Short Course on Digital image processing

HW4

1. Consider a piece of text in which the letters a,e,g,k,l,z occur with probabilities of 3, 8, 13, 19,23,34 percent. Generate a Huffman table to code them.
2. Read the pdf document posted in Ed titled 'WallaceJPEGCompressionStandard.pdf'
3. Down Load 2 medical images such mammograms, ultrasound, xray, etc…
4. If it is a color image convert to YCbCr and only extract the Y channel
5. Use imnoise in MATLAB to add noise to these images. You can also try this without adding any noise and see if you can improve the images with their already existing noise
6. Perform 2D DCT and look at the high frequency areas the bottom right quadrant and estimate the noise constant
7. Use this estimated noise constant to perform a DCT Wiener Filter on each image
8. Also use wiener2 from MATLAB and nonlocal means on the same images and compare the results
9. Use the algorithm described in lecture to generate a MALAB script to calculate a 2D Haar Wavelet decomposition of one channel of an face image. Use a square image and decompose all the way to Log2(width) - 1. The dimenstions of the wavelet image should be the same as the that of the input image (if the input is 512x512 then the wavelet decomposition should also be 512x512).
10. Perform a 2D Haar Wavelet transform using the same image in problem 9 using MATLAB . Use the Lena.png image on Ed home work page.
    a. Use the WaveletMain.m matlab code also posted on the same page
    b. Extend the file so you can see level 3 and level 4 images.
    c. What is your observation?

*** Remember to to read all you rimages into a double typr array. For examaple:

```
Im1 = double(imread('camermsan.jpg'));
```

Once you complete all your image processing tasks use MATLAB function 'imadjust' to map all pixel values to the range [0,1] and then simply multiply by 255 and convert to uint8