IT306 Take Home Assignment 7

Assignment Directions

It is mandatory that you attempt this assignment on your own. You may use any printed resources you would like (text, notes, Internet – not recommended!). You may ask your instructor and TA questions on a limited basis. This is **not** a group assignment; however, limited discussion with your classmates is permitted. You may not work with a tutor or receive assistance on this assignment from outside resources. Sharing your work with a classmate or receiving assistance from someone outside of the course is considered a violation of the Mason Honor Code and results in 0 for the assignment in the first attempt and F in the course for the second attempt.

- **LATE ASSIGNMENT IS NOT ACCEPTED after 11:59 p.m. on the due date. Please don't send your late assignments to me or TA via emails as they will be discarded. You need to submit the softcopy to the myMason Portal on or before 11:59 p.m. If not submitted on time, it is classified as LATE.**
- **All the naming conventions used have to be followed the guidelines:**
- **All the variables have to be declared and initialized inside the method before they are used.**
- **No global variables are allowed to be used in your application class.**
- **All methods must be structured programs.**

Programming:

Map

1- (40 points) For this exercise, use the User.java DDC provided in the lecture slides. Create an Application class. Inside the main method, create user objects on demand, and store them in an expandable data structure that supports the following functionalities. Note that phone number is a unique field for each user object.
   a. Search in O(1).
   b. Not allowing duplicates.
   c. Iterator functionality.

Then, implement the following static methods in the Application class:

- Create the static method "Search" to perform searching a user in O(1) based on their phonenumber, on the data structure in O(1) time.
- Create a static method to print all the users' information using an iterator.
- Create a static method to remove a user object if only it exists in the data structure.
- Submit your Application.java file.

Generic Programming

2- (20 points) Revise the classes PQEntry.java and UnsortedPQEntry.java (Course Content > Module 7 > Lab3) such that the key and value fields of each entry support any generic types (K for key, V for value). Submit your java files.

Interfaces

3- (10 points) Change the User.java DDC, so that it supports the Clonable feature. Submit your java file.
4- (30 points) Create an Application class. Use the User.java class from Q3 (after changes are applied), and inside the main method, create a TreeSet collection. Then create 10 User objects and store them all in the TreeSet collection. Create two classes so that the TreeSet method can sort its elements both based on name and gpa. Submit all the java files, including User.java .

Final Submission: Archive your files and submit to BB before the deadline.