CSc11300 Programming Languages Lab Assignment 3

May 10, 2021

Instructor: Ahmet C. Yuksel Time limit 05/17/2021 11:59pm

Use Python3 to solve the programming problems.

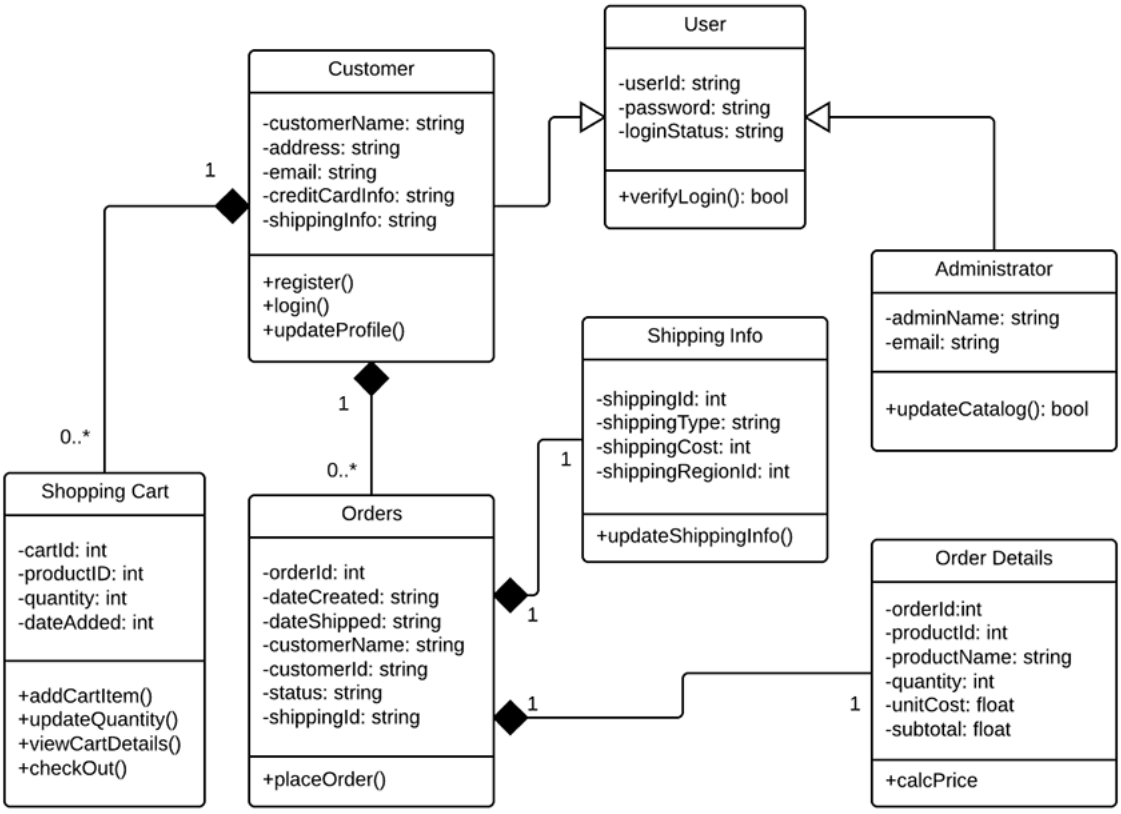
1. Let A and B two text files, containing some binary lines between of length 1..N. Where N is the line with the maximum number of characters, 1 the minimum number of characters in each line.

   Design a Python3 function to compare each line of the files, character by character, and if there is a match of the characters, create a variable representing the similarity between the lines of each file, and return that similarity variable measures the similarity between two files.

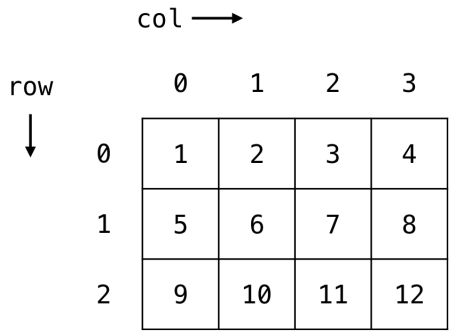
2. Let a .txt file contain n=1000 lines. In this file each line finishes either with an 'X' or with a 'Y'. Design a function that randomly adds either 'X' or 'Y' to the end of each line. Write the result back to the same file(do not append). Then write another function to show the number of the lines finishing with XX and YY and the ratio of the lines finishing with 'XX' and 'YY' / all n-lines. (divide number of lines finishing with double X + double Y by the total number of the lines)

3. Let $I = [1, 2.09, 3, 4, 5, 6, 'a', 8, 9, 10.14, 11, 'b']$ be a Python3 list.
And let J={1,2,7} be a set of indexes.
Write a Python3 function to create a 2D list out of I where each row contains at most 2 elements and then design another function to return the projection of 2D I onto J.(Should work with any J created with respect to the size of I)

4. Design Python3 classes for the UML diagram below. You should pay attention to UML relationships (designated by different arrows). If it is an aggregation (diamond arrows) then the numbers next to the arrows need to be considered. (For example: A shopping cart cannot belong to more than 1 customer, a customer IS-A user, a manager also IS-A user which means we need to inherit the necessary attributes from the user class.) PS: for classes you can make a class that does nothing instead of defined functions.



5. Read the contents of a text file, then place the contents to a 2D list as seen the figure below, where 1, is the element at list[0][0] is the first line of the file and 12, (list[2][3]) is the 12th line of the file. Write a Python3 function to randomly shuffle the elements of 2D list and write it back to the file with that particular order. For randomly selecting an index from the 2d list, you can use random.randint(a,b) or random.shuffle(list) function from the random module, where the randint function returns an integer N and $a <= N <= b$. and the shuffle function returns a shuffled list.



6. Create a 3D list in Python3 with random values [0-1000](size user defined 'n x n x n', hence a cube). Then based on the dimensions of the 3D list, create m-number of randomly generated 2D lists of indexes [0 - (n-1)]. Write a Python3 function to take the projection of the 3D list onto m-2D lists that you randomly created. Your program must return the elements of the 3D list projected onto the indexes that 2D lists contain. (Think of a cube, and a piece of paper which could be at most the size of a side of the cube, (could be smaller), if the piece of paper is sized exactly the same as the side of the cube, then the projection is the piece of paper itself). Note that the projection operator returns the values with respect to indices, it does not return the indices.

Good luck.