This change to the data allows for aligning all the years on the same axis in a way that is more demonstrative of the intended reason for the visualization. Each olympics has a different number of events and as the number of events increases it may be possible for a sub-regions to win more medals while actually winning a smaller percentage of total medals. The adjustment to percentage of medals is more indicative of how different sub-regions are represented in the medal totals.

The color hue identification channel easily allows for differentiating the different sub-regions. The color channel is maintained consistent between years allowing for a viewer to quickly identify the change in length for a given region each year.

Interaction:

The visualization displays a tooltip when a user hovers over a bar. The tooltip shows the sub-region name and its percentage of medals won for that Olympics. This allows a user to get the quantitative value for sub-regions without needing to measure the bar lengths directly.

Conclusions:

The visualization gives an effective way to see how the representation of world subregions in the Winter Olympics over time as demonstrated by percentage of medals won. A viewer can quickly determine which region is most represented in a given year by the length of its bar and how the representation for a sub-region changes based on the change in the length of the bar in subsequent stacks.

From the visualization we can see how the Winter Olympics was heavily dominated by Northern Europe in its original incarnation but as time has continued Western Europe became the dominant sub-region. It can also be seen that the medal winnings of underrepresented sub-regions: Australasia, Easter Asia, and Southern Europe has steadily been increasing suggesting the Winter Olympics is becoming more inclusive.