Data Visualization (CIS 490/680)

Marks & Channels

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Roadmap

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

SpaceTree

TreeJuxtaposer

[Munzner (ill. Maguire), 2014]

What?

Why?

How?

Tree

Actions

Present  Locate  Identify

Targets

Path between two nodes

Encode  Navigate  Select  Filter  Aggregate

Encode  Navigate  Select  Arrange

Why?

[Munzner (ill. Maguire), 2014]

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TreeJuxtaposer

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How?
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)

  - (Updated from original for D3 v5 with new joins)
- https://beta.observablehq.com/@dakoop/d3-intro

Other references:
- Murrary’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?"