

Data Visualisation Tables

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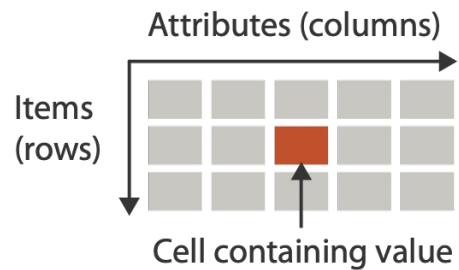
Spring 2024

Slides taken, reformatted, and used from Tamara Munzner (UBC,
Canada)

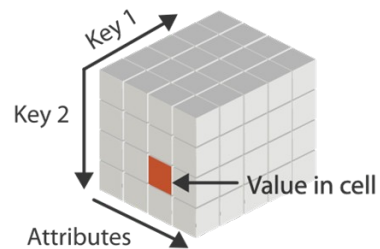
Focus on tables

→ Dataset Types

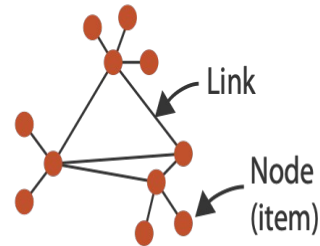
→ Tables



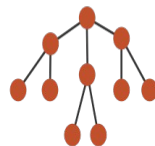
→ Multidimensional Table



→ Networks

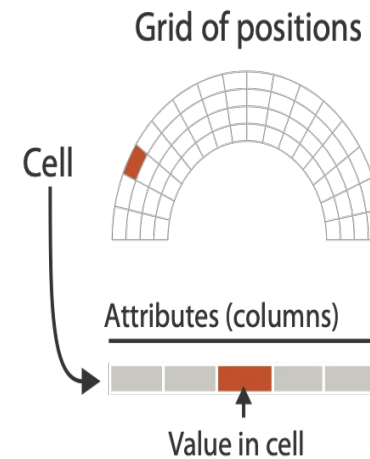


→ Trees



→ Spatial

→ Fields (Continuous)



→ Geometry (Spatial)



Keys and Values

- Key
 - Independent variable
 - Used as unique index to look up items
 - Simple tables : 1 key
 - Multidimensional tables : multiple keys
- Value
 - Dependent variable value of cell
- Classify arrangements by keys used
 - 0,1,2..

