CS/INFO 1305 Programming Exercise 3
Due Monday, August 1, at 5pm

You only need to submit questions 2 to 4 in CMS.

1 Different ways to create vectors

Type the following expressions in the MATLAB *Command Window* to see what kind of vectors they create. Write the resulting vectors (and answer the questions) on the blanks.

```
a= zeros(1,4)  %_________________

b= zeros(4,1)  %_________________  What do the arguments specify?_________________________

c= ones(1,3)   %_________________

d= 10:2:17     %_________________

f= 10:-1:17    %_________________

g= [10 20 40]  %_________________  What does the space separator do?_____________________

h= [10,20,40]  %_________________  What does the comma separator do?_____________________

k= [10;20;40]  %_________________  What does the semi-colon separator do?_________________

m= [a g]       %_________________

n= [b; k]      %_________________

p= [a k]       %ERROR--mismatched dimensions! (Attempt to concatenate a column to a row)

q= b'          %_________________  This operation is called "transpose"

r= [a b']      %_________________
```

2 Evaluate a polynomial

Write a function `evalPoly` to evaluate an n^{th} order polynomial of x:

$$a_0 + a_1 x + a_2 x^2 + \cdots + a_n x^n$$

The two input parameters are `coef` and `x`. `coef` is a vector or real values of length $n+1$ and contains the coefficients of the polynomial. `coef(1)` corresponds to a_0, `coef(2)` corresponds to a_1, ..., etc. Input parameter `x` is a real value. Function `evalPoly` returns the value of the polynomial evaluated at `x`.

3 Minimum value in a vector

Implement the following function:

```
function [val, k] = findMin(v)
% Find the minimum value in vector v.  v is a vector of real numbers.  length(v)>0.
% val is the minimum value in v.
% k is the first position at which the minimum value appears.
```

Do *not* use the built-in functions `min` or `max`.

4 Biggest rectangle

Implement the following function:

```
function [a,b,c,d] = biggestRectangle(x,y,v,w)
% Find the rectangle with the largest area.  Rectangles have sides parallel to the axes.
% x,y,v,w are vectors of the same length containing real numbers.  length(x)>0.
% The points (x(1),y(1)) and (v(1),w(1)) are the opposing corners of rectangle 1,
% the points (x(2),y(2)) and (v(2),w(2)) are the opposing corners of rectangle 2,...
% the points (x(k),y(k)) and (v(k),w(k)) are the opposing corners of rectangle k.
% (a,b) and (c,d) are the opposing corners of the biggest rectangle in the set of
% rectangles defined by x,y,v,w.
```