

# Data Structures and Algorithms Section 08

## CS 146

Fall 2025. In Person. 3 Unit(s) Aug 20, 2025 – Dec 10, 2025  
Modified Aug 19, 2025

## Contact Information

Instructor: Benjamin Poon  
Email: {TBD}@sjsu.edu

Class Day/Time: Mondays and Wednesdays, 7:30 AM – 8:45 AM  
Classroom: MacQuarrie Hall 324

Office Hours:

- Monday and Wednesday 8:45 AM – 9:00 AM (after class in MacQuarrie Hall 324)
- Monday 3:00 PM – 4:00 PM over Google Meet: <https://meet.google.com/aqh-qpxx-jbt>

## Course Description and Prerequisites

Implementations of advanced tree structures, priority queues, heaps, directed and undirected graphs. Advanced searching and sorting techniques (radix sort, heapsort, mergesort, and quicksort). Design and analysis of data structures and algorithms. Divide-and-conquer, greedy, and dynamic programming algorithm design techniques.

Prerequisites: MATH 30, MATH 42, CS 46B, and [(CS 48 or CS 49J) if CS 46B was not in Java], each with a grade of C- or better; Computer Science, Applied and Computational Math, Forensic Science: Digital Evidence, Software Engineering, Data Science majors only; or instructor consent.

Letter Graded.

## Classroom Protocols

Students are requested to use the provided email to contact the instructor or attend office hours.

Course material developed by the instructor is the intellectual property of the instructor. Students cannot publicly share or upload instructor generated material for this course, including but not limited exam questions, programming assignments, lecture notes, lecture slides, hands-on exercises, or solutions without instructor permission.

## Program Information

At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

## Course Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

- Understand the implementation of lists, stacks, queues, search trees, heaps, and graphs and use these data structures in programs they design.
- Prove basic properties of trees and graphs.
- Perform breadth-first search and depth-first search on directed as well as undirected graphs.
- Use advanced sorting techniques (heapsort, mergesort, quicksort).
- Determine the running time of an algorithm in terms of asymptotic notation.
- Solve recurrence relations representing the running time of an algorithm designed using a divide-and-conquer strategy.
- Understand the basic concept of NP-completeness and realize that they may not be able to efficiently solve all problems they encounter in their careers.
- Understand algorithms designed using greedy, divide-and-conquer, and dynamic programming techniques.

## Course Materials

**Textbook:** Cormen, Leiserson, Rivest, and Stein, Introduction to Algorithms, third edition. MIT Press, 2009. ISBN-10:0262033844 ISBN-13: 978-0262033848

**Technology:** Laptop with internet access, an IDE (Integrated Development Environment), and the ability to compile and run Java applications.

**Information:** Syllabus, programming assignment instructions, etc. can be found on Canvas Learning Management System (<https://sjsu.instructure.com>). You are responsible for regularly checking the messaging system through MySJSU for updates, or other communication system as indicated by the instructor.

## Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so

on. More details about student workload can be found in University Policy S12-3:  
<http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Programming assignments may be discussed with peers, but must be completed individually unless otherwise specified. Code you submit must be written by you. See the **Academic Integrity Policy for AI-Assisted Software** section below for more.

## Grading Information

Course weightings will be as follows:

- 3 Programming Assignments (30%; each 10%)
- Midterm 1 (20%)
- Midterm 2 (20%)
- Final (30%)

Final grades may be curved (up) to raise grades if needed.

Your course grade will be determined by your final weighted average:

A plus = 97% or higher

A = 93% to 97%

A minus = 90% to 93%

B plus = 87% to 90%

B = 83% to 87%

B minus = 80% to 83%

C plus = 77% to 80%

C = 73% to 77%

C minus = 70% to 73%

D plus = 67% to 70%

D = 63% to 67%

D minus = 60% to 63%

F = 0% to 60%

Boundary cases count as the higher of the two grades.

