CPSC 350 – Data Structures and Algorithms
Fall 2017
Course Syllabus

Instructor: Prof. Rene German (german@chapman.edu)
Time and Place: TTh 11:30 - 12:45pm LLB B13,
TTh 2:30 - 3:45pm LLB B13,
TTh 4:00 - 5:15pm LLB B13
Office Hours: Mon/Wed. 10am-12pm, 2pm-3pm **and by appointment**

Overview: CPSC 350 is an upper-division CS course in which students will develop and understand data structures, the building blocks of computer programs. For this semester, the data structures we will explore include stacks, lists, trees, and graphs. We will also study the basics of algorithm analysis so that students will understand the importance of choosing suitable data structures given a programming task, as well as efficient methods for searching and sorting. CPSC 350 is a challenging course that will provide a foundation for many courses to follow, so doing well in this class will prove beneficial in future semesters. To give you a low-level view of data structure implementation we will use the C++ programming language.

Prerequisites: CPSC 231 is a strict prerequisite for the course. A course in discrete mathematics (MATH 250 or equivalent) may be helpful in understanding the more theoretical aspects of data structures, but is not required.

Units: CPSC 350 is a 3 unit course.

Required Text: *Data Structures & Algorithms in C++*, 2nd Edition, by Goodrich et al. Wiley, 2009.

Course materials: All course materials will be made available via the course site on Blackboard when possible. Blackboard will also be used for submitting assignments, viewing grades, etc.

Homework, Exams, and Grading (subject to change):
Homework will consist of programming assignments to reinforce material covered in class, and must be submitted electronically. All programs must be written in C++ unless otherwise specified. You may develop on any platform you like, but please make sure your code runs the way you want it to on a Linux (Common Linux VM) machine using g++, since this is what I'll be using to evaluate the assignments. Grading will be based on correctness, elegance of solution, and style (comments, naming conventions, etc.)

For CPSC 350 absolutely no late work will be accepted.

There will be short, in-class quizzes administered approximately once every 2 weeks. Quiz questions will be drawn from the text and lectures. If you keep up with the assigned reading they should not be too difficult. If you miss a quiz, you may not make it up. Note that you may be tested on assigned reading even if the material is not explicitly covered in lectures.

In addition to the course text, I will occasionally assign research papers to be discussed at the beginning of class. The goal is to promote lively discussion about the history and future of computer science. You are always welcome to propose papers for these discussions, or other topics that are pertinent to computer science in general.

There will also be the usual midterm and final, which must be taken on the dates specified. In the case of a well-documented, unavoidable conflict, I will do my best to accommodate you.

Programming assignments will count for 30% of the course grade, quizzes for 10%, the midterm for 25%, and the final for 35%.

Note: To receive a passing grade in the course you must receive a passing grade (>60%) in every component (assignments, quizzes, exams) of the course.

Collaboration Policy:
You have much to learn from your colleagues, and so I encourage you to discuss and study course material together. It is also permissible for students to work in groups of *at most* 2 when completing programming assignments, unless otherwise specified. However, all work you submit for this course must be your own. More specifically, you may not present source code or programs copied from the Internet, other texts, other students, etc as your own work. Of course, you are free to use whatever *reference* materials you like, but please cite them in a README turned in with your assignments. I assume you are familiar with Chapman's policy on academic misconduct (reproduced below)…any incidents of academic misconduct will be dealt with severely in accordance with this policy.

Tentative Schedule:

Week	Topic
1	Course intro, C++ Review
2	Arrays
3	Intro to Asymptotic Analysis, Strings
4	Stacks and Queues
5	Linked Lists I
6	Linked Lists II
7	Trees I
8	**Midterm**
9	Trees II
10	Graphs I

11	Graphs II
12	Sorting I
13	Sorting II
14	Heaps
15	Hashing, Review
16	**Final Exam**

Course Learning Objectives:

1. Design software that leverages common data structures to organize and facilitate data processing.
2. Implement data structures such as binary trees and linked lists, and augmenting as needed for specific domain problems.
3. Conduct asymptotic analysis of algorithms using Big-Oh and Big Omega notation.
4. Integrate several data structures to solve problems requiring several facets of data manipulation.
5. Implement mathematical models for hashing schemes.
6. Build distributable software packages of data structures and algorithms
7. Understand the importance of knowing when to use (and when not to use) what data structures.
8. Compare and contrast sorting algorithms
9. Analyze data structure implementations for thread safety.

Program Learning Objectives:

1. Graduates will have mastered the foundational concepts of computing and problem solving.
2. Graduates will be able to utilize design and implementation practices in traditional and emerging technology settings.
3. Graduates will be able to present technical information in both oral and written formats.

Equity and Diversity:

Chapman University is committed to ensuring equality and valuing diversity. Students and professors are reminded to show respect at all times as outlined in Chapman's Harassment and Discrimination Policy: http://tinyurl.com/CUHarassment-Discrimination. Any violations of this policy should be discussed with the professor, the Dean of Students and/or otherwise reported in accordance with this policy.

Chapman University's Academic Integrity Policy*:*

"Chapman University is a community of scholars that emphasizes the mutual responsibility of all members to seek knowledge honestly and in good faith. Students are responsible for doing their own work and academic dishonesty of any kind will be subject to sanction by the instructor/administrator and referral to the university Academic Integrity Committee, which may impose additional sanctions including expulsion. Please

see the full description of Chapman University's policy on Academic Integrity at www.chapman.edu/academics/academicintegrity/index.aspx."

Chapman University's Students with Disabilities Policy

"In compliance with ADA guidelines, students who have any condition, either permanent or temporary, that might affect their ability to perform in this class are encouraged to contact the Disability Services Office. If you will need to utilize your approved accommodations in this class, please follow the proper notification procedure for informing your professor(s). This notification process must occur more than a week before any accommodation can be utilized. Please contact Disability Services at (714) 516–4520 or visit www.chapman.edu/students/student-health-services/disability-services if you have questions regarding this procedure or for information or to make an appointment to discuss and/or request potential accommodations based on documentation of your disability. Once formal approval of your need for an accommodation has been granted, you are encouraged to talk with your professor(s) about your accommodation options. The granting of any accommodation will not be retroactive and cannot jeopardize the academic standards or integrity of the course."