46B: Introduction to Data Structures

Section 3, Fall 2025

Instructor Information

Instructor: Frank Luo

Email: zhiqiang.luo@sjsu.edu

Class Days/Time: M/W 1:30PM - 2:45PM

Classroom: Clark Building 324

Office Hours:

- M/W: 2:50PM - 3:50PM

Grader: Sakshi Tripathy sakshisanskruti.tripathy@sjsu.edu

Lab Instructor: Sindhu Satish sindhu.satish@sjsu.edu

Course Description

Basic data structures and their applications: 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 (CLO)

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

- **CLO1:** Understand and implement basic data structures such as linked lists, stacks, queues, binary search trees, hash tables, and iterators, using Java classes to embody these structures.
- **CLO2:** Utilize pre-existing data structure implementations, including the Java Collections Framework, and create custom data structures when appropriate pre-

existing classes are unavailable.

- **CLO3:** Apply data structures and algorithms to solve real-world problems, including implementing simple sorting algorithms (e.g., Insertion Sort, Selection Sort), searching algorithms (e.g., Sequential Search, Binary Search), and recursive algorithms (e.g., binary tree traversal).
- **CLO4:** Analyze algorithm efficiency using Big-O notation to make relative estimates of running times for alternative algorithms.
- **CLO5:** Develop and test software by formulating and verifying pre- and post-conditions, distinguishing between types of program defects, and applying testing and debugging techniques to correct them.
- **CLO6:** Work competently with software development tools commonly used in programming and data structure implementation.

Prerequisites

1. Knowledge of Java equivalent to CS 46A (in Java) or CS 49J (with grade of C- or better).
2. Math Enrollment Category M-I or M-II and a satisfactory score on the Precalculus Proficiency Assessment (70 or higher), or MATH 19 with a C- or better.

Required Texts/Readings

Textbook:

- **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.
  - Access: Click any zyBooks assignment link in your learning management system (e.g., Canvas). **Do NOT go to the zyBooks website and create a new account.**
  - Subscription: Wait until the book is available, then subscribe through the learning management system.
- **Big Java: Early Objects, 7e (Optional)**
  - Author: Cay S. Horstmann
  - Publisher: Wiley
  - Edition: 7th
  - ISBN: ISBN-10: 1119499534, ISBN-13: 978-1119499534

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 UNIX), 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 count 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 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 (https://www.sjsu.edu/it/services/academic-tech/equipment-loan.php).
- 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

The final grade will be based on the following:

- Programming assignments: 40%
- Written assignments: 10%
- Midterm Exam 1: 15%
- Midterm Exam 2: 15%
- Final Exam: 20%

Grading Scale: Grades will be calculated in the following manner: The person or persons with the highest aggregate score will receive an A+. All scores will be scaled with A+, for example, highest score is 85, then it will be scalled by 1.17647 (85*1.17647 = 99.99995).for all scores.

Percentage	Grade
97–100%	A+
93–96%	A
90–92%	A-

87–89%	B+
83–86%	B
80–82%	B-
77–79%	C+
73–76%	C
70–72%	C-
67–69%	D+
63–66%	D
60–62%	D-
Below 60%	F

Classroom Protocol

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 ensure 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 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.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc., will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/. Make sure to review these policies and resources.

Tentative Course Schedule

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

Week	Date	Topics
1	Aug 20	Introduction to the Course
2	Aug 25, 27	Java Class, Inheritance, Abstract Class and Interface
3	Sep 3	Interface
4	Sep 8, 10	I/O and Exception Handling
5	Sep 15, 17	Algorithm Complexity and Big O
6	Sep 22, Sep 24	Recursion
7	Sep 29, Oct 1	Review, Midterm Exam 1

8	Oct 6, 8	Sorting and Searching
9	Oct 13, 15	Java Collections Framework
10	Oct 20, 22	Basic Data Structures – Linked/Array List
11	Oct 27, 29	Basic Data Structures – Stack, Queue, HashTable
12	Nov 3, 5	Review, Midterm Exam 2
13	Nov 10, 12	Trees
14	Nov 17, 19	Trees (No class Nov 27 – Thanksgiving Recess)
15	Nov 24	Trees (Heaps)
16	Dec 1, 3	Review
17	Dec 8	Review
Final Exam	Dec 16	Final Exam, 1:00-3:00pm

SJSU Academic Year Calendar: Refer to the SJSU academic calendar for additional details.