Plan for today
- small group exercises
  - Complexity Families
- last week reading Q&A
  - paper: Polars
  - this week reading Q&A
  - chap Manipulate Interactive, Multiple Views, paper: Scalable Insets
- reminder: post-class office hours
  - if you want discussion of your project proposal feedback ASAP
  - faster than waiting for my written comments

Upcoming
- next week (W10): reading week, no class, no readings, no async discussion
  - work on projects!
- week after (W11)
  - light: async reading/discussion (note updated web page)
  - 1 reading: Ch 13, Redux
  - due Tue 3pm: project updates
  - in class project peer reviews
  - each team will be reached with one other
  - read other team’s written update before class
  - first A critiques B & then B critiques A
  - record discussion/thoughts in gdoc
  - in class: mini-lecture

Visualization Analysis & Design
Interactive Views (Ch 11/12)

How to handle complexity: 1 previous strategy
- derive new data to show within view

Idiom: Re-encode
- stacked bars
  - easy to compare
  - first segment
  - total bar
  - align to different segments...

Idiom: Reorder
- what: table with many attributes
  - how: data-driven reordering by selecting column
  - why: find correlations between attributes

Idiom: Change order/arrangement
- what: simple table
  - how: data-driven reordering by selecting column
  - why: find extreme values, trends

Idiom: Change parameters
- widgets and controls
  - sliders, buttons, radio buttons, checkboxes, dropdowns/combos/drag
- cons
  - clear affordances, self-documenting (with labels)

Manipulate View

How to handle complexity: 1 previous strategy + 2 more
- derive new data to show within view
- change view over time
  - facet across multiple views

Idiom: Change order/arrangement
- what: simple table
  - how: data-driven reordering by selecting column
  - why: find extreme values, trends

Idiom: Change parameters
- widgets and controls
  - sliders, buttons, radio buttons, checkboxes, dropdowns/combos/drag
- cons
  - clear affordances, self-documenting (with labels)

Hue

Department of Computer Science
University of British Columbia
@tamaramunzner

Information Visualization
Manipulate Interactive, Facet into Multiple, Scalable Insets
Ex: Complexity Families
Tamara Munzner
Department of Computer Science
University of British Columbia
Week 7, 3 Nov 2021
https://www.cs.ubc.ca/~tmm/courses/547-21
Information Visualization
Manipulate Interactive, Facet into Multiple, Scalable Insets
Ex: Complexity Families
Tamara Munzner
Department of Computer Science
University of British Columbia
Week 7, 3 Nov 2021
https://www.cs.ubc.ca/~tmm/courses/547-21
**Idiom: Animated transitions**

- **smooth transition from one state to another**
  - alternative to jump cuts, supports item tracking
  - less case for animation
  - staging to reduce cognitive load

- **example: geographic map**
  - simple zoom, only viewport changes, shapes preserved

- **[Zoom to Bounding Box](https://observablehq.com/@d3/zoom-to-bounding-box)**

**Idiom: Animated transition - tree detail**

- **an animated transition**
  - network drilldown/rollup

**Idiom: Highlighting**

- **highlight change visual encoding for selection targets**
  - design choices:
    - feedback closely tied to but separable from selection (interaction)
  - design choices: typical visual channels
    - change stroke color
    - hot dots (existing outline coding)
    - add outline mark
    - change size (ex: increase outline mark width)
    - change shape (ex: from solid to dashed line for link mark)

- **unusual channels: motion**
  - motion usually avoids single view
  - with multiple views, could justify to draw attention to other views

**Idiom: Scrollytelling**

- **how:** navigate page by scrolling (panning down)

**Navigate: Changing viewpoint/visibility**

- **change viewpoint**
  - changes which items are visible within view

**Navigate: Unconstrained vs constrained**

- **unconstrained navigation**
  - easy to implement for designer
  - hard to control for user
  - easy to overshadow/underwhelm

- **constrained navigation**
  - typically uses animated transitions
  - trajectory automatically computed based on selection
  - just click; selection ends up framed nicely in final viewport

**Idiom: Animated transition + constrained navigation**

- **example: geographic map**
  - simple zoom, only viewport changes, shapes preserved

**Navigate: Changing attributes**

- **continuation of camera metaphor**
  - **place**
    - show only items matching specific value for given attribute during plane
  - **selection**
    - show only items on or next to plane from camera
  - **project**
    - change mathematics of image creation

**Interaction technology**

- **what do you design for?**
  - mouse & keyboard on desktop?
  - touch screen on mobile?

- **pros & cons**
  - large screens, hover, multiple clicks
  - touch interaction on mobile?
  - small screens, no hover, just tap

**Interaction benefits**

- **interaction pros**
  - major advantage of computer-based vs paper-based visualization
  - small footprint allows animated transitions provide excellent support

- **empirical evidence that animated transitions help people stay oriented**

**Interaction limitations**

- **interaction has a time cost**
  - sometimes minor, sometimes significant
  - degrades to human-powered search in worst case

- **remembering previous state imposes cognitive load**

- **controls may take screen real estate**
  - or invisible functionality may be difficult to discover (lack of affordances)

- **users may not interact as planned by designer**
  - NYTimes logs show ~90% don’t interact beyond scrollytelling - Aisch, 2016