Assignment 2

Specific instructions for Assignment 2:

› The deadline is on 29 March 2022 at 23:59, Finnish time.

› The maximum number of points from this assignment is 15.

› This assignment has three exercises that must all be completed to obtain full points.

General instructions:

› The general grading criteria are available on the MyCourses web page.

› Students should complete the assignment individually, but discussions with others are encouraged. but discussions with others are encouraged. However, your final solution must be your own. Please read the *Aalto University Code of Academic Integrity and Handling Violations Thereof* for further details.

› The language of the reports should be English.

› Policy for late submissions: The score is reduced by three points per day after the deadline. (However, you cannot get negative points for an assignment.)

› If you have a pressing reason that causes you to miss the deadline, you can send an email to the lecturers (cs-e4840@aalto.fi) to request an extension without the late submission penalty. The reason must be such that it would entitle you to be absent from work (e.g., illness) and verifiable (e.g., doctor's certificate). The extension must be requested before the deadline.

› The submitted report should be in a single Portable Document Format (PDF) file. If you are using software such as Word, then export the final document as PDF. If you have several PDFs, then please merge them into one before submitting the assignment.

› Do not attach any source code.

› State your name and your student ID clearly in the report.

› Number your answers by the number of the questions, and keep the order.

Exercise 1 (10 points)

Take a look at the EU Open Data Portal database at https://data.europa.eu/euodp/en/data/group. From there, download one of the open data sets and visualize some interesting phenomena in the data. Write a short (2–3 pages) report that describes your approach, obtained results, and the methods you used. Explore at least three of the topics discussed in the course (see below) and explain in your report how you have used them.

The purpose is not to do an analysis that covers the data from all possible angles. Focus on one or two aspects and make a clear visualisation of them. Try to relate your work to the topics discussed in the course, i.e., Tufte's principles, pre-attentive features, Gestalt laws, etc., when preparing the visualisations. Also, make sure your images convey at least some of their information when printed on a black and white printer.

The use of available visualisation tools—e.g., R, Python (with libraries like Matplotlib), Matlab, Illustrator, (Open)Office, etc.—is encouraged. However, implementing your own scripts and small programs for processing the data will be necessary.

Exercise 2 (2 points)

Discuss the simultaneous brightness and contrast eect shown in Fig. 1 and explain it using the Difference of Gaussians model. Your answer does not have to contain any mathematical calculations. Instead, try to give a clear explanation why the rectangles appear to be of a different gray tone while they in fact are all of the same "color." What are the implications of this phenomena for the design of color scales?

Exercise 3 (1 point)

Fig. 2 is a map of Europe. If you were to show statistical data for comparing the countries, which scale (Greys, Spectral or YlGnBu) would you use? Justify your answer with at least two reasons based on the functioning of the human eye.

Exercise 4 (2 points)

Design a glyph that enables the pre-attentive perception of at least three variables (discrete or continuous). How many variables can you represent with your glyph, and what can you say about how the different variables are perceived?
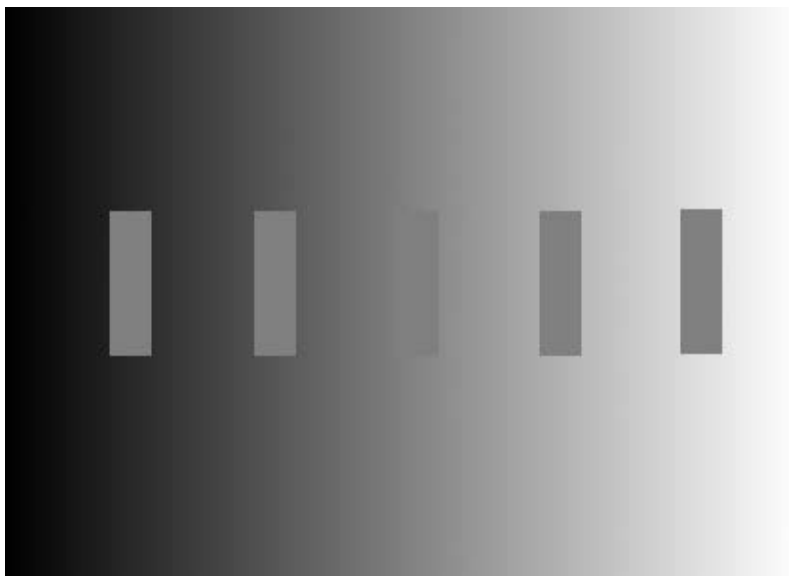

