

Introduction to Data Structures Section 01

CS 46B

Spring 2025 In Person 4 Unit(s) 01/23/2025 to 05/12/2025 Modified 01/26/2025

Contact Information

Instructor(s):	Dr. Chung-Wen (Albert) Tsao
Office Location:	MacQuarrie Hall 411
Telephone:	N/A
Email:	chung-wen.tsao@sjsu.edu (Once the class starts, use Canvas Inbox)
Class Days/Time:	1:30PM - 02:45PM
Classroom:	SC 142
Office Hours:	T/R/F 03:30 - 04:30pm at MH411 or on ZOOM at https://sjsu.zoom.us/j/82400634761

Course Description and Requisites

Fundamental data structures including lists, stacks, queues, and trees, with algorithms for inserting, deleting, searching, and sorting information within them efficiently. Additional topics include Big-O analysis, exceptions, hashing, Java collections framework, generics, iterators, interfaces, recursion, and debugging. Weekly hands-on activities.

Lecture 3 hours/lab 3 hours.

Prerequisite(s): CS46Ai½or CS46AXi½(with a grade of "C-" or better). (If CS46A was not in Java, then CS46AW also required.) Math Enrollment Category M-I or M-II and satisfactory score on the Precalculus Proficiency Assessment (70 or higher), or MATH 19i½with a C- or better, or MATH 18Ai½and MATH 18Bi½with C- or better; Allowed Majors: Computer Science, Data Science, Stats, Applied/Computational Math, Software Engineering or Forensic Science: Digital Evidence.

Letter Graded

* Classroom Protocols

- Students will be dropped from the class by the instructor (and will not be given ADD codes) for either one of the following reasons:
 - absence for 1st day of class without informing you before 2nd day of class
 - lack of prerequisites.
- Do not ask for special treatment. The rules for this course apply to everyone equally.
- Cheating will not be tolerable; a ZERO will be given to any cheated assignment/exams, and it will be reported to the Department and the University.
- Do NOT share/post online any course materials, PPT slides, or homework solutions.
- Use of electronic devices during exams is NOT allowed unless stated otherwise.
- You are required to check Canvas for reading/assignments.
- The information on this syllabus is subject to change; changes, if any, will be clearly explained in class, and it is your responsibility to become aware of them.
- Once the class starts, use Canvas Inbox to email me for a faster response. I check the Canvas Inbox emails much more often than my school emails.

Attendance

University policy F69-24 at <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.

Consent for Recording of Class and Public Sharing of Instructor Material:

University Policy S12-7, <http://www.sjsu.edu/senate/docs/S12-7.pdf>, requires students to obtain instructor's permission to record the course: Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material. Course material cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor's consent.

Program Information

Diversity Statement - 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 Goals

Course Description

Intermediate concepts of Java: Classes, Inheritance, Polymorphism, Memory management, Exceptions

Introductory concepts of Data Structures: Stacks and queues, recursion, lists, dynamic arrays, binary search trees. Iteration over collections. Hashing. Searching, elementary sorting. Big-O notation. Standard collection classes. Weekly hands-on activity.

Course Learning Outcomes (CLOs)

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

1. Use and work with basic structures such as linked lists, stacks, queues, binary search trees, and iterators.
2. Implement Java classes that embody data structures.
3. Use pre-existing implementations such as the Java Collections framework.
4. Make relative estimates of the running times of alternative algorithms using Big-O analysis.
5. Formulate and test for pre-and post-conditions.
6. Distinguish between different types of program defects and understand how testing and debugging are used to correct them.
7. Implement simple sorting algorithms such as Insertion Sort and Selection Sort.
8. Implement the Sequential Search and Binary Search algorithms.
9. Implement simple recursive algorithms such as binary tree traversal.
10. Work competently with commonly used tools for software development.
11. Create custom data structures when appropriate pre-existing classes are not available

