CSC 2054: Data Structures and Algorithms
4 units
Fall 2023

Point Loma Nazarene University
College of Natural and Social Sciences
Mathematical, Information, and Computer Sciences

PLNU Mission
Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Instructor:
>Dr. Benjamin Mood
>bmood@pointloma.edu
>619 849 2269
>RS 216

Meeting Times and Locations:

>MWF – 12:15 to 1:10 in LA101
>T – 12:30 to 2:15 in LA101

Tentative Office Hours:

>M: 11-12pm (Caf) 3:15 – 4:15 (Office)
>T: 11-12pm (Caf)
>W: 11-12pm (Caf)
>R: 11-12pm (Caf) 12-3pm (Office)
>F: 11-12pm (Caf)

Final Time:
>Monday, December 13th at 10:30am

Books:
>*C++ for Java Programmers* by Mark Allen Weiss
>*Data Structures and Algorithm Analysis in C++* by Mark Allen Weiss

Course Description:

Standard data structures, including queues, stacks, trees, and graphs, as objects are defined and illustrated with associated dynamic storage management mechanisms. Introduces formal techniques to support the design and analysis of algorithms, focusing on both the underlying mathematical theory and practical considerations of efficiency. Topics include measuring the complexity of recursive and iterative algorithms, algorithmic strategies, the concept of intractability and the theory of NP. Emphasis is placed on non-numerical algorithms such as sorting, searching, graph and network algorithms both sequential and parallel. Concepts are reinforced through weekly programming assignments. Lecture three hours and laboratory two hours each week.

Learning Outcomes:

Students will be able to write correct and robust software.
Students will use the theory of algorithms and computation to solve problems.
Students will analyze the interaction between hardware and software.
Students will be able to apply their technical knowledge to solve problems.
Students will be able to speak about their work with precision, clarity and organization.
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Students will collaborate effectively in teams.
Students will be able to gather relevant information, examine information and form a conclusion based on that information.
Students will be able to understand and create arguments supported by quantitative evidence, and they can clearly communicate those arguments in a variety of formats.

Department Mission:

The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

Additional Course Information:

Expected time: As this is a 4-unit class (or two units over half the class), it is normal you may spend 8 - 16 hours outside of class on this material (especially while you are learning the harder concepts).

Labs: Labs are used to give students a way to practice the concepts studied in lecture. A completed lab includes answers to the theoretical questions (in a .txt file) AND all code and necessary data files turned in <u>online</u> on canvas. <u>It should be well commented with meaningful variable and function names. Code missing comments or with poor names will not be given full credit.</u> **Labs must be signed off or 5% will be deducted. They can be signed off during lab hours, office hours, or TA hours.**

The lab's code and lab questions are due on canvas BEFORE the start of lab. <u>Any work done once lab has started will be given a zero.</u> I am not planning on accepting late labs. Partial credit will be given, so please turn in whatever is done.

Lab attendance: Lab attendance is required.

Uno AI: CSC2054 students will be creating an AI for a variant of the card game Uno as an end of the semester project. A late Uno project will not be accepted.

Cheating: PLNU requires that each student turns in <u>their own work</u>. <u>Turning in someone else's work, turning in work generated by an AI, turning in code a tutor wrote, or turning it code you found online is cheating</u>. This activities will result in a 0.

In addition, if Dr. Mood suspects that you are not turning in your own work or a student does not understand something they turned in or Dr. Mood suspects cheating for any other reasons, that student will have the privilege of explaining to Dr. Mood the assignment, project, or exam in question as well as closely related questions to demonstrate they really do understand the material. Failure to correctly explain this will result in a 0 and/or any other consequences.

Chat GPT (and other online tools) are banned from this class and their use is considered academic dishonesty (e.g., cheating).

