San José State University
Computer Science Department
Computer Science 46B: Introduction to Data Structures, Fall 2018

Course and Contact Information

Instructor:	Philip Heller
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Office Hours:	Mon 1:30 – 2:30 or by appointment
Class Days/Time:	M/W 3:00 – 4:15
Classroom:	WSQ 109
Prerequisites:	Knowledge of Java equivalent to that obtained by completing CS 046A (in Java) or CS 049J with grade of C- or better. Eligibility for Math 030 or Math 030P, or instructor consent. BRING HARDCOPY PROOF OF PREREQUISITES TO 1ST OR 2ND LECTURE.

Course Format

Lectures: traditional lecture format. Labs: Brief introduction by lab TA, followed by lab exercises conducted in pairs.

Canvas

Course materials, including slides, homework assignments, homework solutions, exam solutions, and lab assignments, 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 and custom collection classes.

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.

Required Texts/Readings

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.

Course Requirements and Assignments

Lectures: Students are expected to attend all lectures. 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. The lowest homework grade will be dropped. All homework submissions must be entirely the student's own work.

Midterm Exams: Midterms are in-class, closed-book, and comprehensive. Bring a Green Book. 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: Dec 17, 12:15 PM. 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 30. 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. Lab Rules:

1) Lab work must be done during lab sessions.
2) You may miss up to 2 scheduled lab meetings. If you miss more than 2 labs for any reason except for documented medical emergency, you will fail the course.
3) You cannot make up a missed lab.
4) Bring your laptop to each lab.
5) Work in pairs, unless there are an odd number of students, in which case 1 team will have 3 students. Teams will be formed at the first lab meeting; you choose your own lab partner. If your lab partner is absent, your lab instructor will form a team for you for that meeting.
6) A lab report is due at the end of each lab meeting. Reports will be graded from 0 to 4.
7) There are 2 roles, "Driver" and "Scribe", in each team. You and your lab partner will switch roles week to week. The driver runs Eclipse and submits a simple lab report. The scribe writes a more detailed lab report. Lab assignments clearly state what each report should contain.
8) If you and your partner are stuck, ask your lab instructor. Don't expect your instructor to give you answers; expect to be given ideas about how to get un-stuck.

Grading

Students who fail their lab section, either by missing more than 2 sections or by getting a failing lab grade, fail the entire course. To pass the lab section, students must receive an average grade of 2 on lab reports. Students who pass their lab section are graded as follows:

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. Disruption and cheating are not tolerated.

Disruption includes using electronics at any time during any class session, except to enhance learning of the course material. The first time a student is disruptive, their final grade will be reduced by 1/3 of a point (e.g. B- becomes C+). The second time, their final grade will be reduced by an entire point (e.g. C+ becomes D+). The third time, the student will receive an F in the course. All incidents of disruption will be reported to the university, which may impose further sanctions.

Cheating includes submitting a homework assignment that is not 100% your own work, allowing another student to copy your homework, and giving/receiving information of any kind during an exam. The first time a student is caught cheating, they will receive zero points on the homework or exam, and will have their final grade reduced by 2 points (e.g. A- becomes C-). The second time, they will receive an F in the course. All incidents of disruption 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 at http://www.sjsu.edu/gup/syllabusinfo/

Computer Science 46B Fall 2018 Course Schedule

Course Schedule

Week	Date	Topics
1	8/21	Need for data structures. Inheritance. No lab this week.
2	8/26	Polymorphism.
2	8/28	Inner classes. Interfaces.
3	9/2	Labor Day. Campus closed.
3	9/4	Equality and comparison.
4	9/9	Sets.
4	9/11	Exceptions and assertions.
5	9/16	I/O and exceptions.
5	9/18	I/O and exceptions.
6	9/23	Review.
6	9/25	Midterm 1.

Week	Date	Topics
7	9/30	Midterm answers. Introduction to recursion.
7	10/2	Recursion & backtracking.
8	10/7	Sorting & searching.
8	10/9	Sorting & searching: algorithm complexity, big-O.
9	10/14	The collections framework.
9	10/16	Hash Tables.
10	10/21	Trees.
10	10/23	Trees.
11	10/28	Review.
11	10/30	Midterm 2.
12	11/4	Midterm 2 answers. Custom collections.
12	11/6	Custom collections.
13	11/11	Veteran's Day. Campus closed.
13	11/13	Binary Search Trees.
14	11/18	Problem solving.
14	11/20	Tree algorithms.
15	11/25	General graphs.
15	11/27	No class. No labs.
16	12/2	General graphs.
16	12/4	Memory.
17	12/9	Review for final exam. Last week with office hours.
Final Exam	12/17	Final Exam 12:15 – 2:30 WSQ 109.