Transforming Data: Cultural Strategies

Room I-405 Mondays 3:00-5:50pm

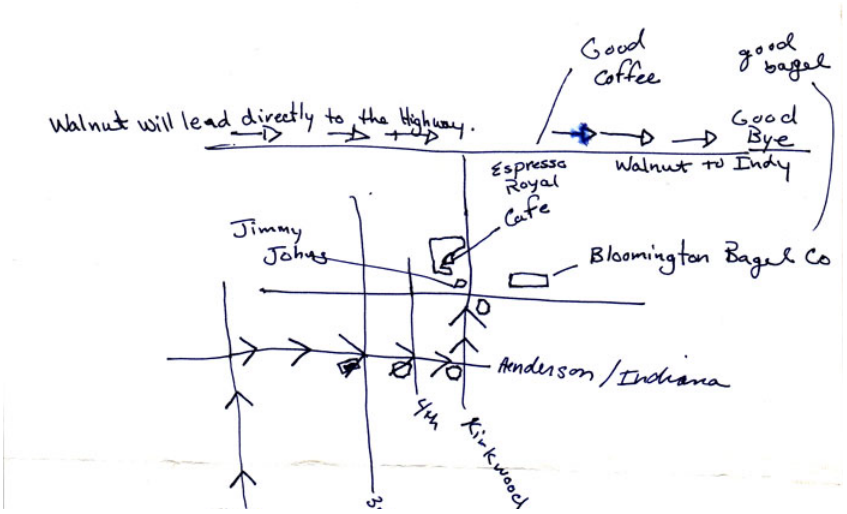
http://www.mat.ucsb.edu/~g.legrady/academic/courses/11fns/index.html

Course Focus

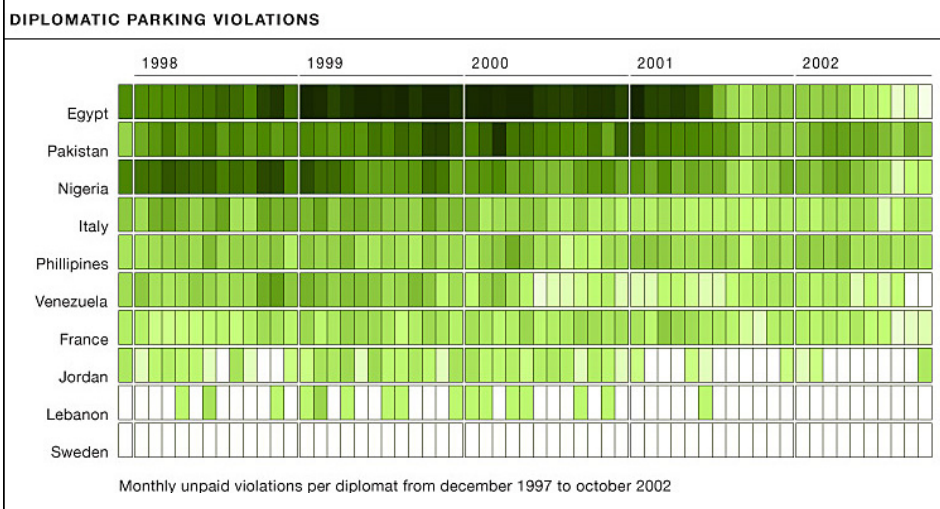
"*Visualizations Give Meaning to Information*"

- A lecture, research and lab course to explore the visual representation of information
- Goals:
  - To explore conceptual, cultural and semiotic issues specific to data visualization
  - Advance conceptual and graphical skills in translating abstract data into visualization

Mapping in 2D: handmaps.org



Frequency Maps Can Tell a Story (catalogtree)



