

## Part A – coding

1. Implement Singly Linked List **detectLoop** which check whether the linked list contains a loop.
  - It's an instance method that takes no parameter. It returns true if the linked list contains a loop that goes on forever if tracing the list from head. It returns false if it does not contain a loop.
2. Implement Doubly Linked List **add** method which add an element to a specific position.
  - It's an instance method that takes a position and an element, then adds the element to this specific position and shifts the element currently at this position and any subsequent elements to the right. It throws an exception if the position is out of bound. It traverses the list from header if the position is closer to the header and traverses the list from trailer otherwise.
3. Implement Polynomial Linked List **add** method which adds two polynomials in standard form and returns sum polynomial which also has to be in standard form.
  - Rewrite the instance method that takes a second Polynomial Linked List, and then adds all terms in the caller Polynomial and all terms in the second Polynomial Linked List together into another sum Polynomial. Both caller and parameter Polynomials are expected to be in standard form, the method should return the sum Polynomial also in standard form. A standard form polynomial has no duplicate terms (each term's exponent is unique) and the exponent is in descending order.

Extra Credit: Implement Polynomial Linked list **multiply** method, similar to add, it returns the result polynomial in standard form.

Submit: Please download the given assignment Linked List

<https://venus.cs.qc.cuny.edu/~yang/sp20/cs313/assignment/A1LinkedList.java>

Change the file and class name to include your initials at the end. eg, if your name is John Smith, please change the file to A1LinkedListSJ and include your name at the very top of the program as comments.

Email your java file to junbinliang66@gmail.com. Write CS313, section number (26-Tue/Thu 12:15 class, 37-Tue/Thu 6:30 class, 51-Fri 1:40 class), time of the class, your name, and A1 in the subject line of your email.