T-61.5010 Information visualization

Exercise 2. Mon Feb. 6, 2006, 10-12 T2

- Basic visual percption
- Color perception and visualization

1. Aliasing and antialiasing. Show an example of aliasing effect and how it can be detrimental to visualizations. How can this be corrected with antialiasing? List and discuss the properties of a perfect 2D computer display (flat display that could not be made to look any better by adding more resolution or refresh frequency or color resolution etc.). Hint: Ware p. 62 onwards and chapter 4.

2. Create an image that shows a strong color contrast effect.
   (The same color looks different when it is surrounded by different colors).

3. Plot the gamut of a color photo in CIELab space. You can convert RGB values to XYZ with the following equation.

$$\begin{bmatrix} X \\ Y \\ Z \end{bmatrix} = \begin{bmatrix} 0.431 & 0.342 & 0.178 \\ 0.222 & 0.707 & 0.071 \\ 0.020 & 0.130 & 0.939 \end{bmatrix} \begin{bmatrix} R \\ G \\ B \end{bmatrix} \tag{1}$$

   The white point to be used in the CIELab formulas is D65:
   $x_n = 0.312713$, $y_n = 0.329016$ and $Y_n = 1.0$.

4. Design a glyph that enables the preattentive perception of as many variables (discrete or continuous) as possible. How many variables can you represent with the glyph and how accurate can the values be perceived? What should be taken into account when designing the glyph?