Course Structure

Concepts & Aesthetics Overview

Wk 01-04 Data mining

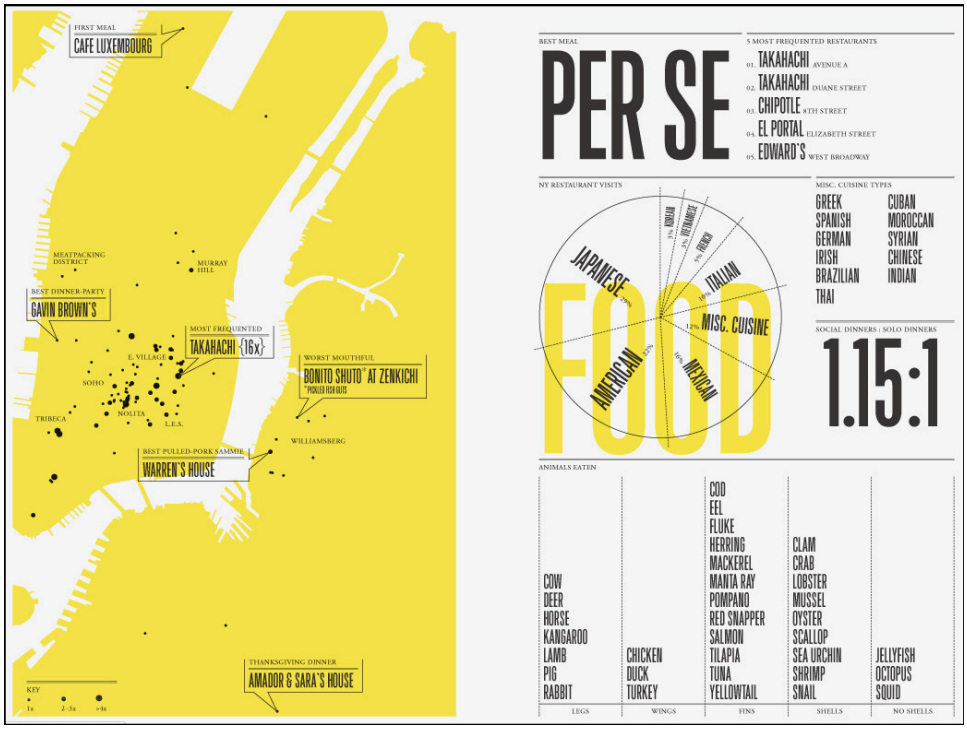
Wk 05-07 Data Mapping

Case Study: Seattle Public Library

Wk 08-10

Visualization/Research Project

Wk 11-15

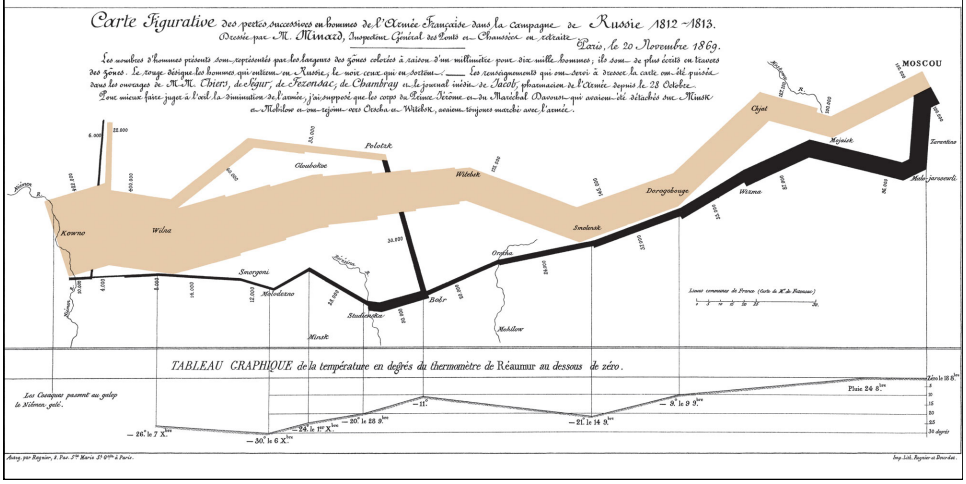


What is Data Visualization?

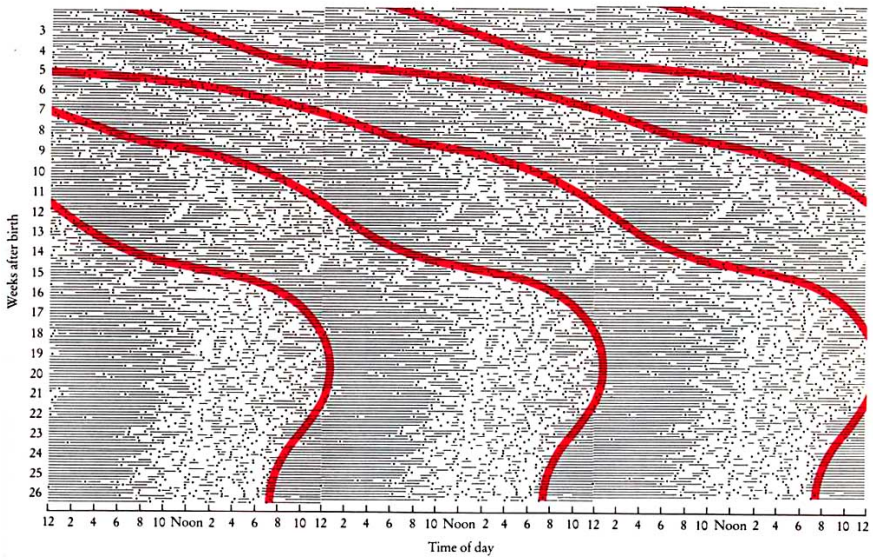
- The visual representation of abstract data
- Visual representation of concepts that may not have physical existence
- Multiple approaches:
  - Information Visualization (visualizes aggregated data)
  - Scientific Visualization (simulates phenomena)
  - Information Graphics (More symbolic like subway maps)

