Assigned on: Nov. 2, 2016
Due: Nov. 16, 2016 (11:59 p.m.)
Total points: 175

Based on:

- Chapter 19: Generics
- Chapter 24: Implementing Lists, Stacks, Queues, and Priority Queues

Questions from textbook:

1. (50 points) Write a java code and UML diagram for the following:

Simulate a simple calculator that supports the following operations on two inputs:

- Addition
- Subtraction
- Multiplication
- Division
- Average

Requirements:

- The calculator should supports inputs of numeric types (int, double, float, byte)
- Interface concept should be used.
- Exceptions should be included wherever appropriate.

References: Chapter 19: 19.3, 19.4

2. (125 points) Write a simple java program that does the following:

- Create a data structure IntegerArrayList using arrays that supports the following operations:
  - add integer at the end, add integer at the beginning, add integer at a particular index, remove integer at end, remove integer at start, remove integer at a particular index, clear the entire array, return the size of the array.
  - Override iterator() defined in Iterable to traverse the IntegerArrayList and access its elements.

- Create a data structure GenericArrayList using arrays that is a generic version of IntegerArrayList that supports both numerics and strings

- Create a data structure IntegerLinkedList using linked structure that supports following operations:
  - add integers to a list at the end, add integer to a list at the beginning, add integer to a list at a particular index, delete integer from list at end, delete integer from a list at the start, delete integer at a particular index, return the size of the array.
  - Override iterator() defined in Iterable to traverse the IntegerLinkedList and access its elements.

- Create a data structure GenericLinkedList using Linked structure that is a generic version of IntegerLinkedList that supports both numerics and strings

- Test program that does the following:

    - read a set of integer scores (from scores.txt) and store it in an IntegerArrayList called **integerArrayListScores.**
    - read the set of integer scores (from scores.txt) and store it in an IntegerLinkedList called **integerLinkedListScores.**
    - read a set of integer scores (from scores.txt) and store it in a GenericArrayList called **genericArrayListScores.**
    - read the set of integer scores (from scores.txt) and store it in an GenericLinkedList called **genericLinkedListScores.**
    - Display the sum and average of integers stored in **integerArrayListScores, integerLinkedListScores, genericArrayListScores, genericLinkedListScores.**

Sample **scores.txt**

5
20
30
45
55

References: Chapter 24: 24.2 – 24.4

Submission instructions:

- Submit a zipped folder with classes for above programs
  (Note: email submissions will not be accepted. Please ensure that you are able to upload the files to canvas by the deadline.)

Grading (Percent distribution per question)

- Comments and documentation: 10%
- UML diagram 10%
- Meets requirements 40%
- Source code compiles successfully 15%
- Works for given inputs 25%