Homework 8: Recursion and Linked Lists

CSCI 60

Due before class Wednesday, March 4, 2020

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Overview. This week's task is to implement four functions that are recursive and/or related to linked lists.

Submission instructions. Implement all nonmember functions in `node.cpp` and submit this to Camino, keeping the original filenames as usual. A test file is provided for you. Your code should run when `node.cpp` is in the same directory as the `node.h` and `hw8main.cpp` starter files, compiled as follows:

```
g++ hw8main.cpp node.cpp -std=c++11
```

Question 1. (5 points) Write a function to recursively compute the nth item in the following sequence: $a_0 = 1, a_1 = 1, a_2 = 2, a_3 = 3, a_4 = 5, a_5 = 7, a_6 = 10, a_7 = 13, \ldots$, where $a_n = a_{n-2} + n - 1$ for $n \geq 2$. Your function must be recursive.

Question 2. (10 points) Write a function to recursively delete the memory for an entire linked list. The head and tail pointers should be null when the function is complete, and no memory should be orphaned. Your function must be recursive.

Question 3. (10 points) Write a function to recursively reverse the order of the elements in an array of integers. The function will be called on an array, specifying the first and last index of the array to reverse. Your function must be recursive.

Question 4. (15 points) Write a function to reverse a linked list given its head and tail pointers. Your function does not have to be recursive, but it can be!