San José State University
Computer Science Department
Computer Science 46B: Data Structures, Section 1, Fall 2016

Course and Contact Information

Instructor:	Philip Heller
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Office Hours:	Tu/W 1:30 – 2:30
Class Days/Time:	M/W 3:00 – 4:15
Classroom:	WSQ 109
Prerequisites:	Knowledge of Java equivalent to that obtained by completing CS 046A or CS 049J with grade of C- or better. Eligibility for Math 030 or Math 030P, or instructor consent. Math remediation completed or a post baccalaureate. Pre/Co-requisite: Math 42. BRING HARDCOPY PROOF OF PRE- AND CO-REQUISITES TO 1ST LECTURE.

Course Format

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

Canvas

Course materials, including slides, homework assignments, and lab assignments, will be posted to Canvas at http://sjsu.instructure.com.

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

Cay Horstmann: "Big Java Early Objects" 5th Edition. Wiley. ISBN 978-1-118-60771-8.

Other technology requirements

Students are required to bring a wireless-enabled laptop to every lecture and lab meeting, with sufficient charge to last the entire meeting. Lecture and lab rooms have limited electrical outlets, to which access cannot be guaranteed.

Course Requirements and Assignments

Lectures: Students are strongly encouraged to attend all lectures. Any material presented in any lecture may be tested in any subsequent midterm or final exam.

Homework: There will be 7 substantial programming assignments. No late homework will be accepted for any reason. The lowest homework grade will be dropped.

Midterm Exams: Midterms will be on Oct 3 and Nov 2. Midterms are in-class, closed-book, and comprehensive. Makeup midterm exams will only be given in cases of verifiable emergency.

Final Exam: Monday Dec 19: 12:15 PM – 2:30 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 CS 46B students must concurrently enroll in a lab section. Labs are led by student TAs. Lab Rules:

1. You may miss up to 3 scheduled lab meetings. If you miss more than 3 labs for any reason including personal emergency, you will fail the course. So choose your misses wisely.
2. The first lab meetings will be the week of Sept. 6.
3. You cannot make up a missed lab.
4. Bring your laptop to each lab.
5. All labs involve programming in Java, using the Eclipse IDE. Try to install Eclipse before your first lab meeting.
6. 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.

7. A lab report is due at the end of each lab meeting.
8. 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.
9. If you and your partner are stuck, bring the Driver's laptop to the instructor at the front of the room and ask for help. Your instructor's job is to give you the skills to get yourself un-stuck. This is the most important skill any programming student can acquire. Don't expect your instructor to give you answers; expect to be given ideas about how to get un-stuck.

Class Participation: Students are expected to post questions, help, and opinions to the course Piazza bulletin board. Post 50 useful messages for full Class Participation marks. Questions should be specific. Questions like "How do I solve Homework #3?" or "Why doesn't the following code work?" don't count, will be taken down immediately, and will adversely affect your score. If you post code whose behavior you don't understand, discuss what you expected to see, and what you actually saw. Helpfulness will be rewarded. Sarcasm, harshness, and any other communication that makes students feel unwelcome, will not be tolerated.

Grading

Students who fail their lab section, either by missing more than 3 sections or by getting a failing lab grade, fail the entire course. Students who pass their lab section are graded as follows:

Homework: 35%
Midterm 1: 15%
Midterm 2: 15%
Class Participation: 5%
Final: 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

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 Section 1 Fall 2016 Course Schedule

Course Schedule

Week	Date	Topics
1	Aug 24	The CS 46B Social Contract. Introduction to the course. How to get an A. Review: Objects and references.
2	Aug 29	Need for data structures. Inheritance.
2	Aug 31	Polymorphism.
3	Sep 5	Labor Day – Campus closed.
3	Sep 7	Inner classes. Interfaces.
4	Sep 12	Equality and comparison.
4	Sep 14	Sets.
5	Sep 19	Exceptions and assertions.
5	Sep 21	I/O.
6	Sep 26	I/O.
6	Sep 28	Review.
7	Oct 3	Midterm 1.
7	Oct 5	Midterm answers. Introduction to recursion.
8	Oct 10	Recursion & backtracking.
8	Oct 12	Sorting & searching.
9	Oct 17	Sorting & searching: algorithm complexity, big-O.
9	Oct 19	The collections framework.
10	Oct 24	The collections framework.
10	Oct 26	The collections framework.
11	Oct 31	Review.
11	Nov 2	Midterm 2.
12	Nov 7	Midterm answers. Hash Tables.
12	Nov 9	Trees.
13	Nov 14	Custom collections.
13	Nov 16	Custom collections.
14	Nov 21	Custom collections.
14	Nov 23	No class
15	Nov 28	Binary Search Trees.

Week	Date	Topics
15	Nov 30	Binary Search Trees.
16	Dec 5	General graphs.
16	Dec 7	General graphs.
17	Dec 12	Review, last lecture.
Final Exam	Dec 19 (Mon)	WSQ 109 (Same as lectures). 1215-1430.