FULL SAIL UNIVERSITY

Data Structures and Algorithms

Lab 4: std::list

Overview

The **std::list** class is a templated sequence container that uses a doubly-linked list data to store the data non-contiguously. This has several advantages over the **std::vector**, in both memory overhead and more efficient adding and removing of elements. However, it is not without its downsides, and does not offer random-access iteration, which may be required in some situations.

This lab focuses on using several of the key methods provided by this class. In addition, queue and stack ordering will be re-enforced, as the **std::list** will be treated with this ordering in mind in several methods throughout.

Things to Review

- Stack and queue ordering
    - For the purposes of this lab, we will be treating the front of the list as the front/top

New Topics

- std::list methods

Data Members

mList	The list that will be used in all methods

Methods

QueueOrderingAdd

- Adds all of the values from the parameter into the list using queue ordering

StackOrderingAdd

- Adds all of the values from the parameter into the list using stack ordering

QueueOrderingRemove

- Remove and return the next value in the list using queue ordering

StackOrderingRemove

- Remove and return the next value in the list using stack ordering

Insert (iterator)

- Insert the supplied value at the spot specified by the iterator passed in
- *This is as simple as calling the class' insert method*

Insert (index)

- Insert the supplied value N nodes away from the front node, based on the index passed in
- Requires creating an iterator and "moving it" to the correct position

RemoveDecimalGreater

- Removes all values from the list that have a decimal value greater than the passed-in value (which will always be < 1), and returns the number of values removed
    - Does not care about the whole number portion, so only compare the decimal value
    - **Example list with value passed in as 0.42**
        - 498.28 not removed, because 0.28 is not greater than 0.42
        - 39812.181 not removed, because 0.181 is not greater than 0.42
        - 983.498 removed, because 0.498 is greater than 0.42
        - 3981.89 removed, because 0.89 is greater than 0.42
        - 487.2 not removed, because 0.2 is not greater than 0.42
- *Find a way to isolate only the decimal portion of the values in the list*