0 key

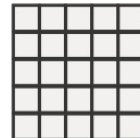
→ Express Values



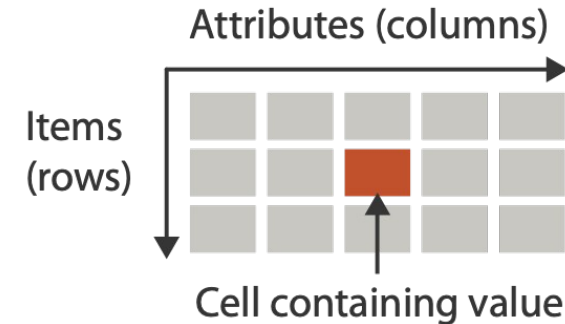
→ 1 Key
List



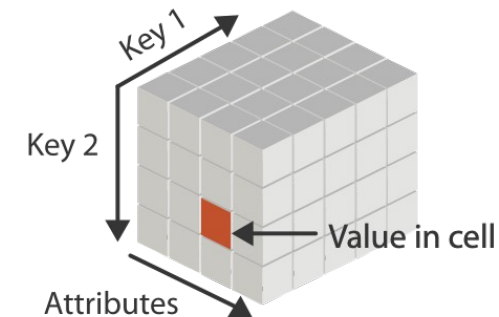
→ 2 Keys
Matrix



→ Tables



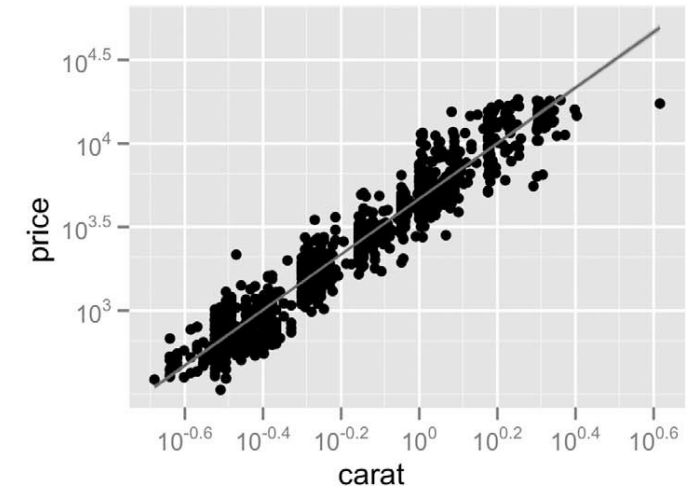
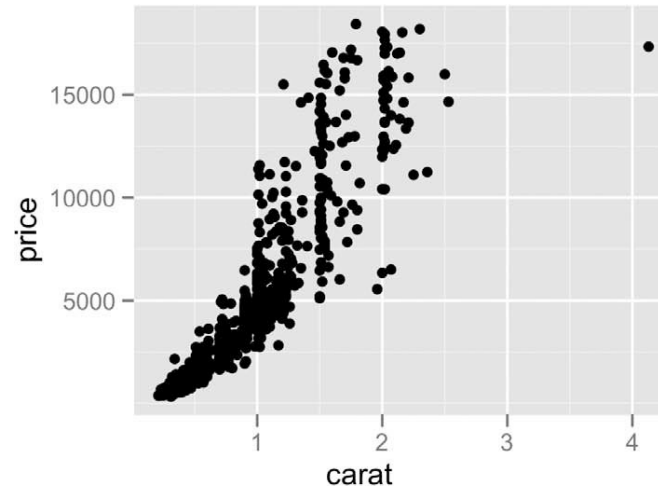
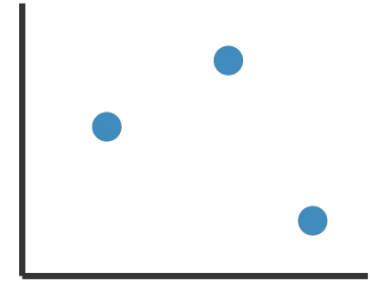
→ *Multidimensional Table*



Idiom: scatterplot \rightarrow Express Values



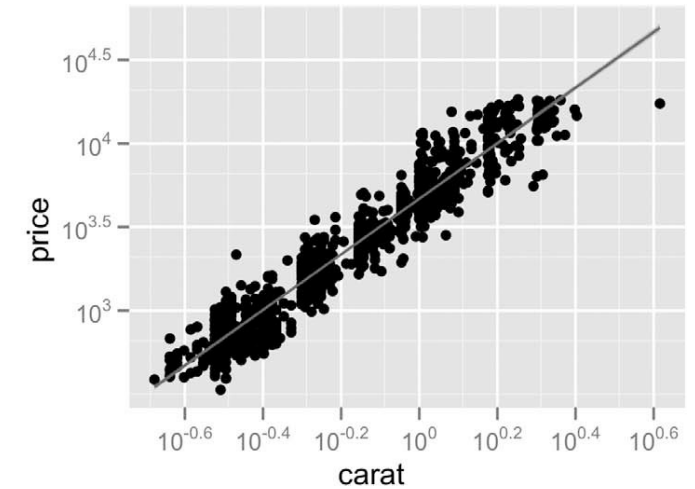
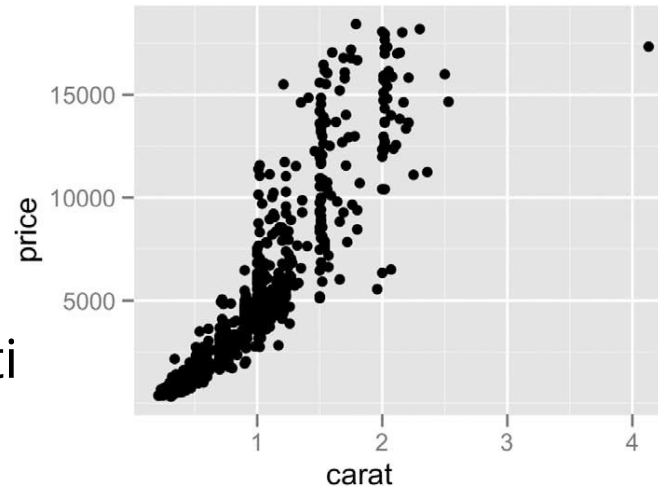
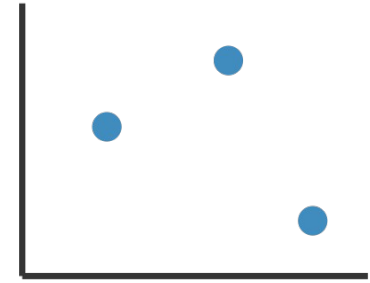
- Express values (magnitudes)
 - Quantitative attributes
- No keys, only values



