

EE P 590A Data Structures and Algorithms for ECE Applications

Course Description

This course will introduce techniques for solving programming problems with fundamental algorithms and data structures. We will explore and make use of core data structures such as linked lists, stacks, queues, graphs and trees, evaluating the tradeoffs of different data structures and algorithms. Specifically, the course covers algorithms for sorting and searching over several of these data structures. This course will be taught with the Python programming language.

Logistics

People

- Adrienne: ahandrew@uw.edu
 - Office Hours: Friday 3-5pm on Zoom
 - Weekends by appointment

Meetings

- M, W 4:30-6:50pm
 - More Hall, Rm 220

Communication

- Primarily via Slack
 - We will use Slack for conversations

Grading

- Programming assignments: 80%
- Midterm: 10%
- Final Exam: 10%

Programming assignments: Intended to put the weekly concepts into practice

Midterm: A mid-quarter check

Final Exam: A comprehensive exam taken during finals week

Late Policy

- 1 late assignment/quarter will be excused, with prior notice.
 - Max 1 week late
 - Otherwise, 25% penalty for each day late
- The last assignment can not be submitted late.

Materials and Resources

- Grokking Algorithms by Aditya Bhargava
 - [eBook Available via UW Libraries](#)[Links to an external site.](#)
- PyCharm
 - Free license available from JetBrains: <https://www.jetbrains.com/community/education/#students>[Links to an external site.](#)

Course Outcomes

Upon completion of this course, students will:

- Be able to describe common data structures and their characteristics
- Be able to compare and contrast the use of different data structures in given algorithms
- Have implemented a basic version of all common data structures

Course Topics

Topics covered in this course:

- Basic data structures
 - Array
 - List
 - Stack
 - Queue
 - Trees
 - Graphs
 - Hashtables
- Basic asymptotic analysis

- Common sorting algorithms
 - Bubble sort
 - Merge sort
 - Hashsort
 - Quick sort
 - Linear sorts:
 - Counting sort
 - Bucket sort
 - Radix sort

Statement on the use of AI

AI coding agents are becoming a larger part of software development. As this is an intro course, the use of any type of AI agent is ***strongly discouraged*** for completing all parts of homework assignments.

- This class provides starter code for assignments. You do NOT have permission to enter this code into any AI agent.
- IF you do utilize an AI agent for ANY part of an assignment, as a matter of academic honesty, **you must indicate which tool you used, how you used it, and what it contributed to the assignment.**
 - **Not indicating this can be interpreted as a instance of academic dishonesty and will be treated as such.**

Academic Honesty

I take academic honesty seriously and view academic dishonesty as one of the most serious offenses that a student can commit while in college and impose appropriate punitive sanctions on violators. Here are some examples of academic dishonesty. While this is not an all-inclusive list, I hope this will help you to understand some of the things instructors look for.

- **Cheating:** intentionally using or attempting to use unauthorized materials, information or study aids in an academic exercise
- **Fabrication:** intentional and unauthorized falsification, misrepresentation, or invention of any data, or citation in an academic exercise

- **Plagiarism:** intentionally representing the words, ideas, or data of another as one's own in any academic exercise without providing proper citation
- **Unauthorized collaboration:** instances when students submit individual academic works that are substantially similar to one another; while several students may have the same source material, the analysis, interpretation, and reporting of the data must be each individual's independent work.
- **Participation in academically dishonest activities:** any action taken by a student with the intent of gaining an unfair advantage
- **Facilitating academic dishonesty:** intentionally or knowingly helping or attempting to violate any provision of this policy

I will address instances of academic dishonesty on a case-by-case basis. Penalties could include receiving a 0 on an assignment, failing the class, or referral to the university for handling.

Course Policies

Religious Accommodation

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at [Religious Accommodations Policy](https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/) (<https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/>)[Links to an external site.](#) Accommodations must be requested within the first two weeks of this course using the [Religious Accommodations Request form](https://registrar.washington.edu/students/religious-accommodations-request/) (<https://registrar.washington.edu/students/religious-accommodations-request/>)[Links to an external site.](#)

Accommodations & Access

If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu.[Links to an external site.](https://disability.uw.edu) DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between the student, instructor, and DRS. It is the policy and practice of the University of

Washington to create inclusive and accessible learning environments consistent with federal and state law.

Academic Integrity

Engineering is a profession demanding a high level of personal honesty, integrity and responsibility. Therefore, it is essential that engineering students, in fulfillment of their academic requirements and in preparation to enter the engineering profession, adhere to the College of Engineering [Statement of PrinciplesLinks to an external site.](#). Any student in this course suspected of academic misconduct (e.g., cheating, plagiarism, or falsification) will be reported to the College of Engineering Dean's Office and the University's Office of Community Standards and Student Conduct to initiate the [student conduct processLinks to an external site.](#). Any student found responsible for academic misconduct may receive a zero for their grade on the impacted academic work (e.g., assignments, project, or exams), and academic consequences, with the possibility of expulsion.

