

Computer Science 136: Data Structures & Advanced Programming

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Technical Support:	Lida Doret lpd2@williams.edu
Course web site:	www.cs.williams.edu/~cs136
Textbook:	www.cs.williams.edu/~bailey/JavaStructures
Lectures:	Students are enrolled in one of the following lecture sections, which meet in Schow 030B. <ul style="list-style-type: none">• MWF 9:00-9:50am, 10:00-10:50am, or 11:00-11:50am
Lab Sections:	Students are enrolled in one of the following lab sections, which meet in TCL 217A. <ul style="list-style-type: none">• Wednesday 1:10-2:25pm or 2:35-3:50pm• Thursday 9:55-11:10am, 1:10-2:25pm, or 2:35-3:50pm
Instructor Hours:	See course calendar
Assistants:	Milo Chang, Kary Chen, Samuel Chistolini, Diego Esparza, Gaurnett Flowers, Nolan Holley, Emma Neil, Saul Richardson, Ye Shu
TA Hours:	See course calendar

Description. This course couples work on program design, analysis, and verification with an introduction to the study of data structures. Data structures capture common ways in which to store and manipulate data, and they are important in the construction of sophisticated computer programs. We will use the Java programming language in class and for the assignments.

Students will be expected to write several programs, ranging from very short programs to more elaborate ones. Since one of our goals in this course is to teach you how to write large, reliable programs composed from reusable pieces, we will be emphasizing the development of clear, modular programs that are easy to read, debug, verify, analyze, and modify.

You will be carrying out your programming assignments on laboratory computers in the department. All of the software tools you will need for this course are installed on these machines. Our first lab will be devoted to guiding you through the workflow we expect you to use throughout the rest of the semester.

Organization. You will prepare for each week's work with readings from the course text, *Java Structures*. In lecture, we will discuss the readings and explore additional examples and applications. In lab, we will construct several programs of varying size and complexity. The typical student should expect to spend at least 10 hours a week beyond the scheduled lecture and lab hours. If you find yourself spending substantially more time than that on a regular basis, discuss the issue with your instructor.

On most weeks, there will be laboratory programming assignments. Attendance in lab is mandatory: there are valid reasons to miss lab, but any unexcused lab absence may result in failure in the course.

All lab assignments will be graded (35% of the final grade) on design, documentation and style, correctness, and efficiency, in that order. Programs should be turned in electronically by 5pm on the due date, typically the Tuesday following lab. Late programs will be accepted with an *extreme penalty*; we prefer an incomplete program over a late but otherwise perfect program. We will refuse to grade or debug programs that are poorly documented.

There will be a scheduled 75 minute midterm (25%) on the evening of Thursday, October 14. There will be an 2.5 hour final exam (30%) scheduled during the final examination period.

Over the semester, we expect *participation*. You will be graded (10%) based on that effort.

Community. We embrace diversity. We welcome all students and expect everyone to contribute and support a respectful and welcoming environment. If you have concerns, please share them with us or the college administration.

Tentative Schedule of Topics

	Monday	Wednesday	Lab	Friday
Sept. 6	—	—	—	1. Introduction
Sept. 13	2. Java Basics (<i>Ch. 0,1,B</i>)	3. Organization	Java/Git intro	4. Associations (<i>Ch. 1,2</i>)
Sept. 20	5. Vectors (<i>Ch. 3,4</i>)	6. Complexity (<i>Ch. 5</i>)	Vectors	7. Recur. & Ind. I (<i>Ch. 5</i>)
Sept. 27	8. Recursion II (<i>Ch. 5</i>)	9. Lists I (<i>Ch. 7,9</i>)	Recursion	10. Lists II (<i>Ch. 7,9</i>)
Oct. 4	11. Sorting & Search (<i>Ch. 6</i>)	12. Sorting II. (<i>Ch. 6</i>)	Linked Lists	13. Stacks (<i>Ch. 10</i>)
Oct. 11	<i>Reading Period</i>	Midterm Prep		TBD
Oct. 18	14. Queues (<i>Ch. 10</i>)	15. Ord. Structs. (<i>Ch. 11</i>)	Stacks	16. Iteration (<i>Ch. 8</i>)
Oct. 25	17. Lambdas (<i>TBD</i>)	18. Generation (<i>TBD</i>)	Skip Lists	<i>Mountain Day</i>
Nov. 1	19. Trees I (<i>Ch. 12</i>)	20. Trees II (<i>Ch. 12</i>)	Iteration	21. Trees III (<i>Ch. 12</i>)
Nov. 8	22. Heaps (<i>Ch. 13</i>)	23. Search Trees (<i>Ch. 14</i>)	Trees	24. Search Trees II (<i>Ch. 14</i>)
Nov. 15	25. Maps & Dicts. (<i>Ch. 15</i>)	26. Hashtables (<i>Ch. 15</i>)	Hashing	27. Hashtables (<i>Ch. 15</i>)
Nov. 22	29. TBD			
Nov. 29	30. Graphs (<i>Ch. 16</i>)	31. Graphs (<i>Ch. 16</i>)	Graphs	32. Graphs (<i>Ch. 16</i>)
Dec. 6	33. TBD	34. TBD		35. Review

Quiz dates: Evening of October 14 and during final exam period.

Late Policy. You are expected to turn in all assignments in a timely manner receive full credit. Please contact us—*ahead of time*—if this is not possible.

Help. There are many resources available when *you* need it. You are encouraged to discuss any questions, concerns, difficulties, or thoughts about the course with your instructor. TAs are available to help you with challenges as you work thorough course material and lab assignments. If you find yourself facing challenges beyond the typical, we encourage you to reach out to the Peer Academic Support Network. Free tutors can be arranged when 1-1 help is required beyond that available from your instructor and TAs. Go to:

academic-resources.williams.edu/peer-academic-support

Also at that site, the Math and Science Resource Center: Support is available for students grappling with the more quantitative aspects of their course work.

Students Who Need Accommodations. If formal accommodations need to be made to meet your specific learning or physical abilities, please contact one of us as soon as possible to discuss appropriate accommodations. Please also contact the Director of Accessible Education, Dr. G. L. Wallace (x4672) or the Dean’s Office (x4171). We will work together to ensure this class is as accessible and inclusive as possible.

Mental Health. Students experiencing mental or physical health challenges that are significantly affecting their academic work are encouraged to contact one of us or to speak with Dean’s Office staff (x4171). In addition the Heath Center provides a range of medical, psychological and health/wellness services. Go to:

health.williams.edu

Honor Code. The Honor Code as it applies to non-programming assignments is outlined in the Student Handbook. The complete CS Honor Code and Computer Usage Policy at

csci.williams.edu/the-cs-honor-code-and-computer-usage-policy

The honor code, as it applies to assignments in this class: You may discuss general approaches to the labs and Java syntax with other students. However, each student is responsible for developing their own step-by-step logic and should write up and hand in their own assignments separately. *What you turn in should reflect your independent understanding after any collaboration.*

Guideline: Discussion is allowed. Copying is forbidden. Avoid writing/typing/crafting your response to the assignment in the presence of others. You should be able to articulate what every part of your program does. Prioritize understanding over finishing. Become good programmers.

If you do not understand how the Honor Code applies to a particular assignment, consult your instructor.

Sharing Solutions and Intellectual Property. As per College policy, no part of this course—including your solutions—may be reproduced and/or distributed without permission.