MSiA 422 – Fall 2017

Homework # 1

DUE: 10/1/2017 (Sunday)

Exercise 1 – Procedural vs Functional Programming

Problem Definition:

Given a list of numbers and words, find the count of each element type in the list.

Example:

***Example**: L = [2, 3, 'word', -1, 'python programming language', 9, 321]*

Count of Numbers: 5

Count of words: 4

Write a pure python code (No external libraries) to achieve the following:

1. Create a function the will randomly generate a list of **N** numbers and words. Numbers and words count are random and the order is random too.
2. Create two functions to calculate the desired output as follows:
    a. Procedural code by using loops
    b. Functional code by using list comprehension.
3. Use **TimeIt** standard library and **matplotlib** to present the performance difference among the 2 solutions for different list sizes (**N**=100, 1000, 10000, 100000).

Exercise 2 – Simple Student Grading System - memory based

In a given course the following applies (a CSV data set **exams.csv** file is attached):

- The system track students by student name and unique ID.
- Grades are based on:
    - Exams Score (40% of the final grade)
    - Projects Score (30% of the final grade)
    - Quizzes Score (30% of the final grade)

- Final Grades based on final score (out of 100) As follows:
    - [90-100]:**A** ; [80-90): **B** ; [20-80): **C** ; [10-20): **D** ; [0-10): **F**

Create a data structure (dict!) to store the class related information.

Provide the system user with a console based **menu** as follows:

- Load the data set from exams.csv file (file is comma delimited).

- Print a list of student names, final scores, and letter grades sorted by names.

- Print score summary (Student Count, Min, Max, mean, mode, and standard deviation)

- Identify values that are larger than the mean and two times standard deviation

- Plot a **pie chart** showing the final letter grades distribution.

- Create **box plots** parameters (not drawing them but just computing the numbers [min, max, medial, Q1, Q3] for a box plot).

- Exit the system.

** Make your own assumptions but usability counts*

** Functions and readability counts.*

** Only core python built-in data types.*

Exercise 3 -

Pick an extension library from **PyPI or other sources** (something of interest to you). Summarize the functionality provided by the library (one paragraph) and show a usage example.

Document step-by-step how to run the example provided.

PyPI: https://pypi.python.org/pypi