

Homework #1 Data Structures

Due: January 26, 2013 (Saturday at 11:59 PM)

Flesch-Kincaid Grade Level Program

Design and implement a program that analyzes a text file to determine its Flesch-Kincaid grade level. The Flesch-Kincaid grade level indicates the approximate grade level of student that could understand the text. Alternatively, it indicates the number of years of education generally required to understand the text. The Flesch-Kincaid grade level is calculated by the formula:

$$0.39 \left(\frac{\text{total number of words}}{\text{total number of sentences}} \right) + 11.8 \left(\frac{\text{total number of syllables}}{\text{total number of words}} \right) - 15.59$$

Use the following definitions for a sentence, word, syllable:

A *sentence* is considered to be any String ending in a '.', ':', ';', '?', or '!'. (Yes, I know this allow sentences that do not represent grammatically correct English sentences)

A *word* is considered to be any elements of a sentence that is separated by spaces, tabs or new lines.

We'll calculate the number of *syllables* in a word by counting the number of groups of adjacent vowels with the exception of an 'e' appearing at the end of a word which does not count as a syllable. For example:

- "simplicity" contains 4 syllables
- "though" contains 1 syllable
- "cleaning" contains 2 syllables
- "yet" contains 1 syllable
- "are" contains 1 syllable
- "syllable" contains 2 syllables.
- "able" contains 1 syllable.

All non-letter's such as digits and punctuation should be treated as non-vowels. For example:

- "myString123" counts as 2 syllables.
- "What?" counts as 1 syllable.

All words must have at least 1 syllable. So, if by the above calculations a word would have 0 syllables it should be reported to have 1 syllable. For example:

- "pqr132" counts as 1 syllable.
- "X=227-314" counts as 1 syllable.

When you write your program, be sure you:

- think about the functional-decomposition (top-down) design before you start to write code
- use meaningful variable names with good style (i.e., useCamelCase)
- use comments (""" Multi-line Comment """) at the start of the program **and** immediately after each function definition describing what they do (see lab1 `diceOutcomes.py` program)
- use a main function (see lab1 `diceOutcomes.py` program) located at the top of program with a call to it at the bottom to start execution
- use global constants where appropriate with good style (ALL_CAPS_AND_UNDERSCORES). (Put your global constants after your initial comments describing the program and before your main function definition so they can be found and changed easily in future versions of your program.)
- allow the user to enter the file name to be analyzed and verify that the file name exists (`import os.path`)

Submit your homework electronically at https://math-cs.cns.uni.edu/~schafer/submit/which_course.cgi

Submit the single file, hw1.zip containing the following:

- **hw1.py** (your Python program)
- **design.doc** (or design.pdf, or design.txt, or design.rtf) a document describing the design of your program including a functional-decomposition diagram with text describing each function (see lab1 description)