# CS 240 – Data Structures and Algorithms 1

## Programming Assignment #1

### Due date: 4/21/16 10:00 AM

### 20 Points

## Statement

The main aim of this assignment is to develop your knowledge and understanding of the data structure Linked Lists. You will fully complete the empty Linked list class; a node inner class has already been provided. Test your class using the given framework. Make sure to test for all boundary cases.

## Methods

Your program should contain the following methods:

* public LinkedList() - LinkedList Constructor
* public void append(int elem) - adds element to end of the list
* public void prepend(int elem) - adds element to the beginning of the list
* public void insert(int index, int elem) - Post insert, element should be at a given index. Index is 0-based. i.e.: insert (0, 5) is equivalent to prepend(5)
* public void deleteElemAt(int i) - deletes element at index i(0-based)
* public int findElem(int elem) - returns the index of the element found; return -1 if not found
* public int readElemAt(int i) - returns element at index i; return -1 if not found
* public String toString(int elem) - returns space separated list of elements such as "1 3 5 2". For an empty list simply return “”.

## Code

### Download

Download PA1.zip from the Blackboard under Assignments → Programming Assignments → PA1.

### Code Structure

* PA1/
  + src/ - contains source files and any dependencies
    - GenerateScore.java
    - LinkedList.Java - **You should only modify this file**
  + data/ - contains standard data for testing purposes
  + run - A tool to compile, run & test your code.

**Extract and Run**

Download the file PA1.zip. Extract it.

Copy the directory to your ZFS system by following the basic linux guide provided.

Let's say you extracted into 'PA1I' directory. Now, from the terminal:

$cd PA1I

# to run and evaluate your code

$./run.py

### Compatibility

Note that, all assignments will be tested under Linux environment with Python and Oracle JDK 8 is installed. Given code might work on other platforms (like Windows, etc.) but has not been tested. Hence, it is encouraged to develop and test your code in a Linux based environment.

### Evaluation

There is some held out data set against which your code will be tested and evaluated.

## Submission

1. Add the following four lines to the top of LinkedList.java file.

// your name

// CS240, section Number

// Programming Assignment 1

// today’s date

Make sure you write comments describing what you want to do in the code, in most of the places where applicable. *At least 2 points will be deducted if your code is not commented properly.*

2. You should only modify and upload LinkedList.java to Blackboard. **Any change in other files will not be accepted and you will not be evaluated in that case.**

**Evaluation**

There is some held out data set against which your code will be tested and evaluated. Your main aim is to write a Linked List class following the specifications provided.

### Honor Code

I encourage students to discuss the programming assignments including specific algorithms and data structures required for the assignments. However, students should not share any source code for solution.

Code exists on the web for many problems including some that we may pose in problem sets or assignments. Students are expected to come up with the answers on their own, rather than extracting them from code on the web. This also means that we ask that you do not share your solutions to any of the homework ­ programming assignments, or problem sets ­ with any other students. This includes any sort of sharing, whether face­ to ­face, by email, uploading onto public sites, etc. Doing so will drastically detract from the learning experience of your fellow students.