

Lab Exercises: LAB 3

(Arithmetic and Boolean operations)

Exercise 1.

Arithmetic operations: Addition, Subtraction, Multiplication and Division of two images

Read two images into 2 matrices and apply arithmetic operations to them for a new image, then shift and re-scale all the pixel values in the result image and display the new image.

Exercise 2.

Bitwise Boolean NOT operation: Bitwise NOT of one image.

Read an images into a matrix and apply bitwise NOT Boolean operation to all the pixel values of the image for a new image, then display the new image.

Exercise 3.

Bitwise Boolean operations: AND, OR and XOR of two images.

Read two images into 2 matrices and apply bitwise Boolean operations, AND, OR and XOR, to the images for a new image, then display the new image.

Exercise 4.

ROI-based operations: Use a Black-and-White image as the Alpha channel for image processing. ROI stands for Region of Interest.

Read or generate a Black-and-White image and use it as the Alpha channel for ROI-based image processing. The image processing method is only applied to the ROI and the non-ROI regions should be kept the same.

If a Boolean AND is used, Black can be 0 for the pixel value, and White can be 255. If an arithmetic multiplication is used, Black can be 0 for the pixel value, and White can be 1.

If 0 is for non-ROI pixels, 255 or 1 can be used for ROI, and you can use image NOT or image negative, respectively, to convert between ROI and non-ROI.

*** It is also acceptable if you use a window (rectangular or not) on the image for ROI-based image processing, since this is also a popular way we work with ROI.**

Questions: What is the difference between image negative (as in the template code) and image bit-wise NOT?