Brightness and contrast

In this practise, we will produce the effect of *increasing/decreasing the brighness* by summing/substracting a constant to all the (grayscale) pixels of the image.

To create the effect of *increasing/decreasing the contrast*, consider the minimum (m) and the maximum (M) colors m present in the image. The *color range* of the image is $[m, M]$. We want to *map* this range to a larger/smaller ranger. For example, the *maximum contrast* that we can achieve in this way would be by mapping $[m, M]$ to $[0, 255]$. Let $[\mathbf{new\_m}, \mathbf{new\_M}]$ be the new range to which we want to map $[m, M]$. The color $c \in [m, M]$ will be mapped as follows:

$$c \mapsto \mathbf{new\_m} + \frac{c - m}{M - m} \cdot (\mathbf{new\_M} - \mathbf{new\_m})$$

Exercises

1. Implement a function that allows to change the brightness in an image. Ideally, you present a *slider* to the user, and it is possible to variate the brightness by moving it.

2. Same as excercise 1, but with the contrast instead of the brightness.

3. (optional, perhaps part of the PC1) Study and understand how it works the tone mapping, to create HDR images.