Figure 1. Simultaneous brightness and contrast effect.
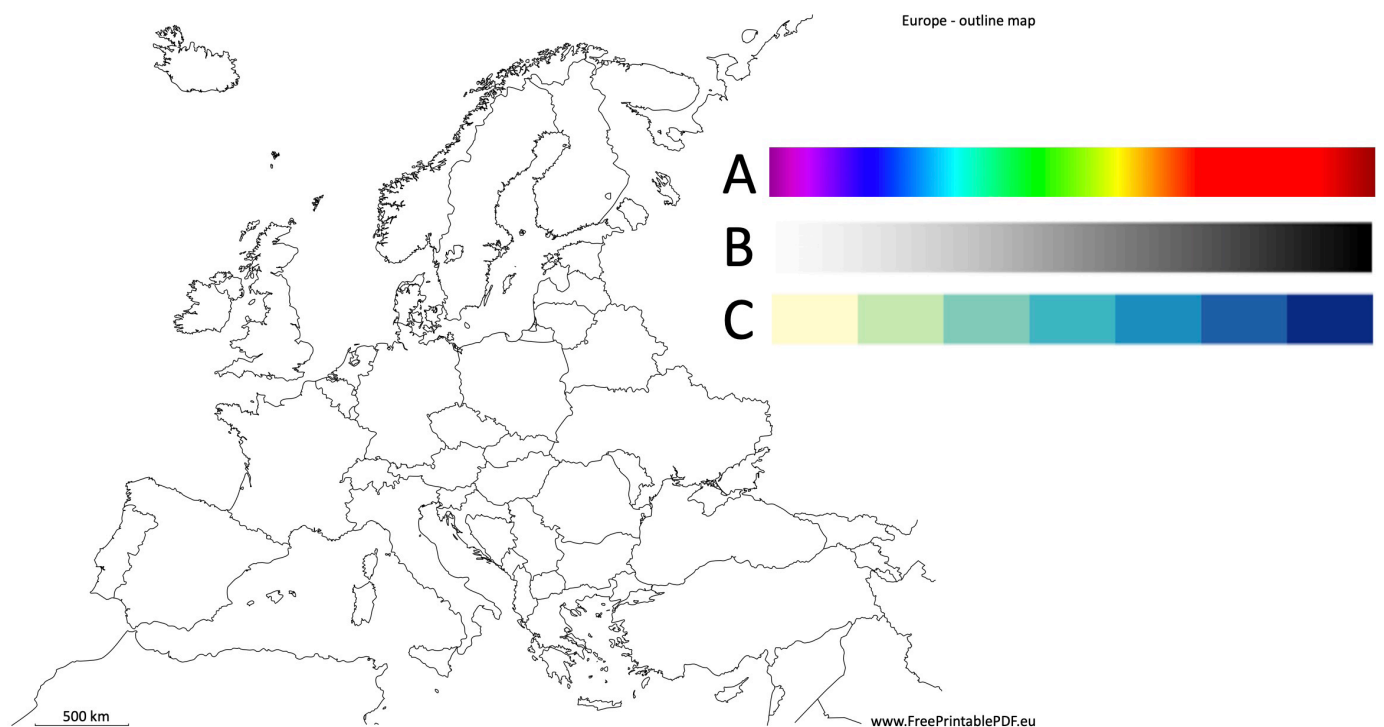

Figure 2. Three colour scales (A: Spectral, B: Greys, C: YlGnBu) and map of Europe with country borders.