

Question 1: For image_1, perform the following operations:

- (a) Rotation (30, 45, and 90 degrees)
- (b) Scaling operation (scale factor=0.5 and 2) on the image. For scale factor=2, there should be some blank spaces between the image. Think of a way to fill them up.

Question 2: For image_2 (Let the image be L), perform the following operations:

- (a) $L' = L + (L - L\{x-1, y-1\})$, where, $L\{x-1, y-1\}$ denotes translation by 1 pixel. What is the implication of this operation?
- (b) $L' = L - \text{mean}(L)$. Under what scenario is this operation useful?
- (c) Perform an operation to the image L , such that the new image looks like the mirror image of L .
- (d) How many bits are required to store the colored image? Assume that there are no headers or extra information to be stored, and only pixel information needs to be stored.
- (e) Convert the color image to grayscale.
- (f) Complement the grayscaled image.
- (g) For the grayscale image, show a histogram of the count of pixel values (i.e, what is the occurrence of each pixel value $[0, 255]$).
- (h) Binarize the image.

Submission Policy and Requirements

1. This is a warm-up assignment. While there is no submission or marks, we recommend you to implement the techniques from scratch and refrain from using in-built function (especially if you're new to IA).
2. Recommended programming languages: python+opencv.