Python Programming

CS 126, second year students

Assignment 1

February 20, 2023. Due to March 6.

Overview

In this assignment you have to get acquainted with basic Python 3 data structures and to solve an algorithmic problem.

Description

Given the arbitrary .txt file one should implement the next tasks:

1. Write a function which reads a text file specified by file path ***def read_file(file_path: str) -> Tuple[str, words_count, sentence_count]*** and returns its content, number of words and number of sentences. Use **typing** and **docstring** standards [1, 2, 3]. For reading a file, use *context manager* [4, 5]. For word and sentence counting one may use regular expressions, ***list()*** or custom algorithms.
2. Implement two functions ***def get_all_palindromes(content: str) -> Dict*** and ***def check_pallindrome(word: str) -> bool*** which finds all palindromes in content. In order to practice, use an algorithmic approach.
3. Implement function ***def get_palingrams(content: str) -> Dict*** which returns all found palingrams in the content. *A simple palingram is a phrase with segments of one or more words that reads the same backwards. E.g., nurses run, stir grits, lived devils etc.* To complete this task you must know what a word is, so you may use these English vocabs: https://github.com/dwyl/english-words, http://www.gwicks.net/dictionaries.htm, https://github.com/en-wl/wordlist/blob/master/alt12dicts/2of4brif.txt. Also, you

have to use one of the functions developed in step 2. You can use these vocabularies to test your code.

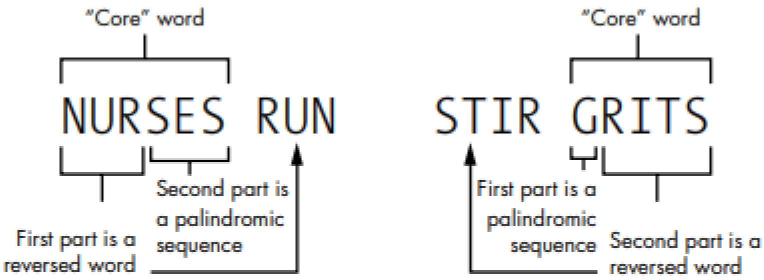

Fig. 1. Example of palingrams.

4. *(Challenging task)*. More precisely, a palingram is a phrase with segments of one or more words that reads the same backwards after a permutation of the letters within each segment.* Modify your code to find and examine this type of palingrames. *Examples: BEDROOM BOREDOM, GARDEN DANGER, MOWED A MEADOW, SEASIDE DISEASE.*

References:

1. ***https://docs.python.org/3.10/library/typing.html***
2. ***https://towardsdatascience.com/12-beginner-concepts-about-type-hints-to-improve-your-python-code-90f1ba0ac49***
3. ***https://sphinxcontrib-napoleon.readthedocs.io/en/latest/example_google.html***
4. ***https://www.pythontutorial.net/python-basics/python-read-text-file/***
5. ***Dan Bader. Clean Python book.***
6.