SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

Introduction to Data Structures Section 02

CS 46B

Spring 2024 4 Unit(s) 01/24/2024 to 05/13/2024 Modified 01/24/2024

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:	MoWe 3:00PM - 4:15PM
Classroom:	Science Building 164
Office Hours:	T/Th 10:30 – 11:30am at MH411 T/Th/F 10:30 – 11:30am on ZOOM https://sjsu.zoom.us/j/86250414128

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.ï¿½Additional 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): CS46Aï¿½or CS46AXï¿½(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 19ï¿½with a C- or better, or MATH 18Aï¿½and MATH 18Bï¿½with 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 may be dropped from the class by the instructor 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

For a book purchase reference at SJSU: link or you can find it at Amazon or at some other online bookstore of your choice. You can rent the textbook as well, but just make sure you rent it for the entire semester through the final exam. Earlier editions are fine. There aren't specific reading assignments from the text.

Big Java: Early Objects, 7e

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

ISBN: 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)

- Sign in or create an account at learn.zybooks.com
- (Use your SJSU email, and also your name needs to be the same as your name on canvas)
- Enter zyBook code: SJSUCS46BTsaoSpring2024
- Subscribe (Wait until the book is available)

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 a student missed or submitted inadequate lab work two times, they 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 me before your lab section begins to make alternate arrangements.

- You can make up for a missed lab by attending office hours to complete the exit interview.

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.

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.

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

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.
- However, everyone has two passes in the last week of semester to waive the penalty for
  - any two submissions that are each turned in within 24 hours after the due date, or
  - any one submission of that are turned in within 48 hours after the due date.

Breakdown

Grading:

- Homework (15%)

- Lab exam1 (10%)
- Lab exam2 (10%)
- Lab (12%)
- Quizzes/Class Activity (3%)
- Exam 1 (15%)
- Exam 2 (15%)
- Final (20%)

Criteria

Grading Scale					
A+	97%	A	93%	A-	90%
B+	87%	B	83%	B-	80%
C+	77%	C	73%	C-	70%
D+	67%	D	63%	D-	60%
F	below 60.0%				

University Policies

Per University Policy 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) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

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

Main section - Mondays			Lab section - Fridays		
Week/ session	Date	Topics	Lab	Date	Lab activity
W0/s0	1/24	CFA strike	W0/s0	1/26	CFA strike
W1/s1,2	1/29 & 1/31	Intro to Java/ Classes and methods	W1/s1	2/2	Classes and methods
W2/s3,4	2/5 & 2/7	Inheritance	W2/s2	2/9	Inheritance
W3/s5,6	2/12 & 2/14	Generics converting and casting	W3/s3	2/16	converting and casting
W4/s7,8	2/19 & 2/21	I/O & Exceptions	W4/s4	2/23	I/O and exceptions
W5/s9,10	2/26 & 2/38	I/O & Exceptions	W5/s5	3/1	JUnit tests and exceptions
W6/s11,12	3/4 & 3/6	Recursion	W6/s6	3/8	Recursion
W7/s13,14	3/11 & 3/13	Review & First exam	W7/s7	3/15	Lab Exam1
W8/s15,16	3/18 & 3/20	Big O & sort &search	W8/s8	3/22	Sort 1&2
W9/s17,18	3/25 & 3/27	Memory management and & Linked List	W9/s9	3/29	Linked List (1)
w10/s19,20	4/1 & 4/3	Spring Recess	W10/s10	4/5	Spring Recess

w11/s21,22	4/8 & 4/10	Linked List	W11/s11	4/12	LinkedList (2)
w12/s23,24	4/15 & 4/17	Stack, Queue	w12/s12	4/19	Stack
w13/s25,26	4/22 & 4/24	Trees,BST	w13/s13	4/26	BST
w14/s27,28	4/29 & 5/1	Hash Tables, Sets & collections	w14/s14	5/3	Custom collection
w15/s29,30	5/6 & 5/8	Review & Second Exam	w15/s15	5/10	Lab Exam2
W16/s31	5/13	Review			
Final Exam: Wednesday, May 15 2:45-5:00 PM https://www.sjsu.edu/classes/final-exam-schedule/spring-2024.php					

- Other important dates.
  - Mon, Feb 19: Last Day to Drop Classes without a "W" Grade
- Spring 2024 calendar:
  - https://www.sjsu.edu/registrar/calendar/spring-2024.php