

CS 2401 Assignment #8

Due Date: Monday, November 19, 07:00AM (See the syllabus for late policy)

Objective: The goal of this assignment is to practice implementing stacks.

Background: A mathematician hires you to write a program that can compute some expressions written in postfix form.

Assignment:

Specific instructions are as follows:

1. Write a class for a stack using a linked list. The stack class must have the name `GenericStack`. You must write regular stack methods (e.g., `createStack`, `isEmpty`, `push`, `pop`, `popAll`, `peek`) in the `GenericStack` class. Stack content must be of `Object` type (that is, the stack can store any data type). Create any other class necessary for the linked list node.
2. Write a class named `Calculator`. The `Calculator` class is the only class that will contain the `main` method. The `Calculator` class will prompt for an input file and read the file line by line. Each line of the file will contain a postfix expression as an input. In the lecture session, we have already seen how we can compute a postfix expression using a stack. Use a `GenericStack` object to compute the value of each expression your program will read from the input file. The actual evaluation must be done in the `Calculator` class. `GenericStack` is the data structure that will be used to evaluate an expression. Report the result for each expression on the terminal. Some expressions may be incomplete; report an error for those expressions.

An example line from an input file is provided below.

6 5 2 3 + 8 * + 3 + *

If you compute (evaluate) this postfix expression, it will result in 288.

An example of an incomplete expression is as follows:

6 5 2 3 + 8 * + 3 +

You will not be able to complete the evaluation of this expression; you must report that the expression is incomplete.

Comment:

- Each operand and operator in an expression will be separated by spaces in the input file.
- You are not allowed to use `java LinkedList` class (that is, `java.util.LinkedList`). You must use your own linked list node.

Deliverables: You are expected to submit more than two Java files (`GenericStack.java`, `Calculator.java`, and any other file(s) to support your linked list) using Blackboard. Your TA will instruct you with further details.