420-LCU-05 Programming in Python - Assignment 3
Due April 19, 2022 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, program and 4 grades. Note that attributes are all strings and are used as keys in the inner dictionary. Values take the appropriate data type (string or float). As an example, consider the following dictionary **students** to store student information similar to was seen in A2.

```
students ={
12345:{'name':'Lea','prog':'HH','T1':20.5,'T2':22.0,'A1':24.0,'A2':23.5,'gr':90.0,'lg':'A'},
23456:{'name':'Joe','prog':'H2','T1':20.0,'T2':25.0,'A1':20.0,'A2':22.0,'gr':87.0,'lg':'B'}
}
```

A student in the dictionary can be accessed by key

```
>>> students[12345]
{'name':'Lea','prog':'HH','T1':20.5,'T2':22.0,'A1':24.0,'A2':23.5,'gr':90.0,'lg':'A'},
A particular attribute or information about a student is accessed by its key.
>>> students[12345]['name']
'Lea'
>>> students[23456]['T1']
20.0
```

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 "books.txt" includes 72 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 and 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 **Books= {}** and fill with the data from the given file.

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

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

Program Menu:

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

1- How many different languages are there? Print a numbered list of languages.
2- What language has the most books? (**Hint: create a new small dictionary to count books in each language**)
3- Display all the books in a language. **(Ask user to enter a language and Print book title, author, type and copies sold)**
4- How many different types of books are there? Print a numbered list of the types? Which type has most copies sold? (**Hint: create a new small dictionary**)
5- List all authors who have more than one book on the list. (show result as author: number of books)
6- List the top 10 authors based on the number of books they have authored (on the list)
7- For a given author, what is the total number of books sold? **(Ask user to enter an author name)**
8- List all books of a given type. **(When selected, display list of types from option 4 then ask user to input a type)**
9- What are the top 5 types of books based on total sold? (**Hint: create a new small dictionary**)
10- Display a pie chart plot to show the distribution of books among the top 5 types of books (from option 8).
11- 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 books.txt and create the dictionary. This is not part of the menu and has to be done as soon as program starts. We will be doing this as part of Lab-10

If the dictionary is empty, all menu options should give an error message and exit.

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: There are 10 options but do not worry. The code for each option is short: 3-10 lines.