Exercise 1 (Histogram Equalization - Framework: Tonemapping, 8 Credits)

From the lecture you know the Histogram Equalization, which the cumulative histogram is used as transfer function $T(x)$. This is applied to the luminance values of the image pixels. In other words: if the color values are given in the HSV space, then the component $V$ is transformed.

In this task, you should also apply $T(x)$ to other color components and apply in other colored rooms.

Extend the framework so that the Histogram Equalization is done for all components of the HSV and RGB space. Therefore you need to implement the following methods: `PictureArea::computeHistogram` and `PictureArea::equalizeImage`.

Use conditions like: `m_colorSpace == ColorSpace::HSV` to decide the different cases/images. In Figure 1 you can see, how it should look like.

Note: Routines for the conversion between RGB and HSV color space lie to the framework. They might not be necessary if you use Qt functions to get/write HSV values. 

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1 https://doc.qt.io/qt-5/qcolor.html
Figure 1: Results of doing histogram equalization.