

CS 46B: Introduction to Data Structures, Section 01, Spring 2022

Computer Science Department

San José State University

Course and Contact Information

Instructor: Alexandra Gendreau Chakarov, PhD

Office Location: MacQuarrie Hall 416

Telephone: 408-924-5065 (email preferred)

Email: alexandra.chakarov@sjsu.edu

Office Hours: Tuesdays from 3:00 pm to 4:00 pm and Wednesdays from 2:30 pm to 4:30 pm or by appointment

Class Days/Time: Tuesdays and Thursdays from 10:30 am to 11:45 am

Classroom: Washington Square Hall 109. Zoom for the first three weeks.

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 1/30 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

When deemed safe by the University, lecture and lab will be in person. Until that time both lecture and lab will meet online. During online instruction, the lecture portion of the class will be recorded and posted on Canvas. Students will engage in small group work (in breakout rooms during online instruction) supported by the instructor and three learning assistants.

Most Friday's there will be a lab. The first lab is on February 4. The lab will begin with a quiz (ungraded) and then students will progress through a programming activity working in small groups. 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 miss more than two labs, you will fail the course. 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.

Zoom

Lecture: <https://sjsu.zoom.us/j/83945488692?pwd=V0k5c2ZhRFo1dDltQ2xvN245Y1VBZz09>

Office Hours: <https://sjsu.zoom.us/j/87585495994?pwd=MIBZaHJ4ckwzTU9qazVpMkc2WFpYdz09>

Canvas

All course material will be posted on canvas including lectures slides, in class exercise, homework, and labs. It is your responsibility to check canvas regularly. For help with using Canvas see [Canvas Student Resources page](#).

Discord

Please join the class discord channel (<https://discord.gg/W8WQ8axhmN>). This channel serves as a place to ask questions and collaborate with classmates. There is a specific channel for lecture questions that will be monitored by the learning assistants during class. Please make your nickname your actual name followed by your lab section number (e.g., Emily Cooper 13). This will allow me to assign you to the right channels within the course.

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

Recommended 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 in small group exercises.

Participation: There will be weekly surveys. The percentage of surveys students complete will be the participation grade. I reserve the right to increase this grade based on your participation on the class discussion board.

Homework: Homework will be assigned approximately once a week. Homework will be due after either one or two weeks depending on the assignment. Homework must be submitted by 11:59PM on the due date.

Grading Interviews: Students will participate in two grading interviews during the semester 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 if they have been assigned a grading interview.

Lightning Talk Review: You will have 90 seconds to explain a topic from the course at the level a 5th grader could understand. For inspiration see @coderintuition on TikTok ([link](#)). You will give the lightning talk during the last lab of the semester. More information will be provided including a list of topics near the end of the semester.

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 completed in teams of three. You will be assigned a lab team during the first lab. This will be your group for the first half of the semester. This team may change after Spring Break. To get credit for completing the lab, your group must complete an exit interview. If you miss more than two labs, you will fail the course. To make up for a missed lab, you must attend office hours to complete the exit interview.

Quizzes: There will be short quizzes at the beginning of each lab. 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 questions will be reviewed during the lab exit interview.

Exams: There will be two exams during the semester. The first one is Thursday, March 3 and the second one is Thursday, April 21. Makeup exams are only given if there is a verifiable emergency or illness or if prior arrangements have been made at least two weeks before the exam.

Final Exam: Friday, May 20, 2022 from 9:45am - 12:00pm. The final exam will be cumulative. Makeup exams are only given if there is a verifiable emergency or illness or if prior arrangements have been made at least two 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.

- Homework (30%)
- Grading Interviews (10%)
- Participation (5%)
- Project (5%)
- Lab (5%)
- Exam 1 (12.5%)
- Exam 2 (12.5%)
- Final (20%)

<i>Grade</i>	<i>At least</i>
<i>A</i>	93 %
<i>A minus</i>	90 %
<i>B plus</i>	87 %
<i>B</i>	82 %
<i>B minus</i>	80 %
<i>C plus</i>	77 %
<i>C</i>	72 %
<i>C minus</i>	70 %
<i>D plus</i>	67 %
<i>D</i>	62 %
<i>D minus</i>	60 %

These percentages are the highest possible percentages needed to receive the grade. I reserve the right to lower these percentages, but not increase them.

Collaboration Policy

Collaboration is encouraged, but you must cite the classmates you work with and you cannot copy their code. This includes sharing large blocks of code on discord.

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 an exam, the student will receive a 0. 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 subject to penalty based on how late it is. Work submitted over one week late will not be accepted unless arrangements have been made with the instructor.

Classroom Protocol

During online instruction, 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. Once in person instruction resumes, please refrain from using laptops/phones/etc. unless you are engaging with the class materials or activities.

University Policies

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.

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) (<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.

Undergraduate Assistants

This course has six undergraduate learning assistants and six undergraduate lab instructors. 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 to figure out how to debug your programs on your own.

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 Spring 2022 Course Schedule

Topics are subject to change.

Week	Date	Topics
1	1/27	Introduction to Course, Introduction to Data Structures
2	2/1	Introduction to Data Structures (cont.), Inheritance
2	2/3	Polymorphism
3	2/8	Interfaces
3	2/10	Equality and Comparison
4	2/15	Sets
4	2/17	Exceptions and Assertions
5	2/22	I/O
5	2/24	I/O
6	3/1	Review
6	3/3	Exam 1
7	3/8	Recursion
7	3/10	Recursion
8	3/15	Sorting and Searching
8	3/17	Sorting and Searching
9	3/22	Algorithm Complexity and Big O
9	3/24	The collections framework
	3/29	Spring Break
	3/31	Spring Break
10	4/5	Custom Collections
10	4/7	Stacks
11	4/12	Linked Lists
11	4/14	Linked Lists
12	4/19	Review
12	4/21	Exam 2
13	4/26	Queues
13	4/28	Trees
14	5/3	Binary Trees
14	5/5	Binary Search Trees
15	5/10	Hash Tables
15	5/12	Review (last day of class)
Final Exam	5/20	9:45 - 12:00