

APPLIED ALGORITHMS

Fall 2025

Instructor:	Sam McCauley	Time:	TF 1:10-2:25
Email:	srm2@williams.edu	Place:	Schow 30A

Webpage: <https://williams-cs.github.io/cs358-f25/index.html>

Lab Times: Thursday 1:00–2:30 and 2:30–4:00; TCL 312 (Unix lab)

Office Hours: Monday Noon–1:30pm; TCL 306 or TPL 304 (Sam’s office)

TA Hours: Wed 7:00–9:00PM, TCL 312

Textbooks: None

Objectives: This course aims to study the interaction between practical and theoretical computer science. At the end of the course, students should be able to:

- analyze potential bottlenecks in code,
- analyze potential bottlenecks in a given algorithmic strategy,
- translate a high-level description of an algorithm into efficient code, and
- apply the algorithmic techniques discussed in class to solve computational problems.

Prerequisites: CS 256 and 237 or equivalent. Concurrently taking both this class and 256 is acceptable, but a student in that position may need to do extra work to catch up on some topics if we cover them before 256 does. (Probability and Dynamic Programming are likely in this category.) Similarly, taking both this class and 237 is acceptable, but students who do not much experience coding in C are encouraged to seek outside help (e.g. office hours/lab hours or recommended texts), especially during the first few homeworks.

Course Outline:

- Section 1: Time, Space, and Cache Efficiency
- Section 2: Hashing and Randomization
- Section 3: Strings and Trees
- Section 4: Linear Programming

The midterm will be on October 24th in class. The final is TBD.

Grading Policy: Assignments (30%), Midterm (30%), Final (35%). Whichever score is better between midterm and final will be worth an extra 5%.

Assignment Resubmission: After each assignment is graded, you can “resubmit” a corrected version of your assignment. This can raise the grade on the assignment by at most one letter grade.

Lecture Attendance: Attendance is not required in lectures; however, it is highly recommended.

Lab Attendance: Attendance is not required in lectures; however, it is highly recommended. For labs, each assignment will have a (small) number of points dedicated to us having a conversation during the lab period. This discussion could be you showing me working code and us going over it together; or I could help out with anything you are having issues with.

With this in mind, you will get the most out of the course if you start assignments before the lab period begins. It is perfectly OK to not finish the assignments before lab, but you should try to get yourself stuck.

If you cannot make lab please let me know ahead of time.

Academic Honesty: For a full description of the Computer Science Honor Code, please see:

<https://csci.williams.edu/the-cs-honor-code-and-computer-usage-policy/>.

If you have any doubt about what is appropriate, please contact me; one way is via email at srm2@cs.williams.edu.

You should not use LLMs (ChatGPT, Claude, etc.) for anything in this course.

For exams, academic honesty is simple: all work should be solely your own, and you should not use any resources except those specifically allowed.

On each assignment, you will submit two things: code, and a pdf. The academic honesty policy for each is different—in particular, the honesty policy for code is more permissive than in most CS courses.

- For the pdf submission, the work should be your own. The standard CS assignment policy holds here: you can discuss high-level strategies with others and with the TA, but everything that goes into the final pdf should be your own (“hands-in-pockets” collaboration). You should not use google to find the answers to problems. You may use google to debug Latex errors, though this should rarely be necessary.
- For the code submission, you may collaborate freely with your classmates, up to and including sharing code. You may also use google. In both cases, you must cite any external resources you use. The one restriction is that you may not use LLMs to write code—not even with a cite, not even to write small portions of the code, and not to look up errors or to get help with debugging or refactoring.

Grading: Grading in this course will generally be done using letter grades rather than specific point values. The hope is that this will help ensure that the focus of the course is on understanding the key points, rather than on small details.

Final grades will be calculated by averaging letter grades, and then using the standard cutoffs (above 93 for A, above 90 for A-, etc.). These final cutoffs may be lowered (i.e. a 89.5 for an A-), but will not be raised.

Generally, the highest grade given for a quality assignment will be an A, which translates into a 95. On most assignments, there will be an extra task—think of it as extra credit—which will allow a grade to be raised to an A+, which translates into 100 points.

Accommodations: Students with disabilities of any kind who may need accommodations for this course are encouraged to contact the Office of Accessible Education. I am happy to discuss accommodations personally as well.

Also, students experiencing mental or physical health challenges that are significantly affecting their academic work or well-being are encouraged to contact me and/or speak with a dean so we can help you find the right resources. The deans can be reached at 597-4171.

Health and Accessibility Resources: Students with disabilities or disabling conditions who experience barriers in this course are encouraged to contact me to discuss options for access and full course participation. The Office of Accessible Education is also available to facilitate the removal of barriers and to ensure access and reasonable accommodations. Students with documented disabilities or disabling conditions of any kind who may need accommodations for this course or who have questions about appropriate resources are encouraged to contact the Office of Accessible Education at oaestaff@williams.edu

Inclusion and Classroom Culture: The Williams community embraces diversity of age, background, beliefs, ethnicity, gender, gender identity, gender expression, national origin, religious affiliation, sexual orientation, and other visible and non visible categories. I welcome all students in this course and expect that all students contribute to a respectful, welcoming and inclusive environment. If you have any concerns about classroom climate, please come to me to share your concern.

Addressing Each Other: In this class, we use the name and gender pronouns that individuals ask us to use as a sign of mutual respect. I will use the pronouns you have indicated on GLOW unless you alert me to a different pronoun (I'll also ask in Homework 0). That said, everyone makes mistakes—in general, should you use an incorrect pronoun or name, the best course of action is to make a quick correction and move on, rather than dwelling on it.