### Derive

- don’t just draw what you’re given!
  - decide what the right thing to show is
  - create it with a series of transformations from the original dataset

- one of the four major strategies for handling complexity

- independently choose, mix and match
  - analyse, query, search

### Analysis example: Derive one attribute

- Deliver
  - don’t just draw what you’re given!
  - choose what the right thing to show is
  - create it with a series of transformations from the original dataset

- one of the four major strategies for handling complexity

- independently choose, mix and match
  - analyse, query, search

### Analysis example: Derive one attribute

- Deliver
  - don’t just draw what you’re given!
  - choose what the right thing to show is
  - create it with a series of transformations from the original dataset

- one of the four major strategies for handling complexity

- independently choose, mix and match
  - analyse, query, search

### Methodology for Problem-Driven Work

- definitions
  - 9-stage framework
  - 32 pitfalls and how to avoid them

### Design study problem-driven vis research

- a specific real-world problem
  - real users and real data
  - collaboration is (often) fundamental

- design a visualization system
  - implications: requirements, multiple ideas

- validate the design
  - at appropriate levels

- reflect about lessons learned
  - transferable research improves design guidelines for vis in general

- confirm/refine, repeat, propose

### News

- marks for lecture 2 comments/questions sent out by email
  - see me after class if you didn’t get them

- order of marks matches order of questions in email

- only one question per reading required

- no two questions on one reading and no questions on the other

- if you spot typo in book, let me know if it’s not already in errata list


### Targets

#### 4

- All Data
- Outliers
- Features

#### Attributtes

- One
- Many
- Features
- Distribution
- Dependency
- Correlation
- Similarity

#### Spatial Data

- Shape

### Analysis example: Compare idioms

- **SpaceTime**
- **TreeJuxtaposer**
- **Tree**

#### Analysis

- **Search**
- **Query**

- **Attributes**
  - One
  - Many

- **Spatial Data**
  - Shape

- **Network Data**
  - Topology

### Design Study Methodology

Reflections from the Trenches and from the Stacks

- High-level actions: Analyze
  - **consume**
    - discover vs present
    - aka explore vs explain

- **enjoy**
  - aka casual, social

- **produce**
  - annotate, record

- **design**
  - crucial design choice

### When To Do Design Studies

- **Algorithm Automation Possible**

- **Design Study Methodology Suitable**
  - in car networks
Nine-Stage Framework
17
PRECONDITION
personal validation
CORE
inward-facing validation
ANALYSIS
outward-facing validation
learn implement winnow cast discover design deploy reflect write

Further reading: Books
  – Chap 3 Task Abstraction
• Information Visualization: Using Vision to Think. Stuart Card, Jock Mackinlay, and Ben Shneiderman.
  – Chap 1

Further reading: Articles
1. Turnsek, Chris, and Tamara Munzner. “Using Strahler numbers for real time visual exploration of huge graphs.”
   SIGGRAPH 2003.
4. Nominal, Ordinal, Interval, and Ratio Typologies are Misleading
5. An Operator Interaction Framework for Visualization Systems
8. Task taxonomy for graph visualization
10. Coordinated Graph and Scatter-Plot Views for the Visual Exploration of Microarray Time-Series Data
14. Cerebral: Visualizing Multiple Experimental Conditions on a Graph with Biological Context.
17. Pathline: A Tool for Comparative Functional Genomics.
18. BallotMaps: Detecting Name Bias in Alphabetically Ordered Ballot Papers

Further reading: Design Studies
• definitions
• 9-stage framework
• 32 pitfalls and how to avoid them
INFORMATION LOCATION
• metaphor: horse race vs. music debut
• reminder: my office hours are Tue right after class

Further reading: Abstraction
In-class exercise: Abstraction
Next Time
• to read
  – VAD Ch. 4 Validation
• reminder: my office hours are Tue right after class