Objective
The objective of this lab work is to understand image arithmetic, image enhancement, histogram equalization and color image enhancement.

Due date to submit project work with report: **12.09.2017.** *The report will contain explanations of the problem, the way it has been solved and discussion about the results. Also you have to show sample input image and outputs. Add also the Matlab code in the report. Each exercise contains equal weight.*

Exercise-1
Objective*: to understand Image arithmetic.*
Problem statement: It is often to see in newspapers a children task which is to find the differences between two apparently equal black and white cartoons. Implement a simple code to find the differences between them. Use an arbitrary cartoon. Could you show another example in which image arithmetic will be useful?

Exercise-2
Objective*: Image enhancement using intensity transformations:*
Problem statement: The focus of this exercise is to experiment with intensity transformations to enhance an image. Download the image *spine.jpg* and enhance it using:
i- the log transformation. We would use a transformation of this type to expand the values of dark pixels in an image while compressing the higher level values.
ii- a power-law transformation.

In (i) the only free parameter is c, but in (ii) there are two parameters, c and γ for which values have to be selected. As in most enhancement tasks, experimentation is a must. The objective of this exercise is to obtain the best visual enhancement possible with the methods in (i) and (ii). Once (according to your judgement) you have the best visual result for each transformation, explain the reasons for the major differences between them.

Exercise-3
Objective*: Histogram equalization:*
Problem statement: i- Run MATLAB. Open the documentation help and look for Histogram Equalization. Read also about Contrast-Limited Adaptive Histogram Equalization.
ii- Write the code for a histogram equalization of the image spine.jpg. Does this improve the look of the image? Explain
iii- Try to enhance the image with the Contrast-Limited Histogram Equalization. Does the image quality improve? Estimate the number of 'tiles' for a subjective improvement.

Exercise-4
Objective*: Color Image Enhancement by Histogram Processing:*
Problem statement: i- Download the image rocks.jpg. Convert the image to RGB. Histogram equalize the R, G, and B images separately using the histogram equalization program and convert the image back to jpg format.
ii- Form an average histogram from the three histograms in (i) and use it as the basis to obtain a single histogram equalization intensity transformation function. Apply this function to the R, G, and B components individually, and convert the results to jpg. Compare and explain the differences in the jpg images in (i) and (ii).