1. Write a function which takes an input image and automatically do contrast stretching, histogram equalization and gamma correction (if needed) of the image. The output of the function should be the processed image. ***Name the file as autoHist***

2. Using an appropriate image processing (only point intensity operations covered in Lectures), write a universal function which could do the following (a and b). Please note the input to the function will be a video which has a static background and a moving foreground and the output will be a video and an image as given below:
    a. A single output image which captures mostly the background without the moving part.
    b. A single video output which shows the moving part in each of the frames with reduced background effect.
    c. Illustrate the working of the developed code by doing any experiment. For example, using your smartphone camera record a scene which has a static part and a moving part (e.g. rotation of a fan).
    d. ***Name the file as motionSegmentation***

3. Read the image 'grain.png' available in the directory. It can be seen that the image is dark towards left and white towards right. Using image addition, subtraction and histogram-based point operations, try to obtain a better image. Please submit the best processed image along with the commented code as a function. The input to the function will be an image and the output will be the processed image. ***Name the file as grain***

4. Write a MATLAB/Python function for computing an affine transform of an image. The input to your function is: (i) image, (ii) 3D spatial transformation matrix T of the form $\begin{bmatrix} a & b & 0 & t_x \\ c & d & 0 & t_y \\ 0 & 0 & 1 & 0 \end{bmatrix}$, and (iii) interpolation method (nearest neighbourhood, linear and bi-linear) and output will be the transformed image. Test you function as follows:
    a. Spatial transformation of the input image using the matrix T and the bilinear interpolation, where T is specified as T = [0.3 0.1 0; 0.5 1.9 0; 0 0 1].
    b. Observe the difference between the input image and the image that has been obtained by applying the inverse spatial transform T?
    c. ***Name the file as affineTransform***

5. Using your smartphone camera record a static scene while shaking the camera mildly. Using affine transformation algorithm code developed in (4), remove the shaking effect of the camera. Also estimate the approximate motion induced by the shaking. (Hints: Identify a set of points (name it as key points) on the first frame of the image. Try to align the "key points" identified in the first frame for all the frames in the image using affine transformation). The input to the function will be the recorded video and the outputs will be a video without camera motion and a signal showing the estimation (approx.) of motion. ***Name the file as motionEstimation***

Please follow the below guidelines while submitting the assignment:

- Copy all your files (strictly follow the code names as mentioned above) into a single folder and name the folder with your Roll Number. Zip the folder and upload the same.
- Codes may be evaluated using an automation tool and counter checked for correctness. Hence it is important to follow the conventions correctly.