# Data Processing - Readings 5

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## Questions

1. Ware (2008, p. 44-46) argues that human perception involves 2.5 dimensions. This has to do with the fact that information about the *up-down* dimension and *sideways* dimension can be directly inferred, while information about the *away* dimension must be indirectly inferred.

   Given this assertion, 3D visualizations might still be useful. As described by Ware (2008, p. 97), '*some data already has three-dimensional properties; for example, architectural designs, and data from the physical and biological sciences.*' Visualizing this data in 2D might not be successful, since we are already used to navigate in three dimensions when perceiving such data. On the other hand, visualizing data that does not exhibit three dimensional properties (i.e., non-spatial data) in 3D might also not be successful.

2. In chapter six, Ware (2008) presents some implications of pattern recognition and visual working memory on design. Figure 1 shows an advertisement that harnesses some of these principles[1]. As stated on the advertising agency's website, the advertisement was created for '*The Association for Environment and Nature Protection (BUND) ... to raise awareness of the extinction crisis facing many species in order to mobilize donators.*'[2].

   There are a number of ways in which the advertisement harnesses some of the principles. First, the advertisement shows objects that are typical members of their class (i.e., the clock/watch and the brown bear). This allows the viewer to rapidly and reliably identify the objects in the advertisement.

   Second, the advertisement makes use of a gist-object mismatch/conflict in order to hold the viewer's attention. The advertisement shows a scene with clearly expressed gist (i.e., a clock/watch). However, the brown bear

[1] Advertising Agency: Scholz & Friends, Berlin, Germany. Source: `http://www.s-f.com/berlin/en/creation/cases/bund/`

[2] Source: `http://www.s-f.com/berlin/en/creation/cases/bund/`

in the scene is incompatible with that gist, and thus the advertisement succeeds in holding the viewer's attention.


Figure 1: An advertisement that harnesses some of the principles on implications of pattern recognition and visual working memory on design.

Third, the advertisement uses a strong symbol. As stated on the advertisement agency's website: "'It's 5 minutes 'till 12" *is a German expression meaning* "We don't have much time before a catastrophe strikes" - *in the adverts' case - before a species becomes extinct. So the advert shows crushed animals between the hands of a watch, because if you want to save species, you must not lose any time and donate now.*'

Fourth, and finally, the advertisement exhibits some emotional valence. The image of the brown bear being crushed between the hands of the clock/watch draws attention. The emotional valence is likely to result in more donators.

3. According to Bostock et al. (2011), D3 has the following primary advantages:

   - D3 directly manipulates the Document Object Model (DOM).
   - D3 is much more expressive than other visualization tools.
   - D3 is easy to debug and allows for iterative development.
   - D3 delivers improved performance compared to other visualization tools.

   Visualizations that involve lots of data points would be easier and better implemented in D3 as opposed to HTML5, JSON, and JavaScript.

4. Of the visualization figures presented in Heer et al. (2010), I find the treemap (enclosure diagram) the most difficult to comprehend. Figure 2 shows a screenshot of the treemap.

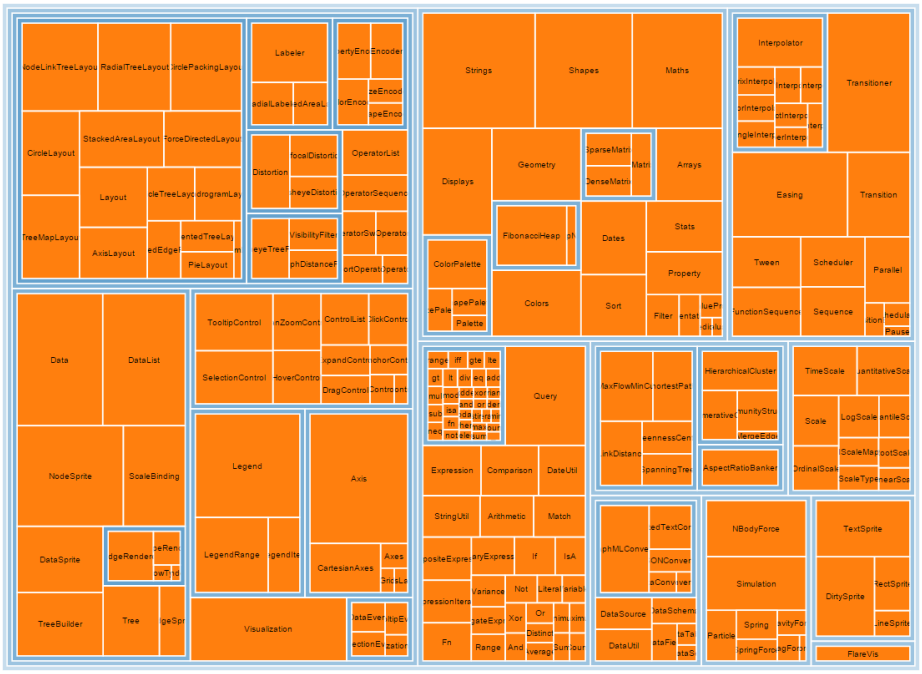


Figure 2: The treemap (enclosure diagram) from Heer et al. (2010). The treemap shows the Flare package hierarchy.

