DynaPop

https://observablehq.com/d/3d06e3088c7a6d34

DESIGN RATIONALE: This visualization of US census data and population estimates endeavours to provide a quick and intuitive way to compare county-level dynamics within a state to the country as a whole. The intended use is to compare population change trends within a state to the country as a whole for a selected year range, for purposes such as real estate investment. Thus, a faceted visualization containing information for the 2 bases of comparison was chosen. As years form a discrete interval, a two-ended slider was selected as the most intuitive way to specify a range. Additionally, a dropdown menu (supporting typed input) listing the states in alphabetical order was chosen as the interactive input for the county-level sub-visualization. The intent is for the audience to first select a state to focus on, then adjust the year range to explore and compare. This input mechanism was determined to be the most effective for this purpose.

The state-level information is presented on an Albers projection of the lower 48 with Alaska and Hawaii appended below. A map was chosen to encode the nominal state data as the US map is presumed to be familiar to the audience and allows all data points to be displayed without compromising effectiveness. This specific projection was chosen as it is area-preserving and a common depiction of the position of US states. The quantitative variable to be analyzed, percent population change, is assigned the colour channel as per Mackinlay's effectiveness rankings. A "Greens" palette normalized into 7 bins for each year range using d3.scaleQuantize was chosen for its colourblind-friendliness and readability. Since few values are negative, we deemed these benefits to outweigh those of a diverging palette. Finally, as binning values by colour compromises expressiveness on its own, mouse-over interaction to display the exact values for each state on-demand was deemed as the optimal way to ensure sufficient detail without reducing effectiveness (as would be the case with 50 static labels at each range).

At the county level, the 3 counties with the highest and lowest population change rates were chosen to represent internal population dynamics for the intended audience. As such, a simple bar chart was determined to be the most effective visualization. The nominal county names and corresponding population changes are given horizontal and vertical position, respectively. The implicit ordinal data of "highest" and "lowest" were redundantly encoded with colour to ensure expressiveness is not compromised. Specifically, a green-orange contrasting scheme was chosen to closely correspond to American cultural norms for colours associated with increases and low values/decreases, but modified to ensure accessibility for the colourblind. Our audience is presumed to be accustomed to these norms.

DEVELOPMENT PROCESS: After discussing several ideas and finalizing our project idea, the work was divided into 3 broad categories: state-level visualization, county-level visualization, and dashboard, assigned to be put together as a "version 1" by Willem, Yirong, and Jack and Patrick, respectively. Once the drafts of our components were complete, fine-tuning and debugging was done collaboratively. The work done by each member amounted to approximately 10 people-hours (40 people-hours cumulatively). The most time consuming aspects: were data processing and cleaning, the debugging that arose when combining the components programmed with different philosophies and styles, as well as simply learning a new tool as none of us were familiar with D3 or web development beforehand.