Lab Exercises: LAB 8
(Thresholding)

General guidance:

1. Download the template code to make menus and demonstrate how to read, write and manipulate images.
2. All the images you use can be downloaded from the course website: http://www.eecs.qmul.ac.uk/~phao/IP/Images/
3. For RAW images, the files have no head data, just the image data as matrices stored. For our RAW images, we do not provide the colour components, and all the data are gray-scale values, a one-byte unsigned integer per pixel, value from 0 to 255.
4. The size of image Cameraman is of 128x128. Other images are of 512x512.

Exercise 1.

Mean and Standard Deviation

To find the mean and the standard deviation of an image by using the histogram. Note that a normalised histogram is the probability distribution of the counted pixel values.

Exercise 2.

Simple Thresholding

To segment an image by using a given value as the threshold. The threshold could be any number between 0 and 255.

Exercise 3.

Automated Thresholding

To automatically find a proper threshold for an image and use it to segment the image. The method can be the iterative algorithm for optimal threshold selection.

Exercise 4 (for MSc students).

Adaptive Thresholding

To automatically find proper thresholds for all the sub-images in an image and use them to segment the sub-images if the variances are large enough (e.g. 100).

Questions: When the “optimal” thresholding works? How can the edges be detected by thresholding?