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

Course and Contact Information

Instructor:	Philip Heller
Office Location:	MacQuarrie Hall 211
Telephone:	(408) 924-8145
Email:	Philip.Heller@sjsu.edu
Office Hours:	Tu 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

Big Java 6e ENGAGE Custom Interactive Text by Cay S. Horstmann, ISBN: 9781119290223 (preferred) or Big Java Early Objects 5th Edition by Cay S. Horstmann, ISBN 978-1-118-60771-8.

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 approximately 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 March 6 and April 5. Midterms are in-class, closed-book, and comprehensive. Makeup midterm exams will only be given in cases of verifiable emergency.

Final Exam: May 24, 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 Jan 30.
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, 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 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%
Final: 35%

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 Fall 2016 Course Schedule

Course Schedule

Week	Date	Topics
1		No class. We meet M/W, Week 1 begins on a Thursday. No labs this week.
2	1/30	Need for data structures. Inheritance.
2	2/1	Polymorphism.
3	2/6	Polymorphism.
3	2/8	Inner classes. Interfaces.
4	2/13	Equality and comparison.
4	2/15	Sets.
5	2/20	Exceptions and assertions.
5	2/22	I/O and exceptions.
6	2/27	I/O and exceptions.
6	3/1	Review.
7	3/6	Midterm 1.
7	3/8	Midterm answers. Introduction to recursion.
8	3/13	Recursion & backtracking.
8	3/15	Sorting & searching.
9	3/20	Sorting & searching: algorithm complexity, big-O.
9	3/22	The collections framework.
10	3/27	SPRING BREAK
10	3/29	SPRING BREAK
11	4/3	Review.
11	4/5	Midterm 2.
12	4/10	Midterm answers. Hash Tables.
12	4/12	Trees.
13	4/17	Custom collections.
13	4/19	Custom collections.
14	4/24	Custom collections.
14	4/26	Binary Search Trees.
15	5/1	Binary Search Trees.

Week	Date	Topics
15	5/3	General graphs.
16	5/8	General graphs.
16	5/10	General graphs.
17	5/15	Review, last lecture.
Final Exam	May 24 (Wed)	WSQ 109 (Same as lectures). 1215-1430.