Charles Joseph Minard (1781-1870)

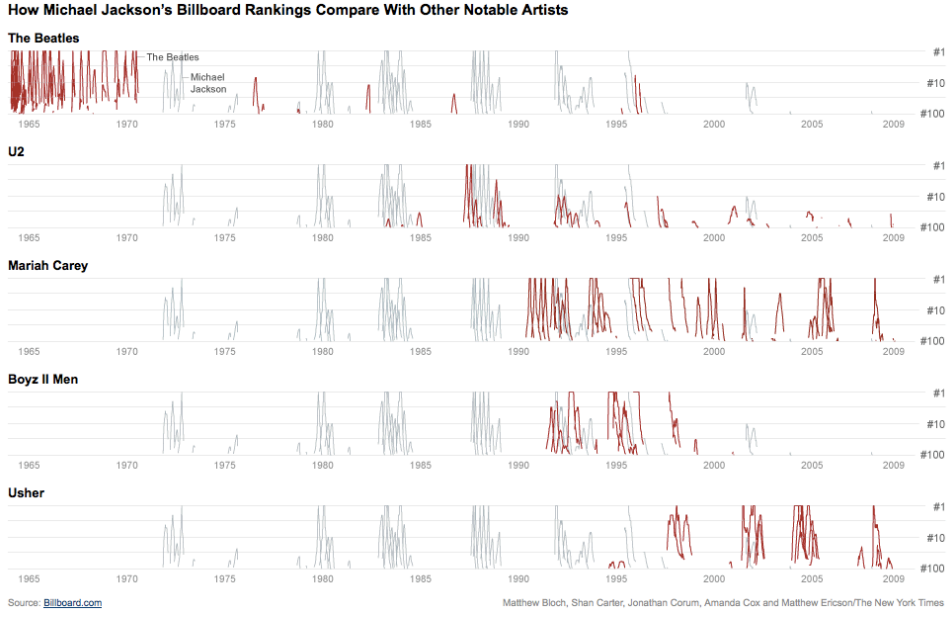
- French civil engineer and pioneer in the field of information graphics



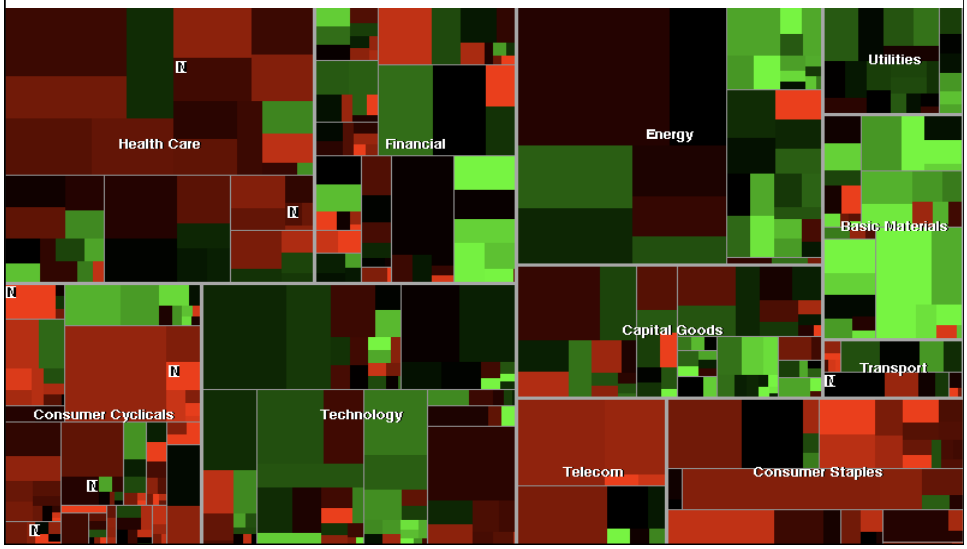
BioRythm: Frequency Map reveals pattern



TransForming Data – New School George Legrady 2011 Fall



TreeMap: SmartMoney (Schneiderman/Wattenberg)



