CS 113-02 : Discrete Structures
Spring — 2023

Instructor Information

Name: Paul Raupach
Email: praupach@Ohlone.edu
Office Hours: Mo-Th 8:00AM - 8:50AM and by appointment
Location: 1201M

Lecture Class Information

Dates: 1/23/2023 - 5/19/2023
Time: T/Th 1:00 PM - 2:25 PM
Location: Building 3, room 3405

Lab Class Information

Dates: 1/23/2023 - 5/19/2023
Time: T/Th 2:25 PM - 3:35 PM
Location: Building 3, Room 3405

Course Description
This course is an introduction to the discrete structures used in computer science with an emphasis on their applications. Topics covered include functions, relations, and sets; basic logic; proof techniques; basics of counting; graphs and trees; and discrete probability. **Lecture Units:** 3

Student Learning Outcomes

Students will be able to

- Describe how formal tools of symbolic logic are used to model real-life situations, including those arising in computing contexts such as program correctness, database queries, and algorithms.
- Relate the ideas of mathematical induction to recursion and recursively defined structures.
- Analyze a problem to create relevant recurrence equations.
- Demonstrate different traversal methods for trees and graphs.
- Apply the binomial theorem to independent events and Bayes' theorem to dependent events

Why I'm excited to teach this class

Discrete math is not like other math classes. Discrete math is, among other things, the study of logic. The problems we study in this class will relate directly to your study and understanding of computer science as well many practical aspects of your day to day life. In my own studies I had a hard time memorizing formulas in trigonometry and calculus, but discrete math is different. We're not going to memorize a bunch of formulas but rather dig in and prove some fundamental truths. Computers at the end of the day are math machines, discrete math machines, understanding discrete structures will fundamentally improve our understanding of computer science. Additionally Discrete Structures prepares us for the study of automata and the very limits of computation.

Textbook, Computer, Connectivity & Software

Textbook: Discrete Structures, provided by zyBooks
The textbook for this class will be online, interactive and rented for $40 for the semester via zybooks. The textbook will be accessed via a link in the Canvas Classroom. For this class you must use the version of the text assigned through the canvas classroom.

Computer: You will need a computer with a modern operating system installed and an internet connection sufficient for accessing the textbook. You will also need to have sufficient permissions on that computer to install development software and tools. If you do not have access to such a computer please check with the College IT Services Student Resources:
https://www.ohlone.edu/it/students.

Canvas: Course materials, assignments, due dates, and other information will be posted on Canvas. (https://ohlone.instructure.com/).

Class Attendance and Participation

It is essential to your success in this course that you attend lectures and participate in the discussions. Therefore, you are expected to attend each lecture and to show up on time. Lectures will take place on both Tuesdays and Thursdays. Missed in class assignments, lab work, or quizzes due to absence or tardiness will be given a zero.

Reading/Assignments

Reading and Assignments from the textbook will be given weekly. The reading and assignments will be covering topics not yet covered in class, this is to encourage preparation for engaging lectures and discussions. The textbook assignments can be repeated an unlimited number of times up to the deadline.

Quizzes

Quizzes will be give approximately weekly and may take place at varying times during the class or lab periods. Quizzes will cover topics from the reading, lecture and lab material. You are not permitted to use any outside materials, or resources on the quiz unless specified by the instructor. Any violation of this policy is a violation of the college's Academic Integrity Policy. *There will be no make-up quizzes, even in the case of an emergency.* A missed quiz counts as a zero. The lowest scored

quiz will be dropped from the final quiz total grade. This dropped quiz is to provide for unforeseen circumstances such as car accidents, family emergencies or illness, including COVID illnesses.

Lab Work

Labs will be both paper and pencil assignments as well as coding assignments. Labs are at the center of the learning process for this course. Lab classes are your opportunity to practice the topics of the class with an instructor and/or other students there to help you when you need it. You are expected to attend all labs in person. The Instructor may ask you to present and explain your work in-person to them during the lab class time. Lab assignments are intended to be done in the lab. While some lab assignments may be completed outside of the class many require you to be present in the classroom.

It is essential for students to complete all of the lab assignments. The purpose of the lab assignments is for you to practice the concepts covered in class. Completing all lab assignments is the best way to learn the material. Assignments will be graded for both completing assignment objectives and coding style.

