

# CSC2052-1 FA22 - Data Structures In C++

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## CSC 2052: Data Structures & Lab

2052 – 2 units

Fall 2022

## Point Loma Nazarene University

College of Natural and Social 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](mailto:bmood@pointloma.edu) (<mailto:bmood@pointloma.edu>)

619 849 2269

RS 216

### Meeting Times and Locations:

#### Lecture:

**MWF:** 12:15-1:10 in RS265

#### Lab:

**R:** 3:00pm - 4:45pm in RS395

### Office Hours:

Monday: 11:15 - 12:15 @ caf (or PBC on request)

Tuesday: 11:00 - 12:00 @ office, 12:00 - 1:00 @ caf (or PBC on request), 1:00 - 3:00pm @ office

Wednesday: 11:15 - 12:15 @ caf (or PBC on request)

Thursday: 11:00 - 12:00 @ office, 12:00 - 1:00 @ caf (or PBC on request) , 1:00 - 3:00pm @ office

Friday: 11:15 - 12:15 @ caf (or PBC on request)

### **Books:**

**CSC2052** *C++ for Java Programmers* by Mark Allen Weiss

### **Course Description:**

Students transition to the C++ language and are introduced to additional data structures, including queues, stacks, trees, and graphs considering their implementation with both arrays and linked lists. Concepts are reinforced through weekly programming assignments. Lecture three hours and laboratory two hours each week (this is a quad class). Annually. CSC2052 is the first quad of CSC2054.

### **Learning Outcomes:**

Students will be able to write correct and robust software.

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.

Students will be able to write about their work with precision, clarity and organization.

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 online on canvas. It should be well commented with meaningful variable and function names. Code missing comments or with poor names will not be given full credit. Labs must be signed off or 5% will be deducted. They can be signed off during lab hours, office hours, or TA hours.

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

**Lab attendance:** Lab attended is required.

**Grade Complaints:** Students may complain about the grades a TA has graded ONLY to Dr. Mood (that is, students are not allowed to complain to a TA about a grade). However, if you do complain about even a small part of your, Dr. Mood will regrade the entire assignment according to whatever key he creates instead of the key the TA graded with. You may get a higher grade if you are correct, but you may get a lower grade even if you are correct due to how point distributions change.

**Cheating:** PLNU requires that each student turns in their own work. Turning in someone else's work, turning in code a tutor wrote, turning it code you found online, or turning in work that you do not understand or how to solve the problems is cheating. Copying and pasting will result in a 0. If Dr. Mood can demonstrate you copied and pasted from another student or the internet, he will give you an automatic zero on the assignment or whatever punishment he feels is required.

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.

**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.

**Be Courteous and Respectful. Be respectful to me. Be respectful of each other.**

### Grading:

Grades are based on the number of points accumulated throughout the course with the following exceptions:

- In CSC2052, a student must pass at least one programming exam. That is, a score of 60% must be achieved on one of the programming in-class examinations, or else the final grade will be an F regardless of all other point totals.

Labs	30%
Programming Exam 1	20%
Programming Exam 2	25%
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

### SPIRITUAL CARE

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

If you have questions, a desire to meet with the chaplain, or if you have prayer requests, you can contact the [Office of Student Life and Formation \(https://www.pointloma.edu/offices/student-life-formation\)](https://www.pointloma.edu/offices/student-life-formation).

### STATE AUTHORIZATION<sup>Ⓢ</sup>

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 \(https://www.pointloma.edu/offices/office-institutional-effectiveness-research/disclosures\)](https://www.pointloma.edu/offices/office-institutional-effectiveness-research/disclosures) 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 \(https://catalog.pointloma.edu/content.php?catoid=52&navoid=2919#Academic\\_Honesty\)](https://catalog.pointloma.edu/content.php?catoid=52&navoid=2919#Academic_Honesty) 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 \(mailto:EAC@pointloma.edu\)](mailto: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.

## **SEXUAL MISCONDUCT AND DISCRIMINATION**

Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. If you (or someone you know) have experienced any form of sexual discrimination or misconduct,

including sexual assault, dating or domestic violence, or stalking, know that help and support are available through the Title IX Office at [pointloma.edu/Title-IX](http://pointloma.edu/Title-IX) (<http://pointloma.edu/Title-IX>). Please be aware that under Title IX of the Education Amendments of 1972, it is required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at [counselingservices@pointloma.edu](mailto:counselingservices@pointloma.edu) (<mailto:counselingservices@pointloma.edu>) or find a list of campus pastors at [pointloma.edu/title-ix](http://pointloma.edu/title-ix) (<http://pointloma.edu/title-ix>).

### **Final Exam: Date and Time:**

The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

### **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.

### **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 2 unit class delivered over 7.5 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend an estimated 75 total hours meeting the course learning outcomes. The time estimations are provided in the Canvas modules.

### **COURSE MODALITY DEFINITIONS**

1. **In-Person:** Course meetings are face-to-face with no more than 25% online delivery.
2. **Online:** Coursework is completed 100% online and asynchronously.
3. **Online Synchronous:** Coursework is completed 100% online with required weekly online class meetings.
4. **Hybrid:** Courses that meet face-to-face with required online components.

