

# CS 2100: Data Structures, Spring 2018

## Homework 6

Due *via git* by midnight on March 18

For this program, you'll modify the `List.h` and `testList.cpp` files that are posted on the schedule page; *all* of the problems are designed to be added to that class. Please don't forget to add appropriate comments to the functions and to the main, as well.

1. Write the function `T& operator [] (int index)` for the list class. This function should return the element at index `i` in your linked list structure.
2. Write the function `void replace(T val1, T val2)` for the list class, which takes as input two values and replaces all instances of `val1` with `val2` in your list.
3. Write the function `void reverse()` for the list class, which reverses your linked list.
4. Finally, you will also be implementing a sorting algorithm for this assignment in the list class. Add the sorting function of your choice to the `List.h` file as a member function also, and clearly indicate in the name and the comments which algorithms you have chosen. Note that I don't care which algorithm you implement in particular, but you may wish to review these and try to take into account which sorting algorithms are easier to implement in lists!
5. Finally, write a main function to test all of your functions. Please comment and output appropriately, so that by looking at your code and running your main, we can see exactly where and how you are testing each problem.
6. Extra credit: Code a different sorting algorithm for the vector class, again clearly labeled to indicate which sorting algorithm you have chosen. Note that if you do this one, you will need to also submit your revised `Vector.h` (with the sorting function added) and a `testVector.cpp` file that tests your function.