San José State University
Computer Science Department
Computer Science 46B: Introduction to Data Structures, Fall 2020

Course and Contact Information

Instructor: Philip Heller

Email: philip.heller@sjsu.edu

Class Days/Time: Mondays and Wednesdays, 3:00 – 4:15 PM, San Jose time. See below for Zoom link.

Zoom Office Hours: Mondays 1:30 PM – 2:30 PM, Tuesdays 8:30 – 9:30 PM, or by appointment.

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 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.

Zoom Links:
Lectures:
https://sjsu.zoom.us/j/94682988226?pwd=OE5nOUkrUVZzWHJGcDA1QjMreVQ5dz09
password = 1o814u
Monday Afternoon Office Hours:
https://sjsu.zoom.us/j/95056483627?pwd=MVBDZWNFNHZQRnZHSEpseWVxQ05EUT09
password = 2n926l
Tuesday Night Office Hours:
 https://sjsu.zoom.us/j/96163996479?pwd=SGFoNzF6OVRwbFNBd3JBWlg5em9kdz09
password = 0h333s

Course Format

Lectures: Traditional lecture format. Most lectures will be recorded and posted to Canvas.
Labs: Brief introduction by lab TA, followed by lab exercises.

Canvas

Course materials, including recorded lectures, slides, homework assignments, homework solutions, lab assignments, and lab solutions will be posted to the course Canvas site.

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 Learning Outcomes

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 defect, 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.

Textbook

Big Java Early Objects--EText by Cay S. Horstmann. It is available from

- the bookstore ISBN 9781119499459 (E-Text only) or 9781119499534(E-Text + loose leaf book)
- direct from the publisher (Wiley)

It's ok to use an earlier edition if that will save you some money. There will be no reading or programming assignments from the book.

Course Requirements and Assignments

Lectures: Students are expected to attend all lectures, either live via Zoom or by watching recordings. Any material presented in any lecture may be tested in any subsequent midterm or final exam.

Homework: There will be approximately 8 substantial programming assignments. No late homework will be accepted for any reason except documented medical emergency. The lowest homework grade will be dropped.

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: Thursday Dec 10, 12:15 PM. The exam will only be given during class time. Makeup final exams will be only be given in cases of verifiable emergencies or, if the instructor is notified at least 3 weeks before the last class meeting, to students with at least 2 other finals in a 24-hour period.

Lab: All students must concurrently enroll in a lab section. The first lab meeting will be on Friday August 28 (the week after the first lecture). Labs are led by student TAs. All labs involve programming in Java, using the Eclipse IDE; try to install Eclipse before your first lab meeting. Code and a report must be submitted at the end of each lab session. Lab work is not graded, but students who miss lab, or submit inadequate lab work, 2 or more times will fail 46B.

Lab assignments will be posted by noon (San Jose time) on the day before each lab session. Code and reports are due at noon (San Jose time) on the day after each lab session. Attending lab Zoom sessions is not required, but the session is the only time when you have guaranteed live access to your lab instructor.

Grading:

Homework: 40%
Midterm 1: 15%
Midterm 2: 15%
Final Exam: 30%

At least	Letter Grade
93%	A
90%	A-
87%	B+
83%	B
80%	B-
77%	C+
72%	C
70%	C-
67%	D+
62%	D
60%	D-
<60%	F

Conduct

Students are expected to be honest and respectful at all times. Cheating and intellectual property violations are not tolerated.

Cheating includes receiving information of any kind during an exam, other than the information in the Java API pages, or giving information to another student. The first time a student is caught cheating on an exam, they will receive zero points on that exam, and their final grade will be reduced by 2 points (e.g. A- becomes C-). The second time, they will receive an F in the course. All incidents of cheating will be reported to the university, which may impose further sanctions.

All course materials, including slides, homework assignments, lab assignments, exams, and instructor's solutions, are the instructor's *intellectual property* and may not be distributed without permission. Distribution includes posting to social media sites. Distribution is grounds for failing the course, and all incidents will be reported to the university, which may impose further sanctions.

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](http://www.sjsu.edu/gup/syllabusinfo/) at http://www.sjsu.edu/gup/syllabusinfo/

Computer Science 46B Fall 2020 Course Schedule

Topics and midterm exam dates are approximate

Week	Date	Topics
1	8/19	Need for data structures. Inheritance. No lab this week.
2	8/24	Polymorphism.
2	8/26	Inner classes. Interfaces.
3	8/31	Equality and comparison.
3	9/2	Sets.
4	9/7	Labor Day. No class.
4	9/9	Exceptions and assertions.
5	9/14	I/O and exceptions.
5	9/16	I/O and exceptions.
6	9/21	Review.
6	9/23	Midterm 1.
7	9/28	Midterm answers. Introduction to recursion.
7	9/30	Recursion & backtracking.
8	10/5	Sorting & searching.
8	10/7	Sorting & searching: algorithm complexity, big-O.
9	10/12	The collections framework.
9	10/14	Hash Tables.
10	10/19	Trees.
10	10/21	Trees.
11	10/26	Review.
11	10/28	Midterm 2.
12	11/2	Midterm 2 answers. Custom collections.
12	11/4	Custom collections.
13	11/9	Binary Search Trees.
13	11/11	Veteran's Day. No class.
14	11/16	Problem solving.
14	11/18	Tree algorithms.

15	11/23	General graphs.
15	11/25	No class. No labs on Friday 11/27.
16	11/30	General graphs.
16	12/2	Memory.
17	12/7	Review for final exam. Last week with office hours.
Final Exam	Thursday 12/10	Final Exam 12:15 – 2:30PM