Missed Classes: Homework missed due to PLNU activities (i.e., sports teams, choirs, etc), can be turned in the day after the student is back. Missed exams due to emergencies can be made up once the dean of students informs Dr. Mood that PLNU has approved the reason. Non-emergency missed exams will result in a zero. It is the student's responsibility to inform the professor of when they will be gone. Missed class activities, which are due to a non-dean of students' approved emergency, will result in a zero.

Recordings: Dr. Mood will be recording each class and post the recordings online (assuming he doesn't forget).

Late Assignments: Late assignments will not be accepted in this class.

Grading:

Grades are based on the number of points accumulated throughout the course with the following exceptions:
- In CSC2054, a student must pass at least one written and one programming exam in order to pass the class. That is, a score of 60% must be achieved on one of the examinations, or else the final grade will be an F regardless of all other point totals.

Labs	25%
Programming Exam 1	15%
Programming Exam 2	15%
Midterm/CSC2052 Final	15%
Uno AI	5%

Final   25%

Grading scale
93 – 100%   A
90 – 92%   A-
87 – 89%   B+
83 – 86%   B
80 – 82%   B-
77 – 79%   C+
73 – 76%   C
70 – 72%   C-
67 – 69%   D+
63 – 67%   D
60 – 62%   D-
0 – 59%   F

PLNU Policies

FINAL EXAM POLICY
Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the Class Schedules site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for <u>one</u> of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

STATE AUTHORIZATION
State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on State Authorization to view which states allow online (distance education) outside of California.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing

grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation.

CLASS ENROLLMENT

It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

SPIRITUAL CARE

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

 If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the Office of Spiritual Development.

COURSE CREDIT HOUR INFORMATION

In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 4 unit class delivered over 15 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework.

The following schedule is approximate:

Monday	Tuesday	Wednesday	Thu	Fri
Aug 28 Intro Chapter 1	29 Lab: Visual Studio & First Programs	30 Chapter 2	31	Sep. 1 Chapter 2
4 **No Class**	5 Lab: Functions, Parameters, Arrays, vectors, Strings	6 Pointers Chapter 3	7	8 Pointers Chapter 3
11 Pointers Chapter 3	12 Lab: "Fun" with Pointers	13 Safe IO in C++	14	15 Classes Chapter 4
18 Classes Chapter 4	19 **Programming Exam 1** Pointer lab due before Classes I Lab	20 Classes Chapter 4	21	22 Operator Overloading Chapter 5
25	26 Classes II Lab	27 Sample problems to solve (interview)	28	29 Inheritance Chapter 6
2 Inheritance Chapter 6	3 Inheritance lab	4 Templates	5	6 STL Algorithms 10.8-10.11 /File IO Chapter 9 & next section
9 STL Containers Chapter 10	10 STL Containers & Templates (Maps) + files	11 Review	12	13 **Midterm / CSC2052 Final**

16 Review	17 **Programming Exam 2** Lab due!	18 Algorithms Intro / How to use book / different datastructures /Chapter 2	**19 (Fall Break) No Classes**	**20 (Fall Break) No Classes**
23 DS Chapter 2	24 Stacks and queues lab.	25 Trees DS Chapter 4	26	27 Trees DS Chapter 4
30 Trees DS Chapter 4	31 Tree lab	1 Trees DS Chapter 4 (heap)	2	3 Hashing DS Chapter 5
6 Hashing DS Chapter 5	7 Hashing Lab	8 DS Chapter 7, Sorting	9	10 DS Chapter 7, Sorting
13 DS Chapter 7, Sorting	14 Sorting Lab Uno Project	15 DS Chapter 9	16	17 DS Chapter 9
20 DS Chapter 9	21 Uno Project continue/	22 **Thanksgiving break (No Classes)**	23 **Thanksgiving break (No Classes)**	**Thanksgiving break (No Classes)**
27 DS Chapter 9	28 Uno Project continue/	29 DS Chapter 9	30	Dec 1 DS Chapter 9
4 DS Chapter 9	5 Uno project due @ end of class.	**6** DS Chapter 9	**7**	8 Review
11 **Final Exam**	12	13	14	15