420-LCU-05 Programming in Python - Assignment 3
Due April 13, 2021 at 11:59 p.m.

1- **Identification section**: This section must be either in a comment, with a '#' preceding each line, or enclosed within triple quotes ('''). The grader and I need this section for the accurate processing of your assignment. Assignments missing this may lose up to 5% of the mark.

```
"""
Your Name and ID
420-LCU Computer Programming, Section #
S. Hilal, instructor
Assignment 3
"""
```

2- **Submission**: Submit your assignment in 1 Python file, with the extension .py. Be sure to respect other instructions specified in the assignment. An important part of each assignment is to correctly follow the instructions closely. **Late assignments** are accepted up to 1 week from deadline. But late penalty applies.

Learning Objectives:

- Practice using dictionaries and nested dictionaries for objects with many attributes.
- Using a dictionary as a lookup table for information.
- Practice with dictionary methods.
- Strings, for loops and Multidimensional data structures.
- Reading data from a File and structuring the data.
- Use formatted-printing for organized display of information.

Nested Dictionaries:

A nested dictionary (or dictionary of dictionaries) can be used to store items with multiple attributes. Consider the following example of students as seen in A2 where student ID (of type int) is the unique identifier and is used as key. For attributes, I used name and 4 grades. Note that attribute names are all strings and are used as keys in the inner dictionary. Attribute values take the appropriate data type (string or int).
Consider the following dictionary to store student information as seen in A2.

```
students = {1234567: {'name': 'Anne', 'T1': 20, 'T2': 22, 'A1':24,'A2':25},
            2345678: {'name': 'John', 'T1': 15, 'T2': 25, 'A1':12,'A2':22}}
```

A student in the dictionary can be accessed by key

```
>>> students[1234567]
{'name': 'Anne', 'T1': 20, 'T2': 22, 'A1':24,'A2':25}
A particular attribute or information about a student is accessed by its key.
>>> students[1234567]['name']
'Anne'
>>> students[2345678]['T1']
15
```

Assignment Description:

You will use a nested dictionary as a lookup table to extract information of interest from a set of data.

Description of Data:

The text file "top-books.txt" has the information for 61 books from the list: "Goodreads: 100 Books You Should Read in a Lifetime". This list was published in Time magazine a couple of years ago. Please take a look at the content of the file before starting your code. The data for each book is (in order): book title, author, language, type (genre) and number of copies sold (int). You will use one of the file reading methods seen to read the contents of the file. You will structure the information in a **nested dictionary**. ***The unique key for each book is its title, a string***. The other information associated with each book will be in the inner dictionary with the keys as shown.

You will start with empty dictionary **TopBooks= {}** and fill with the data from the given file.

Here's an example of how it should look like:

```
TopBooks = {'The Lord of the Rings': {'author': 'J. R. R. Tolkein',  'language': 'English', 'type': 'fantasy', 'sold': 150000000},
            {'The Alchemist': {'author': 'Paul Coelho', 'language': 'Portuguese', 'type':'fantasy', 'sold': 150000000},
            {'Dream of the Red Chamber': {'author': Cao Xueqin', 'language': 'Chinese ', 'type': ' Family Saga','sold': 100000000}}
```

Program Menu:

You will simply create a menu to get some information from in the dictionary TopBooks created above.

1- How many different languages are there? Print the list of languages.
2- What language has the most books? (**Hint: create a new small dictionary**)
3- Display all books in a given language. (Ask use to enter language and **Print** book title, author, type and copies sold).
4- What are the different types of books? Which type has sold most copies)? (**Hint: create a new small dictionary**)
5- List all authors who have more than 1 book on the list. (show result as author: number of books)
6- For a given author, what is the total number of books sold?
7- List all books of a given type (**Hint** When option selected, display list of types from 4 (ask to input type)
8- What are the top 8 types of books (with highest total sold) (**Hint: create a new small dictionary**)
9- Display a plot to show the distribution of books among the top 8 types of books (from option 8).
10- Exit

Note: Do not include information between () on the menu.

Important Note: Before doing any of the options on the menu, you have to read the data from the file top-books.txt and create the dictionary. This is not part of the menu. It has to be done before. ***If the dictionary is empty, all menu options should give an error message***. We will be doing this as part of Lab-8

Error Checking: **Error Checking**: No need to validate the data that you read from the file but you have to validate any data inputted from the menu options.

Formatted-Printing: Use formatted-printing to display results whenever your search gives a set of multiple items.

Important Final Note: The code for each option will be between 3-10 lines.