Outline

Information Presentation

Screen Design

Aesthetics

Exercise

References
Information Presentation is a wide topic; we give an overview of common ways of presenting data.

Screen Design and Layout impinges on information presentation, but also interaction and graphic design.
Information Presentation

- Interfaces give feedback or display results
  - maybe *rich*, multi-modal (e.g., touch, sound, ...)
- **Visualisation** is the study of techniques for presenting data.

2D: indicative, statistical representations

3D: complex numerics, physical space on various scales
Presentation Principles

- Purpose matters
  - lookup values or see trends
  - precise (technical, scientific) or indicative (reporting
  - application type: document or web page, custom app, dashboard

- Paper presentation techniques are a guide
- ... but interactivity can be added
  - e.g., re-ordering columns, zooming, changing formats
  - ... this softens design choices
  - ... but also can allow for making a pig’s ear!
Library of Presentation Methods

- Lists
  - horizontal: sorted, tabulated
  - bulleted
  - enumerated

- Tables and charts

- Graphs
  - line graphs, scatter graphs
  - histograms (bar graphs)
  - ...use categorical scales: nominal, ordinal, interval

- Structural graphs and trees
  - hierarchical or connected nodes
  - animations and drag-and-drop rearrangement

These are traditional and well-known methods but have many variations.
Tag Clouds (weighted lists)

ambient darkwave death metal disco doom metal downtempo drum and bass dub easy listening ebm electro electronic electronica emo experimental favorite favorite songs favorites favourite favourites female female vocalist female vocalists finnish folk folk metal french fun funk german good goth gothic gothic metal gothic rock grindcore grunge guitar hard rock hardcore heavy metal hip hop hip-hop hiphop house idm indie indie pop indie rock industrial industrial metal instrumental j-pop j-rock japanese jazz jpop jrock latin lounge love male vocalists mellow melodic death metal metal metalcore minimal new age new wave noise nu metal oldies piano polish pop pop punk pop rock post-hardcore post-punk post-rock power metal progressive progressive metal progressive rock psychedelic psychedelic rock psy trance punk punk rock rap reggae rnb rock russian sad screamo seen live sexy shoegaze
Pie charts: controversial

- Highly popular and attractive
- But poor presentation method
  - hard to judge area/angle
  - hard to relate segment size
  - . . . need extra labels
- 3D effects even worse:
  - “wasted” use of dimension
  - distorts sizes
  - risks distorting text
Sparklines and Small Multiples

- Sparklines introduced in Tufte (2006)
  - “data-intense, design-simple, word-size graphics”
  - deliberately no scales!
  - x-axis usually time
  - display current key value with history context
  - e.g.: blood glucose level, manufacturing defects, ...

- Multiples: repeated presentations of different data with the same design. Coined by Tufte (1990).
  - Repetition adds an extra (categorical) dimension
  - Understanding transfers from first to rest
Treemaps

- Introduced by Johnson and Shneiderman (1991)
  - 2D display of large hierarchical/categorised datasets
  - Rectangle size encodes a quantity; is zoomable
  - Colour (saturation) encodes a category (quantity)

[This image is from Fekete and Plaisant (2002)]
Interactive visualisation for the masses

This is IBM’s Many Eyes service:
http://services.alphaworks.ibm.com/manyeyes/home
Designing Charts in Excel 2007

Screen Layout Principles

- **Process:**
  - **Ask:** what is the user doing?
  - **Think:** what information, comparisons, orders
  - **Design:** form follows function

- **Tools:**
  - item grouping and spacing
  - item order
  - decoration
  - white space
  - alignment

<table>
<thead>
<tr>
<th>Surname</th>
<th>Forename</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspinall</td>
<td>David</td>
</tr>
<tr>
<td>Webb</td>
<td>Barbara</td>
</tr>
</tbody>
</table>

- **Tools:**
  - fonts and boxes

- **Tools:**
  - **Tools:**
  - item grouping and spacing
  - item order
  - decoration
  - white space
  - alignment
Grouping and structure