You are encouraged to work with others on lab assignments. Learning is a social activity! However, do not simply use others to do your work but rather use others to help work through and engage in the concepts. If you work with others on assignments, indicate on your assignment with whom you worked. The work you turn in must be your own, not a copy of another student's work. *Plagiarism is unacceptable* and will result in a zero grade for all persons involved, and will result in serious academic repercussions.

Late Assignments

- Every student will receive 3 late days
- A late day is a 1 business day (Monday through Friday, excluding holidays) extension that can be applied to any programming assignment. They CANNOT be used for quizzes, exams, in class work, group assignments, or extra credit.
- You may use a single extension, or multiple extensions on an assignment
- **You must indicate on your assignment how many late days you wish to use on the assignment when you turn it in.** This can be done on in the assignment comment section in Canvas. **Do not email me to state how many late days you want to use.**
- After all late days have been used up late assignments will not be graded and receive zero points.

Final Exam

The final exam is comprehensive and will be given during a two-hour block on Thursday May 18 at 1:00PM-3:00PM. The final exam will only be given at this time. *There will be no exceptions*. You are expected to be present, and ready to take the exam before the exam begins. If a student has a conflict with another final exam, the student must contact their instructor at least two weeks in advance in order to have it resolved.

Grading

Grades are earned based on the quality of results you deliver. Grades are not based on want, need, or time spent.

Grade Weight

Lab Assignments	15%
Assignments	10%
Team Project	10%
Quizzes	35%
Final Exam	30%

Grade Scale

A	90 – 100
B	80 – 89
C	70 – 79
D	60 – 69
F	0 – 59

Lab Work Rubrics

Each coding assignment will be given a rubric so you can understand why you got the grade you got. The rubric will break the assignment into sections and score it as:

Not Attempted	0%
Attempted	25%
Solid Attempt	50%
Almost Complete	75%
Complete	100%

An example Rubric for a programming assignment:

	Possible	Not Attempted	Attempted	Solid Attempt	Almost Complete	Complete	Score
		0%	30%	70%	85%	100%	
Part 1	30%	0%	9%	21%	25.5%	**30%**	30%
Part 2	30%	0%	9%	21%	**25.5%**	30%	25.5%
Part 3	30%	0%	**9%**	21%	25.5%	30%	9%
Style & Readability	10%	0%	3%	7%	**8.5%**	10%	8.5%
Total							**73%**

In the above example Part 1 in marked "Complete", Part 2 is marked "Almost Complete", Part 3 is marked "Attempted", and Style is marked "Almost Complete" resulting in a final grade of 73%.

Success!

This class is designed for you to succeed. Programming, and learning in general, can be a very frustrating task. But the joy we get when we wrap our heads around a new idea, algorithm or concept is worth the work every time. In my studies and in my 25 years as a professional programmer I "knocked my head against the wall" many times trying to overcome a problem. Most of the time success came when I stepped away, took a break, and approached the problem from a new perspective. The truth is when coding we fail over and over until we get it right, this is part of the process.

Students get an A in my classes often do these things:

- **Start the assignments early**. Often you will get stuck and want to take a break. That's hard to do when up against the due date.
- **Come to all lectures and labs**. If you miss a class you're likely to miss valuable information.
- **Ask lots of questions**. Many of us fear looking foolish when asking questions. I've found that people that ask questions actually look smarter than those that don't. Interrupt me all you want, I'll never be upset if you're asking questions.
- **Do the reading ahead of the class**. Being exposed to the information when we begin talking about it is always better than hearing it from me for the first time.
- **WRITE CODE!** Writers write, painters paint, if you want to be a good programmer write code! Try to code the extra assignments in your textbook, find coding challenges on the internet. Do anything that makes you write more code.

Approximate Schedule

The College has scheduled the final exams. The instructor cannot change the exam date. The following schedule is tentative. The instructor reserves the right to modify as necessary.

