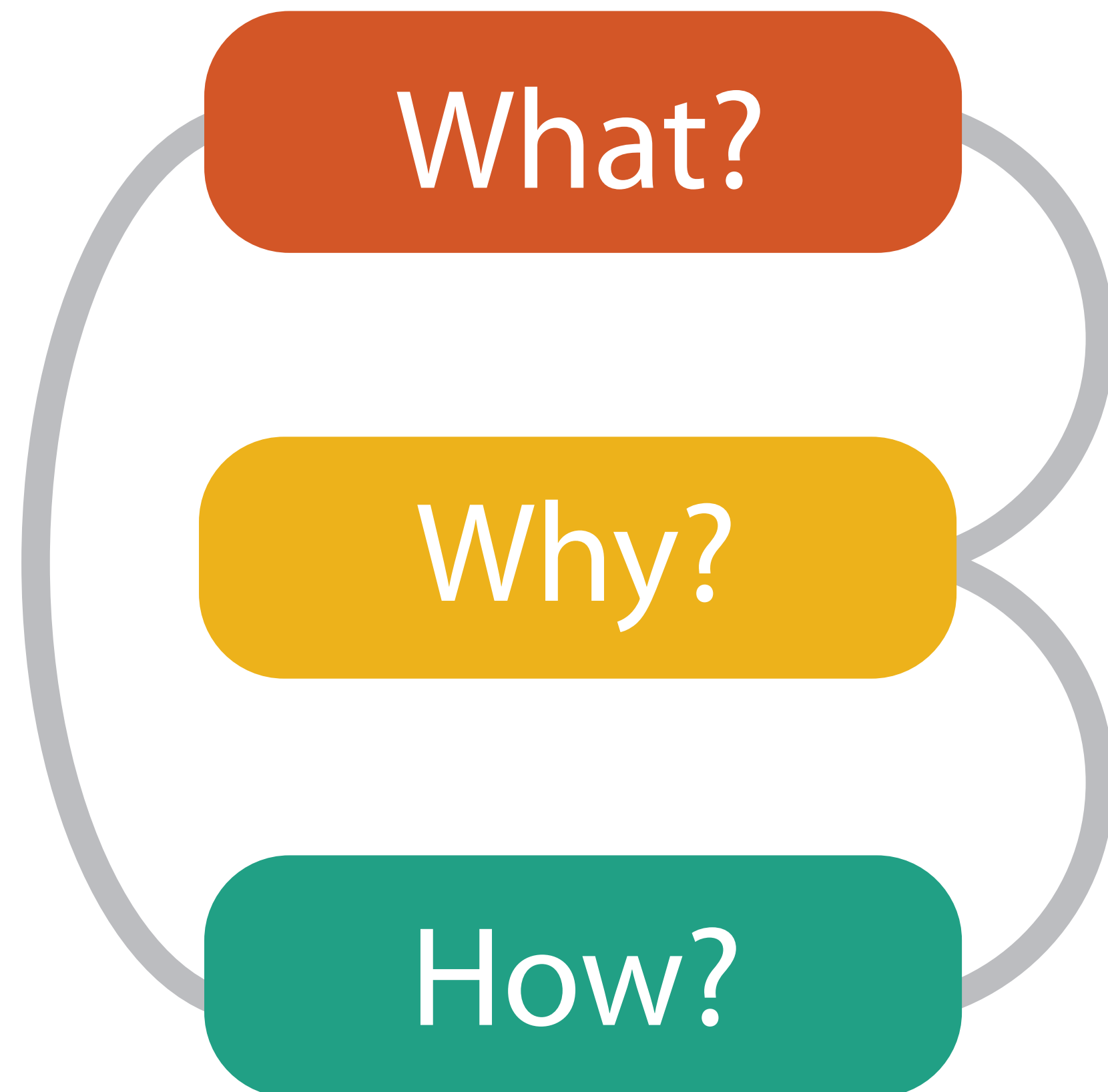


Data Visualization (CIS 490/680)

