Week 2: Arrange Tables

Tamara Munzner
Department of Computer Science
University of British Columbia

Manipulate Facet Reduce
Change
Select
Navigate
Juuxtapose
Partition
Superimpose
Filter
Aggregate
Embed

How?
Encode Manipulate Facet Reduce
Express Values
Separate Order Align

University of British Columbia

Demo 1: Basic Visual Encoding & Dashboarding

— Tableau Lessons
— Big Ideas
— Behind the scenes
— Big Picture
— Use

Demo 2: Vancouver Election Results

• Tableau Lessons
  — sorting along axis
  — disaggregate into multiple charts

• Big Ideas
  — absolute numbers can sometimes mislead
  — check hunches with relative percentages

Demo 3: Vancouver Crime

• Tableau Lessons
  — multiple pills on a shelf, pill ordering
  — show filters
  — undo
  — duplicate & rename tabs

• Big Ideas
  — underlying causes can be tricky to understand

Encode tables: Arrange space

Arrange -> Express, Separate
Order -> Align

Some keys: Categorical regions

• Separate
• Order
• Align

• regions: contiguous bounded areas distinct from each other
  — using space to separate (proximity)
  — following expressiveness principle for categorical attributes

• use ordered attribute to order and align regions

Idiom: bar chart

• one key, one value
  — data
  — 1 group chart, 1 quant attr
  — mark lines
  — bar mark
  — length: to express quant value
  — space regions one per mark
  — separated horizontally, aligned vertically
  — ordered by quant attr
    — by text (alphabetical) by length short (plate-driven)
  — task
  — compare, backup values
  — scalability
  — dozens to hundreds of levels for key attr

LIMITATION: Hard to know rank. What’s the 4th most? The 5th?

[Slide courtesy of Ben Jones]


Separate and Aligned but not Ordered

Separated, Aligned and Ordered

• Tableau Lessons
  — Dimensions (categorical) and Measures (quantitative)
  — drag and drop to create visual encodings
  — combining multiple charts side by side into dashboards

• Big Ideas
  — see different patterns with different visual encodings

[Last Time]

• 1 Key
• 2 Keys
• 3 Keys
• Many Keys

List Recursive Subdivision
Volume Matrix

100 75 50

An animal

Idiom: scatterplot

• express values
  — quantitative attributes
  — no keys, only values
  — data
  — 2 quant attrs
  — mark points
  — channels
  — axes = vars position
  — tasks
  — task: trends, outliers, distribution, correlation, clusters
  — scalability
  — hundreds of items

Some keys: Categorical regions

• Separate
• Order
• Align

• regions: contiguous bounded areas distinct from each other
  — using space to separate (proximity)
  — following expressiveness principle for categorical attributes

• use ordered attribute to order and align regions

Idiom: bar chart

• one key, one value
  — data
  — 1 group chart, 1 quant attr
  — mark lines
  — bar mark
  — length: to express quant value
  — space regions one per mark
  — separated horizontally, aligned vertically
  — ordered by quant attr
    — by text (alphabetical) by length short (plate-driven)
  — task
  — compare, backup values
  — scalability
  — dozens to hundreds of levels for key attr

LIMITATION: Hard to know rank. What’s the 4th most? The 5th?

[Slide courtesy of Ben Jones]
Idiom: stacked bar chart
- one more key
  - data
  - 3 bars: chart 1, quant attrib
- marks: vertical stack of line marks
  - glyph: composite object, internal structure from multiple marks
- channels
  - length and color hue
  - spatial region: one per glyph
- aligned: left, right, other for bar components
- task
  - part-to-whole relationship
  - scalability
- several to one dozens levels for stacked attribs

Idiom: line chart
- one key, one value
  - data
  - 3 quant attribs
- marks: points
- line connection marks between them
- channels
  - signed lengths to express quant value
  - separated and ordered by key attrib into horizontal regions
- task
  - find trend
  - connection marks emphasize ordering of items along key axis by explicitly drawing relationship between data and the x-axis

Idiom: cluster heatmap
- in addition
  - derived data
  - 2 cluster hierarchies
    - dendrogram
    - parent-child relationships in tree with connection line marks
  - separate and align in 2D matrix
    - aligned: full glyph, lowest bar component
    - indexed by 2 categorical attribs
  - heatmap
    - marks (re-)ordered by cluster hierarchy traversal

Idiom: scatterplot matrix, parallel coordinates
- scatterplot matrix (SPLOM)
  - rectilinear axes, point mark
  - all...
Idiom: glyphmaps

- rectilinear good for linear vs nonlinear trends
- radial good for cyclic patterns

Orientation limitations
- rectilinear: scalability wrt axes
  - 3 axes best
  - 4 problematic
  - more in afternoon
- radial: impossible
- parallel: unfamiliarity, training time
- radial: perceptual limits
  - asymmetry: angles lower precision than lengths

Connected Scatterplots

- Dense software overviews

Basic Timelines – Working with Dates

Change from Previous

Dual Axis Line Plots

Next

- Demos (45 min)
  - Carlos will walk through Tableau demos
  - you follow along step by step on your own laptop
  - Tamara will move the room to help out folks who get stuck
- Lab (30 min)
  - you’ll get started on Tableau assignment

Layout Density

Dense

Gantt Charts

Slopegraphs

Column Charts

Inverted Column Charts

Gantt Charts

Slopegraphs

Next

- Break (15 min)