Computer Vision Course, 2022
Exercise

Problem 1:Image filtering, enhancement, and edge detection.):

- Study MATLAB functions **imread, brighten, contrast, histeq, imcontrast and imadjust**. Write a script hw2q1a.m that applies each one of these functions to the MATLAB image **peppers.png**. Plot the original and the transformed images and comment on what each function does.
- Study the functions **imnoise, medfilt2, conv2, filter2, fspecial, imfilter, and edge**. Write a script hw2q2b.m that does the following. Load image **peppers.png**. Convert it from RGB to grayscale using the function rgb2gray. Add salt and pepper noise to the image. Filter the resulting image using a 3x3 mean filter, a 3x3 median filter, and Gaussian filter with = 1.5 pixels. Repeat, but this time add Gaussian noise with $\sigma = 1$ in the [0, 255] range ($\sigma = 1/256$ in the [0, 1] range) instead of salt and pepper noise. Plot each one of the images and comment on what works best.
- Write a script hw2q1c.m that does the following. Load image **peppers.png**. Convert it from RGB to grayscale using the function rgb2gray. Find the edges in the image using the MATLAB function edge. Use the following methods: **Sobel, Prewitt, Roberts, Laplacian of Gaussian and Canny**. Compare your results

Problem2 (Color-based face detection): One way to detect faces in color images is to search for pixels that have a skin-like color. The figure below shows an example where clusters t 4, t 5 and t 6 of the normalized RGB color space represent primary and secondary face colors. In this exercise, you will implement this simple color-based faced detection algorithm.

Note: 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.