Marks & Channels

Dr. David Koop

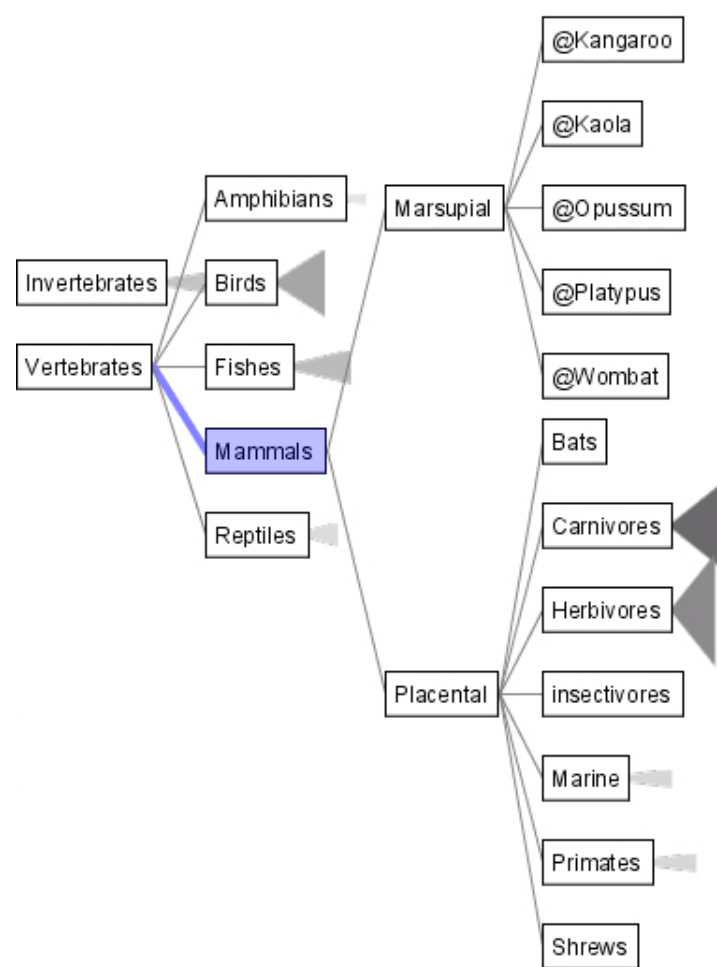
Roadmap



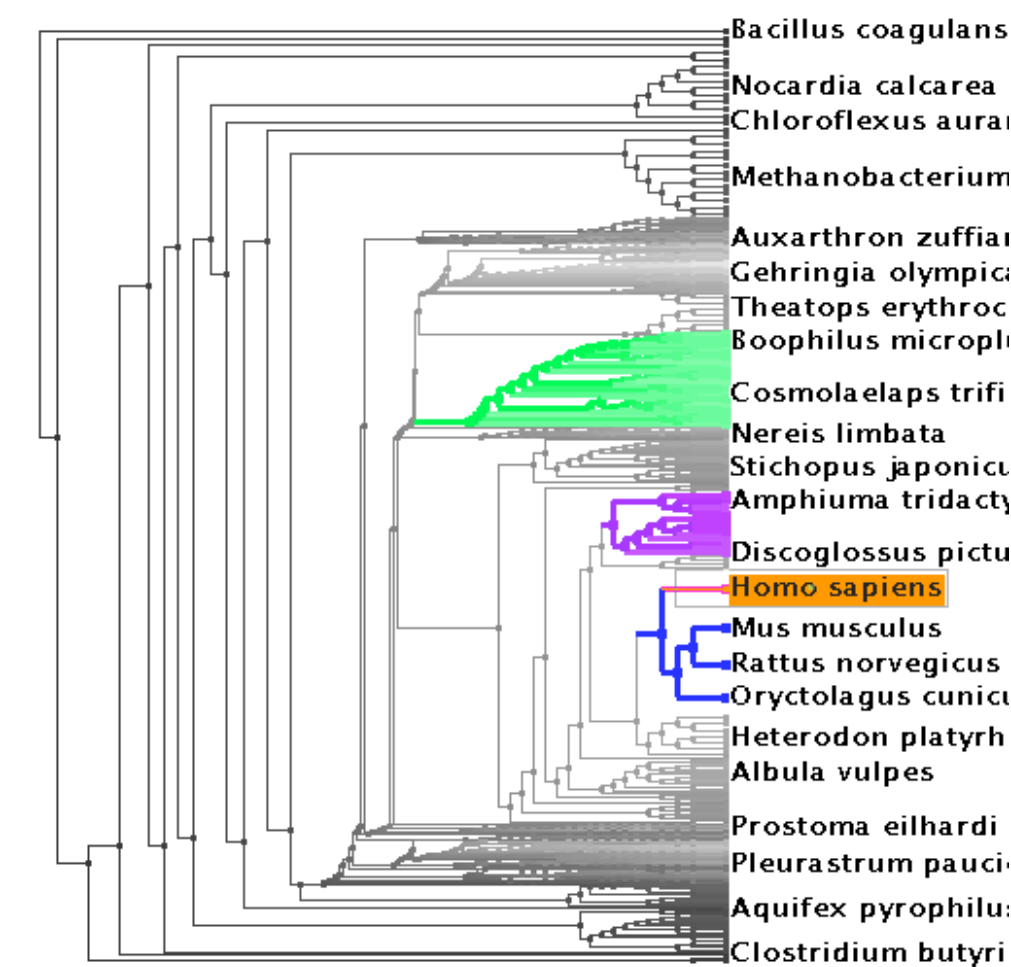
- What? → Data
 - Types
 - Semantics
- Why? → Tasks
 - Actions
 - Targets
- How → Vis Idioms/Techniques
 - Data Representation
 - Visual Encoding
 - Interaction Encoding

