

CS 61B

Data Structures

[Prof. Jonathan Shewchuk](#)

jrs@cory.eecs

(But ask most questions on the [CS 61B Piazza discussion group](#) and send most private requests to cs61b@cory.eecs so the TAs can respond too.)

Spring 2014

Mondays 1–2 pm and Wednesdays noon–2 pm
Wheeler Hall Auditorium



Here are some [practice problems for the Final Exam](#).   Here are the [solutions](#).  

Please congratulate Jianqiao Yang, Chengming Liao, and Junyan Kang, who as the team **ChaoWeiLanMao** slaughtered the opposition and drank the blood of their enemies in the [Network Tournament!](#) They win [gift certificates to Amoeba Records](#).

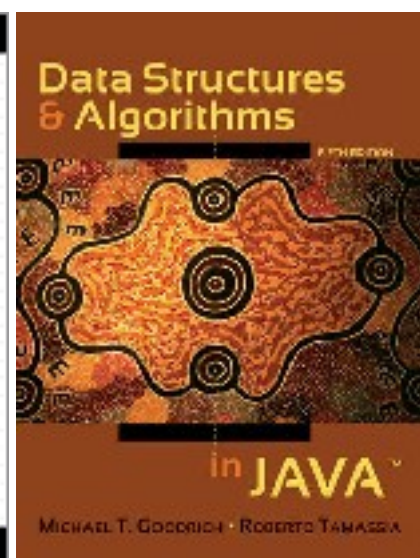
The **Final Exam** will take place **Tuesday, May 13 at 8:00 am** in **100 Haas Pavilion**. Students in the **Disabled Students' Program** who requested extra time will receive alternative locations by email.

The exam is open book, open notes, and **closed electronics**: if we catch you with electronic devices such as cell phones, laptops, or iPods on your person, **you will get zero on the exam**. Leave them at the front of the room. If your cell phone rings at the front of the room, you lose a point. Please keep your notes under your seat so people passing in front of you don't trip over them.

The TAs will hold a **review session** for the Final Exam this **Saturday, May 10 at 2–5 pm** in **2050 Valley Life Sciences Building**.

Textbooks

- **Required:** [Kathy Sierra](#) and [Bert Bates](#), [Head First Java](#), O'Reilly, 2005. ISBN # 0-596-00920-8. (Either the first or second edition will do.)
- **Optional:** [Michael T. Goodrich](#) and [Roberto Tamassia](#), [Data Structures and Algorithms in Java](#), John Wiley & Sons, 2010. ISBN # 0-470-38326-7. (The first, third, fourth, fifth, or sixth editions will do, but the second edition is missing several important data structures.)
- **Warning:** The reading assignments given below apply to the second edition of Sierra & Bates, and the fifth edition of Goodrich & Tamassia. If you have older editions, you'll have to figure out the corresponding readings yourself.



Information

- [Course overview: prerequisites, laboratory and discussion sections, grading, cheating policies.](#)
- [Schedule of labs and sections \(and their TAs\).](#)
- [Getting help: schedule of instructor and TA office hours and more.](#)
- Access the CS 61B [Piazza discussion group](#).
- Online version of the [course reader](#), plus extra documentation on Java and Gmake.
- The Java 2 standard libraries API: [frames](#), [no frames](#) (maintained by [Oracle](#)).
- [The Java language specification](#) (maintained by [Oracle](#)).
- [A brief man page for jdb, Sun's Java debugger.](#)
- Get [tutoring from Upsilon Pi Epsilon](#), International Honor Society for the Computer Sciences.
- Information on [connecting from home](#).
- [User's Guide to EECS Instructional Computing](#).

Work

- [Homeworks and Projects](#).
- [Labs](#).
- [Exams](#). Includes sample solutions to midterms in the reader.





Lectures










The following schedule is tentative. There may be changes as the semester progresses, so check here periodically. You are responsible for knowing and keeping up with the readings listed below; there won't be reminders in class.



























Labs, homeworks, and projects that are currently available can be accessed by clicking on them. Webcasts and podcasts of past lectures are offered by Berkeley's Educational Technology Services through their [Webcast Berkeley page](#). Click on the icons



















































in the schedule below to view past lectures. Lectures are not broadcast live, but they should be available within a day or two after they happen.

Some lecture notes can be obtained by clicking on the lecture titles (for ASCII) or the PostScript  or PDF  links (which save paper). Please understand that they are *lecture notes*, and that they were written so that I would have something to say in class. I write them for *me*, not *you*, and I make them available as a *courtesy* to you. I edit them after class to make sure they say the same thing I said in class. If I receive complaints that my lectures and lecture notes do not differ, I will stop making lecture notes available. For related reasons, I will not make the lecture notes for a class available until after the class has taken place.

