

# CS-241: DSA Weekly Task – 6

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## ADT List

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POINTS: 10 + 10 + 10 = 30

DUE: Sat Sep 19, 2020

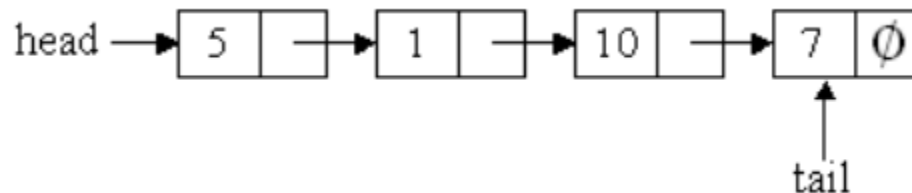
### HOW TO SUBMIT:

1. Create a zip file and add the 4 files: ListInterface.java, LList.java, LListClient.java, and “Changes to the List.PDF” files.
2. Rename the zip file as your ID.
3. TURN IN the zip file.

**Any submission not following any of the above instructions, will not be checked and will be awarded zero points.**

We have discussed the complete implementation of ADT List in the lectures. The complete code, including the ADT, List implementation, and a client (run) program has been shared with you on the Google Classroom page. That implementation only uses one **reference** to point to the **head** of the list. Although the insertion and deletion at the beginning of the list has a time complexity of **O(1)**, but insertions and deletions at the end of the list has a time complexity of **O(n)**.

We wish to implement a list that performs insertion and deletion from the end of the list using **O(1)**. This is achieved by using **two references** in this list: one to point at the **first node** (beginning) of the list, and the other reference to point at the **last node** (end) of the list. For example, the following figure is such a list:



We can see in the above figure that **head** reference points to the first node and the **tail** reference points to the last node. Both **head** and **tail** references are maintained by the list data structure and are updated when insertions or deletions are made to the list.

## WHAT YOU NEED TO DO?

You are required to take the three ADT List files: **ListInterface.java**, **LList.java**, and **LListClient.java**, and make changes so that the above-mentioned list is fully implemented. **Please do not change the names of the files.**

Also, write a short report in which you describe what changes were made in the code, and what methods were changed so that the list was fully implemented. Please type using Microsoft Word and convert to PDF when submitting.

You also need to write a client program (main) that fully demonstrates the list you have implemented. Use the following list as a guide on what files need to be changed for the implementation:

1. ADT **ListInterface.java**: will not be changed
2. **LList.java** will need changes
3. **LListClient.java** will need changes
4. **Changes to the List.PDF** will need to be created

The complete ADT List code will be attached with this file.