

# CPSC 3200: Algorithm Analysis and Advanced Data Structure

## Summer 2013

### Home Assignment 3

#### **Question #1:** (Programming)

Write a JAVA program that allows the user to enter a mathematical expression to check its validation. Implement the **Parenthesis Matching Algorithm** discussed in class using linked-list Stack to be able to check if a user's mathematical expression is valid or not.

**For example:** (3 \* 21 + 5) is valid, while (4 + 52 \* [ 3 + 2 ] ) is not valid.

#### **Question #2:** (Programming)

Adjust the **Evaluation Expressions Algorithm** discussed in class to work with mathematical expressions including parenthesis, such as (3 \* 2 + (7 / 3)) . Using linked-list Stacks, write a JAVA program that allows the user to enter a mathematical expression, and then evaluate the expression.

#### **Question #3:**

Show the output and the current state of the Stack after each of the following stack operation: push(5), push(3), pop( ), push(2), push(8), pop( ), pop( ), push(9), push(1), pop( ), push(7), push(6), pop( ), pop( ), push(4), pop( ), pop( ).

#### **Question #4:**

Show the output and the current state of the Queue after each of the following queue operation: enqueue(5), enqueue(3), dequeue( ), enqueue(2), enqueue(8), dequeue( ), dequeue( ), enqueue(9), enqueue(1), dequeue( ), enqueue(7), enqueue(6), dequeue( ), dequeue( ), enqueue(4), dequeue( ), dequeue( ).

#### **Question #5:** (Programming)

Assume 10 students are sharing a printer, each student will send a printing job to the printer. Write a JAVA program using a linked-list queue to simulate the printer, where printing jobs will be received at the printer randomly. Indicate the printing job by the student number. Your program should print out the printing jobs in the order they will be processed.

#### **Grading system for each question.**

<b>Description</b>
Class name
Comments for the "author" – FirstName, LastName
Comments for the program description
<b>Code and code comments</b> following the <b>Javadoc</b> style