Assignment 1: Visualization Design

In this assignment, you will design a visualization for a small data set and provide a rigorous rationale for your design choices. You should in theory be ready to explain the contribution of *every pixel* in the display. You are free to use any graphics or charting tool you please - including drafting it by hand. However, you may find it most instructive to create the chart from scratch using a graphics API of your choice.

(See Resources for a list of visualization tools.)

Data Set: U.S. Population, 1900 vs. 2000

Every 10 years, the census bureau documents the demographic make-up of the United States, influencing everything from congressional districting to social services. This dataset contains a high-level summary of census data for two years a century apart: 1900 and 2000. The data is a CSV (comma-separated values) file that describes the U.S. population in terms of year, reported sex (1: male, 2: female), age group (binned into 5 year segments from 0-4 years old up to 90+ years old), and the total count of people per group. There are 38 data points per year, for a total of 76 data points.

Dataset: CSV
Source: U.S. Census Bureau via IPUMS

Assignment

Your task is to design a static (i.e., single image) visualization that you believe effectively communicates the data and provide a short write-up (no more than 4 paragraphs) describing your design. Start by choosing a question you'd like your visualization to answer. **Design your visualization to answer that question, and use the question as the title of your graphic.**

While you must use the data set given, note that you are free to transform the data as you see fit. Such transforms may include (but are

not limited to) log transformation, computing percentages or averages, grouping elements into new categories, or removing unnecessary variables or records. You are also free to incorporate external data as you see fit. Your chart image should be interpretable without recourse to your short write-up. Do not forget to include title, axis labels or legends as needed!

As different visualizations can emphasize different aspects of a data set, you should document what aspects of the data you are attempting to most effectively communicate. In short, what story are you trying to tell? Just as important, also note which aspects of the data might be obscured or down-played due to your visualization design.

In your write-up, you should provide a rigorous rationale for your design decisions. Document the visual encodings you used and why they are appropriate for the data and your specific question. These decisions include the choice of visualization type, size, color, scale, and other visual elements, as well as the use of sorting or other data transformations. How do these decisions facilitate effective communication?

Grading

We will determine scores by judging both the soundness of your design and the quality of the write-up. We will also look for consideration of audience, message and intended task. Here are examples of aspects that may lead to point deductions:

- Use of misleading, unnecessary, or unmotivated graphic elements.
- Missing chart title, axis labels, or data transformation description.
- Missing or incomplete design rationale in write-up.
- Ineffective encodings for your stated goal (e.g., distracting colors, improper data transformation).

We will reward entries that go above and beyond the assignment requirements to produce effective graphics. Examples may include

outstanding visual design, meaningful incorporation of external data to reveal important trends, demonstrating exceptional creativity, or effective annotations or other narrative devices.

Submission Details

This is an individual assignment. You may **not** work in groups. Your completed assignment is due on **Fri 4/5, by 11:59pm**. We will be discussing submissions in class, *so be sure to avoid a late submission*.

You must submit your assignment by upload your file to assignment submission system (*the link will be announced in the QQ group later*). Please upload a single zip file named using the pattern `"id_a1.zip"` (replacing `"id"` with your 12-digit student ID, for example, 201811112222). The zip archive should contain at least two files: a plain text file named "readme.txt" (if you are familiar with markdown, mark it up with markdown) and a PNG or JPG image file of your visualization design. If your visualization are generated programmatically, you are supposed to include your source code.

Please use the correct file extension for your image (either .png or .jpg) and be sure your image is sized for a reasonable viewing experience. Viewers should not have to zoom or scroll in order to effectively view your submission!

The readme.txt file should contain your write-up, as described above. Please be sure to include your real name and student ID in your readme.

For further questions, please ask two teaching assistants at will.