CS 46B: Introduction to Data Structures, Section 01, Fall 2021
Computer Science Department
San José State University

Course and Contact Information

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Office Hours: Tuesdays from 3:00 pm to 5:00 pm (zoom) and Thursdays (in person and/or zoom) from 10 am - 12:00 pm or by appointment
Class Days/Time: Mondays and Wednesdays from 4:00 pm to 5:15 pm
Classroom: Zoom

Prerequisites: Knowledge of Java equivalent to CS 46A (in Java) or CS 49J (with grade of C- or better). 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, or MATH 18A and MATH 18B with C- or better. Submit evidence of prerequisites by 8/24 in canvas.

Course Description

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 Format

The lectures for this course will be online. The lab portion of the course will be in person on Fridays. The first 45-50 minutes of class will consist of addressing student questions and lecture. That portion of the class will be recorded and available for viewing on canvas the following day. The remaining 30 minutes of class will be devoted to individual and/or small group exercises and will not be recorded. The lectures will be recorded using the shared screen without active speaker setting in Zoom to maintain the anonymity of students.

Most labs will begin with a 15-20 minute quiz covering the material from the lectures that week. The quiz will be followed by a brief introduction to the lab by the lab assistant. The remaining time will be used for students to complete the lab in teams of two students. If you cannot attend the lab due to illness, please notify me before your lab section begins to make alternate arrangements.

Zoom

Lecture: https://sjsu.zoom.us/j/83945488692?pwd=R1VIVlBMeTVVWjQ1N29QaE1QRmUyQT09
password: 728844
Office Hours Tues: https://sjsu.zoom.us/j/87585495994?pwd=ZmwvZnVFTXViY2pOY3lnTndYdUVndz09
password: oh_f2021
Office Hours Thurs: https://sjsu.zoom.us/j/83327003075?pwd=c3EwdkN6YkNuVDdKcWJjWWNRd0FUZz09
password: oh_f2021

Canvas

All course material will be posted on canvas including lectures, homework, homework solutions, labs, and lab solutions. Please check this page regularly as it can also serve as a forum for students to ask questions. This is a large class and if a student has a question it is likely that other students also have the same question and another student may be able to answer it. Occasionally the instructor or course assistants may provide insight, but the forum is designed to be a place for peers to help each other. For help with using Canvas see Canvas Student Resources page.

Course Learning Outcomes (CLO)

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

Required Text

Textbook

Big Java: Early Objects, 7e Abridged Print Companion with Wiley E-Text Reg Card Set 7th Edition by Cay S. Horstmann
ISBN-10 : 1119499534
ISBN-13 : 978-1119499534

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.

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. Learn Anywhere (link) has information about accessing WIFI. If you run into issues with technology or WIFI, please reach out to the instructor.

Course Requirements and Assignments

Lecture: Students are expected to attend lectures and participate. The last 25 to 30 minutes of class will involve working in small groups to solve example problems and present potential solutions to fellow classmates.

Homework: Homework will be assigned approximately once a week on Sunday. Homework will be due after either one or two weeks depending on the assignment. Homework must be submitted by 4PM on the due date. There are 8

substantial programming assignments along with progress reports on the project or other written assignments. Students are allowed two 24 hour extensions (the assignment must be submitted by 4PM the day after the due date). Graders will keep track of these extensions. For one or two of programming assignments 2, 3, 4, 5, 7, or 8 chosen at random students will participate in an interview with a grader. These interviews will be 15 minutes and are designed for students to demonstrate the knowledge of the programs they produced. These interviews will be virtual on Zoom. Students will receive a message the day after the assignment is due to sign up for an interview grade.

Project: There will be one project where students will work in teams of two to use the skills learned in the course to address a problem of interest. Each team will present a 90 second lightning talk during week 15 describing their problem and solution.

Lab: The lab projects are an opportunity to put the concepts learned in lecture into practice and to improve students' Java programming. Lab projects will be posted by 5PM on the evening before the lab (Thursday) and are due by 5PM the day after the lab (Saturday). Usually students will finish during the allotted time. Lab projects will be completed in pairs. Lab projects aren't graded, but 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 (link).

