ICT1002 Programming Fundamentals

Lab 2

Topics:

1. Advanced data structures in python: list, tuple, dictionary
2. For/while loops
3. List Comprehensions
4. File I/O

Warmup exercises:

The following lab assignment requires the use of all topics discussed so far in the module. You may wish to practice some of the concepts with simple exercises before attempting the lab assignment. You are not required to include these exercises in your submission, though you may wish to do so, to help you in the lab test.

1. Evaluate the following expression

List1=[‘abc’, ‘bcd’, [‘123’, 567], 789]	Tuple1[1:]
List1[1]	Tuple1[:2]
List1[2]	Tuple1[2]=23
List1[2][2]	Dic={‘A01’:’xiaoming’, ‘A02’:[‘mie’, 3]}
List1[4]	Dic[‘A01’]
List1[-3]	Dic[‘A02’]
List1[2:]	Dic[‘A02’][0]
Tuple1=(‘23’,15,8,100)	range(10)
Tuple1[0]	range(2:10:2)
h_letters = [letter for letter in 'human'] print(h_letters)	
number_list = [x for x in range(20) if x % 2 == 0] print(number_list)	
num_list = [y for y in range(100) if y % 2 == 0 if y % 5 == 0] print(num_list)	
obj = ["Even" if i%2==0 else "Odd" for i in range(10)] print(obj)	

2. Create one tuple and one list to store five of your favourite fruits (e.g. pear, apple, strawberry, banana, orange) separately

3. Print all the items that you have created from the list and tuple

4. Update one of the items from the list or tuple, e.g. change the ‘apple’ into ‘papaya’

5. Delete one of the items from the list or tuple, e.g. delete pear

6. Sort all the remained fruits and print the ordered fruits out using for and while loops

7. Use the list comprehension to generate the lists according to below requirements:
   - Find all of the numbers from 1-1000 that are divisible by 7
   - Find all of the numbers from 1-1000 that have a 3 in them
   - Count the number of spaces in a string

8. Create one dictionary to store 12 months and its corresponding number of days. Use for and while loops to print out all the months and all the number of days.

8. You are going to design one program to check the popular words in a given document. Please download the lab2_testdata.txt from LMS. Note that the given data has a fixed scheme where each line is one long string and each string contains multiple keywords that are separated by ",". You need to write one program to read this file and calculate the top 5 most frequent keywords and write out these 5 keywords in the end of the file. The following are some hints which may help you design this program.

- String has a cool function that you can use to split a string separated by a ',' . For instance, given one string str1 = "apple, pear, peach", to get all the keywords in str1, str1.split(',') will return a list of keywords. You can use list1=str1.split(',') to obtain all the keywords and put them into one list.
- To get the top 5 most frequent keywords, you need to extract all the keywords first and figure out one way to calculate the frequency of each keyword. Then select the top 5 keywords.

Input: The given text file "testdata.txt"

Output: Print out the top 5 keywords both in the screen and write them to a new txt file "top_5.txt".

******** You must try exercise 8 to learn how to do the Files I/O!*******

Lab Assignment:

There are three tasks that you have to finish and submit via LMS. You can find the three tasks in LMS/Content/Labs/Lab2-submitted tasks. Once you finish the tasks, please submit them via the LMS the dropbox. Thanks!

You can use either the Python packaged IDLE (Python GUI) or PyCharm to create the Python program. To create one new program, you can create a new file by clicking the NEW FILE under the FILE menu. See below figure.