Lab Exercises: LAB 2
(pixel value re-scaling/shifting)

Exercise 1.
Image Pixel Value Re-Scaling: Re-scaling all the pixel values in an image and displaying the image

To re-scale all the pixel values in an image stored in a matrix. The re-scaling factors should be floating-point numbers, which can be from 0 to 2, e.g. 0.5, 0.7, 1.3 and 2.
The pixel values of the images we provided are of one byte per pixel and unsigned integers and from 0 to 255. After rescaling, all the pixel values should be rounded to integers if they are not.
For the results, if a value is less than 0, just set it 0; if a value is greater than 255, just set it 255.

Exercise 2.
Image Pixel Value Shifting: Shifting all the pixel values in an image and displaying the image

To shift all the pixel values in an image stored in a matrix. The shifting value should be an integer, negative or positive.
For the results, if a value is less than 0, just set it 0; if a value is greater than 255, just set it 255.

Exercise 3.
Image Pixel Value Shifting and Re-Scaling: Add a random value to each pixel value, and then shift and re-scale all the pixel values in the image and display the image

Generate a random integer for each pixel and add it to the pixel value, or generate a random integer matrix of the same size and add it to the images stored in a matrix. Then shift and rescale all the pixel values in the image such that all the pixel values are between 0 and 255.
To shift and rescale the pixel values of an image, you have to find the minimum and the maximum pixel values in the new image.

Note: The above mentioned Shifting and Re-Scaling are for intensities, not for the spatial dimensions/sizes. The factors/parameters can be fixed values, but you should know what the results would be if they are changed.

Questions: What happened if image pixel values are rescaled by 2, rounded to integers, then rescaled by 1/2, and finally rounded to integers again? What happened if image pixel values are rescaled by 1/2, rounded to integers, then rescaled by 2, and finally rounded to integers again?