CPE 491 Homework 2
Due on March 3rd

1. You have read and understood Ezstego embedding algorithm. In your opinion, (a) what are its drawbacks (embedding capacity and robustness), (b) is it easy to break this stego embedding algorithm (steganalysis)? If so, how will you go about it? Give details.

2. Consider the following stego embedding technique:

$$y_i = x_i + \alpha w_i, i = 1,2,...,N$$

where y_i is the stego message, x_i is the original (host) message (signal), w_i is the secret message and $\alpha > 0$ is the message strength. Assume x_i and w_i are zero mean Gaussian distributed random variables with variances equal to σ_x^2 and σ_w^2 respectively. Compute the total embedding capacity (maximum message length in bits) of this embedder using Shannon theory.

3. Consider a source, $X = \{x_1, x_2, x_{3,...,} x_8\}$ with respective probability of occurrences equal to, 0.1,0.1.0.2,0.2,0.15,0.15,0.05,0.05. Compute (a) entropy of this source, (b) Shannon-Fano code, (c) Huffman code, and (d) efficiency of the Shannon-Fano code and Huffman code for this source. What is the average savings (in bits/symbol) of the Shannon-Fano and Huffman codes over fixed length encoding of this source?