	Topic	Reading	Due
1: January 22	Course overview   	Sierra & Bates, pp. 1–9, 18–19, 84	
2: January 22	Using objects   	S & B, Chapter 2; pp. 54–58, 154–160, 661, 669	
January 24			Lab 1
3: January 27	Defining classes   	S & B, pp. 71–74, 76, 85, 240–249, 273–281, 308–309	

4: January 29	Types; conditionals   	S & B, pp. 10–14, 49–53, 75, 78–79, 86, 117, 286–287, 292, 660	Homework 1
5: January 29	Loops & arrays I   	S & B, pp. 59–62, 83, 114–116, 293–300, 670	
January 31			Lab 2
6: February 3	Loops & arrays II  	S & B, pp. 282–285	
7: February 5	Linked lists I  	Goodrich & Tamassia, Section 3.2	Homework 2
8: February 5	Linked lists II  	G & T, Section 3.3	
February 7			Lab 3
9: February 10	Stack & heap  	Sierra & Bates, pp. 77, 235–239, 258–265, 663	
10: February 12	Inheritance  	S & B, Chapter 7; pp. 28–33, 250–257	Homework 3
11: February 12	Testing; equals()  	S & B, pp. 95–109, 662	
February 14			Lab 4
February 17	President's Day		
12: February 19	Abstract classes  	S & B, Chapter 8	
13: February 19	Java packages  	S & B, pp. 154–160, 587–591, 667–668	
February 21			Lab 5
February 22			Project 1
14: February 24	MIDTERM I	covers Lectures 1–12	
15: February 26	Exceptions  	S & B, pp. 315–338	Homework 4
16: February	More Java  	S & B, pp. 189, 283	

26			
February 28			Lab 6
17: March 3	Game Trees  		
18: March 5	Encapsulation  	S & B, pp. 80–84	Homework 5
19: March 5	Encapsulated lists  	S & B, p. 664	
March 7			Lab 7
20: March 10	Asymptotic analysis  	Goodrich & Tamassia, Chapter 4	
21: March 12	Dictionaries & hash tables  	G & T, Sections 9.1, 9.2, 9.5–9.5.1	
22: March 12	Hash codes; stacks & queues  	G & T, Chapter 5	
March 14			Lab 8
23: March 17	Algorithm analysis  	G & T, Chapter 4	
24: March 19	Trees and traversals  	G & T, Chapter 7	Homework 6
25: March 19	Priority queues  	G & T, Sections 8.1–8.3	
March 21			Lab 9
March 24–28	Spring Recess		
26: March 31	Binary search trees  	G & T, Section 10.1	
27: April 2	Balanced search trees  	G & T, Section 10.4	Project 2
28: April 2	Graphs  	G & T, Sections 13.1–13.3	
April 4			Lab 10
29: April 7	Weighted graphs  	G & T, Sections 13.5.1, 13.6–13.6.1	
30: April 9	Four sorting algorithms  	G & T, Sections 8.2.2, 8.3.5, & 11.1	Homework 7
31: April 9	Quicksort  	G & T, Section 11.2	
April 11			Lab 11
32: April 14	MIDTERM II	covers Lectures 1–29	

33: April 16	Disjoint Sets  	G & T, Section 11.4	Homework 8
34: April 16	Sorting & selection  	G & T, Section 11.3.1 & 11.5	
April 18			Lab 12
35: April 21	Radix sort  	G & T, Section 11.3.2	
36: April 23	Splay trees  	G & T, Section 10.3	Homework 9
37: April 23	Amortized analysis  		
April 25			Lab 13
38: April 28	Randomized analysis  		
39: April 30	Garbage collection  	G & T, Sections 14.1.2–14.1.3	Project 3
40: April 30	Augmenting data structures  		
May 2			Lab 14
41: May 5	Sorting video		
42: May 7	Review  		Homework 10
May 9			Lab 15

The **FINAL EXAM** will take place on Tuesday, May 13, from 8 am to 11 am in 100 Haas Pavilion. (CS 61B is in Exam Group 5.)

Course Description (from the catalogue)

Fundamental dynamic data structures, including linear lists, queues, trees, and other linked structures; arrays, strings, and hash tables. Storage management. Elementary principles of software engineering. Abstract data types. Algorithms for sorting and searching. Introduction to the Java programming language.

Prerequisites: CS 61A or Engineering 7. (The catalogue says “with a grade of B– or better,” but I've never seen this rule enforced.)

Grading

- **5%** for the [labs](#).
- **10%** for the [homeworks](#).
- **35%** for three [projects](#).
- **12.5%** for [Midterm I](#) (Monday, February 24, 1–2 pm, Wheeler Auditorium).
- **12.5%** for [Midterm II](#) (Monday, April 14, 1–2 pm, Wheeler Auditorium).

- **25%** for the [Final Exam](#) (Tuesday, May 13, 8–11 am, 100 Haas Pavilion).

cs61b@cory.eecs



“Let's see if I remember this. Do I splay the pineapple pizza through the Ted Nugent tea cozies? Or should I zig-zig the Versace laptops through Katy Perry first?”