### **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.

**Tentative Schedule**

Monday	Tuesday	Wednesday	Thu	Friday
	Aug 30			
Aug 29 -No Class-	(Monday schedule) Intro / Chap 1	31 Chap 1	Sept 1 Lab: Visual Studio & First Programs	2 Chapter 2
		7	8	9
<b>5 No Class</b>	6	Chapter 2, in class 2d arrays examples (nested loops)	Lab: Functions, Parameters, Arrays, vectors, Strings	Pointers Chapter 3
12		14	15	16
Pointers Chapter 3	13	Chapter 3	Lab: "Fun" with Pointers	Activity. <i>How to debug / Algorithm</i>
			22	
			<b>Programming Exam 1</b>	
19 Safe IO in C++	20	21 Classes Chapter 4	Pointer lab due before	<b>23</b> Chapter 4
			Classes I Lab	

26	27	28	29	30
Chapter 4		Operator Overloading	Classes II Lab	Sample problems to solve (interview)
		Chapter 5		
3		5		
Inheritance	4	Inheritance	6	7
Chapter 6		Chapter 6 / Casting	Inheritance lab	Templates
10		12	13	
STL Algorithms		STL Containers	<b>Programming Exam 2</b>	14
10.8-10.11	11	Chapter 10	Inheritance lab due before	Review
/File IO				
Chapter 9 & next section				
		<b>19</b>		
17		Algorithms Intro / How to use book / different datastructures /Chapter 2	20	
<b>Midterm / CSC2052 Final</b>	<b>18</b>		STL Containers & Templates (Maps) + files	<b>21 (Fall Break)</b>
	<b>Last day of Quad I</b>			<b>No Classes</b>
24		<b>26</b>	27	<b>28</b>
DS Chapter 2	<b>25</b>	DS Chapter 2	Stacks and queues lab.	Review: Stacks & Queues & using them to solve problems
31		2	3	
Trees DS Chapter 4	1	Trees DS Chapter 4	Tree lab	4
				Trees DS Chapter 4
7	8	9	10	11

Hashing		Hashing	Hashing Lab	DS Chapter 7, Insertion sort,
DS Chapter 5		DS Chapter 5		
14		16	17	18
DS Chapter 7, Merge sort/ Quick sort	15	DS Chapter 7, Bucket Sort, Radix sort	Sorting Lab Uno Project	Graphs DS Chapter 9
21		23	24	25
Graphs DS Chapter 9	22	<b>Thanksgiving break (No Classes)</b>	<b>Thanksgiving break (No Classes)</b>	<b>Thanksgiving break (No Classes)</b>
28		30	1	2
Graphs DS Chapter 9	29	DS Chapter 9	Uno Project continue/	DS Chapter 9
5	6	7	8	9
DS Chapter 9		DS Chapter 9	Uno project due	Review
12				Final!!! @ 1:30pm

## Course Summary:

Date	Details	Due
Thu Sep 8, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835678">Lab 1</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835678">https://canvas.pointloma.edu/courses/63287/assignments/835678</a> )	due by 3pm
Thu Sep 15, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835681">Lab 2</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835681">https://canvas.pointloma.edu/courses/63287/assignments/835681</a> )	due by 3pm
Thu Sep 22, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835682">Lab 3</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835682">https://canvas.pointloma.edu/courses/63287/assignments/835682</a> )	due by 3pm
	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835675">Programming Exam 1</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835675">https://canvas.pointloma.edu/courses/63287/assignments/835675</a> )	due by 4:55pm

Date	Details	Due
Thu Sep 29, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835683">Lab 4</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835683">https://canvas.pointloma.edu/courses/63287/assignments/835683</a> )	due by 3pm
Thu Oct 6, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835684">Lab 5</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835684">https://canvas.pointloma.edu/courses/63287/assignments/835684</a> )	due by 3pm
Thu Oct 13, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835685">Lab 6</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835685">https://canvas.pointloma.edu/courses/63287/assignments/835685</a> )	due by 3pm
Thu Oct 27, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835686">Lab 7</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835686">https://canvas.pointloma.edu/courses/63287/assignments/835686</a> )	due by 3pm
Thu Nov 3, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835687">Lab 8</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835687">https://canvas.pointloma.edu/courses/63287/assignments/835687</a> )	due by 3pm
Thu Nov 10, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835688">Lab 9</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835688">https://canvas.pointloma.edu/courses/63287/assignments/835688</a> )	due by 3pm
Thu Nov 17, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835679">Lab 10</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835679">https://canvas.pointloma.edu/courses/63287/assignments/835679</a> )	due by 3pm
Thu Dec 1, 2022	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835680">Lab 11</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835680">https://canvas.pointloma.edu/courses/63287/assignments/835680</a> )	due by 3pm
	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835677">Final</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835677">https://canvas.pointloma.edu/courses/63287/assignments/835677</a> )	
	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/841412">HonorLock Test</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/841412">https://canvas.pointloma.edu/courses/63287/assignments/841412</a> )	
	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835690">Programming Exam Grade</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835690">https://canvas.pointloma.edu/courses/63287/assignments/835690</a> )	
	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835676">Programming Exam II</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835676">https://canvas.pointloma.edu/courses/63287/assignments/835676</a> )	
	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835691">Programming Exam II Grade</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835691">https://canvas.pointloma.edu/courses/63287/assignments/835691</a> )	
	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835692">Programming Exam II Turn-In spot</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835692">https://canvas.pointloma.edu/courses/63287/assignments/835692</a> )	
	 <a href="https://canvas.pointloma.edu/courses/63287/assignments/835693">Programming Exam Turn-In spot</a> ( <a href="https://canvas.pointloma.edu/courses/63287/assignments/835693">https://canvas.pointloma.edu/courses/63287/assignments/835693</a> )	