## **IIVP Practice Experiments**

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*Instructions:* Use MATLAB and/or Python and/or Octave tools for the following questions. Do not use the inbuilt functions unless mentioned in the question. If input image not give or specified then you can use

**Topics Covered in the Lecture Session:** Arithmetic operations, image negative, Thresholding of an Image, contrast stretching, bit plan slicing, zooming by interpolation and replication and resizing by the nearest neighbor concept.

Aim of this Lab Session: Arithmetic operations, image negative, Thresholding of an Image.

Lenna image (popular picture use for image processing) as a sample image.

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Experiment No.1	Related image operations		
Aim	Understand basic operation on images with programming		
Tools and Library	You can use PIL (Python Image Library) for split and ndimage.shift for shifting		
Question	(i) Load the given image and split it into three grayscale images that represent		
	the intensities.		
	(ii) Load the given image and perform the shifting operation by considering		
	all RGB channel or axis one by one.		
Tools and Library	You can use <i>PIL</i> (Python Image Library) for split and <i>ndimage.shift</i> for shifting		
Hint:	If this function was applied to the first axis of the data, then it would shift it vertically.		
	You can use the argument (0,0,1) to shift only the third channel		
Input and possible Output Images	Input image of Exp. 1  Possible Output image of shifting operation		
Experiment No. 2	Negation of an image		
Aim	Understand image negative with programing.		
Tools and Library	MATLAB, Python		
Theory/Hint	The negative of an image with gray levels in the range $[0, L-1]$ is obtained by using the negative transformation given by the expression $S=L-1-r$ (1)  This is according to the transformation $S=T$ ( $r$ ) In above transformation (1), the intensity of the output image decreases as the intensity of the input increases. The type of processing is particularly suited for enhancing white or gray detail embedded in dark regions of an image especially when black areas are dominants in site.		

2. Read maximum gray level pixel of i/p image 3. Replace input image by (maximum – i/p) = o/p 4. Display o/p image  Load given grayscale image and writ a code to perform Negation operation over the image.  Input and possible output image  Experiment No. 3 Thresholding of an Image  Understating thresholding techniques over the image. More specifically we wil try to how Thresholding separate out the object from the background.  Tools and Library MATLAB, Python  Theory/Hint Thresholding is a simple process to separate the interested object from the background. It gives the binary image. The formula for achieving thresholding is as follows s = 0 if r <= t s = L-1 if r > t  Algorithmic Steps:  1. Read an input image 2. Enter thresholding value t 3. If image pixel is less than t replace it by zero. 4. If image pixel is less than t replace it by 255 5. Display input image 6. Display threshold image 7. Write input image 8. Write threshold image	1	D = 1 1/2 1		
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