### Late Policy

Programming assignment grades are reduced by 10% per day late. For example, if a programming assignment is turned in minutes after an 11:59 PM due date, that is considered 1 day late and the score is reduced by 10%. Submitting a program 10 or more days late will thus receive a 0.

All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades. See University Policy S20-2 (<https://www.sjsu.edu/senate/docs/S20-2.pdf>) for more details.

# University Policies

Per University Policy S16-9 (<http://www.sjsu.edu/senate/docs/S16-9.pdf>), relevant university policy

concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the Syllabus Information (<https://www.sjsu.edu/curriculum/courses/syllabus-info.php>) web page. Make sure to visit this page to review and be aware of these university policies and resources.

**Academic Dishonesty Statement:** University policy F69-24

(<http://www.sjsu.edu/senate/docs/F69-24.pdf>) states that students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.

It is the aim of the faculty of SJSU to foster a spirit of complete honesty and a high standard of integrity. The University Academic Integrity Policy S07-2

(<http://www.sjsu.edu/senate/docs/S07-2.pdf>) requires you to be honest in all your academic coursework. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The attempt of students to present as their own any work that they have not honestly performed will be considered a violation. During examinations, you must do your own work without collaboration of any kind. Collaborative behavior during examinations may result in failure of the exam, failure of the course, and University disciplinary action.

**Disability Accommodations:** If you require course adaptations or accommodations due to a disability, or if you need special arrangements in case of building evacuation, please schedule an appointment with me as soon as possible or visit me during office hours. Presidential Directive 97-03 mandates that students with disabilities register with the AEC to establish a record of their disability. Although students are not legally required to disclose the nature of their disability to faculty, they need to disclose their AEC registration if they will be utilizing course accommodations. Students are responsible for providing documentation that supports their learning disability diagnosis and justifies requested accommodations. If you have any specific questions or need further assistance, feel free to reach out to the AEC staff at [aec-info@sjsu.edu](mailto:aec-info@sjsu.edu) or call (408) 924-6000 during regular business hours.

**Academic Integrity Policy for AI-Assisted Software:** Use of AI-assisted software must be cited as a reference source. Failure to cite the use of any AI-assisted software constitutes a violation of SJSU policy F15-7 and the School of Information's academic integrity policy (<https://ischool.sjsu.edu/faculty-handbook-academic-integrity>).

# Course Schedule

The schedule is subject to change with advanced notice given.

Date	Lecture #	Topic
Aug 20	1	Intro: Syllabus, logistics
Aug 25	2	Review: Lists, stacks, queues
Aug 27	3	Loop invariants, insertion sort
Sep 1		<b>No class - Labor Day</b>
Sep 3	4	Asymptotic notation
Sep 8	5	Divide and conquer, merge sort
Sep 10	6	Solving recurrences: substitution and recursion tree methods
Sep 15	7	Solving recurrences: master method
Sep 17	8	Heaps, heapsort, priority queues
Sep 22	9	Quicksort
Sep 24	10	Linear time sorts
Sep 29	11	Review for midterm 1
Oct 1		<b>Midterm 1</b>
Oct 6	12	Hash tables
Oct 8	13	Binary search trees
Oct 13	14	Red-black trees
Oct 15	15	Dynamic programming
Oct 20	16	Dynamic programming
Oct 22	17	Disjoint sets
Oct 27	18	Graphs, breadth-first search, depth-first search
Oct 29	19	Topological sort, strongly-connected components
Nov 3	20	Review for midterm 2
Nov 5		<b>Midterm 2</b>
Nov 10	21	Minimum spanning trees
Nov 12	22	Shortest paths: single-source: Bellman-Ford and Dijkstra's
Nov 17	23	Shortest paths: all-pairs: Floyd-Warshall
Nov 19	24	NP-completeness

Nov 24		<b>No class</b>
Nov 26		<b>No class - Non-instructional day</b>
Dec 1	25	NP-completeness
Dec 3	26	Review for final exam
Dec 8	27	Review for final exam
Dec 10		<b>Final Exam (8:30-10:30 AM)</b>