EECS 360
Lab 3: Discrete Convolution

1. Perform convolution for the following cases using the Matlab function "conv". For each case, create a figure with 3 subplots: x[n], h[n], and y[n] = x[n] * h[n].

a) $x[n] \quad 1 \qquad\qquad 0 \quad n \quad 4$
$h[n] \quad 1 \qquad\qquad 2 \quad n \quad 2$

b) $x[n] \quad 1 \qquad\qquad 0 \quad n \quad 20$
$h[n] \quad 1/2^{\,n\ 1} \qquad\qquad 10 \quad n \quad 10$

c) $x[n]$ = [0.5, 0.5, 0.5]

$h[n]$ = [3.0, 2.0, 1.0]

2. Convolve the signals given in part 1 a through c by hand. Compare the results with the ones obtained by using the conv function.

3. Use the following sequences to complete the problem.

$$x_1[n_1] \quad 1 \quad 1.3e^{\frac{n_1}{5}} \qquad\qquad 2 \quad n_1 \quad 1$$
$$x_2[n_2] \quad e^{\ 0.7n_2} \qquad\qquad 0 \quad n_2 \quad 4$$

   a. Create a figure containing 8 subplots. Using pairs of subplots, show the first 4 shifts of the discrete convolution of the above sequences. See figure 5-18 in the handout distributed in the class for help. You need to have the "signal" stem plot and the "multiplication" stem plot.
   b. Create a new figure and display the results of the convolution of the two sequences using the conv function.
   c. Compare the first four results of the conv solution to your work in part a. Do they match? Comment on the results.

Useful Website:
http://www.eece.unm.edu/signals/Discrete_Convolution/discrete_convolution.html