Idiom: scatterplot \rightarrow Express Values

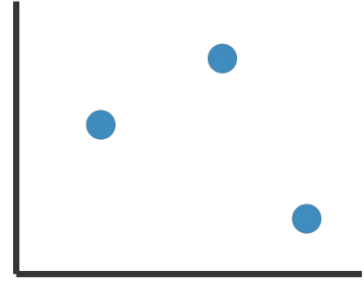


- Express values (magnitudes)
 - Quantitative attributes
- No keys, only values
 - Data
 - 2 quantitative attributes
 - Mark: points
 - Channels
 - Horizontal + vertical position

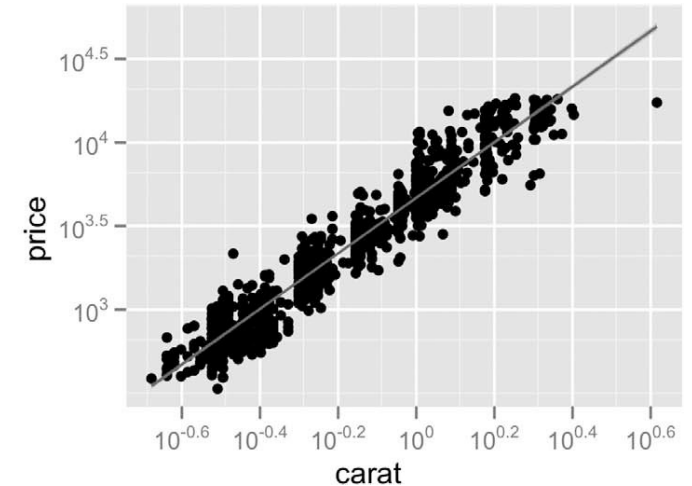
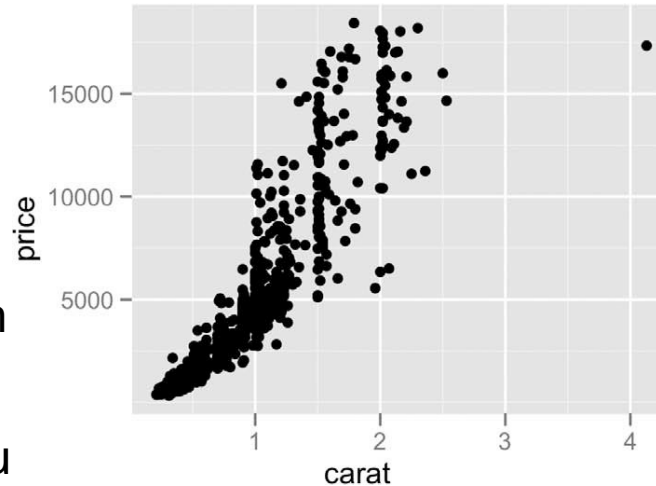