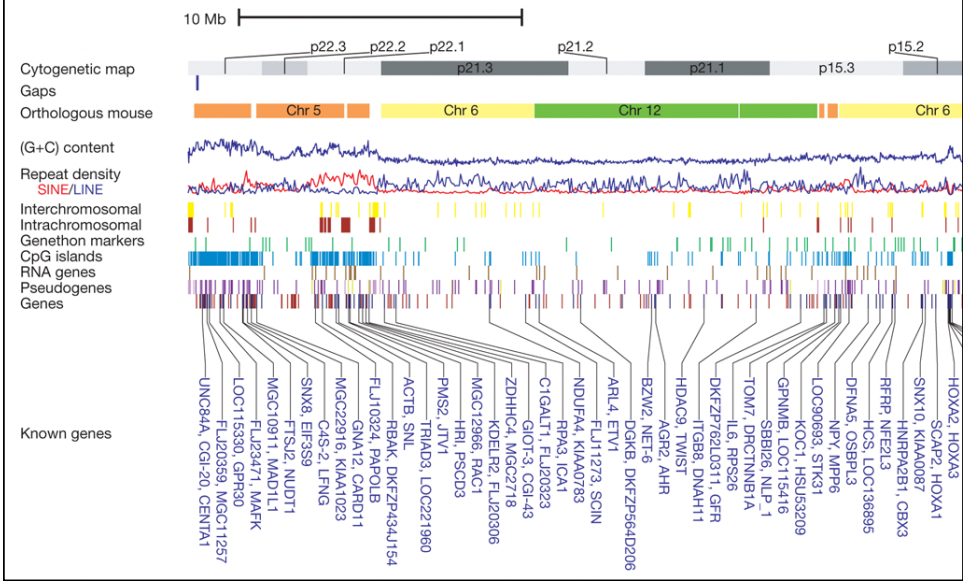
An Interdisciplinary Process

Cultural overlaps:

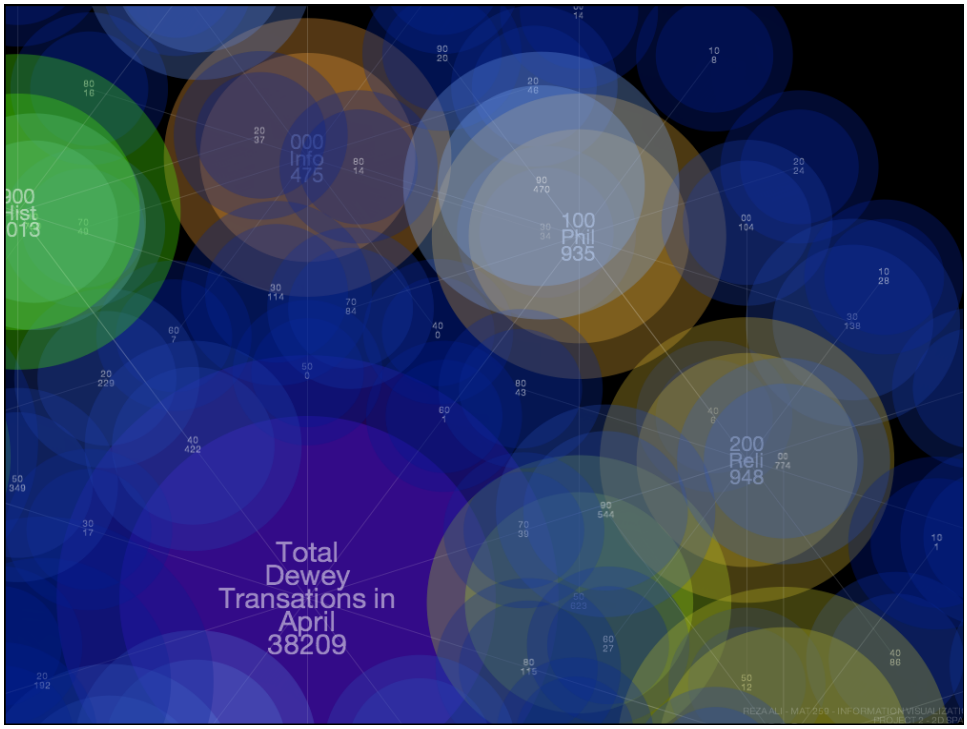
- Analysis Oriented: theoretical, cultural, information research (*social scientist*)
- Technical: Statistical aggregation and computational processes (*engineer*)
- Aesthetic: Visual design, expression (*artist, designer, architect*)

