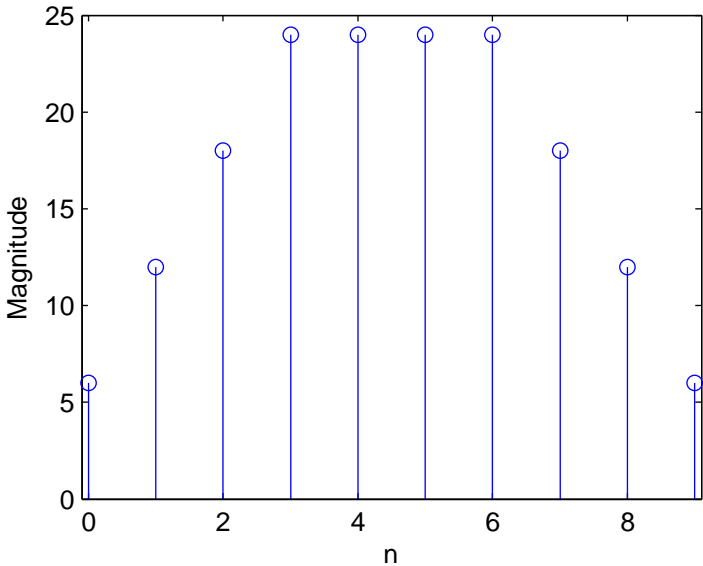# Lab #2
EE 102B   Spring-2013
LAB REPORT SUMMARY SHEET

Name: Solutions   Date: April 14, 2013

Part 2.1 (50 points)
Print this page, fill it out with your answers, and turn it in as part of your lab writeup.

Part	Observations (Write down answers for each part)
2.1(a)	Convolve impulses: $\delta[n-3] * \delta[n-5] = \delta[n-8]$
2.2(b)	Rectangular Pulse through a First-Difference filter: $y[n] = -3\delta[n-2] + 3\delta[n-8]$
2.3(c)	$y[n] = x[n] - x[n-1]$, so $y[n]$ is zero whenever $x[n] = x[n-1]$. This is true for most n in a pulse.
2.4(d)	
2.5(e)	The maximum amplitude is 24. The length is 10.
2.6(f)	$y[n]$ is nonzero at $n = 7, 13, 20, 25, 32, 38, 45, 50.$
2.7(f)	$y[n]$ is positive when $x[n]$ makes a transition from a lower to higher value, and negative when $x[n]$ makes a transition from a higher to lower value. $y[n]$ is 0 otherwise.

Part 2.2 (50 points)

(a)

```
load echart.mat
imshow(echart)
```
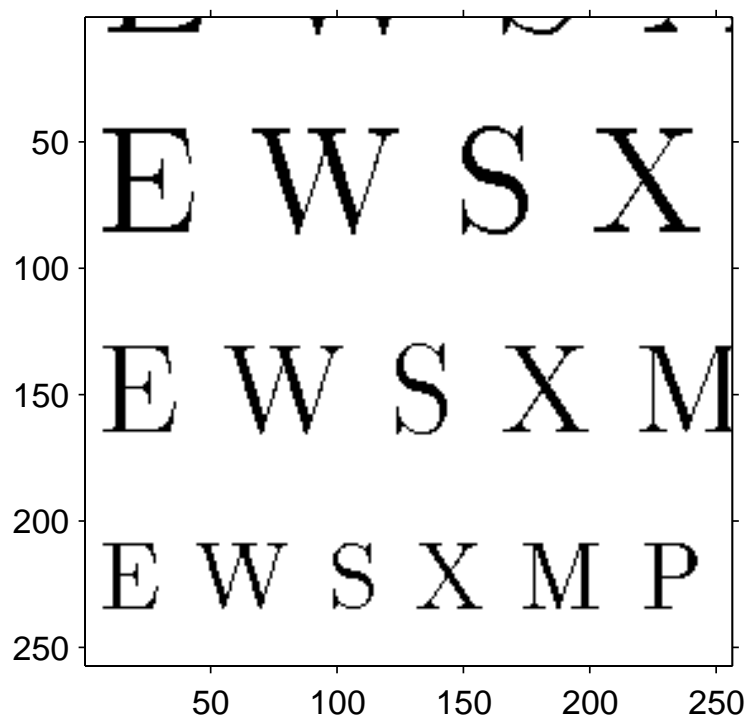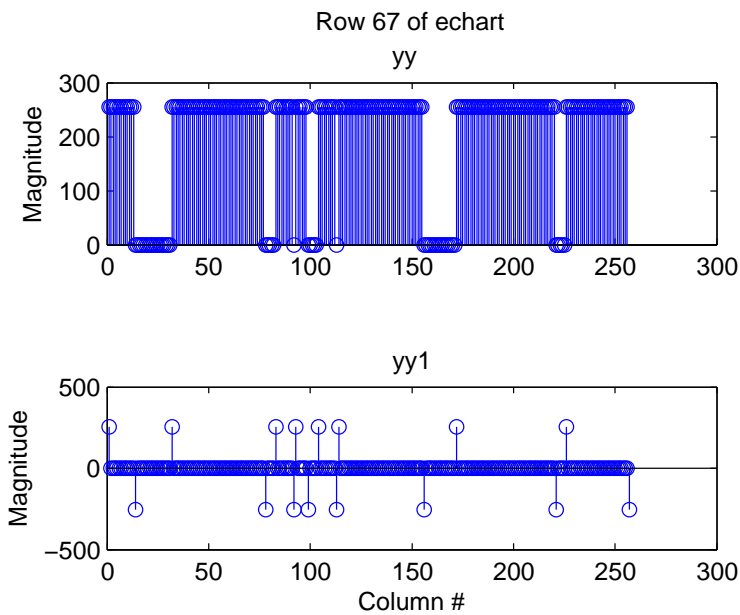
(b)

```
m=65;

yy = echart(m,:);
subplot(2,1,1)
stem(1:size(echart,2),yy);
title('Row 67 of echart \newline yy'); ylabel('Magnitude')

yy1 = firfilt(echart(m,:), [1 -1]);
subplot(2,1,2)
stem(1:(size(echart,2)+1),yy1);
title('yy1'); ylabel('Magnitude'); xlabel('Column #')
```

(c) When there is a transition in yy from black to white (i.e. 0 to 255), yy1 takes a value of 255. When there is a transition in yy from white to black, yy1 takes a value of -255. yy1 is zero when yy is constant.

(d)

```
m=45;
%Choose row 45. No single row spans the entirety of E, so there is ambiguity
yy = echart(m,:);
yy1 = firfilt(yy, [1 -1]);
wbtrans=find(yy1<0); %A vector of indices where yy1<0.
bwtrans=find(yy1>0); %A vector of indices where yy1>0.
bwtrans(2)-wbtrans(1)
%Ignore the first black-white transition (the left edge of the image)
```

The output is 33.