

CIS2168 006 Assignment 5

Recursively Implemented Linked List

1. Objectives

This assignment will help you to:

- Learn how to program using the linked list data structure
- Understand how recursive data structure works
- Learn how to write and use generic classes

2. Overview

You write a generic class named `LinkedListRec` that implements the singly linked list using recursions. The class must have the following methods. Use recursion to implement most of these methods.

- `size`, `empty`
- `insertBefore`, `insertAfter`
- `addAtHead`, `addAtEnd`
- `remove` – remove an item at a given index
- `removeFront`, `removeEnd`
- `replace` – replace the item at a given index by a new item
- `peekFront`, `peekEnd`
- `toString`

You must also write another class `LinkedListRecTest` that tests the implementation of your class `LinkedListRec`. `LinkedListRecTest` will use `LinkedListRec` class to create a collection of Strings or other objects and call each method in `LinkedListRecTest` to perform some operation.

3. Implementation Requirements

- You must write your own `LinkedListRec` class. You cannot use the one provide in the Java API.
- You must use recursion to implement a method if it makes sense.
- The class `LinkedListRecTest` must present to the user a text-based menu, which includes the operations that will call each method listed in 2 in `LinkedListRec` and the quit option.

4. Major Steps

- a. Understand the related class.
 - i. `LinkedListRec.java`
- b. Revise the class `LinkedListRec` to include all required methods
- c. Write the class `LinkedListTest`.
 - i. First use fixed values
 - ii. Then add the menu

- d. Do Steps b, c incrementally. Add a method to LinkedListRec and then test it in LinkedListTest. Repeat for each method

5. Detailed Hint

- If a method does not involve repetitive handling of the data structure, it does not make sense to use recursion such as

6. Submission Requirements & Grading

This assignment is **due by 11:50PM, Thursday, October 8, 2015.**

Please see the file CIS2168 006 Assign5 Submission Requirements.pdf for more details.