

CS 46B: INTRODUCTION TO DATA STRUCTURES

San José State University
Computer Science Department
Section 01, Spring 2020

COURSE AND CONTACT INFORMATION

Instructor: Wendy Lee Ph.D.
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Office Hours: Thursday 9:00 am – 10:00 am or [by appointment](#)
Class Days/Time: Monday & Wednesday 3:00 pm – 4:15 pm
Classroom: Washington Square Hall (WSQ 109)
Prerequisites: 1) Knowledge of Java equivalent to that obtained by completing CS 046A or CS 049J with grade of C or better.
2) Eligibility for Math 030 or Math 030P, or instructor consent. Math remediation completed or a post baccalaureate.
3) Pre/Co-requisite: Math 42.
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.
- Course materials such as syllabus, lecture slides, homework assignments, lab assignments, announcements, etc. can be found on Canvas Learning Management System course login website at <https://sjsu.instructure.com>. You are responsible for regularly checking with the Canvas messaging system to learn of any updates.
- Exams will be in-class, closed-book, and comprehensive.

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.

COURSE LEARNING OUTCOME (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 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 6/e by Cay S. Horstmann. Publisher: Wiley.

- ISBN 9781119499459 (E-Text only), ISBN 9781119499534 (E-Text + loose leaf book)

COURSE REQUIREMENTS AND ASSIGNMENTS

1. **Participation in Lectures (5%):** Students are required to attend all lectures. Any materials presented in any lecture may be tested in any subsequent midterm or final exam. Materials discussed in class may not always be included in the lecture slides.

2. **Homework (30%):** There will be approximately 8 substantial programming assignments. No late homework will be accepted for any reason. All homework must be your own individual work. It is okay to have general discussions about the homework or read other materials for inspiration. You may not copy anything from any other student, textbook, website at all. Your work must be entirely your own. **It is never okay to share your code with other students.** If the other person submits your work, both students will immediately fail the entire course. Copying code from sources other than your own is considered plagiarizing. **If caught plagiarizing, you will fail the entire course and will be reported to the Student Conduct and Ethical Development.** Please refer to the [University Academic Integrity Policy F15-7 \(http://www.sjsu.edu/senate/docs/F15-7.pdf\)](http://www.sjsu.edu/senate/docs/F15-7.pdf).

Homework must be submitted within Canvas by 10:00 pm on the following dates:

- HW 1: Sunday, 2/2, 10 pm
 - HW 2: Sunday, 2/9, 10 pm
 - HW 3: Sunday, 2/16, 10 pm
 - HW 4: Sunday 3/8, 10 pm
 - HW 5: Sunday 3/15, 10 pm
 - HW 6: Sunday 3/22, 10 pm
 - HW 7: Sunday, 4/5, 10 pm
 - HW 8: Sunday, 4/19, 10 pm
3. **Lab (5%):** All CS 46B students must concurrently enroll in a lab section. The first lab meeting will be on Friday January 31st. 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 including personal emergency, you will fail the entire course.**
- 3) You cannot make up a missed lab.
- 4) Bring your laptop to each lab fully charged.
- 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.
- 9) Don’t ask the lab instructor about the homework. The lab is not a general tutoring facility.

4. Exams (60%):

- **Midterm Exams (30%):**
 - **Exam One (15%):** Wednesday, February 26, 2020.
 - **Exam Two (15%):** Wednesday, April 8, 2020.
- **Final Exam (30%):** Friday, May 13, 2020, from 12:15 pm to 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.

All exams are in-class, closed-book, and comprehensive. Make-up exams will be given in cases of verifiable emergency. No usage of mobile phones during exams. If you cheat in the exam, you will fail the entire course and will be reported to the Student Conduct and Ethical Development.

