Lab Assignment Week 11

CSC/DSCI 1301 – Principles of CS/DS I

Week of March 25th, 2024

Introduction

Welcome to the eleventh programming lab of CSC/DSCI 1301! Today we will be covering the following topics:

- Building User-Defined Functions
- Creating Dictionaries
- Using Dictionary Methods
- Creating View Objects

Lab policy reminders:

- Attendance is mandatory.
- Labs must be completed **individually.**
- TAs are here to help you. Ask them for help!
- Lab assignments are due at the end of each lab.

Deliverables:

1. Python files for both your lab programs.
2. Screenshots of both program outputs.

If you have any questions, please do not hesitate to ask your TA!

Program 1: scrabble.py

Scrabble is a word game in which words are constructed from letter tiles, each letter tile containing a point value. The value of a word is the sum of each tile's points added to any points provided by the word's placement on the game board.

Table 1 Scrabble Point Value for Each Letter

Letter	Point Value	Letter	Point Value
A	1	N	1
B	3	O	1
C	3	P	3
D	2	Q	10
E	1	R	1
F	4	S	1
G	2	T	1
H	4	U	1
I	1	V	4
J	8	W	4
K	5	X	8
L	1	Y	4
M	3	Z	10

Write a program using the given dictionary of letters and point values that takes a word as input and outputs the base total value of the word (before being put onto a board). Your program should allow the user to enter multiple words as input until a stop word is detected. There should be at least two valid stop words, one of which should be a single letter shortcut. Ex. ‘quit’ and ‘q’.

Example Output

```
:> Python
PYTHON is worth 14 points.
:> Druid
DRUID is worth 7 points.
:> Ragnar
RAGNAR is worth 7 points.
:> Vampire
VAMPIRE is worth 14 points.
:> Daring
DARING is worth 8 points.
:> quit
```

Skills Covered

- Creating User-defined Functions
- Creating Dictionaries
- Using Dictionary Methods

Deliverables

For this program you will need to provide the python file containing your code as well as a screenshot of the output of your program. Please name your files as follows:

- Python Files
    - lastname_firstname_filename.py
    - For example: **hawamdeh_faris_scrabble.py**
- Screenshots
    - lastname_firstname_filename.png
    - For example: **hawamdeh_faris_scrabble.png**

Program 2: word_frequency.py

In natural language processing (NLP) and information retrieval (IR), the bag-of-words model is a simple but effective way of representing text data for use in machine learning algorithms. The bag-of-word model ignores grammar and word order but does keep track of the frequency of words. This is used in many NLP tasks, such as text classification, sentiment analysis, and topic modeling. A bag of words is nothing more than an unordered collection of words with their associated frequency counts.

For this lab you will need to write a program that takes in text as input and converts it into a bag of words. You will need to implement the build_dictionary() function to build a word frequency dictionary from a list of words. The main code of your program will build the word list from an input string, call your build_dictionary() function to build the dictionary, then display the dictionary sorted by key value. Your bag of words should be case-insensitive, so words spelled the same with different capital letters should count towards the frequency of the same word.

Hints

- Dictionary Methods or Membership Operators will be very useful for checking if a word has already been added as a key to the dictionary.
- Keys in a dictionary can't be sorted within a dictionary, but you can retrieve the keys of a dictionary using a view object.

Example Output

```
:> The quick brown fox jumps over the lazy dog

Word List:
['the', 'quick', 'brown', 'fox', 'jumps', 'over', 'the', 'lazy', 'dog']

Bag of Words:
brown - 1
dog - 1
fox - 1
jumps - 1
lazy - 1
over - 1
quick - 1
the - 2
```

Skills Covered

- Creating User-defined Functions
- Creating Dictionaries
- Using Dictionary Methods
- Creating View Objects

Deliverables

For this program you will need to provide the python file containing your code as well as a screenshot of the output of your program. Please name your files as follows:

- Python Files
  - lastname_firstname_filename.py
  - For example: **hawamdeh_faris_word_frequency.py**
- Screenshots
  - lastname_firstname_filename.png
  - For example: **hawamdeh_faris_word_frequency.png**