Computer Vision Course
Homework and Lab 01

Problem 1 (Gray level modification): Create an function GrayLevelModification[1], that modifies the values of an 8-bit gray-scale input image according to the function

$$s = 16 \times sqrt(r) \tag{1}$$

where r is the input intensity and s is the processed intensity. the factor of 16 guarantees that the result will be in the range 0 to 255. Use this function to modify any currently open 8-bit gray-scale image.

Problem2 (Thresholding): Create a function called **MedianThreshold** that sets the threshold value to the median of the histogram. Use this function to threshold an input image 8-bit grayscale image.

Definition: The median m is the value that satisfies $P(x < m) = P(x > m)$, in other words, half of the intensity values are less and half of the values are greater than m.

Problem 3 (Power Transform): Create an function PowerTransform which performs a power law transformation on an image. This function should an 8-bit grayscale image and the gamma value (as a variable you can modify in your program) to transform the image. Remember that power law transformations are achieved using the simple formula:

$$s = c \times r^{\gamma} \tag{2}$$

where s is the processed pixel value, r is the original pixel value, γ is the parameter controlling the power law transformation and c is a constant usually set to 1. Try this new function out on the following images (*spine.jpg* and *runway.jpg*), experimenting with different values for γ. In the comments of your function, state what values of γ worked best for each *spine.jpg* and for *runway.jpg*

[1]for example in Matlab/Octave this will be **GrayLevelModification.m**