Course: Digital Signal Analysis and Applications (IEC239)
Assignment 2 (Deadline: March. 31, 2015)

Note: Submit the report in .pdf format and all the programs will be evaluated by TA's

Q1. Read the Images (uploaded in course portal). Perform the convolution operation on an image once, twice and thrice with matrix :

$$h[n1,n2] = 1/16 * \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \end{bmatrix}$$

Display the images and list the observations.

Q2. Generate a sinusoid signal x[n] = cos(ωnΔT), with parameters ω=200π, n = 1 to 1000, and ΔT=0.001 s. Perform auto-correlation on x[n] for every 10 ms non-overlapping frame of x[n]. Give the time instant (in seconds) where the maximum value occurs between 3 ms to 12 ms in auto-correlation of each frame and also plot as a function of frame number. List the observations.

Q3. **Image Steganography (using Discrete cosine transform):**

Steganography is the art of hiding the fact that communication is taking place, by hiding information in other information. Many different carrier file formats can be used, but digital images are the most popular because of their frequency on the Internet. For hiding secret information in images, there exists a large variety of steganographic techniques some are more complex than others and all of them have respective strong and weak points.

You will be given 2 images (uploaded on course portal). The task is to use DCT to hide the first image in the second image.