

**Sultan Qaboos University**  
**College of Science - Computer Science Department**  
**COMP 3203: Data Structures and Algorithms, Spring 2023**  
**Homework 3**  
**Due by Saturday 22 April 2023**

**Q1.** (10 points) Download the folder *hwk3\_Q1* available on Moodle (under week 10) containing the 3 source files *DoublyLinkedList.java*, *Node.java*, and *Hw3\_Q1.java*. Familiarize yourself with this project and test all menu options offered in the `main()` function in the *Hw3\_Q1.java* file.

Make all needed changes to transform the doubly linked list to a single linked list (remove all uses of the *tail* and *prev* links). Also, rename the class *DoublyLinkedList* as *SingleLinkedList*.

**Submit the following in a compressed folder called H3\_Q1\_XXX where XXX is your ID.**

- (a) The three modified source code files.
- (b) Screen shots showing a sample run in which you test all the menu options.

**Q2.** (10 points) Write a program that reads repeatedly from the keyboard a prefix expression, converts it to a fully parenthesized infix expression, and determines the value of the expression. **Your program must use a stack** (make use of the Java Stack class). Assume the prefix expression contains only integer numbers and the operators `*`, `/`, `+`, `-`. After reading and processing a prefix expression, your program should ask the user if he/she wants to enter another prefix expression as shown in the example below.

**Example:**

Enter a prefix expression: + 5 \* 10 2

The corresponding infix expression is: (5 + (10 \* 2)) and its value is 25

Do you want to enter another expression (Y/N)? Y

Enter a prefix expression: / \* 3 2 - 7 4

The corresponding infix expression is: ((3 \* 2)/(7 - 4)) and its value is 2

Do you want to enter another expression (Y/N)? N

**Submit the following in a compressed folder called H3\_Q2\_XXX where XXX is your ID.**

- (a) Your program source code file.
- (b) Screen shots showing a sample run of your program.