# Assignment 8 for CPTN278

**Name:** Timed Algorithms With Lists and a Tree

**References:**

* The text book
* In class notes
* Any other resource you can find other than people

### Assignment Description:

You are to create an application in C++ that uses a Tree Data Structure. You will also be required to provide a detailed description of the program along with conclusions.

The application will build a dynamically linked sorted list of at least 50000 random integers. Then build a dynamically linked unsorted list and binary tree using the same integers. Then search the sorted list, unsorted list and tree for every integer. Provide time measurements for each task performed and display this information. These are the time it takes to

* Generate the integers
* Sorted list Operations
  + Total time spent inserting items on the sorted lists
  + Total time spent searching for every item on the sorted list
* Unsorted list Operations
  + Total time spent inserting items on the unsorted list
  + Total time spent searching for every item on the unsorted list
* Tree Operations
  + Total time spent inserting items in the tree
  + Total time spent searching for every item in the tree

You do not need, and should not, display these integers.

How to generate random numbers, time measurement and tree structure code will be provided.

Details on program requirements, format and construction are provided in class.

### Assignment Deliverables:

1. A C++ class header file containing your tree class data members and member function definitions. The base name of this file must be **CPTN278\_A8\_Tree\_*lastname*.h** where *lastname* is your actual last name.
2. A C++ class body source file containing your tree class source code. The base name of this file must be **CPTN278\_A8\_Tree\_*lastname*.cpp** where *lastname* is your actual last name.
3. A C++ class body source file containing your sorted list class source code. The base name of this file must be **CPTN278\_A8\_List\_*lastname*.cpp** where *lastname* is your actual last name.
4. A C++ class header file containing your sorted list class data members and member function definitions. The base name of this file must be **CPTN278\_A8\_List\_*lastname*.h** where *lastname* is your actual last name.
5. A C++ class body source file containing your unsorted class source code. The base name of this file must be **CPTN278\_A8\_UList\_*lastname*.cpp** where *lastname* is your actual last name.
6. A C++ class header file containing your unsorted class data members and member function definitions. The base name of this file must be **CPTN278\_A8\_UList\_*lastname*.h** where *lastname* is your actual last name.
7. A C++ class header file containing your list node class data members and member function definitions. The base name of this file must be **CPTN278\_A8\_Node\_*lastname*.h** where *lastname* is your actual last name.
8. A C++ class body source file containing your list node class source code. The base name of this file must be **CPTN278\_A8\_Node\_*lastname*.cpp** where *lastname* is your actual last name.
9. A C++ class header file containing your tree node class data members and member function definitions. The base name of this file must be **CPTN278\_A8\_Tree\_Node\_*lastname*.h** where *lastname* is your actual last name.
10. A C++ class body source file containing your tree node class source code. The base name of this file must be **CPTN278\_A8\_Tree\_Node\_*lastname*.cpp** where *lastname* is your actual last name.
11. A C++ application program source file containing your application source code. The base name of this file must be **CPTN278\_A8\_Application\_*lastname*.cpp** where *lastname* is your actual last name.
12. A Microsoft Word 2010 document with the following contents and sections. Each major bullet needs to be a new section. The name of this file must be **CPTN278\_A8\_Description\_*lastname*.docx** where *lastname* is your actual last name.

* Title page
  + Document name
  + Author
  + Creation Date
  + Course Number
* Table of Contents
* Introduction
* A one paragraph description of what the application does
* A description of the program variables and objects
* A description of the class and application source code including
  + The list and correct sequence of steps used to accomplish the task
  + A description of what occurs in a section of code
  + A description of how the variables and objects “change” as a result of executing each section of code
* Captured Program Output
* Conclusions about the application
* Conclusion
* References documented using APA style
* Appendix (if needed)

### Strenuously Recommended Approach:

See Previous Assignments for details.

Post the deliverables to Blackboard via the “Assignment 8” link.

You will be submitting 12 files. They are:

* CPTN278\_A8\_Tree\_lastname.h – The tree class header file
* CPTN278\_A8\_Tree\_lastname.cpp – The tree class body file
* CPTN278\_A8\_Tree\_Node\_lastname.h – The tree node class header file
* CPTN278\_A8\_Tree\_Node\_lastname.cpp – The tree node class body file
* CPTN278\_A8\_List\_lastname.h – The sorted list class header file
* CPTN278\_A8\_List\_lastname.cpp – The sorted list class body file
* CPTN278\_A8\_UList\_lastname.h – The unsorted list class header file
* CPTN278\_A8\_UList\_lastname.cpp – The unsorted list class body file
* CPTN278\_A8\_Node\_lastname.h – The list node class header file
* CPTN278\_A8\_Node\_lastname.cpp – The list node class body file
* CPTN278\_A8\_Application\_lastname.cpp – The application source file
* CPTN278\_A8\_Description\_lastname.docx – Your design document

Use the above link for assignment submissions. Do not submit assignments via the Blackboard Digital Drop Box or forums. Do not use e-mail attachments. Do not hand in hard copies of documents. Please zip them into a single file that has the .zip extension. That is do not use any other zip utilities other than the default from Microsoft Windows. They should not have extensions like .tar, .gz7, .gzip, .rar or anything else, requiring me to use any other zip utilities. The zipped file should only contain these files. Do not zip a folder or directory. Do not include any files other than theses files like .sln or .vcproj files.