Introduction to Information Visualization
• **What is Visualization?**

• “Is a method of Computing. It transforms the symbolic in the geometric, enabling researchers to observe simulations and computations ... providing scientific insight through visual methods” *(McCormick et al., 1987)*

• “Is concerned with exploring data and information graphically in such a way as to gain understanding and insight into the data” *(Brodlie et al., 1992)*

• “Means the study, development and use of graphics representation and supporting techniques that facilitate the visual communication of knowledge” *(Keller & Keller, 1993)*

• “A computationally intense visual thinking” *(Rhyne, 2002)*
What is Information Visualization?

Information visualization (**InfoVis**) is the communication of abstract data through the use of interactive visual interfaces. (Keim et al., 2006)

Information visualization (**InfoVis**) produces (interactive) visual representations of abstract data to reinforce human cognition; enabling the viewer to gain knowledge about the internal structure of the data and causal relationships in it ([www.infovis-wiki.net](http://www.infovis-wiki.net))

**Abstract data** refers to (heterogenous) data that has no inherent spatial structure; thus it does not allow for a straightforward mapping to any geometry
This course:

InfoVis

after

an introduction to: Data/Info Visualization
  Computer Graphics
  Visual perception

http://sweet.ua.pt/bss

some materials in Moodle
Outline:

Introduction to Data and Information Visualization

Introduction to Computer graphics:
- Geometric transformations (2D, 3D) and Visualization (2D, 3D)
- Introduction to visibility, illumination, surface rendering and color models

Visual Perception

Information Visualization:
- Main issues
- Data and Design
- Representation
- Presentation
- Interaction
- Evaluation

Beatriz Sousa Santos + Paulo Dias
Lab Classes

- SVG, Three.js
- Visualization tools (Google Charts, D3, …)
Main Bibliography


• Ware, C., *Information Visualization, Perception to Design*, 3nd ed., Morgan Kaufmann, 2012

Other Bibliography


- Friendly, M., "Milestones in the history of thematic cartography, statistical graphics, and data visualization“, 2008


- InfoVis Wiki http://www.infovis-wiki.net/

- Papers and sites
Sessions: Thursday – 11h-13h; Thursday – 14h-16h
(subject to minor adjustments)

1 (12/02/15) - Introduction to the course
2 (12/02/15) - Introduction to the lab classes; Google Charts
3 (19/02/15) - Introduction to DataVis and InfoVis
4 (19/02/15) – Google Charts
5 (26/02/15) – Introduction to CG
6 (26/02/15) – Introduction to three.js
7 (05/03/15) - Introduction to CG (cont.) (paper presentation)
8 (05/03/15) – Introduction to three.js
9 (12/03/15) – Visual Perception (paper presentation)
10 (12/03/15) – Introduction to three.js, 1rst assignment
11 (19/03/15) – Main issues in InfoVis
12 (19/03/15) - Introduction to three.js, 1rst assignment
13 (26/03/15) – Representation: coding of value (paper presentation)
14 (26/03/15) - 1rst assignment
15 (09/04/15) – Representation: coding of value (cont) (paper presentation)
16 (09/04/15) – Introduction to SVG
17 (16/04/15) – Representation: coding of relation (paper presentation)
18 (16/04/15) – Introduction to SVG
19 (23/04/15) – Presentation of the 1rst assignment
20 (23/04/15) – Presentation of the 1rst assignment
21 (30/04/15) – Evaluation in Visualization (paper presentation)
22 (30/04/15) – Assignment on evaluation
23 (7/05/15) – Introduction to D3, 2nd assignment
24 (7/05/15) – Introduction to D3, 2nd assignment
25 (21/05/15) – Presentation and Interaction (paper presentation)
26 (21/05/15) – Introduction to D3, 2nd assignment
27 (28/05/15) – Experiment on evaluation
28 (28/05/15) – Experiment on evaluation
29 (4/06/15) – Presentation and Interaction (cont) (paper presentation)
30 (4/06/15) – 2nd assignment
Assessment

- paper analysis, presentation and discussion – 10%
- assignment on evaluation – 10%
- exam – 30%
- 1\textsuperscript{st} programming assignment – 20%
- 2\textsuperscript{nd} programming assignment – 30%
Assignments

- 1\textsuperscript{st} programming assignment – three.js, SVG
- 2\textsuperscript{nd} programming assignment - D3, …
- Assignment on evaluation
Assignment on evaluation:

- “Naïve critique” of a visualization example
- Evaluation using an analytical method
- Presentation of findings
- Participating in evaluation sessions
Analyzing and presenting an Info Vis paper

• Each student must:

• Select an InfoVis paper from:
  - IEEE Computer Graphics and Applications
  - IEEE Transactions on Visualization and Computer Graphics

• Propose it until 27/2/2015 to bss@ua.pt
  Indicating preferences concerning presentation date

• Read the presentation guidelines

• Make a 20 minute presentation and submit the slides

• Students who work must contact the lecturer during the two first weeks to establish evaluation details

  • Students profile?

  • Any doubts, questions?
Bibliography-papers


Interesting links

- http://www.infovis-wiki.net/
- http://www.visualcomplexity.com/vc/
- http://selection.datavisualization.ch/
• Until February, 28:

  – Select from the list the papers you prefer

  – Think about the presentation dates you prefer

  Send to bss@ua.pt

Good luck with your work!

http://www.infovis-wiki.net/