Course Materials

SBN: ZyBook: CS 46B – Introduction to Data Structures

Required: (This book is created based on Cay S. Horstmann, Big Java: Early Objects and some other references)

- Click any zyBooks assignment link in your learning management system
 - (Do NOT go to the zyBooks website and create a new account)
- Subscribe
- Subscribe (Wait until the book is available)

Big Java: Early Objects, 7e

- **Author:** Cay S. Horstmann,
- **Publisher:** Wiley
- **Edition:** 7/e,
- **ISBN:** ISBN-10 : 1119499534 ISBN-13 : 978-1119499534
- **Optional**

Undergraduate Assistants:

- This course has several learning assistants and lab instructors, and graders.
- The learning assistants are here to help you during in-class exercises and during the lab.
- The lab instructors will introduce the labs and work together with the learning assistants to help you learn the material.
- They are not here to debug your programs.
 - They are here to support you in figuring out how to debug your programs on your own.

Course Requirements and Assignments

The course is delivered in person.

- All students are required to have access to a wireless laptop (running OSX, Windows, or some version ofUNIX), with a camera and microphone, upon which you can install the required software.
 - You will need it for all classes, labs, and exams.
- The technology used will include Canvas, programming in Java, and an IDE (Integrated Development Environment)

Lab:

- The lab projects are an opportunity to put the concepts learned in lecture into practice and to improve students' Java programming.
- Most Fridays, there will be a lab.
- Lab projects will be posted by noon before the lab (Thursday) and are due by 11:59PM the day after the lab (Saturday).
- Usually students will finish during the allotted time.
- Lab projects will be completed in pairs.

- if you miss or submit inadequate lab work more than twice you will fail the course.
 - If you missed or submitted inadequate lab work two times, you must schedule a meeting with the instructor.
- To receive credit for the lab, your group will participate in a short exit interview addressing questions from both the lab and the quiz with the lab instructor or learning assistant.
- If you cannot attend the lab due to illness, please notify both the lab instructor and me before your lab section begins to make alternate arrangements.
 - To make up for a missed lab, you must contact your lab instructor to complete the exit interview during their office hours to get the points for the missing lab.
 - Note that the make-up for a missed lab will still counts as a missed lab and you fail the course for 3 or more missed labs.

Midterm Exams:

- Midterms will only be given during class time.
- Makeup midterm exams will only be given in cases of verifiable emergency.
- Midterm exam dates in this syllabus are approximate and are subject to change.

Move Course Requirement or Assignment Item Up Move Course Requirement or Assignment Item Down Edit Course Requirement or Assignment item Delete Course Requirement or Assignment item

Final Exam:

- The final exam will be cumulative.
- Makeup exams are only given if there is a verifiable emergency or illness OR if a student has more than two final exams within a 24 hour period and notifies the instructor 2 weeks before the last class meeting.

Move Course Requirement or Assignment Item Up Move Course Requirement or Assignment Item Down Edit Course Requirement or Assignment item Delete Course Requirement or Assignment item

Quizzes:

- There will be weekly quizzes throughout the semester.
- The quizzes are designed to help students stay on top of the material and illustrate areas of confusion for both students and the instructor

Move Course Requirement or Assignment Item Up Edit Course Requirement or Assignment item Delete Course Requirement or Assignment item

Technology:

- Students are required to have an electronic device (laptop, desktop or tablet) with a camera and built-in microphone.
- If you do not have access to an electronic device, SJSU has a free equipment loan program available for students ([link](#)).
- You will need a reliable WIFI connection to attend class.

- If you run into issues with technology or WIFI, please reach out to the instructor.

✓ Grading Information

- Final grades will not be adjusted in any way - so an 89.99% is still a B+.
- No incomplete grades will be given.
- No late submission of assignments will be accepted except for the verified emergency such as doctor's notes or family death certificates.