Quizzes: There will be a 15-20 minute quiz at the start of every lab for a total of 14 quizzes throughout the semester. The two lowest quiz scores will be dropped. The quizzes are designed to help students stay on top of the material and illustrate areas of confusion for both students and the instructor. The beginning of Tuesday lecture will go over parts of the quiz.

Final Exam: Wednesday, December 8, 2021 from 2:45 - 5:00. Location To be determined (potentially online). 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.

Per University Policy S16-9, success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Grading Information

Grades will be posted to canvas, but they do not represent your weighted average in the course.

- Homework (35%)
- Grading Interviews (10%)
- Participation (5%)
- Project (10%)
- Quizzes (20%)
- Final (20%)

Grade	*At least*
A	*93 %*
A minus	*90 %*
B plus	*87 %*
B	*82 %*
B minus	*80 %*
C plus	*77 %*
C	*72 %*
C minus	*70 %*
D plus	*67 %*

D	*62 %*
D minus	*60 %*

Collaboration Policy

Collaboration is encouraged, but you must cite the classmates you work with and you cannot copy their code.

Cheating

If a student is caught cheating on a homework assignment, the student will receive a 0 on that assignment. If a student is caught cheating on a quiz or exam, the student will receive a 0. Incidents of cheating will automatically count towards a student's grade and are not subject to the lowest scores dropped language used in the previous section. A second incident of cheating will result in the student receiving an F in the course. All incidents of cheating must be reported to the University per University Policy F15-7.

Latework

Latework is not accepted for lab assignments. Two 24 hour late passes are available for homework assignments.

Classroom Protocol

Cameras do not have to be on during the lecture portion of the class. Cameras are encouraged when working in breakout rooms and when presenting to the class.

Per University Policy S12-7, course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without permission. Students may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent. This includes unauthorized recording or posting of recordings of lectures. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. These policies are designed to protect student privacy and ensure academic integrity.

University Policies

Per University Policy S16-9, 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 Syllabus Information web page (https://www.sjsu.edu/curriculum/courses/syllabus-info.php). Make sure to visit this page to review and be aware of these university policies and resources.

Additional Information

Basic Needs

It is hard to succeed in any course if your basic needs are not met. SJSU has resources to assist with food or housing insecurity, emergency financial loans, and other assistance at SJSU Cares. A list of SJSU resources for student success (tutoring and other educational support), basic needs, mental health resources, COVID-19 relief resources, affinity groups on campus, and other helpful resources can be found on Canvas and here (link). This list is adapted from a list created by Dr. Wilkinson in the biology department. These resources are available in order to help you succeed and make sure your basic needs are met. Please do not hesitate to make use of any available resources. If you have any questions or additions to this list, please reach out to the instructor.

Tutoring

There are tutors available to help you through both the computer science department and peer connections. Look on canvas for schedules and more information.

Computer Science 46B Fall 2021 Course Schedule

Topics are subject to change.

Week	Date	Topics
1	8/23	Introduction to Course, Introduction to Data Structures
1	8/25	Introduction to Data Structures (cont.), Inheritance
2	8/30	Polymorphism
2	9/1	Inner Classes, Interfaces
3	9/6	Labor Day. No Class
3	9/8	Equality and Comparison
4	9/13	Sets
4	9/15	Exceptions and Assertions
5	9/20	I/O
5	9/22	I/O
6	9/27	Recursion
6	9/29	Recursion and Backtracking
7	10/4	Sorting and Searching
7	10/6	Sorting and Searching
8	10/11	Algorithm Complexity and Big O
8	10/13	Midsemester Review
9	10/18	The collections framework
9	10/20	Hash Tables
10	10/25	Trees
10	10/27	Trees
11	11/1	Custom Collections
11	11/3	Custom Collections
12	11/8	Binary Search Trees
12	11/10	Problem Solving
13	11/15	Tree Algorithms
13	11/17	General Graphs
14	11/22	General Graphs
14	11/24	No Class. No Lab on Friday
15	11/29	Lightning Talks
15	12/1	Lightning Talks and Review
16	12/6	Review (last day of class)
Final Exam	12/8	2:45 - 5:00 (location TBD, potentially online)