



## ET601: Problem Set 1

**Due date: December 4, 2013 (Thursday), 1 PM**

1. Consider the matrix A defined below.

```
>> A = (rand(4,5)>0.5)

A =

     1     1     1     1     0
     1     0     1     0     1
     0     0     0     1     1
     1     1     1     0     1
```

We want to take the boxed part and assign it as a matrix B.  
There are many ways to do this using MATLAB statements.  
Please provide three different solutions.

2.
  - a. Use the colon operator to create a row vector  $x$  which contains the values 1,2,3,...,7.
  - b. Let  $y = \text{cumsum}(x)$ .
  - c. Now, recall that  $\sum_{k=1}^n k = \frac{k(k+1)}{2}$ . So, in fact, vector  $y$  is  $\left[ \frac{1 \times 2}{2} \quad \frac{2 \times 3}{2} \quad \dots \quad \frac{7 \times 8}{2} \right]$ .  
Use array operations to compute the vector  $y$  from vector  $x$  without using the `cumsum` command.

3. In class we have seen the script LLN\_cointoss.m. It is repeated below:

```
close all; clear all;
N = 1e3; % Number of trials (number of times that the coin is
tossed)
s = (rand(1,N) < 0.5); % Generate a sequence of N Coin Tosses.
                        % The results are saved in a row vector s.
NH = cumsum(s); % Count the number of heads
plot(NH./(1:N)) % Plot the relative frequencies
```

Modify the script LLN\_cointoss.m so that it also shows the following:

- In the same figure, the plot of the relative frequencies for the tails event.  
The plot command that you added to the script should also specify the color of the graph for the tails event to be red.
- In another figure, the plot of the difference between the number of heads and the number of tails  
Hint: use the `figure` function to create a new figure.

Examples of the expected two figures are shown below:

