College of Science · Computer Science

Introduction to Data Structures CS 46B

Fall 2025 Section 2

Contact Information

Instructor(s): Robert Nicholson
Email: robert.nicholson@sjsu.edu
Class Days/Time: M/W 10:30 – 11:45
Classroom: Duncan Hall 318
Office Hours: W 2-4:00 PM via Zoom: https://sjsu.zoom.us/j/8791841945

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.

Lecture 3 hours/lab 3 hours – weekly hands-on activities.

Prerequisite(s): CS46A or CS46AX (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 19 with a C- or better, or MATH 18A and MATH18B with 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.

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 / 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. .

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

Required: ZyBook: CS 46B – Introduction to Data Structures
(This book is created based on Cay S. Horstmann, Big Java: Early Objects and some other references)

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 of LINUX), 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 before the lab due by 11:59PM the day on the same day. 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

You can get at most half the credit (5/10) from the make-up labs. 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.

Final Exam
The final exam will be cumulative.
Makeup exams are only given if there is a verifiable emergency or illness.

Quizzes
There will be 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. 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%)

Grade Criteria
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), 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 & Wednesdays
Lab section - Fridays

Week/Topics
W0 Introduction, Syllabus
W1 Java/ Classes and methods W1 8/29 Classes and methods
W2 Classes and methods & Inheritance
W3 Generics,
W3 converting and casting
W4 I/O & Exceptions
W5 I/O, Exceptions, and Unit Tests
W6 Recursion
W7 Review & First exam
W8 Big O, Sort & search
W9 Memory management and & Linked Lists
W10 Linked Lists, Stack/Queue
W11 Stack, Queue, Trees
W12 Trees
W13 BST, Sets & collections
W14 Hash Tables
W15 Review, Second Exam (5/7) 12/4
Final Exam