“Idiom” Comparison

SpaceTree



TreeJuxtaposer



[SpaceTree: Supporting Exploration in Large Node Link Tree, Design Evolution and Empirical Evaluation. Grosjean, Plaisant, and Bederson. Proc. InfoVis 2002, p 57–64.]

[TreeJuxtaposer: Scalable Tree Comparison Using Focus+Context With Guaranteed Visibility. ACM Trans. on Graphics (Proc. SIGGRAPH) 22:453– 462, 2003.]

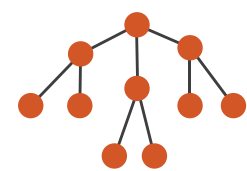
What?

Why?

How?

What?

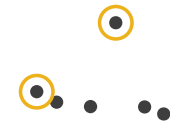
→ Tree



Why?

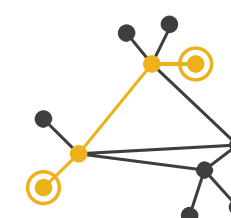
→ Actions

→ Present → Locate → Identify



→ Targets

→ Path between two nodes



How?

→ SpaceTree

→ Encode → Navigate → Select → Filter → Aggregate



→ TreeJuxtaposer

→ Encode → Navigate → Select → Arrange



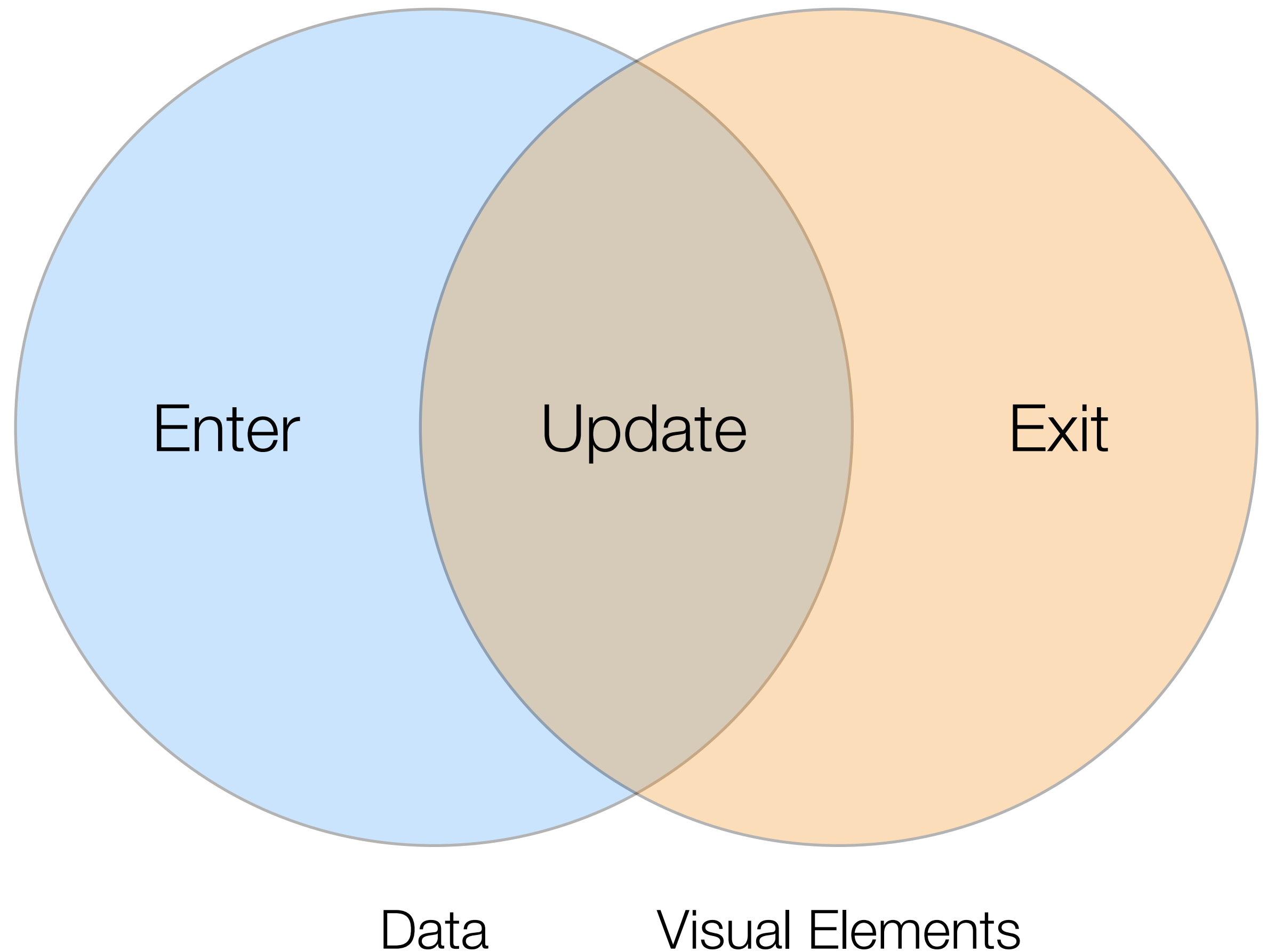
[Munzner (ill. Maguire), 2014]

D3 Key Features

- Supports data as a core piece of Web elements
 - Loading data
 - Dealing with changing data (joins, enter/update/exit)
 - **Correspondence** between data and DOM elements
- Selections (similar to CSS) that allow greater manipulation
- Method Chaining
- Integrated layout algorithms, axes calculations, etc.
- Focus on interaction support
 - Straightforward support for transitions
 - Event handling support for user-initiated changes

D3 Data Joins