Idiom: scatterplot

➔ Express Values

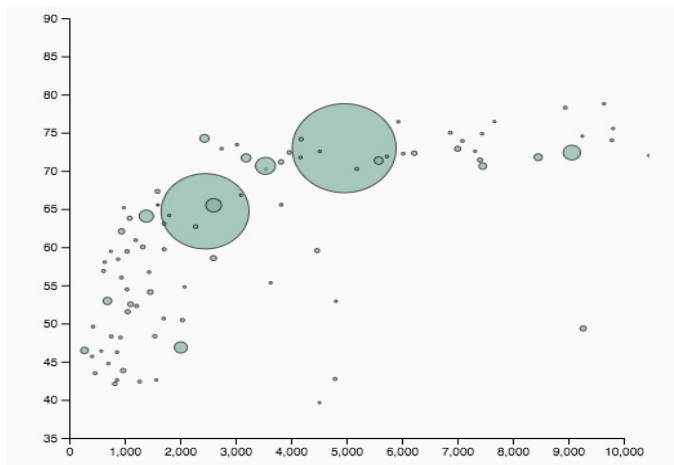


- Express values (magnitudes)
 - Quantitative attributes
- No keys, only values
 - Data
 - 2 quantitative attributes
 - Mark: points
 - Channels
 - Horizontal + vertical position
 - Tasks
 - Find trends, outliers, distribu
 - Scalability
 - Hundreds of items

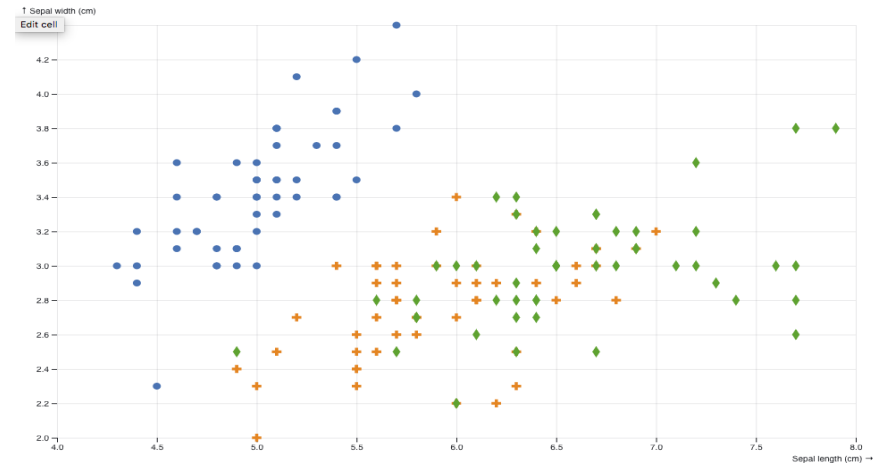


Scatter plots: Encoding more channels

- Additional channels viable since using point marks
 - Color
 - Size (1 quantitative attribute, used to control 2D area)
 - Note radius would mislead, take square root since area grows quadratically
 - Shape



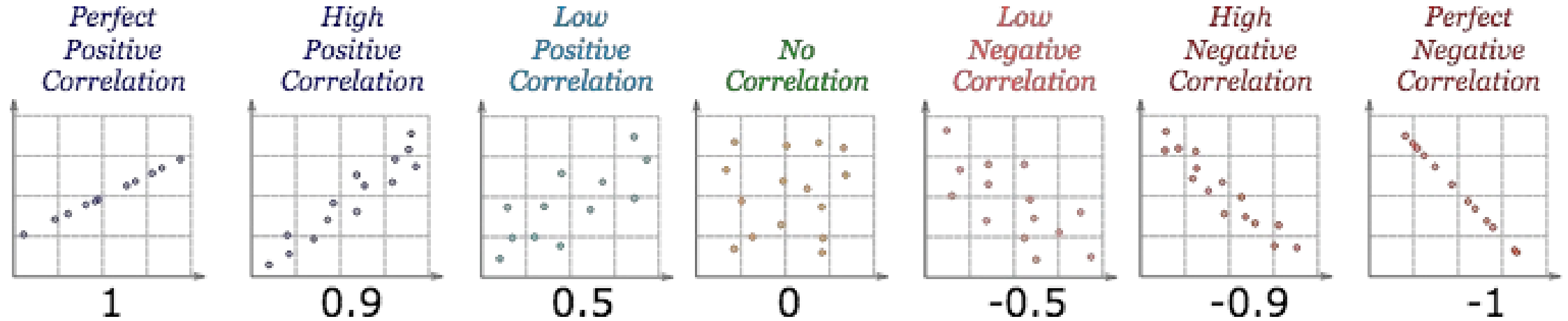
https://www.d3-graph-gallery.com/graph/bubble_basic.html



