LAB ASSIGNMENTS

Assignment Set I
Date of Posting the Assignment : 30/9/2014
Date of Submission : 23/10/2014

Submission may be done through email separately for each class

Q1. Create a checkerboard pattern of size 64x64. Each square of the checker board pattern is a small 8x8 square. Display the image?

Q2. Create an image of size 32x32 where $I(i,j)=\left|\sin\left(\sqrt{i^2+j^2}\right)\right|$. Display the image?

Q3. Quantize the intensity levels in the above image by dividing the range [0,1] into four equal intervals. Quantization happens according to the following table.

Image gray level	Output graylevel
$0 \le I < 0.25$	0
$0.25 \le I < 0.5$	0.25
$0.5 \le I < 0.75$	0.5
$0.75 \le I < 1$	0.75
1	1

Q4. Read and display the image provided along with this.

Q5. Increase the brightness of the image in Q4. by increasing the value of each pixel by adding (1/4 * max_intensity). max_intensity is depends on the number of bits alloted for representing the image. For an 8 bit the max_intensity is 255). If on increasing the pixel value it crosses the max_intensity then round it to max_intensity value.

Q6. Perform

i. 4-level quantization of the intensities of the image in Q4.(0-max_intensity interval divided into 4 equal intervals and follow the scheme in Q3).
ii. 8-level quantization of the intensities of the image Q4.(0-max_intensity interval divided into 8 equal intervals and follow the scheme in Q3).

Observe the difference in image quality.

Q7. Find the mean pixel intensity of the image in Q4. Write a program that converts the image to a binary image by using the following transformation.

$$G(i,j)=\begin{cases}1 & \text{if } I(i,j)>mean\\ 0 & \text{if } I(i,j)\le mean\end{cases}$$

(***This is also a way of quantizing the image but the range of pixel intensities is not divided into equal halves.This operation is called thresholding***)

Q8. Perform the following the intensity transformations on the image in Q4.

i. $G(i,j)=\log(1+(e^{\sigma}-1)I(i,j))$ Try this transformation for various values of sigma ranging from 0 to 2 and note down your observations. Give a plausible explanation for the observations.

ii. $G(i,j)=e^{\sigma I(i,j)}$ Try this transformation for various values of sigma ranging from 0 to 2 and note down your observations. Give a plausible explanation for the observations.

iii. $G(i,j)=I(i,j)^{\gamma}$ Try this transformation for various gamma values ranging from 0 to 3. Note down the observations.