Homework 3

Due on September 25,2016

September 8, 2016

Notes:

- Please zip the files into a single file named "Homework3.zip" and upload it into the grading area.
- I will use my own Java main method by importing the package into my Java class method to test your code. Please be sure that all the constructors and methods are working in your own main method i.e. design a wide testing main to be sure that everything is working fine.

1. Given the following notations

   (a) Prefix notation - Here instead of having something like X+Y-Z+D, you have operators written before their operands. +-+XYZD

   (b) Postfix notation - Here instead of having something like X+Y-Z+D, you have operators written after their operands DZYX+-+

   Note Clearly the order can be override by the use of parenthesis, but for this simple example we are not taking the parenthesis in account. Instead, we are taking in account the reading order from left to right with the order of the operands inverted to suit our problem.

   Please do the following:

   (a) Use the name "Conversion" for the class.

   (b) Design a recursive Java code with input in an array linear representation using Items of the class Character of a prefix statement with operations (+,-). Then, the recursion returns a list in a postfix notation.

      i. Use the Name "Recursive" for the static method

      ii. Put everything in the package Utilities

   (c) Use the Stack Class of Java to implement the iterative version.

      i. Use the Name "Iterative" for the static method

      ii. Put everything in the package Utilities

   (d) What is the complexity of the Recursive Vs the Iterative Version put your results in a "Readme1.txt"

2. Given arithmetic expressions (+,-) without parenthesis in prefix notation using a Chain, please

   (a) Use the name "Evaluation" for the class.

   (b) Design a recursive Java code to evaluate the expression in the Chain.

      i. Use the name "Recursive" for the static method

      ii. Put everything in the package Utilities

   (c) Use the Stack Class of Java to implement the iterative version.

      i. Use the name "Iterative" for the static method

      ii. Put everything in the package Utilities

   (d) What is the complexity of the Recursive Vs the Iterative Version put your results in a "Readme2.txt"

3. Suppose that you read a binary Chain list—that is, a list of 0s and 1s—one character at a time.

   (a) Design a iterative Java code that uses an stack to see if the numbers of 1's is equal to the number of 0's.

      i. Use the name "Check" for the class

      ii. Use the Name "Iterative" for the static method

      iii. Put everything in the package Utilities

4. Hash Tables

   Please implement a HashTableOpenAddressing.java class where you implement the interface of the hash table using

   (a) The First Universal Hashing Function.

   (b) Please do the necessary test to see that the class works as advertised.

   (c) Additionally test the complexity times of the hash tables under Open Addressing.

Note: We will copy and run our own main static method into the code, please use the names described for each problem