Proposal of Testing Project in CS562

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Date: Jan 26, 2016

The purpose in my proposal is to use TSTL to test a library of linked list. A linked list in computer science is a data structure that includes a group of nodes and these nodes will form a sequence. A simple form of a linked list is that each node is corresponding to the data and then link to the next adjacent node in the sequence.

The source of this library of linked list is from internet as following:
https://github.com/ImrulKayes/DataStructuresAlgorithms/blob/master/linkedList-1.py
This library is written by an individual as a training of programming. So this library can not be recognized as a standard python library and it would expected to have some flaws which is quite eligible to be our testing object by using TSTL.

This test library of linked list is constituted of functions. These functions have the different properties, like inserting the data, removing the data, deleting data, changing the order of the list, printing the list, merging lists together and so on. Here we introduce several main functions in the library and then give a brief description of these functions:

1)Insert: insert one or more sequences of data.
2)PrintList: print the input list in its original given order.
3)ReversePrint: print the input list in a reverse order from the original given order
4)reverseList: reverse the order of the input list
5)removeElements: remove an element from the list
6)deleteDuplicates: delete duplicate elements and each element appears once in the list
7)mergeTwoLists: merge two list into one list
8)rotateRight: find all of the data from given position to tail and rotate these data with the other data in front the given position
9)etc.

To test the library by using TSTL, the correctness of these functions should be checked. Let's talk more in detail. To test the "Insert" function, we could consider inserting different data, such as numbers (etc. int, float), chars, strings in different orders. And these kind of data can be given extreme large or small to test the limitation of this function. For the printing functions, we should test whether it can print a list when it is empty. And we should also ensure whether these print functions perform correctly to display the correct results. In addition, for testing the "removeElements" function, we can try to remove existent

elements appear in position of head and tail, and in other positions of the list to see the result; we can also remove an inexistent element by using the “removeElements” function to verify its correctness.

Function called “deleteDuplicates” could be tested by different ways. For example, we could let the list only contains 2 duplicated numbers, and then execute this function to have a check. The we could increase more duplicate numbers and try this function again. “mergeTwoLists” function can be tested by merge two empty lists. Then we could merge one empty list and other non-empty list together. And again we could merge two non-empty list to see the result too. In testing “rotateRight” function, we could firstly give the position with positive integer and negative integer whose absolute values are less the the length of the list to see how this function acts. Then we can try to give a position number equal “0”. In addition, we can give a positive integer larger than the length of this list to test the correctness of this function. Furthermore, for other functions in the library, we could test them by similar methods mentioned above as well.

This proposal is written based on the present knowledge in Python programming language and the tested linked list library so far. With the study in TEST and functions in Python, small revisions of the proposal are expected to be done in order to get a better testing result.