HW14 - Linked Lists [100 pts]

1. Create a *doubly linked list* with at least five nodes using a class template with template methods
   a. Print the linked list
2. Add a copy constructor and overloaded assignment operator to the linked list
   a. Test the copy constructor and the copy assignment operator
3. Read the linked list from part 1 and create another linked list reversing the logical order of the first linked list
   a. Print the linked list
4. Delete the third node of each list. (Also try to (1) delete a non-existent node and (2) delete from an empty list)
   a. Print both linked lists
5. Add a node in the middle of each linked list
   a. Print both linked lists
6. Repeat steps 1-4 using doubles
7. Run *valgrind* to test for memory leaks

Sample printout (similar output for doubles):

Part 1:
Linked list 1: 88 78 62 143 60

Part 2:
Linked list 1 copy constructor: 88 78 62 143 60
Linked list 1 copy assignment: 88 78 62 143 60

Part 3:
Linked list 2: 60 143 62 78 88

Part 4 (after deleting the third node):
Linked list 1: 88 78 143 60
Linked list 2: 60 143 78 88

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Part 5 (after adding a node in the middle of the list):
Linked list 1: 88 78 70 143 60
Linked list 2: 60 143 70 78 88

Part 6 – Repeat Part 1 thru 5 using doubles

Part 7 – Run valgrind memory leak check

Extra Credit [+10 pts]

Implement an *ordered singly (or doubly) linked list* class (suggested name *listOrdered*). This time linked nodes are stored internally in *ascending* order. Perform operations 1 thru 5 as outlined above using *listOrdered*.

Run *valgrind* to test for memory leaks.

Use the command script to capture your interaction compiling and running the program, including all operations, as shown below:

CS1C Summer 2019 MTWTH HW14 100pts **Due: Tu 7/23/2019**

cs1c@cs1c-VirtualBox ~/cs1c/hw/14 $ script hw14.scr
Script started, file is hw14.scr
cs1c@cs1c-VirtualBox ~/cs1c/hw/14 $ date
…
cs1c@cs1c-VirtualBox ~/cs1c/hw/14 $ ls -l
…
cs1c@cs1c-VirtualBox ~/cs1c/hw/14 $ make all
…
cs1c@cs1c-VirtualBox ~/cs1c/hw/14 $ ls -l
…

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cs1c@cs1c-VirtualBox ~/cs1c/hw/14 $ ./hw14

... // print queue output after each addition, deletion operation above
… // print output from linked list steps 1 thru 5 above
… // print output from valgrind memory leak check

cs1c@cs1c-VirtualBox ~/cs1c/hw/14 $ exit
Script done, file is hw14.scr
cs1c@cs1c-VirtualBox ~/cs1c/hw/14 $ make tar
...
Submit the tar package file hw14.tar by Tuesday July 23, 2019.