**ECE 1111: Engineering Computation I**

**Homework No. 14: Functional Programming in Python**

**Deposit your work in:**

/data/courses/ece\_1111/current/homework/hw\_14/<lastname\_firstname>

**Goal:** Introduce you to functional programming concepts in Python.

**Description:** As an introduction to this assignment, please review the following tutorials:

*https://medium.com/@utkarshshukla.author/pythons-powerful-trio-map-filter-and-reduce-for-simplifying-data-processing-f4ab79fd076f*

*https://www.geeksforgeeks.org/functional-programming-in-python/*

*http://stackoverflow.com/questions/12375761/good-mapreduce-examples*

For the text file found here:

*https://isip.piconepress.com/courses/temple/ece\_1111/resources/data/text/data\_v00.txt*

using map, reduce and filter, write a program that does the following:

* counts the number of times each word occurs;
* sorts this list into ascending order based on the frequency of occurrence;
* computes a cumulative distribution of the word frequencies;
* computes the average number of times a word occurs.

Your program should process all the text files (\*.txt) specified from the command line:

*myprog.py data\_v00.txt data\_v01.txt …*

Analyze your code and discuss how run-time varies with the size of the input file. Is the run-time linearly proportional to the size of the file, which we denote as $O(N)$? Is it proportional to $O(N^{2})$, $O(Nlog(N))$? Plot of the run-time of your program versus size of the input file for sizes ranging from $[10^{2}, 10^{8}]$. Submit the plot as a jpg named *AAREAMDE.jpg*. Put your analysis in *AAREAMDE.txt*. Your Python program should be named *p01.py*.

Time your code using the Python profiler:

[*https://stackoverflow.com/questions/1557571/how-do-i-get-time-of-a-python-programs-execution*](https://stackoverflow.com/questions/1557571/how-do-i-get-time-of-a-python-programs-execution)