Digital Image Processing, Assignment No.7 1399.10.25, **Submission deadline: 1399.10.30**

1- (20) Download a standard color image.

a) Convert its colors to safe colors and display the image.
b) Find the most dominating color and let's call it color 1. Segment the image to 4 regions:
   1) Region 1, showing color 1.
   2) Region 2, areas which color are within a distance D1 to color1. D1 is the radius of a sphere. Region 2 will have color2.
   3) Region 3, areas that are within a distance D2 to color 2, where D2 < D1.
   4) All remaining pixels get a gray color of your choice.

   Note that color similarity is based on Euclidian distance on RGB. At the end, you will have an image segmented in 4 colors.

2-(25) Download a standard color image.

a- Apply Laplacian, Sobel and Di Zenzo edge detection methods on each RGB channels. Show the results of edge detection on each RGB plate and also show a combined version of edges in all 3 methods.

3-(25) Download a standard gray scale image.

a- Resize the image such that you can extract a fixed number of 8x8 blocks.
b- Apply DCT and FFT on each block independently.
c- Define a binary mask to keep the first 15 coefficients of DCT as shown in Fig. 8.29(a).
d- Multiply this mask to DCT coefficients of the block.
e- Reconstruct the compressed image.
f- Perform similar approach using FFT, by keeping about 15 most important coefficients. Define a binary mask, and reconstruct each block accordingly.
g- Show the original, compressed images obtained using DCT, DFT and also their difference and Root MSE with the original image.

Note: You can use the Matlab functions for DFT and DCT, but you should write the code representing each of the above steps.

4- (30) Download a standard gray scale image.

a) Compute the prediction error using equation 8.2-34. Display the 4 images similar to Fig. 8.34.
b) Use a variable length coding method to code f^(x,y) obtained in equation 8.2-34.
c) Reconstruct the compressed image.

d) Show, the original, compressed and the difference images.
e) Compute the entropy of original and compressed images.

Additional Notes:

You can use Matlab function in this homework.

Delay penalties are same as before