Questions Related to the Visualization Lectures, Part I

Visualization - Overview
Questions:

Question: p. 23 Pair analytics: Is the support of the domain expert by the visualization expert meant here, or also the further development of the visualization system (e.g. analysis of the handling and problems during use)?
German: Pair analytics: Ist hier die Unterstützung des Domain-Experten durch einen Visualisierungsexperten gemeint, oder auch die Weiterentwicklung des Visualisierungssystems (Analyse des Umgangs und der Probleme bei der Verwendung)?

Answer: Pair analytics means that a domain expert and a vis. Expert work together directly interacting with the data. The domain expert says, what he wants to see/analyze; the vis. Expert tries to do this but may also suggest further analysis. Over time, the domain expert better understands what is feasible and the vis. Expert better understands what is needed. In research, the dialog between the two may be recorded as a kind of "Think aloud" evaluation - could be very interesting.

Goals, Quality Criteria, Principles (1)
Questions:

Question: p.18/19 Data categories: Can one say that the term "categorical" is synonymous with "nominal" or an umbrella term for nominal and ordinal data?
German: Datenkategorien: Kann man sagen der Begriff "kategorisch" ist synonym zu "nominal" oder ein Überbegriff für nominale und ordinale Daten?

Answer: Categorical data and nominal data is indeed the same.

Question: p. 20 Independent data: Are there other dimensions besides space coordinates and time for independent data? (e.g., data on a test person X, where the test person is a dimension of independent data?),
German: S. 20 Unabhängige Daten: Gibt es noch andere Dimensionen neben Raumkoordinaten und Zeit für unabhängige Daten? (z.B. Daten zu Proband X, wobei Proband eine Dimension unabhängiger Daten ist?)

Answer: Yes. Data associated to a person is another good example for independent data. The person is unique and independent and its blood pressure is dependent.

Question: p. 26 Expressiveness: How is data considered, that cannot be represented without distortion, e.g. projection of the globe on a two-dimensional map?

German: Expressiveness: Wie werden Daten, im Sinne von „Expressiveness" betrachtet, die nicht verzerrungsfrei dargestellt werden können, z.B. Projektion des Globus auf eine zweidimensionale Karte?

Answer: Very good question, indeed! It depends on what is typically analyzed. If a map of the Northern hemisphere is shown Greenland (Grönland) is typically strongly distorted; actually shown much smaller than it is. If your goal would be to compare distances in Greenland to distances in Central Europe that would be not expressive. If the analytical tasks focus more on central europe, the distortion is negligible.

Question: p. 34 Visualization Level: Where are outliers classified outside the interquartile range or does this depend on a definition?
German: S. 34 Visualization Level: Wo werden Ausreißer außerhalb des Interquartilsabstands („interquartile range") eingeordnet oder ist dies abhängig von einer Definition?

Answer: Outliers are placed at their actual value: if you have measurements with an interquartile range from 3 to 8 and you have values of 0.2 or 12.5 - you mark them at the same scale as outliers. What exactly is considered an outlier is indeed depending on a definition. Mild outliers (outside 1.5 * Interquartile range) and extreme outliers (outside 3* interquartile range) are typical definitions.

Goals, Quality Criteria, Principles (2)
Questions:

Visual Perception (1)
Questions:

Visual Perception (2)
Questions:

Question: Is pre-attentive a time dependent component from stage 1? Because if we combine other properties, it says that it's no more a pre-attentive?

Answer: Pre-attentive vision is what you perceive in less than 0.25 s.

Data Types, Data Structures and Data Formats in Visualization (1)
Questions:

Question: By transforming a structured grid into unstructured shouldn't there be any information loss?

Answer: There is always a loss of information involved due to the need to interpolate (which involves assumptions).

Question: Since the regular grid is a little less regular(dx<dy), can Cartesian grids be always categorized as Regular grid?
Answer: Yes the Cartesian grid is regular.

Data Types, Data Structures and Data Formats in Visualization (2)
Questions:

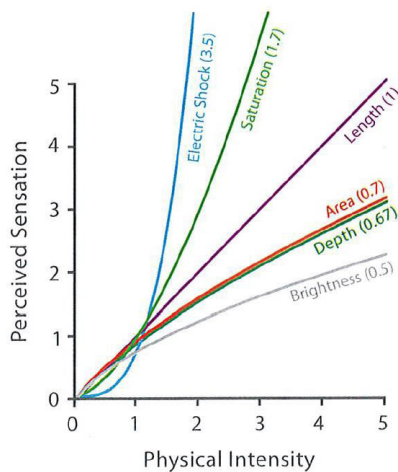## Basic Visualization Techniques (1)
Questions:
Question:

Perception of lengths logarithmically (differences between longer structures should be larger to be recognizable).

Example: Lines with length from 0.5 – 1.4

On this slide it is mentioned that length is perceived logarithmically. However on the next slide it appears that length is perceived linearly:

Perceived difference of a sensation may be lower (brightness, area) or higher (saturation, electric shock) than the differences in the underlying phenomena (From: Munzner, 2014)

Question: How is length actually perceived? Or do logarithmic and linear length perception do refer to different scenarios?

Answer: Length differences are perceived logarithmically (I read this in Colin Ware's book and he is considered the authority for perception and visualization). We perceive how many % a line differs from another one; not the actual line difference. What the diagramm from

Tamara Munzner's book probably refers to is the assessment of one line (not the comparison to others).

I checked once more: And like always perception is complex. Line length perception also strongly depends on orientation, i.e. in an "L"-shape the horizontal and vertical line are assessed differently even if they have the same size: (Source: https://www.researchgate.net/publication/24436948_Length_perception_of_horizontal_and_vertical_bisected_lines). Moreover, stylization, e.g. arrows affect perceived length (Source: https://en.wikipedia.org/wiki/Müller-Lyer_illusion). The takehome message is: Users will correctly perceive if one line is much larger/smaller than another one. They may fail to notice small differences and they can hardly quantify a difference they notice - add a number to the line, e.g. as tooltip to compensate for these biases.

Basic Visualization Techniques (2)
Questions:

Question: This question is from the assignment- what happens to isolines when the isovalues changes ?

Question: Can you recommend any good tutorial for the OpenGL program that is used in the exercise tasks?
Answer