Reversible List Classes

Due Date:

This assignment is due *Wednesday, 2009-10-07.*

Purpose:

The purpose of this assignment is to investigate the design of a linked-list class with fast reverse, and to compare it against using a standard linked-list class.

A Reversible Linked Class:

Write a class that supports the following operations in $O(1)$-worst-case time:

- appending an element,
- concatenating another list, and
- list reversal.

Your class should provide iterators that are more-or-less standard for the language in which your code is written. Your class should be *generic*, that is be able to contain relatively arbitrary data.

Testing of A Reversible List Class

⇒ Write code that times the creation of large linked-lists that are created from smaller linked lists with the most expensive possible combination of appends and reversals.

⇒ Time your results as a function of the size of the list that you create, and demonstrate that both append and reversal operations have constant time.

Testing of A Standard Linked List Class

⇒ Carefully derive the expected asymptotic time for the above operations on a standard linked-list class (where reversal is $O(n)$.

⇒ Use the Write test code written above to time the creation of large linked-lists that are created from smaller linked lists with the most expensive possible combination of appends and reversals, *using standard linked-lists.*

⇒

Time your results as a function of the size of the list that you create, and demonstrate that total time conforms to your theoretical predictions.

Hand in Format:

E-mail to the instructor a `tar`'d and `gzip`'d file consisting of

- All source code
- `.pdf` versions of all test plots
- Other calculations and data either as text files, TEX files, or `.pdf`-files.

The name of the `tar`'d and `gzip`'d file should be

- `cpsc482-2009-`*surname*`-lab1.tgz`

and it is helpful if the files contained in the `tar`'d and `gzip`'d file are contained in a directory structure

- `cpsc482-2009/`*surname*`/lab1`