Course focus: Integrated approach

DNA Sequential Map



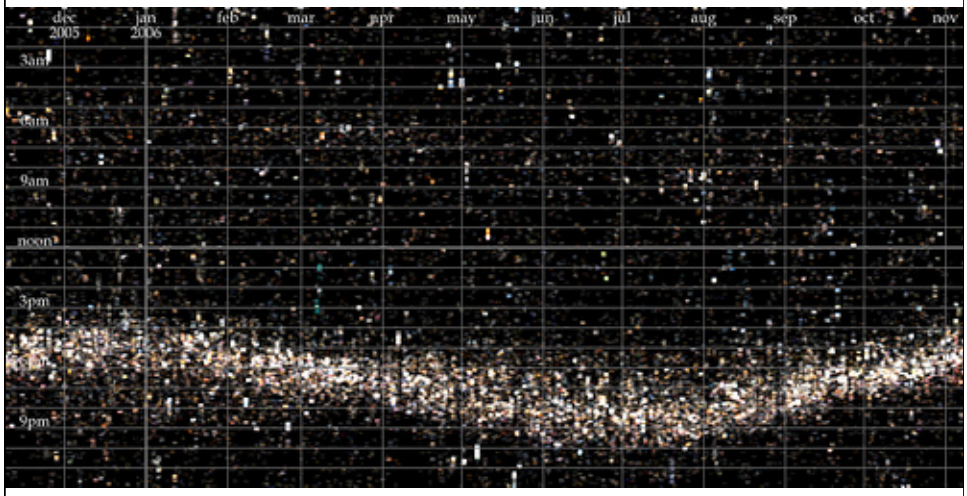
Spatial mapping using the Kohonen Self-Organizing Algorithm (Pockets Full of Memories)



How? Organization Through Metadata

- Metadata is data that describes data
- Examples:
  - **Personal Statistics**: Your name, age, gender, height, soc sec number, etc.
  - **Dewey Decimal System** (DDC)**:** To organize books according to subject
  - **EXIF** (Exchangeable image file format): Standard that specifies the format for images, sound, in digital devices: Type of camera, date/time, compression, image resolution, exposure program, focus, metering, flash, colorspace,

Linear Time Graphs



What Do We Represent? (AJ Ayer's Propositions)

- **Synthetic:** We synthesize some knowledge about the world
- **Subjective:** We make a statement that is evaluative, and expressive of a feeling (but not about the world)
- **Syntactic:** We test the communication process, re-affirm that communication is proceeding as planned. We explore the syntax of the language

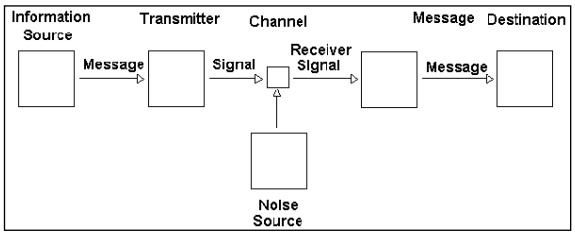
Breadth of Visualization: From Poetic to Pragmatic

- Polarized knowledge base:
  - Computation is utilitarian and visualization requires aesthetic skillsets

