Digital Image Processing

Lab Assignment – 1

1) Basics of image processing in python. Libraries used in image processing like: Numpy, Opencv, Matplotlib, Scikit-learn, Scipy, Pil and pillow.
2) Perform the following tasks:
   (i) Read an image
   (ii) Display an image
   (iii) Write an image
3) Convert RGB image to gray scale
4) Perform the following tasks:
   (i) Read a video and convert to frames.
   (ii) Convert frames to video.
   (iii) Change the frame rate of a video and write that file.
5) Write a function that computes the histogram of the given. Do not use specific Python functions for histogram computation (like hist).
6) Write a function that performs histogram equalization (see lecture notes or course book). Use your own function, but do not use functions like **cv2.equalizeHist();**
7) Plot NEGATIVE of the given image (subtract each pixel's value from 255, and store the result in the same pixel).
8) Plot LOG TRANSFORMATION of the given image (use S=c*log (1+r) to each pixel element where c is a positive constant, r is original pixel value and s is the resultant pixel value).
9) Plot POWER LAW TRANSFORMATION of the given image. Compare the original image with image generated by power transformation and find out parameters which generate the best image.
10) Perform contrast stretching on the given and display original image as well as resultant image in the same frame.
11) Apply bit plane slicing and then display the original image and the bit-planes formed by the extracted bits.

Note: Use the given image (convert the color image into grayscale image) as input image for all the problems.