Exercises for Image Processing 1 - WiSe 2012/13

Exercise 2

1. Under what circumstances is it not possible to see the stairs of a staircase (see picture) in a camera image? What photometric effects are relevant for that. (The left and right border of the staircase can be assumed to be outside of the image)

2. Achromatopsy is a kind of color blindness, where people can only recognize brightness but no colors. In this exercise you have to generate a test image for achromatopsy. Therefore generate an image with some characters or numbers which differ from the background only in hue but not in brightness. This has to be done in two steps:
a) Generation of a non-calibrated color image B1. Measure the brightness values of the different image components.
b) Given B1, generate a calibrated image B2 where all components have the same brightness.

As solution please send:
- B1 and the measured non-calibrated brightness values
- B2 as color image and as gray-value image
- Commented Python-Code

3. A Grayscale-TV-Camera generates images with 576 rows with 512 columns each with the typical aspect ratio of 3:4. The rows are given in interlaced mode, i.e. at first rows 1, 3, 5, ... , 575, then rows 2, 4, 6, ... , 576. In a traffic scene a car (5 m long) moves with 50km/h parallel to the image plane. The projected car has a length of 50 pixels.

How many pixels is the difference between the left border of the car in row 200 compared to line 201?