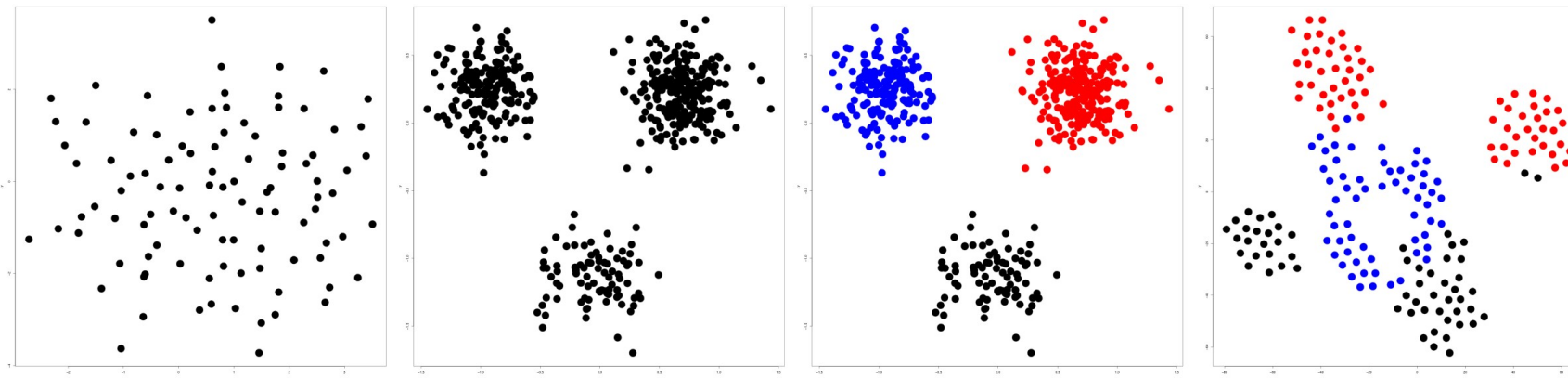
<https://observablehq.com/@d3/scatterplot-with-shapes>

Scatter plot tasks

- Correlation



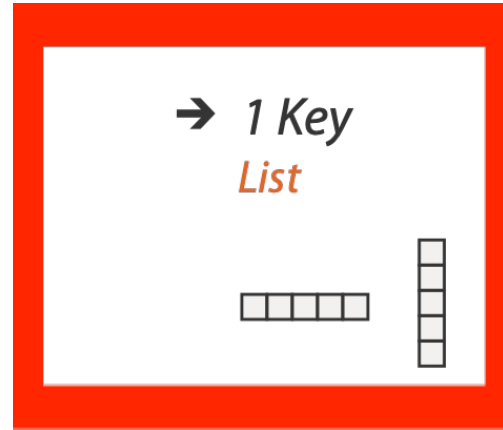
- Clusters/groups, and clusters vs classes



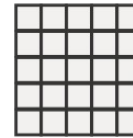
Some keys

→ 0 Keys

→ Express Values



→ 2 Keys
Matrix

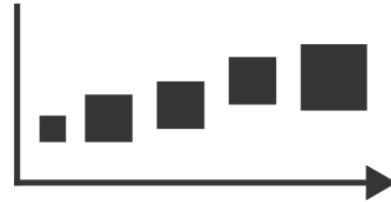


Some keys: categorical regions

→ Separate



→ Order



→ Align

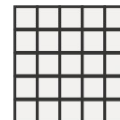


- Regions: contiguous bounded areas distinct from each other
 - Separate into spatial regions: one mark per region (for now)
- Use categorical or ordered attribute to separate into regions
 - No conflict with expressiveness principle for categorical attributes
- Use ordered attribute to order and align regions

