Programming Assignment 5: Linked Lists

CPSC 131: Introduction to Computer Programming II (Fall 2015)

Due December 1, 2015

1 Description of the Program

In this assignment, you are asked to write three methods that 1) read the items from a file into a linked list; 2) remove the first, the middle, and the last item of the linked list; and 3) print the linked list with separators. The prototypes of three methods and requirements are as follows:

1. `public static LinkedList<String> readItems(String fileName);`
   The items from the files could be values, letters or strings. To make you method general enough, you may treat all items have the `String` type.

2. `public static void removeFirstMiddleLast(LinkedList<String> l);`
   The middle item to be removed is the one middle one in the original list, not the middle one in the list after the first item removed. In addition, for the list of even length, there are TWO middle items, you should remove the first middle one (Hint: *you may use the method size()and figure it out which one is the middle element*).

3. `public static void printListWithSeparator(LinkedList<String> l);`
   The list printed should be separated by " -> ", so they should look like as follows: `ITEM1 -> ITEM2 -> ... -> ITEMn`, where `ITEM1`, `ITEM2` and `ITEMn` are the items in the list.

For the testing purpose, three sample files (`input1.txt`, `input2.txt`, and `input3.txt`) are provided. In the `main` method, you should do the followings:

1. Create a linked list to hold the items from the first file (`input1.txt`);
2. Print the linked list;
3. Remove the first, middle and last items from the linked list;
4. Print the linked list after three items removed;
5. Create a linked list to hold the items from the second file (`input2.txt`);
6. Print the linked list;
7. Remove the first, middle and last items from the linked list;
8. Print the linked list after three items removed;

9. Create a linked list to hold the items from the third file (`input3.txt`);
10. Print the linked list;
11. Remove the first, middle and last items from the linked list;
12. Print the linked list after three items removed;

Your outputs should look like the following screenshot:

```
Linked list items (input1.txt):
11 -> 21 -> 31 -> 41 -> 51 -> 61 -> 71 -> 81 -> 91 -> 101 -> 111 -> 121 -> 131 -> 141 -> 151 -> 161 -> 171 -> 181

Linked list items (input1.txt) after removing:
21 -> 31 -> 41 -> 51 -> 61 -> 71 -> 81 -> 101 -> 111 -> 121 -> 131 -> 141 -> 151 -> 161 -> 171


Linked list items (input2.txt):
AA -> BB -> CC -> DD -> EE -> FF -> GG -> HH -> II -> JJ -> KK -> LL -> MM -> NN

Linked list items (input2.txt) after removing:
BB -> CC -> DD -> EE -> FF -> HH -> II -> JJ -> KK -> LL -> MM


Linked list items (input3.txt):
I -> get -> a -> lot -> of -> complaints -> about -> stolen -> and -> abandoned -> shopping -> carts -> in -> Waikiki,
-> and -> I -> was -> thinking -> as -> a -> public -> servant

Linked list items (input3.txt) after removing:
get -> a -> lot -> of -> complaints -> about -> stolen -> and -> abandoned -> carts -> in -> Waikiki, -> and -> I ->
was -> thinking -> as -> a -> public
```

Figure 1: A screenshot of outputs

2 Submission

1. **Electronic submission** (Due by Monday, December 1, 2015 11:59PM)
   (a) Make sure that they run correctly in `BlueJ`;
   (b) Zip up the whole folder `Program5_FirstNameLastName` (e.g., `Program5_DongshengChe`);
   (c) Upload the zip file onto D2L Dropbox.
2. **Hardcopy submission** (Due by Tuesday, December 2, 2015 in class)
   (a) Your hardcopy should include:
   - Grading sheet (top)
   - Source codes (middle): print out through BLUEJ (with line numbers)
   - Output screenshots (bottom)