Breakdown

- Homework (15%)
- Lab exam1 (10%)
- Lab exam2 (10%)
- Lab work (10%)
- Quizzes (5%)
- Exam 1 (15%)
- Exam 2 (15%)
- Final (20%)

100% - 97.00%	A+
96.99% - 94.00%	A
93.99% - 90.00%	A-
89.99% - 87.00%	B+
86.99% - 84.00%	B
83.99% - 80.00%	B-
79.99% - 77.00%	C+

76.99% - 74.00%	C
73.99% - 70.00%	C-
69.99% - 67.00%	D+
66.99% - 64.00%	D
63.99% - 60.00%	D-
below 60.00%	F

University Policies

Per [University Policy S16-9 \(PDF\)](http://www.sjsu.edu/senate/docs/S16-9.pdf) (<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) (<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.

Course Schedule

CS 46B-01 / Introduction to Data Structures, Spring 2025, Course Schedule

This schedule is subject to change with fair notice via Canvas)

Main section – Mondays & Wednesdays			Lab section - Fridays		
Week/ session	Date	Topics	Lab	Date	Lab activity
W0					
W1	1/27 & 1/29	Syllabus, Java/ Classes and methods	W1	1/31	Classes and methods

W2	2/3 & 2/5	Classes and methods & Inheritance	W2	2/7	Inheritance
W3	2/10 & 2/12	Generics, converting and casting	W3	2/14	converting and casting
W4	2/17 & 2/19	I/O & Exceptions	W4	2/21	I/O and exceptions
W5	2/24 & 2/26	I/O & Exceptions	W5	2/28	JUnit tests and exceptions
W6	3/3 & 3/5	Recursion	W6	3/7	Recursion
W7	3/10 & 3/12	Review & First exam (3/12)	W7	3/14	Lab Exam1
W8	3/17 & 3/19	Big O & sort &search	W8	3/21	Sort 1&2
W9	3/24 & 3/26	Memory management and & Linked List	W9	3/28	Linked List (1)
W10	4/7 & 4/9	Linked List	W10	4/11	LinkedList (2)
W11	4/14 & 4/16	Stack, Queue, Trees	W11	4/18	Stack
W12	4/21 & 4/23	Trees, BST, custom collection	W12	11/25	Trees

W13	4/28 & 4/30	Hash Tables, Sets & collections,	W13	5/2	BST/Custom Collection
W14	5/5 & 5/7	Review, Second Exam (5/7)	W14	5/9	Lab Exam2
W15	5/12	Review	W15		
Final Exam	Monday, May 19	1:00-3:00 PM			

Other important dates:

Thu, Feb 20	<ul style="list-style-type: none"> Late Add Post Census Request Requirement begins Late Drop/ Semester Withdrawal Petition Requirement begins: Undergraduate (https://sjsu.edu/ue/student-petitions/drops/index.php), Graduate (https://www.sjsu.edu/cgs/current-students/forms/withdrawal-form-instructions.php)
Fri, March 21	Graduation Application Deadline to Qualify for Priority Registration (https://www.sjsu.edu/registrar/graduation/application-central.php) for Undergrads
Mon-Fri, March 31 - April 4	Spring Recess - no classes
Mon, March 31	Cesar Chavez Day - Campus Closed
Thu, April 22	<ul style="list-style-type: none"> Last Day to File Late Drop/ Semester Withdrawal Petition: Undergraduate (https://sjsu.edu/ue/student-petitions/drops/index.php), Graduate (https://www.sjsu.edu/cgs/current-students/forms/withdrawal-form-instructions.php) Last day to submit Late Enrollment Post Census for current semester

Mon, May 12	<ul style="list-style-type: none"> • Last Day of Instruction • Last Day to Complete Coursework for "Incomplete Grades"
Tue, May 13	Faculty Web Access for Grade Posting Opens at 8 am
Wed, May 14 Thu, May 15 Fri, May 16 Mon, May 19 Tue, May 20 Wed, May 21	Culminating Activities & Final Examination Period (https://www.sjsu.edu/classes/final-exam-schedule/spring-2025.php)