

**CSC 228-01 Data Structures and Algorithms, Spring 2020**  
**Instructor: Dr. Natarajan Meghanathan**

**Assignment 3 (Programming): Design and Implementation of a  $\Theta(n)$  Algorithm to Delete all the Occurrences of an Element in a List ADT**

**Due by:** Feb. 13th, 11.59 PM

In this programming assignment, you will design and implement algorithms to delete all the occurrences of an element (integer data) in a List ADT: implemented using a singly linked list.

You are given the code for the singly linked list-based implementations of a List ADT. The main function in this program is already setup to generate random integers and fill up the contents of the list. The `deleteALL(int deleteData)` function is called on the list to delete all the occurrences of the 'deleteData' in the list.

Your task is to implement the `deleteALL(...)` function in the singly linked list-based implementation of the List ADT. Your algorithm/implementation should run in  $\Theta(n)$  time, where  $n$  is the number of elements in the list before the deletions.

The main function is written in such a way that it will print the contents of the list before and after the deletions.

**Testing Procedure:**

You would test your code by entering 15 as the list size and 5 as the maximum value for any element. The list will be then filled with random integers in the range [1...5]. As there are going to be 15 integers in the list, it will be definitely the case that there will be more than one occurrence for one or more integers in the list. Enter one of such integers as the input for the 'deleteData' and the `deleteALL(...)` function is called with the `deleteData` to delete all the occurrences of `deleteData` in the list.

**Submission:**

- 1) The entire .cpp file for the singly linked list-based implementation of the List ADT.
- 2) Screenshot of the execution of the implementation (using the testing procedure described above) submitted as a jpeg or in some other image file format.