INTRODUCTION TO IMAGE PROCESSING 2014-2015–FALL
DUE: 12 December 2014

HOMEWORK 2

Submit ONE SINGLE PDF FILE on DYS. Any material that is not in your PDF document will NOT be graded.
Label all axis for plots and bars. Put a descriptive title on plots, bars and images.
Include all the MATLAB code in your homework (in the PDF file).
Display the original and processed images in your homework.
Put informative captions under the images.
Each homework should be done individually. You will suffer a significant GRADE REDUCTION if you submit very similar material.

PART 1 – GAUSSIAN SMOOTHING

In this part, you will implement a Gaussian smoothing filter. The Gaussian's standard deviation (sigma) and the filter size should be adjustable.
Your program should first compute the coefficients for a square Gaussian mask (N xN) using the following equation: (u,v) = (0,0) should correspond to the center of the mask.

$$g(u,v) = \frac{1}{2\pi\sigma^2} e^{-\frac{u^2+v^2}{2\sigma^2}}$$

Consider the following image ("sc3.tiff"). You are going to reduce the noise in this image with your Gaussian filter. Choose N and sigma so that the noise is effectively reduced with the least amount of blurring. Include in your report, various output images with different choices of N and sigma, and compare the results.

PART 2 – EDGE DETECTION

Consider the “chessboard.tiff” image. Apply various edge detection methods with different parameters, until you get an edge map that includes as many borderlines between the black and white chess fields as possible. You can use MATLAB’s “edge” function (http://www.mathworks.com/help/images/ref/edge.html). Report which methods you have tried, and include the resulting edge maps in your report. Give the parameters of the best performing method.