GRADING INFORMATION

Students who fail their lab section, either by missing more than 2 lab sessions 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:

- Participation (5%)
- Lab (5%)
- Homework (30%)
- Term Exam One (15%)
- Term Exam Two (15%)
- Final Examination (30%)

GRADING INFORMATION

Grading Scale:

Point Range	Letter Grade	Point Range	Letter Grade
97.0 – 100	A+	72.0 – 76.99	C
93.0 – 96.99	A	70.0 – 71.99	C-
90.0 – 92.99	A-	67.0 – 69.99	D+
87.0 – 89.99	B+	62.0 – 66.99	D
82.0 – 86.99	B	60.0 – 61.99	D-
80.0 – 81.99	B-	<60.0	F
77.0 – 79.99	C+		

CLASSROOM PROTOCOL

- Students are expected to listen and follow the lecture. Be considerate to your classmates. No cell phones usage during lecture, including texting, talking, web-surfing, playing games, etc. Instructor reserves the right to confiscate cell phones from students who violate this rule.
- Laptops or tablets should only be used for course-related purposes.
- Be respectfully quiet and no prolonged conversations during lecture.
- Please arrive to class on-time so that you benefit fully from the course experience and you do not disturb classmates and the instructor while class is in session.
- Students are responsible for knowing all materials covered in class lectures, readings, assignments, and other course-related work.

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/>

COPYRIGHT OF MATERIALS

Copyright of Materials: All materials created by the instructor for this course, including lectures, handouts, homework, exams, solutions, and so on, are copyrighted property of the instructor. You may transcribe lectures or copy course materials for the use of yourself and other students registered in this course. You may not sell or give transcriptions of lectures or copies of course materials to others without the prior written consent of the instructor.

ADDITIONAL INFORMATION

Piazza

- Have a question? Ask it on Piazza
- Have an answer? Submit it. ** Note: Do not submit program code in Piazza
- If you email me a question about the course material, I will repost it on Piazza and answer it there. Only email me with personal and confidential questions.

Clicker Questions

- Several times per class, there will be a “clicker” question to record your active participation.
- You will log in to Piazza. You may be asked to answer a question or record that you participated
- You get a point for each answer (even if it's wrong or you were unable to do the activity correctly). The point is for being in class and participating.

COURSE SCHEDULE

The course schedule is subject to change with fair notice. Changes will be announced on Canvas.

Week	Date	Topics
2	1/27	Why are data structures important? Inheritance
2	1/29	Polymorphism <i>HW1 due Sunday, 2/2, 10 pm</i>
3	2/3	Inner classes. Interfaces
3	2/5	Equality and comparison <i>HW2 due Sunday, 2/9, 10 pm</i>
4	2/10	Sets
4	2/12	I/O and exceptions <i>HW3 due Sunday, 2/16, 10 pm</i>
5	2/17	I/O and exceptions
5	2/19	Exceptions and assertions
6	2/24	Review
6	2/26	Midterm 1
7	3/2	Recursion
7	3/4	Midterm answers. Recursion & backtracking. <i>HW4 due Sunday 3/8, 10 pm</i>
8	3/9	Sorting and searching

Week	Date	Topic
8	3/11	Sorting and searching: algorithm complexity, Big-O <i>HW5 due Sunday 3/15, 10 pm</i>
9	3/16	The collections framework
9	3/18	Hash Tables <i>HW6 due Sunday 3/22, 10 pm</i>
10	3/23	Trees
10	3/25	Trees
11	3/30	Spring Recess - no classes
11	4/1	Spring Recess - no classes <i>HW7 due Sunday, 4/5, 10 pm</i>
12	4/6	Review
12	4/8	Midterm 2
13	4/13	Custom collections
13	4/15	Midterm 2 answers. Custom collections <i>HW8 due Sunday, 4/19, 10 pm</i>
14	4/20	Custom collections
14	4/22	Binary Search Trees
15	4/27	Binary Search Trees
15	4/29	Tree algorithm
16	5/4	General graphs
16	5/6	General graphs
17	5/11	Review for final exam
17	5/13	Final Exam. 12:15 pm – 2:30 pm. WQS 109 (same as lecture)

Important Dates:

2/4/2020: Last day to drop courses without a “W” grade.

2/5/2020: Late drop (petition required)

2/11/2020: Last day to add courses for Spring 2020.

4/23/2020: Last day to withdraw for Spring 2020.