Week 4: Manipulate, Facet, Reduce

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Whereabouts
- Caitlin on travel this week and next week
  - don’t expect email answers until she returns; email Tamara instead!
- Tamara on travel Thu Oct 6 - Mon Oct 10
  - in Portland Fri/Sat to give another keynote, will still be answering email
  - short office hours in Sing Tao next week: 12:30-1:30pm

News
- Assign 2 marks not out yet
  - stay tuned, just got back from Stanford late last night
- Today’s format
  - interface foundations & demos
    - Tamara will walk through Tableau demos
    - you follow along step by step on your own laptop
- Tamara will take breaks to rove the room to help out folks who get stuck

Demo 1: Stone Color Workbook
- Credit: Maureen Stone, Tableau Research
  - designer of Tableau color defaults, author of Seriously Colorful: Advanced Color Principles & Practices
- Tableau Lessons
  - more visual encoding practice
    - color palettes, univariate & bivariate
    - discrete (categorical) vs continuous (quantitative)
  - Big Ideas
    - Integrating visual encoding design choices with given spatial data

Demo 2: Intro to Maps
- Tableau Lessons
  - handling spatial data
    - multiple data sources
    - paths on maps
    - more on handling missing data / filtering
  - Big Ideas
    - Integrating visual encoding design choices with given spatial data

Change over time
- change any of the other choices
  - encoding self
  - parameters
  - arrange, narrate, reorder
    - aggregation level, what is filtered...
  - interaction entails change

Idiom: Re-encode
made using Tableau, http://tableausoftware.com
System: Tableau

Last Time

How to handle complexity: 1 previous strategy + 3 more
- derive new data to show within view
- change view over time
- facet across multiple views
- reduce items/attributes within single view

Idiom: Reorder
- data: tables with many attributes
- task: compare rankings
System: LineUp

Idiom: Animated transitions
- smooth transition from one state to another
  - observe to jump cuts
  - support for item tracking when amount of change is limited
  - example: multilevel matrix views
  - example: animated transitions in statistical data graphics

Select and highlight
- selection: basic operation for most interaction
  - design choices
    - how many item tracking?
    - click vs hover: heavyweight, lightweight
    - primary vs secondary semantic (eg, source/target)
  - highlight: change visual encoding for selection targets
    - color
    - limitation: existing color coding hidden
    - other channels (eg motion)
    - add explicit connection marks between items

Navigate: Changing item visibility
- change viewpoint
  - changes which items are visible within view
    - camera metaphor
      - zoom
    - semantic sources: familiar topography
    - semantic sources adopt object representation based on available pixels
    - pan/translate
    - perspective
      - especially in 3D
    - constrained navigation
    - often with undersized transitions
    - often based on selection set

Manipulate
- change any of the other choices
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  - interaction entails change

Idiom: Realign
- stacked bars
  - easy to compare
    - first segment
    - second bar
    - align to different segment
  - supports flexible comparison

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Superimpose Layers

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- System: HIVE
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Continuous scatterplot

- Static visual layering
  - foreground layer: roads
  - background layer: regions

Dynamic visual layering

- interactive, from selection
  - conventional click
  - very lightweight: hover

Reduce items and attributes

- reduce/increase: inverses
- filter
  - progressive, forward and intuitive
  - no understand and compact
  - don't get out of sight, out of mind
- aggregation
  - too many.
- not mutually exclusive
  - combine filter, aggregate
  - combine reduce, change, facet

Idiom: dynamic filtering

- browse through tightly coupled interaction
  - alternative-to queries that might return too many or too few

Idiom: DOSFA

- static item aggregation
- task: find distribution
- data: table
- derived data
  - new table: keys are bins, values are counts
  - bin size crucial
  - for interaction: control bin size on the fly

Idiom: histogram

- hierarchical dimension ordering
- encoding: star glyphs

Idiom: Hierarchical parallel coordinates

- dynamic item aggregation
- derived data: hierarchical clustering
- encoding: cluster band with variable transparency; line at mean, width by minimum value
- color by proximity in hierarchy
**Demo 3: House Price Index**
- Credit: Robert Kosara, from TCC 2014 talk Recreating News Visualizations in Tableau
- Tableau Lessons
  - more calculated field practice
  - reference lines
  - interactive sliders
- Big Ideas
  - calculated fields plus interactivity gives you a list of power and flexibility

**Assignment 4**
- final/view House Price Index workbook
- add interactivity to last week's story
  - update workbook
  - upload to Tableau Public
  - revise story to include embedded interactive
- final project proposal