- Logically grouped → physically grouped

<table>
<thead>
<tr>
<th>Online invoice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Billing details</strong></td>
</tr>
<tr>
<td>Name:</td>
</tr>
<tr>
<td>Address: ...</td>
</tr>
<tr>
<td>Credit card: ...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Order details</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Item:</td>
</tr>
</tbody>
</table>
Ordering and Decoration

- **Ordering** should follow “natural” ordering
  - inherits cultural (language; computer system) constraints
  - more noticed areas: top-left, center if given whitespace

- **Decoration** on screen
  - use boxes to group logical items
  - use fonts for emphasis, headings
  - . . . but not too many: strive for simplicity
Alignment

- We read from left to write (English & European) 
  \[\implies\text{align on the left.}\]

Willy Wonka and the Chocolate Factory
Winston Churchill - A Biography
Wizard of Oz
Xena - Warrior Princess

\textbf{rather than}

Willy Wonka and the Chocolate Factory
Winston Churchill - A Biography
Wizard of Oz
Xena - Warrior Princess

- For \textbf{names}: often scanning for surnames

\begin{tabular}{|c|c|c|}
  \hline
  David Aspinall & David Aspinall & Aspinall, David Webb \\
  Barbara Webb & Barbara Webb & Webb, Barbara \\
  \hline
  BAD & OK & OK \\
  \hline
\end{tabular}
Alignment, continued

For **numbers**:
- visually: long number = big number
- align decimal points or right-align integers

<table>
<thead>
<tr>
<th>56123</th>
<th>56123</th>
<th>56123</th>
<th>56123.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>97151.2</td>
<td>97151</td>
<td>97151.2</td>
<td>97151.20</td>
</tr>
<tr>
<td>57.2498</td>
<td>57</td>
<td>57.2498</td>
<td>57.25</td>
</tr>
<tr>
<td>1035</td>
<td>1035</td>
<td>1035</td>
<td>1035.00</td>
</tr>
<tr>
<td>49312.5</td>
<td>49313</td>
<td>49312.5</td>
<td>49312.50</td>
</tr>
</tbody>
</table>

BAD | OK | OK-ish | OK

For **dialog boxes**
- align entry fields for different label widths

<table>
<thead>
<tr>
<th>Name:</th>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surname:</td>
<td>Surname:</td>
</tr>
</tbody>
</table>

BAD | OK
Additional space usually helps good design

... but sometimes we need to fill it
- in tables, use *leaders* or highlight alternate rows

Cat number ................. A14567
Aesthetics and utility

- aesthetically pleasing designs
  - increase user satisfaction and improve productivity
- beauty and utility may conflict
  - mixed up visual styles $\implies$ easy to distinguish
  - clean design, little differentiation $\implies$ confusing
  - backgrounds behind text
    — nice to look at, but hard to read
- but aesthetics can help usability
  - e.g. the design of the counter
  - in consumer products — key differentiator
- many of these lessons have been (re)-learned in web design
Colour and 3D

- both often used very badly!
- colour
  - older monitors limited palette; defined colour names limited
  - colour over-used because “it is there”
  - beware colour blind
  - use sparingly to reinforce other information
- 3D effects
  - good for physical information and some graphs
  - but if over used . . .
    e.g. text in perspective: old mistake was on 3D pie charts
Aspects of internationalisation

- localisation & internationalisation
  - changing interfaces for particular cultures/languages
  - globalisation: choose symbols that work everywhere
- more than language change...
  - also changes sizes, left-right order etc.
- and deeper issues
  - cultural assumptions and values
  - e.g., meanings of symbols

tick and cross:
See http://www.perceptualedge.com/files/GraphDesignIQ.html
References


See also:

- Dix et al, Chapters 5 (5.7) and 20 (20.4).
- Tufte’s website: http://www.edwardtufte.com