Reading 2

1. Find a visualization not discussed in class or used in a homework and answer the following questions pertaining to that visualization. Attach the visualization as a screenshot in your submission.
2. Consider Bertin’s characterization of visual variables (position, size, shape, value, colour, orientation, and texture). Pick 2 of Bertin’s visual variables, and discuss them in relation to your visualization.

*Jacques Bertin described visual variables as being basic building blocks of cartography or data graphics. Carpendale discussed these variables in terms of computational information visualisation. Here I’ll focus on the latter.*

*The visualisation I chose for this task only conveys information about the location of the buildings and the year in which they were built. The position, size and shape of the depicted buildings are entirely dependent on the location of the actual building within the city itself. Adjusting this would not make sense as they have a fixed form, unlike perhaps the markers that Bertin describes. It is therefore not surprising that there is just one striking aspect of the visualisation: the use of colour.*

*Bertin’s original description of the use of this visual variable was simple: changes in hue at a given value. As can be seen in the visualisation, the given values are provided to the user in the legend. It has an associative effect as objects marked with the same colour are mentally grouped together, despite the difference in locations. The differences in hue are big enough to easily distinguish between the different building periods. However, value-wise there seems to be some discrepancies. The sudden ‘jumps’ from yellow to green, to blue to purple seem further apart visually than the gaps in time actually call for, making it confusing at first sight. Especially since the first three groups (brown, orange and yellow) span a period of over a century but have a natural flow to them and the vivid green, blue and purple seem too strong and far apart for the short time period that they cover. However, it may not be the authors intention to attach value to the colours. As noted by Carpendale, changes in colour do not lend themselves to readings of greater or lesser (or time periods in this case). Therefore, it is unwise to use them for this purpose. Using a value (changes in darkness or lightness) is much more appropriate and communicative.*

1. Munzner proposed a nested model for visualization design and validation. Discuss/validate your visualization with respect to domain problem characterization and data/operation abstraction design.

*Domain problem characterisation entails the description of the task and the data in the vocabulary of the problem domain in order to relate the visualisation design to the target group. In this case the map is constructed of data involving the exact location of the buildings and their year of construction, so no major vocabulary needs here. The initial problem that initialised this visualisation might have been that the municipality of Amsterdam wanted to use the information for decisions concerning planning or maybe just for pr reasons. All I can do is speculate the reasoning behind making this visualisation. However, what is known from the website is that the designer actually made a large collection of maps that may be superimposed to easily see relations between the chosen data. The visualisation I chose specifically, provides an overview of the age of different buildings throughout the city of Amsterdam, using colours and dates. In general, for a visualisation to be user-centered is that the problems of the target audience need to be well understood by the designer. The user in this case might be anyone interested in the history of Amsterdam or involved in urban planning and therefor the designer may have wanted to keep the amount of information to a minimum.*

*According to Munzner, characterising the problem is followed by an abstraction stage: data/operation abstraction. This leads to a description of operations and data types, which in turn are the input for making visual encoding decisions. In the case of the chosen visualisation, the designer chose to group the quantitative data on which houses were built when and where into specific time periods that in turn allow quick comparisons between these groups, but not within the groups. The buildings are mapped according to their locations in the city. The map can be zoomed and panned to get to the building year of each individual building/block, allowing for a more precise use of the map. However, it is unclear where more information may be available, e.g. on the contractor or the population size at that time, or why these specific groupings are made.*

1. Based on Cleveland and McGill’s results, does your visualization embody good practices (i.e. can people accurately perform the tasks based on the encodings?)

*Cleveland and McGill describe elementary perceptual tasks that are carried out when people try to extract quantitative information from graphs. The higher the task is in their proposed hierarchy, the more accurate the judgements of the users and therefore their ability to observe patterns.*

*Elementary perceptual tasks from most to least accurate:*

1. *Position along a common scale*
2. *Positions along nonaligned scales*
3. *Length, direction, angle*
4. *Area*
5. *Volume, curvature*
6. *Shading, colour saturation*

*These elementary perceptual tasks described primarily concern graphs (e.g. use of scales, length, direction and angle) and seem to have less to do with coloured maps. However, there are still some observations that can be made.*

*As noted by Cleveland and McGill, colour hue is excluded from the list of elementary perceptual tasks as there is no “unambiguous single method of ordering from small to large and thus [it] might be regarded better for encoding categories rather than real variables”. Which is exactly how colours are used in the example visualisation that I picked out: different colours indicate different groups of buildings that were built in a certain time period. This is a good practice.*

*However some aspects of this design choice is open for interpretation. In effect the colouring indirectly suggests that the coloured area is a measure for the amount of buildings in a category. This might be argued as the surface area is not necessarily linearly related to the number of buildings in that particular area. Furthermore, the chosen colours and categories seem form visual cues as to how old a certain area on the map is, but fail to deliver (see the answer of question 2 for more details). Luckily, for those who really want to know the actual dates, hovering shows you the precise year in which something was built and the animation shows the you the development of the city over time (but only showing buildings that currently exist!).*

1. Do you agree that visualization is a functional art? Explain.

*To answer this question it is important to first consider what art is. This is of course a much debated subject and I plan to refrain from going into much detail. A description of art is: the expression or application of human creative skill and imagination. This seems to be consistent with the act of visualisation. It takes imagination to make certain design decisions and it takes skill to make these into a complete and clear visualisation.*

*The second consideration is: what makes art functional? Some people may consider only objects that serve utilitarian purposes/jobs as functional. As stated by Albert Cairo: in the case of visualisations it is the communication of data that is the primary purpose. However, can’t it also be said for paintings that they communicate history? Or better yet: of in-depth newspaper articles that they are art (as they require creative skill and imagination to write) and are functional as they communicate facts? Other people may argue that all art is functional as the objects serve a purpose of triggering emotions, deep thought, or other arguably less practical purposes.*

*What it actually comes down to is the question: does it influence the design process of making visualisations if I do or do not consider data communication the primary goal of the end product?*

*Yes it does.*

1. Ask yourself what the designer is trying to convey and think of three to four possible tasks this visualization should help you with. Does the visualization achieve any of your tasks? (To view an example, see Albert Cairo, pages 26-­28.)

*The graph presents buildings currently standing in Amsterdam, the year in which they were built and their location. It should allow comparisons across these variables; it does so by using different colours for different categories and the areas that are coloured indicate the amount of buildings in a certain time category. Another task is that the visualisation should help me organise something based on the variables and comparisons. The coloured categories, the location on the map, and the timescale do exactly that. The last task is that it should make correlations evident to me. For instance, although a straight forward correlation, you’re able to see that further away from the centre the houses tend to get younger.*

*link:* [*http://maps.amsterdam.nl/bouwjaar/?LANG=nl*](http://maps.amsterdam.nl/bouwjaar/?LANG=nl)