Weeks	Week Starting	Topics	Reading
1	01/23	Logic & Basic Propositions	Chapter 1
2	01/30	Quantified Statements	Chapter 2
3	02/06	Quantifiers	Chapter 3
4	02/13	Rules of Inference	Chapter 4
5	02/20	Induction	Chapter 5
6	02/27	Sequences, & Recurrence Relations	Chapter 6
7	03/06	Sets	Chapter 7
8	03/13	Functions	Chapter 8
	03/20	Spring Break	
9	03/27	Relations/digraphs	Chapter 9
10	04/03	Counting	Chapter 10
11	04/10	Advanced Counting	Chapter 11
12	04/17	Probability	Chapter 12
13	04/24	Graphs	Chapter 13
14	05/01	Trees	Chapter 14
15	05/08	Review and Presentations	
16	05/15	Final Exam Thursday May 18 at 1:00PM-3:00PM	

Students with Disabilities

If you have a documented disability and wish to discuss academic accommodations, or if you would need assistance in the event of an emergency evacuation, please contact me as soon as possible. Students with disabilities needing accommodation should speak with the Accessibility Services. https://www.ohlone.edu/sas

Academic Integrity

By enrolling in this class the student agrees to uphold the standards of academic integrity described in the College Document AP 5501 Academic Dishonesty https://www.ohlone.edu/studentservices/academicdishonesty.

The work you do for this course will be completed individually, and must be your own work. You are not to submit other people's work and represent it as your own.

You may discuss general ideas about how to approach an assignment, but never specific details about the code to write. Any help you receive from or provide to classmates should be limited and should never involve details of how to write code. You may not show another student your solution to an assignment, nor look at his/her solution. You may not have any another person "walk you" through an assignment, describe in detail about how to solve it, or sit with you as you write it. You

also may not provide such help to another student. (The only exceptions to this ban are the course instructor, Learning Assistant and on university tutor such as a Lab Assistant.)

Under this policy, a student who gives inappropriate help is equally guilty with the student who receives it. Instead of providing such help to a student who does not understand the assignment, point them to course resources such as the lecture notes, the textbook, or the instructor.

You must also take reasonable steps to ensure that your work is not copied. Make sure to log out of shared computers, do not email your code to other students or post your code on the web, and do not leave printouts of your code in public places. Students who violate this policy will receive no credit on the assignment.

Exams are closed book, closed note, closed slides, and closed internet (Canvas test window being the exception). The exam must be taken solely by the student whose name appears on the test without assistance from anyone else. Answers must be given entirely in the student's own words, copy and pasting of any kind is not allowed.

Any violation of these terms student will receive a score of zero on the assignment or exam. Additionally any violation may result in a failing grade for the course. An Academic Dishonestly Report may also be filed with the college. The filing of an Academic Dishonestly report may result in disciplinary probation, suspension, or expulsion. For more information see: https://www.ohlone.edu/sites/default/files/groups/President_s_Office_/Board/ap_5501_academic_dishonesty_final_04-2019.pdf.

Emergency information

Ohlone College is committed to being a safe and caring community. Your appropriate response in the event of an emergency can help save lives. Information on what to do in an emergency situation (earthquake, electrical outage, fire, extreme heat, severe storm, hazardous materials, terrorist attack) may be found at:
https://www.ohlone.edu/emergency
Please be familiar with these procedures. Information on this page is updated as required. Please review the information on a regular basis.

A Note on Discrimination, Harassment, and Retaliation (DHR)

Title IX and Ohlone College policy prohibit discrimination, harassment and retaliation, including Sex Discrimination, Sexual Harassment or Sexual Violence. Ohlone is committed to protecting students and staff from unlawful sex discrimination, sexual violence, and sexual harassment. Unlawful sex discrimination includes sexual harassment and sexual assault. For more information about policies and resources or reporting options, please visit the following:
https://www.ohlone.edu/titleix

Important Dates
Please see the following links for important dates such as Financial Aid deadlines, Drop dates and

so on: https://www.ohlone.edu/admissions/academiccalendar#fallcalendar

https://www.overleaf.com/project/62fd2044857a4469b33988b3

Respect Policy

Ohlone College is committed to maintaining a safe and healthy living and learning environment for students, faculty, and staff. Each member of the campus community should choose behaviors that contribute toward this end (https://www.ohlone.edu/studentservices/studentcodeofconduct)