

Homework 0- Practice & Review

Linked Lists

Project: Build and process a sorted linked list. As an entry-level programmer you have to be able to read, understand existing code and update it (add new features). One of this assignment's goals is to read about 500 lines of code (in five files: [22C_Hw0.cpp](#), [College.hpp](#), [College.cpp](#), [CollegeList.hpp](#), [CollegeList.cpp](#)), compile and run the program, understand it, and change it as required. The existing program does the following:

A. Reads data from a text file (**colleges.txt**) and inserts them into a sorted linked list. Create the input file using the data on the next page. The list is to be sorted in ascending order by the college name (assume it is unique). The **College** class has the following data members: rank, school name, year founded, transfer rate, first year retention rate, cost of attendance, and number of students:

rank (int)	such as 3
name (string)	Santa Barbara City College
year (int)	1909
website (string)	http://www.sbcc.edu
transfer (double)	53.8
retention (double)	84.3
cost (int)	18524
noStu (int)	30687

B. Print the list as a table with the following columns: rank, name, cost, and number of students (header included).

C. Search: prompt the user to enter a college's name, search for that name: if found, display its' data (all members), otherwise display some message, such as "... Not found" – put this in a loop, to search for more items; to stop the loop enter Q

D. Delete: prompt the user to enter the college's name to be deleted – put this in a loop, to delete more items from the list; to stop the loop enter Q

E. Destroy list //no memory leak

YOUR TASK is to read and understand this program. Then do the following:

1. Overload the stream insertion operator. The overloaded operator is going to replace the displayAll() function.

```
col.displayAll(); // old
cout << col;      // new
```

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2. Overload two relational operators: == and < and use them in insertNode(), deleteNode() and searchList()

```
pCur->col.getName() < dataIn.getName() // old
col.getName() == target // old
pCur->col < dataIn // new
col == targetCollege // new
```

This is not a simple task: you will have to make changes to the deleteNode() and searchList() member functions of the linked list class, and as a consequence, you will also have to change the way you call them.

```
void insertNode(College); // old
bool deleteNode(string); // old
bool searchList(string, College &); // old
void insertNode(College); // new
bool deleteNode(College); // new
bool searchList(College, College &); // new
```

3. Run the program once and save the output at the end of the source file as a comment. Compress the source and header files, input and output files (if any), and upload the compressed file: [22C_LastName_FirstName_H0.zip](#) (remove the existing comment)

Extra Credit 1: This assignment does not have to be submitted. However, if you do submit it on time and if it is perfect, you will earn your first Extra Credit Point!

Use the given input file or create the input file using the following data:

```
3 Santa Barbara City College;
1909 http://www.sbccc.edu 53.8 83.4 18524 30687
5 Pasadena City College;
1924 http://www.pasadena.edu 50.2 92.1 17666 26057
7 Napa Valley College;
1942 http://www.napavalley.edu 48.0 88.7 18920 8996
15 Palo Verde College;
1947 http://www.paloverde.edu 31.2 82.7 18266 3898
4 Diablo Valley College;
1949 http://www.dvc.edu 50.2 90.5 20579 22000
6 Foothill College;
1957 http://www.foothill.edu 68.8 87.5 19302 18362
12 College of the Siskiyous;
1957 http://www.siskiyous.edu 59.8 82.0 21936 2473
10 Cuesta College;
1963 http://www.cuesta.edu 50.7 86.2 19135 9571
8 Ohlone College;
1965 http://www.ohlone.edu 52.1 91.1 15878 18000
1 De Anza College;
1967 https://www.deanza.edu 72.7 90.7 19302 24187
9 Irvine Valley College;
1985 http://www.ivic.edu 51.1 90.3 20577 14384
```