CMPSC-122: Intermediate Programming
Spring 2018

Homework 6

Due Date: 04/02/2018, 7:59 am
100 points

Overview

A data structure is a particular way of organizing and storing data in a computer so that it can be accessed and modified efficiently. More precisely, a data structure is a collection of data values, the relationships among them, and the functions or operations that can be applied to the data. [1]

Instructions:

In class, we worked on the implementation of a linked list. That data structure keeps the elements of the linked list unsorted. Based on the LinkedList code, implement the data structure OrderedLinkedList with the following characteristics:

- *OrderedLinkedList*() creates a new ordered list that is empty. It needs no parameters and returns nothing. Assume the items in the list are **unique**
- *add*(*item*) adds a new Node with value=item to the list making sure that the ascending order is preserved. It needs the item and returns nothing. [40 pts]
- *delete*(*item*) removes the Node with value=item from the list. It needs the item and modifies the list. You can assume the Node is present in the list. [20 pts]
- *search*(*item*) searches for the Node with value=item in the list. It needs the item and returns a boolean value. [10 pts]
- *pop*() removes and returns the last Node in the list. It needs nothing and returns an the value of the Node. [20 pts]
- *isEmpty*() tests to see whether the list is empty. It needs no parameters and returns a boolean value. [5 pts]
- *size*() returns the number of items in the list. It needs no parameters and returns an integer. [5 pts]

NOTE: There is no partial credit for methods that do not work properly. Code will be tested calling all methods and comparing the final list

EXAMPLE:

```
>>> ordered_ll=OrderedLinkedList()
>>> ordered_ll.add(8)
>>> ordered_ll.add(7)
>>> ordered_ll.add(3)
>>> ordered_ll.add(-6)
>>> ordered_ll.add(58)
>>> ordered_ll.add(33)
>>> ordered_ll.add(1)
>>> ordered_ll.add(-88)
```

[1] https://en.wikipedia.org/wiki/Data_structure

```
>>> ordered_ll.printList()
-88 -6 1 3 7 8 33 58
>>> ordered_ll.head
-88
>>> ordered_ll.tail
58
>>> ordered_ll.isEmpty()
False
>>> ordered_ll.size()
8
>>> ordered_ll.delete(7)
>>> ordered_ll.printList()
-88 -6 1 3 8 33 58
>>> ordered_ll.delete(-88)
>>> ordered_ll.printList()
-6 1 3 8 33 58
>>> ordered_ll.delete(58)
>>> ordered_ll.printList()
-6 1 3 8 33
>>> ordered_ll.size()
5
>>> ordered_ll.head
-6
>>> ordered_ll.tail
33
>>> ordered_ll.pop()
33
>>> ordered_ll.printList()
-6 1 3 8
>>> ordered_ll.pop()
8
>>> ordered_ll.printList()
-6 1 3 >>>
>>> ordered_ll.head
-6
>>> ordered_ll.tail
3
```

Deliverables:

- Upload the file HW6.py to the Homework 6 Vocareum assigment

[1] https://en.wikipedia.org/wiki/Data_structure