Title IX

The UW, through [numerous policiesLinks to an external site.](#), prohibits sex- and gender-based violence, harassment, and discrimination and expects students, faculty, and staff to act professionally and respectfully in all work, learning, and research environments.

For support, resources, and reporting options related to sex- and gender-based violence, harassment, or discrimination, refer to the [UW Title IX's websiteLinks to an external site.](#), specifically the [Know Your Rights & ResourcesLinks to an external site.](#) guide. Should you wish to make the Office of the Office of the Title IX Coordinator aware of a Title IX concern, visit the [Make a Title IX ReportLinks to an external site.](#) webpage.

Please know that if you choose to disclose information to me about sex- or gender-based violence, harassment, or discrimination, I will connect you (or the person who experienced the conduct) with resources and individuals who can best provide support and options. You can also access additional resources directly:

- You can request anonymous support, from [SafeCampusLinks to an external site.](#)
- You can request confidential support, from a [confidential advocateLinks to an external site.](#)
- If you know you want to submit a formal complaint, contact the [Civil Rights Investigation OfficeLinks to an external site.](#)

Please note that some senior leaders and other specified employees have been identified as [Officials Required to Report.Links to an external site.](#) If an Official Required to Report learns

of possible sex- or gender-based violence, harassment, or discrimination they are required to contact the Office of the Title IX Coordinator and report all the details they have in order to ensure that the person who experienced harm is offered support and reporting options.

Relevant Websites

- Title IX: uw.edu/titleix/Links to an external site.
- Survivor resources: uw.edu/titleix/survivor-resources/Links to an external site.
- Confidential advocates: uw.edu/sexualassault/support/advocacy/Links to an external site.
- SafeCampus: uw.edu/safecampus/Links to an external site.
- Officials Required to Report: uw.edu/titleix/employee-reporting-expectations/Links to an external site.
- Policies: uw.edu/titleix/policies/Links to an external site.

Mental Health and Wellbeing Resources

The following wellbeing & mental health resources are available to you on campus:

- [Let's Talk](#) connects you with support from a counselor without an appointment via drop-in hours.
- [The Counseling Center](#)[Links to an external site.](#) provides you with personal counseling, assessment, referral, and crisis intervention services (206-543-1240).
- [UW LiveWell](#) provides you with support and case consultation if you are experiencing personal hardship, including academic hardship as the result of extenuating life circumstances (206-543-6085).
- [Husky Health & Well-Being](#) provides you with a central online resource for access to health and wellness services across the campus.
- Academic Advising can help if you are experiencing challenges navigating academic commitments.
- [SafeCampus](#)[Links to an external site.](#) is here for you to privately discuss mental, emotional, or physical safety and well-being concerns for yourself or others (206-685-SAFE [7233]). SafeCampus's team of caring professionals will provide individualized support, while discussing short- and long-term solutions and connecting you with additional resources when requested.

- [Forefront Suicide Prevention](#)Links to an external site. provides information and services to reduce suicide by empowering individuals and communities to take sustainable action, championing systemic change, and restoring hope.
- Crisis Clinic: If you or someone you know experiences a crisis outside of business hours, please call the Crisis Clinic at 206-461-3222 or toll-free at 1-866-427-4747.
- Food and Housing: If you are experiencing food or housing insecurity, you can start with UW Emergency Aid (<https://www.washington.edu/emergencyaid/Links to an external site.>) or the UW Food Pantry (<https://www.washington.edu/anyhungryhusky/Links to an external site.>).
- Study Centers: <https://www.engr.washington.edu/current/academics/studycentersLinks to an external site.>

Privacy

It is possible that some aspects of the course will take place over zoom (e.g. office hours). While students are encouraged to turn on their cameras if they are able, there is no requirement or penalty for keeping your camera off. For any session that is recorded on Zoom, the recording will capture the presenter’s audio, video and computer screen. The recordings will only be accessible to students enrolled in the course to review materials. These recordings will not be shared with or accessible to the public. The University and Zoom have FERPA-compliant agreements in place to protect the security and privacy of UW Zoom accounts. Students who do not wish to be recorded should:

- Choose a Zoom username that does not include any personal identifying information like their name or UW Net ID; and
- Not share their computer audio or video during their Zoom sessions.

Land Acknowledgement

The University of Washington acknowledges the Coast Salish peoples of this land, the land which touches the shared waters of all tribes and bands within the Suquamish, Tulalip, and Muckleshoot nations.