- Experience in both give best results
- Both require extensive practice

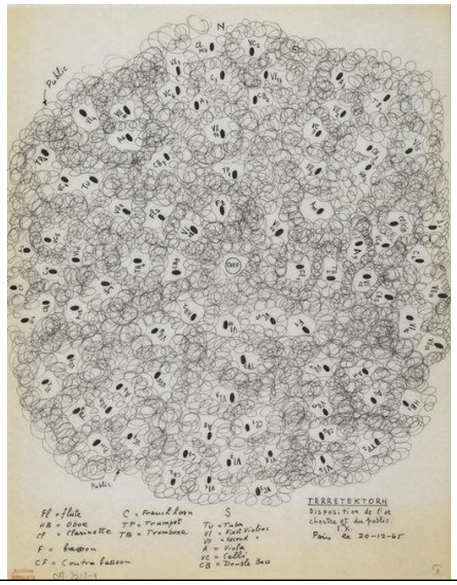
Why? Communication Involves Reception

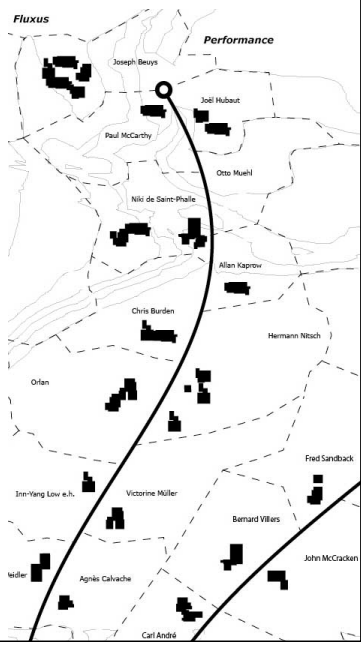
Shannon's Information Theory



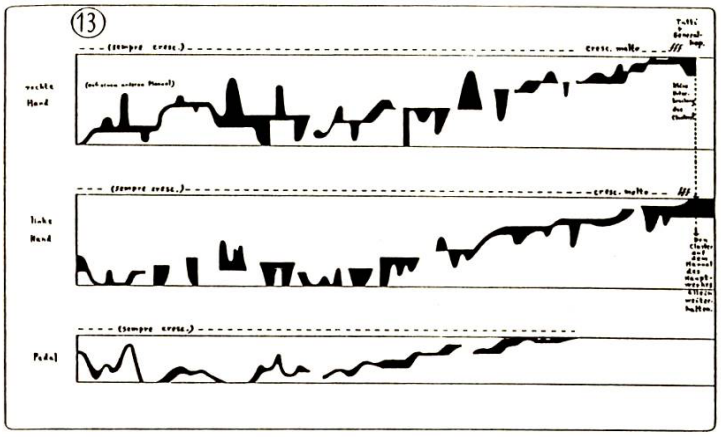
- **Signal** is ordered information, noise is unintended, randomized information
- Art leans towards a high noise mix, or an order of increased complexity rather then pure signal

Two maps: Xenakis, Art practice





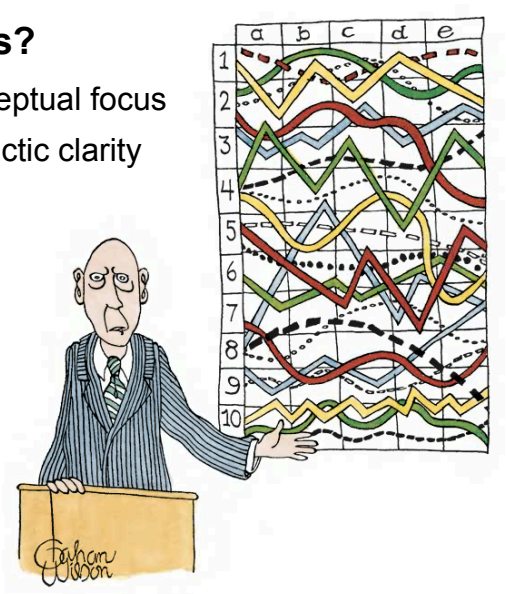
Proj 1: Linear (Ligeti musical composition)



Sektion 13 der revidierten Fassung (1966) in der Handschrift des Komponisten.

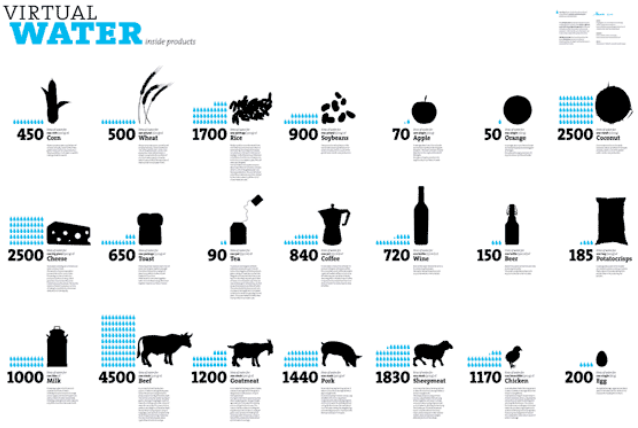
What are the Issues?

- Conceptual focus
- Syntactic clarity



"I'll pause for a moment so you can let this information sink in."

Mosaic Grid: Structure determines order



Bibliographic References

- Visual Display of Quantitative Information, Edward Tufte
- Beautiful Visualization,
- Visualizing Data, Ben Fry
- Robert Kosara