Concordia University
Department of Computer Science & Software Engineering

COMP 478/6771 Image Processing

Assignment 4
Due Date: November 27, 2017

1. In Otsu's method for thresholding in Chapter 10 of the textbook, derive Eq. (10.3.15). You must give details of your derivations.

2. Explain why Hough transform for lines cannot be carried out in the Cartesian (x, y) coordinate system. Give details on how Hough transform for lines is done on a set of *n* points.

3. Do problem 10.24 on page 791 of the 3rd Ed. Gonzalez and Woods.

4. Download the image from the course webpage. This image contains noise.
   a) Apply Otsu's algorithm to the image and show the result.
   b) Smooth the image by a 5 by 5 averaging filter, then apply Otsu's algorithm and show the result. Compare the results in a) and b).

5. Dowload the image lena.tif from the course webpage, then do the following:

   a) Write a Matlab program to do wavelet transform of the Lena image up to and including level 3 by using Haar wavelet.

   b) Write a Matlab program to do wavelet transform of the Lena image up to and including level 3 by using Daubechies-4 wavelet.

   c) Visually compare the quality of the approximation images at level 3 of the two cases.