- Two groups:
 - data items
 - visual elements
- Three parts of the join between them:
 - enter: `s.enter()`,
 - update: `s`,
 - exit: `s.exit()`



Assignment 3

D3 Introduction (Continued)

- <http://dakoop.github.io/IntroD3/>
 - (Updated from original for D3 v5 with new joins)
- <https://beta.observablehq.com/@dakoop/d3-intro>
- Other references:
 - Murrar's book on Interactive Data Visualization for the Web
 - The D3 website: d3js.org
- Another JavaScript reference:
 - js4ds.org

D3 Examples

- Bar Chart:
 - Start: <http://codepen.io/dakoop/pen/dNxjYL>
 - Simple Solution: <http://codepen.io/dakoop/pen/aJoLBp>
- With Axes and Scales: <http://codepen.io/dakoop/pen/WpeZOV>
- With Objects and Margin Convention: <http://codepen.io/dakoop/pen/MJNGwZ>
- More on Margin Convention:
 - <https://bl.ocks.org/mbostock/3019563> (Note this is D3 v3!)

Toward Reusable Charts

- D3 does not provide "standard" charts
- E.g. there is no barchart method
- What is a standard chart?
 - "Should you expose the underlying scales and axes, or encapsulate them with chart-specific representations?"
 - "Should your chart support interaction and animation automatically?"
 - "Should the user be able to reach into your chart and tweak some aspect of its behavior?"

[Towards Reusable Charts, M. Bostock, 2012]