→ 1 Key
List

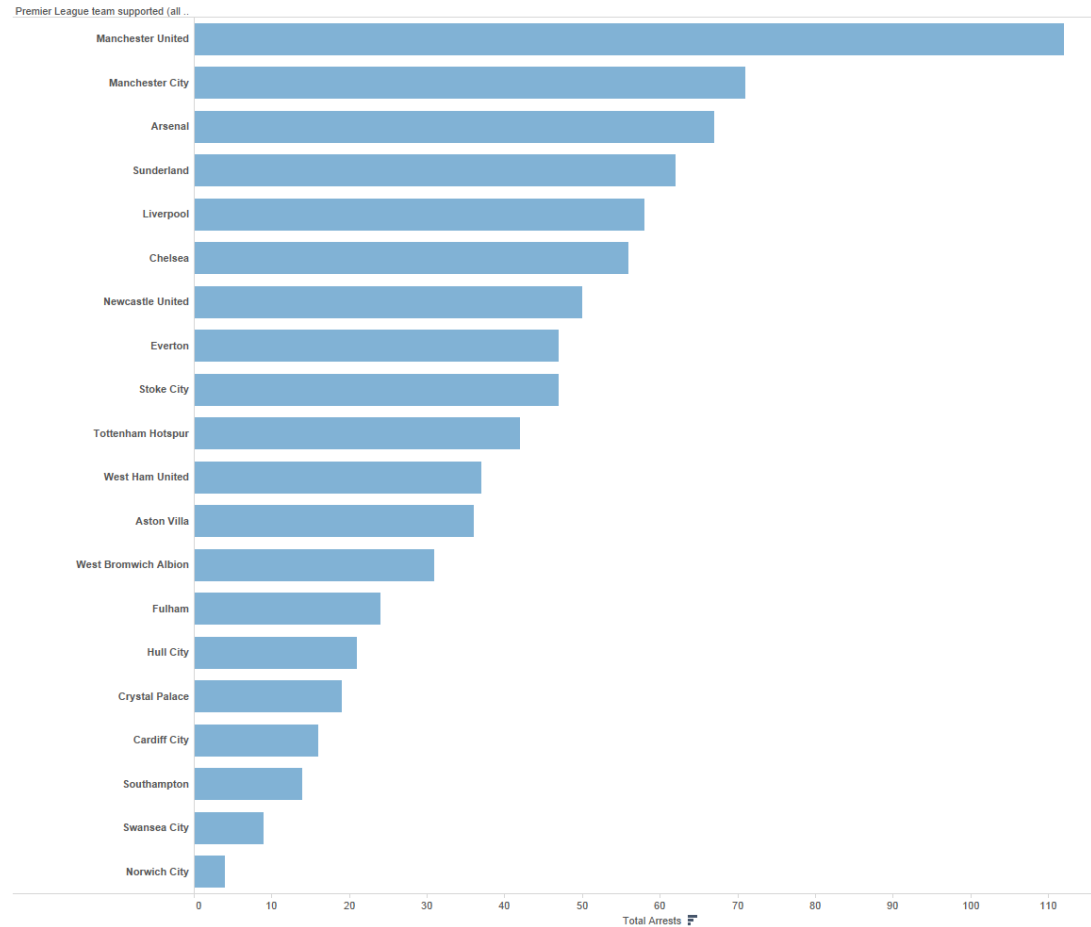


→ 2 Keys
Matrix



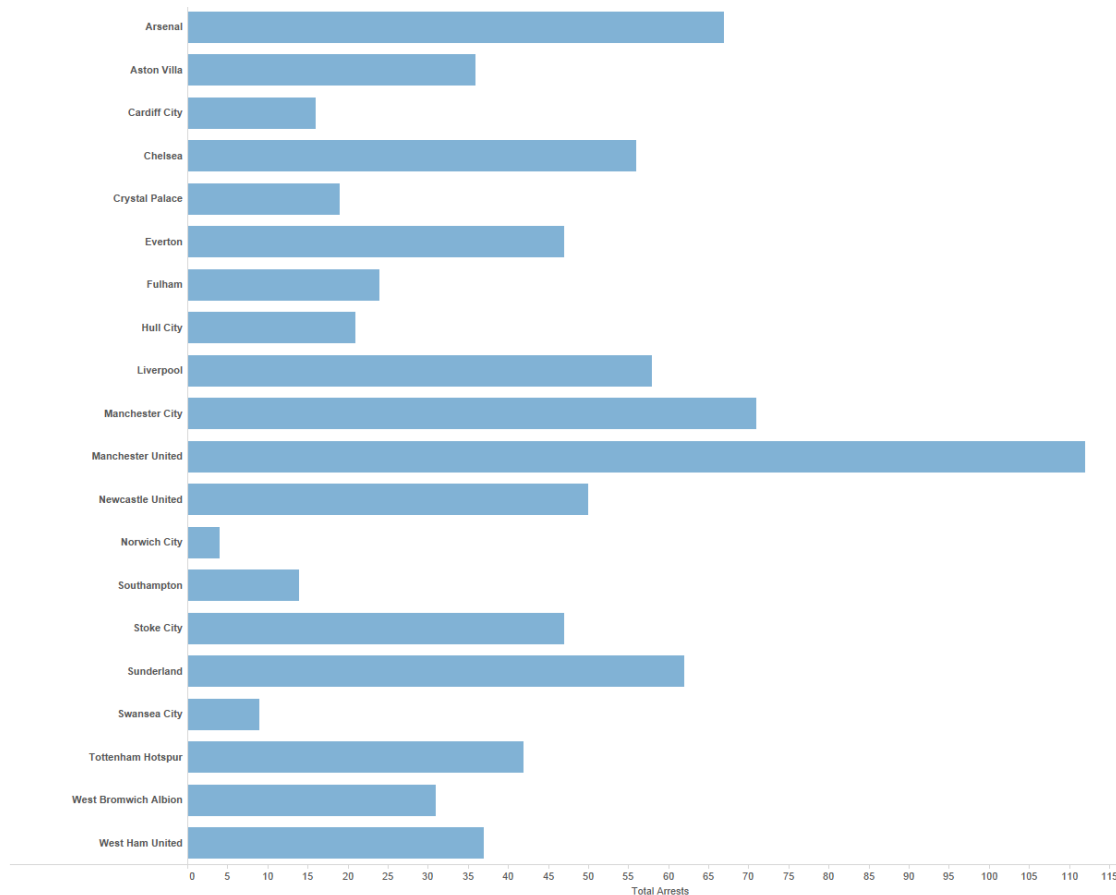
Separated and aligned and ordered

- Best case



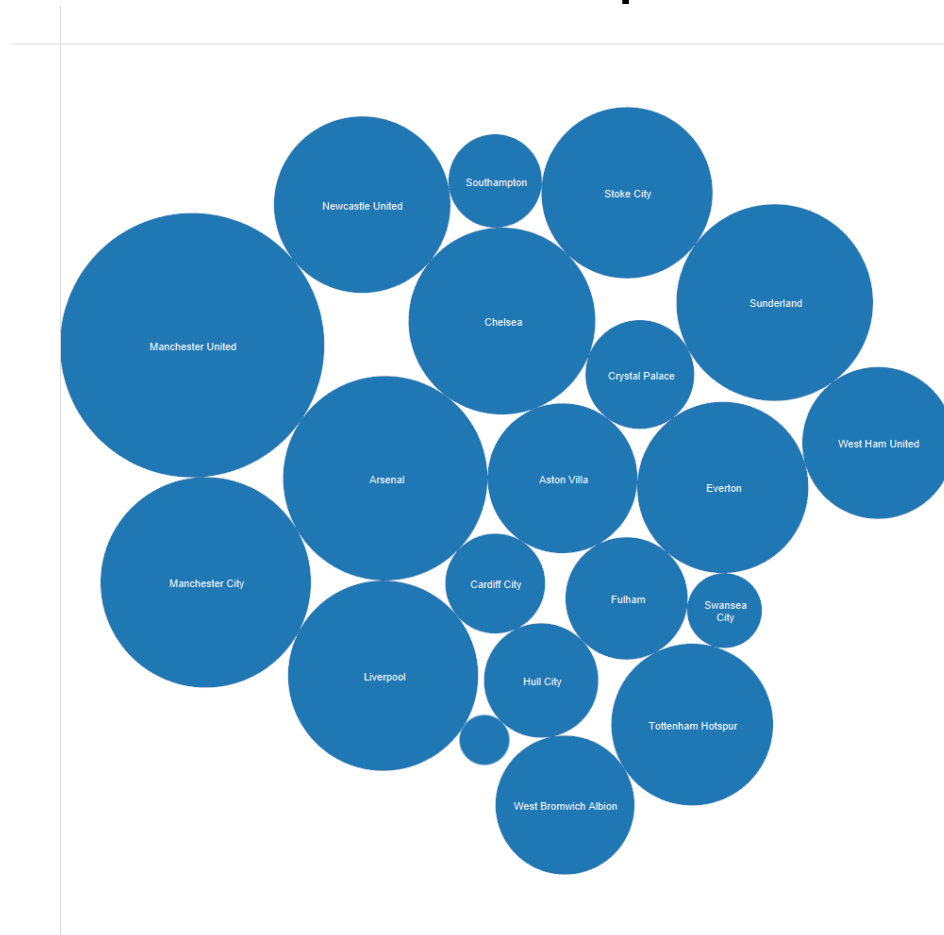
Separated and aligned but not ordered

- Limitation: hard to know rank. What's 4th? What's 7th?



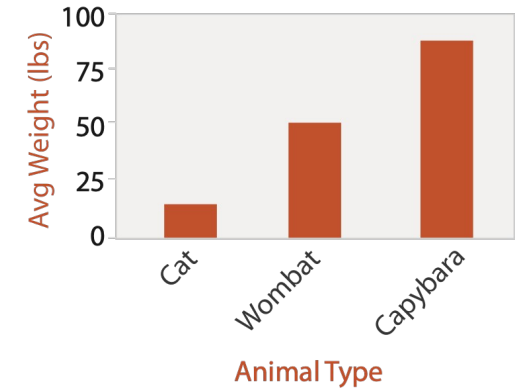
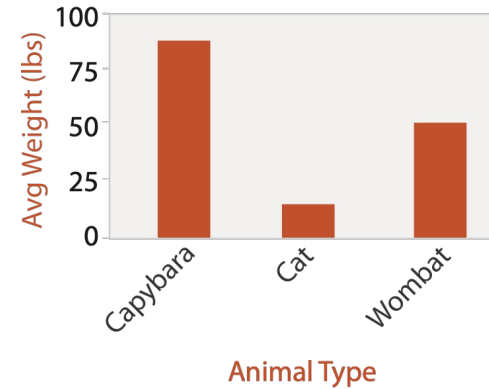
Separated but not aligned or ordered

- Limitation: hard to make comparisons with size (vs aligned position)



Idiom: bar chart

- One key, one value
 - Data
 - 1 category attribute, 1 quantitative attribute
 - Mark: lines
 - Channels
 - Length to express quantitative value
 - Spatial regions: one per mark
 - Separated horizontally, aligned vertically
 - Ordered by quantitative attribute
 - By label (alphabetical) by length attribute (data-driven)
 - Task
 - Compare, lookup values
 - Scalability
 - Dozens to hundreds of levels for key attribute (bars) , hundred for values



Idiom: stacked bar chart

https://www.d3-graph-gallery.com/graph/barplot_stacked_basicWide.html

- One more key
 - Data
 - 2 category attribute, 1 quantitative attribute
 - Mark vertical stack of line marks
 - Glyph: composite object, internal structure from multiple mark
 - Channels
 - Length and color hue
 - Spatial regions: one per glyph
 - Aligned full glyph, lowest bar component
 - Unaligned: other bar components
 - Task
 - Part to whole relationship
 - Scalability
 - For stacked key attribute, 10-12 levels (segments)
 - For main key attribute dozens to hundred levels (bars)