The complexity of the figure does not necessarily interfere with the goal. As described by Heer et al. (2010), the treemap is used to represent a hierarchy, which is clarified using containment. It is clear that the treemap in Figure 2 shows a hierarchy, however, there are two reasons why I find the treemap difficult to comprehend. First, only the names of the classes are visible (i.e., the leaf nodes). The classes are part of packages, and those packages are part of other packages, etc. However, the names of these packages are not visible; it is only clear that they are there (by means of containment). This makes it difficult to get a complete overview of the hierarchy (i.e., in what package is the 'Sort' class included?). You can hover over a square to see the name of the package (or class), but some precision is required to do so.

Second, since the rectangles are densely packed, it is sometimes difficult to differentiate between packages (even though padding with different saturation is used). This also makes it difficult to get a complete overview of the hierarchy (i.e., it requires considerable cognitive effort to find out the number of packages).

5. Figure 1A in Heer et al. (2010) shows the percentage change of selected stock prices if purchased in January 2005 (up to March 2010). If you open

the graph in a browser, you can change the purchase date (per month) and see the percentage change from that point, for example, you can see the percentage change of selected stock prices if purchased in October 2007. This allows you, for example, to determine what would have been the best time to buy stocks (i.e., to discover a trend).

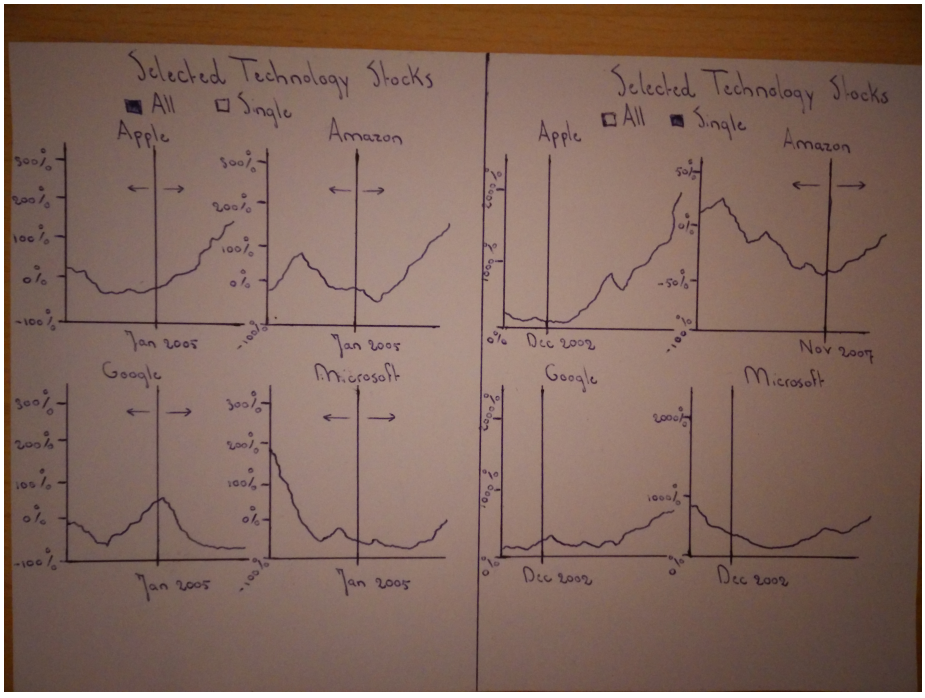


Figure 3: A redesign (sketch) of the contents of Figure 1A in Heer et al. (2010) using the *small multiples* approach.

Figure 3 shows a redesign (sketch) of the contents of Figure 1A using the *small multiples* approach. Every technology stock is plotted in its own chart. You can hover over a single chart and all the other charts will change accordingly (by selecting the option 'All', the same way in which all the technology stocks change if you hover over the graph in Figure 1A), or you can hover over a single chart and only change the date for that particular technology stock (by selecting the option 'Single'). This design has two advantages. First, there is no overlap between different technology stocks (since every technology stock is plotted in its own chart), and this allows you to more accurately see overall trends. Second, you can change the date for a single technology stock, and this allows you to more accurately see individual trends.

# References

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