ES 314 Advanced Programming, Modeling and Simulation   Fall 2012

Home Work # 3
Due: October 10, 2012

1) Write a function, wc, that opens a file and counts the number of lines, the number of words and the number of letters in it.

2) Exercise 7.11

3) The purpose of this exercise is to demonstrate that vectorized operations run much faster than loop based iterations. Consider the task of computing $f(x, y) = A \sin (a\, x + b\, y)$ for constants A, a and b and for $1 <\, = x, y <= N$. Perform this by writing a nested loop as well as by vector operation. Run both code for N = 100, 200, ..., 2000, and plot the ratio of the costs (loop in the numerator of the ratio) of the operations as each of those values.

4) In this problem, we will represent an arbitrarily large *positive integer* as a vector by breaking down the number into groups of 5 digits with the last five digits stored in position 1 of the array. For example, the number 1287 08765 94512 will be stored as the vector [**94512, 8765, 1287**]. You are to write a function **multbyk** that takes as input a vector v representing a positive integer x with unlimited number of digits and a 5 digit positive integer k, and returns a **string** that represents k times x. An example of input/output is:

```
>> v = [1287, 8765, 94512];
>> multbyk(v, 912)
ans =
   11738239454194944
```