# CS-E4840 Information Visualization

## Assignment 2

Specific instructions for Assignment 2:

- Deadline is on 25 March 2018 at 23:55, local time.

- Maximum number of points from this assignment is 16.

- Assignment 2 has five exercises that must all be completed to obtain full points.

General instructions:

- The assignment should be completed by one person and 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 assignments is English.

- The deadline has a late submission policy: each day being late automatically reduces 3 points of the assignment. However, you cannot get negative points for each assignment.

- If you have a pressing and verifiable (e.g., by a doctor's certificate) reason that causes you to miss the deadline, you can send an email to the lecturers to request an extension (without penalty). The extension must be requested before the deadline. Otherwise, the extension will be refused.

- 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 clearly your name and your student id in the report.

- Number your answers to correspond the questions in each assignment, and do it in order corresponding to the questions.

**Exercise 1 (1 point)**

We may ask some volunteer students to briefly present their solutions to *Exercise 3 of Assignment 1* (Bitcoin vs. SP & 500) or *Exercise 2 of Assignment 2* (Helsinki Region Infoshare, see below) to the class on 29 March 2018 at 10–12 o'clock. The duration of the presentation should be 1–3 minutes. Your presentation can contain a couple of slides or other material that—if requested—you should send us beforehand at noon 28 March, at latest.

Please answer "yes" to this exercise, if you are able and willing to present your results of the assignments to the class. I.e., you do not have to prepare any material yet, the answer to this exercise at this time should be either "yes" or "no". If you answer "yes" here, you will get a point from this exercise. We may contact you about your presentation on 27 March at latest, and you will receive the point even if we would not ask you to present your work (it is unfortunately not possible for all to present their work).

**Exercise 2 (10 points)**

Take a look at the Helsinki Region Infoshare at `http://www.hri.fi/en/`. 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.

The purpose is not to do an analysis that covers the data from all possible angles. Focus on one or two aspects and try to 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 laser printer.

The use of available visualisation tools (e.g., R, Matlab, Illustrator, (Open)Office, etc.) is encouraged. However, implementing your own scripts and small programs for processing the data will be necessary.
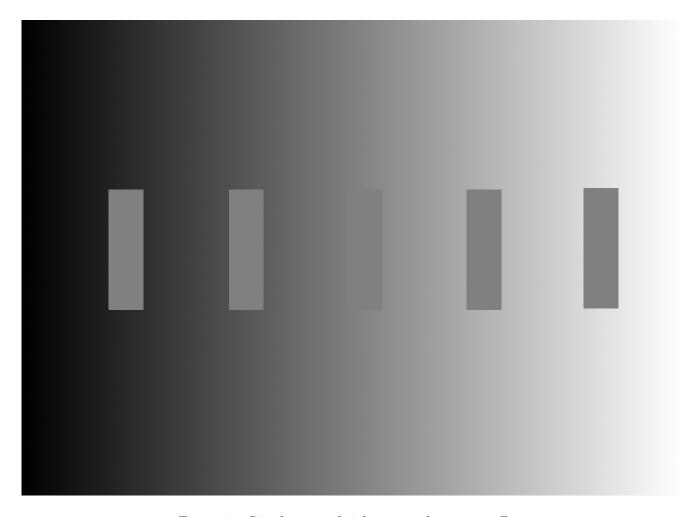
**Exercise 3 (2 points)**

Discuss the *simultaneous brightness and contrast* effect 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 "colour". What are the implications of this phenomena for the design of colour scales?

**Exercise 4 (1 point)**

Digital cameras have a white-balance setting. Why is this needed? Why do pictures taken outside using an indoor setting appear blue, and why do pictures taken indoors using an outdoor setting appear red?

**Exercise 5 (2 points)**

Design a glyph that enables the pre-attentive perception of at least 3–4 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.