CS 6301.502. Implementation of advanced data structures and algorithms

Fall 2017

Long Project 5: Skip Lists

Thu, Oct 26, 2017

Version 1.0: Initial description (Thu, Oct 26).

Due: 1st deadline: 11:59 PM, Sun, Nov 5. Final deadline: 11:59 PM, Sun, Nov 19.

Max marks: 100. Maximum excellence credit: 2 (for rebuild() and get()).

Implement the following operations of skip lists. Starter code is provided.

Do not change the name of the class or move it away from cs6301/gXX.

You can keep other source files in subfolders, if you wish to do so.

Do not change the signatures of public methods in the starter code.

\* add(x): Add a new element x to the list. If x already exists in the

skip list, replace it and return false. Otherwise, insert x into the

skip list and return true.

\* ceiling(x): Find smallest element that is greater or equal to x.

\* contains(x): Does list contain x?

\* first(): Return first element of list.

\* floor(x): Find largest element that is less than or equal to x.

\* get(n): Return element at index n of list. First element is at index 0.

\* isEmpty(): Is the list empty?

\* iterator(): Iterator for going through the elements of list in sorted order.

\* last(): Return last element of list.

\* rebuild(): Reorganize the elements of the list into a perfect skip list.

\* remove(x): Remove x from the list. If successful, removed element is returned.

Otherwise, return null.

\* size(): Return the number of elements in the list.