CSCI 361: Algorithms & Data Structures

Professor

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Meetings

MWF 2:00-2:50 in Thompson 409. The final will be on Monday, December 11th at 4:00.

Course Description

Welcome to Algorithms.

In many ways, this course is the most important one in the Computer Science major. We have built you up in previous courses, teaching you the basic language of programming a computer. In courses after this one, we will teach you advanced applications, that revolve around the construction, analysis, and use of algorithms. Any talented programmer must have a deep understanding of how they work.

An algorithm is a recipe; it is step-by-step procedure for calculating something. Of course, not all algorithms are created equal. Some are so useful that no one seriously considers any alternatives, some work well in particular circumstances, and some are so bad so as to be the punchline of obscure jokes. You are here in this class so that you will be able to tell one from another.

Topics Covered ("Learning Outcomes")

You will be able to understand, implement, and use the following tools:

- Formal analysis of algorithms (especially using asymptotic notation).
- Priority queues.
- Searching algorithms.
- Graph algorithms.
- Symbol tables (both ordered and unordered).
- Dynamic programming.
- An introduction to computational theory.

Web Page

The class web page is located at `https://cs.pugetsound.edu/~aasmith/cs361/`. Valuable info and links are posted there.

Text

The text we will use is Algorithms (4th Ed.) by Sedgewick and Wayne. The authors have also created valuable online resources, that you can access via the class web page.

Prerequisites

You should have already taken CSCI 261 (Computer Science II), CSCI 281 (Architecture, may be concurrent), and MATH 210 (Math of Computer Science), or their equivalents. Calculus is also recommended.

Course Policies

There will be six assignments over the course of the class—usually one every other week. Most will be programming assignments, but some will be written work. You are free to talk to others in the class about them, and to work in teams on written assignments, but all programming must be *100% your own work*. Note that these assignments will be substanitally harder than the ones you may have had in previous classes. If you enjoy sleeping, do not wait until the night before they're due to start them.

Assignments will be penalized by 20% for each working day (or fraction thereof) they are late, down to 40%. However, you will have three "extension days" during the semester to extend a deadline by one working day. These are intended for unforeseen

circumstances, and will be used automatically unless you specify otherwise. Written assignments will not be accepted at all two weeks after their due dates, so that I can release the keys.

Most of you will probably do your work in Java, since that's probably the language with which you are most comfortable. You may also use Python, if you wish to learn the language. If there's another language you'd like to use, please talk to me individually.

Use of telephones is forbidden in class. Laptops or tablets may be used only in ways directly relevant to the material. Anyone violating these rules will be asked to leave.

You all should be aware of the Honor Code at the college. Please do not cheat—it will not go well for you. *Any suspected cheating will be immediately reported.* If you use resources outside the text and lecture notes, you must cite them in order to avoid academic dishonesty. AI sources such as ChatGPT are strictly forbidden.

Exams are closed book, and will be cumulative. They will be given in the evenings, or some other time when we can have two uninterrupted hours. You are allowed a calculator (or your phone, so long as it is in "airplane mode") and one two-sided, letter-sized page of notes.

Grading

Class work will count toward your final grades with the following weights:

Homeworks	Midterm 1	Midterm 2	Final
35%	20%	20%	25%

In particular, notice how heavily weighted assignments are. *Missing assignments is the easiest way to get a lower grade.* Please be sure you do them, and on time.

Tests will be cumulative. They will each be divided by the top score, so the top performer gets 100%.

Here are the percentages you must earn for each final letter grade:

95%	90%	86⅔%	83⅓%	80%	76⅔%
A	A-	B+	B	B-	C+
73⅓%	70%	66⅔%	63⅓%	60%	Lower
C	C-	D+	D	D-	F

In addition, class participation and effort may help bump you up, if your final grade is borderline.

Attendance

I will not be keeping attendance (except on the first day). However, odds are that your attendance will correlate highly with your final grade.

Miscellany

If there are any special holy days that you will be taking off, please let me know as soon as you can so that we can work around them.

Please consider getting a flu shot. Influenza kills, and disease can spread rapidly in the dorms. (And you really don't want to miss a week of class. Trust me.)

Finally...if there's anything else I can do to help you, please let me know. I'm willing to go out of my way to make this a valuable class for you, but I can't do that unless you talk to me.

Mandatory UPS Boilerplate Syllabus Text

In their infinite wisdom, the lawyers and administrators that lead us have decreed that this text will be included in every class syllabus.

University, Academic, and Administrative Policies

There are many university policies and resources that offer guidance on how to be safe and make the most of your college education. Here are a few that you should take a moment to review:

- Please review university emergency preparedness, response procedures and a training video posted at `www.pugetsound.edu/emergency/`.
- Protect yourself and others from COVID-19 by following our ongoing campus safety protocols, posted here: `https://www.pugetsound.edu/emergency/communicable-disease-outbreak-prevention/university-response-covid-19/protect-yourself/`.
- For information on academic and administrative policies (such as policies on grade policies, leaves of absence, declaring a major, academic integrity, and academic petitions) please refer to the University Bulletin located here: `pugetsound.edu/sites/default/files/2023-08/AD23BULLETIN_online_Academic%20and%20Administrative%20Policies.pdf`.
- If you are seeking a religious accommodation in an academic course or program, please follow the process provided in the university's policy on Student Religious Accommodations in Academic Courses or Programs, available at `https://www.pugetsound.edu/office-university-counsel/policies/campuswide-policies/student-religious-accommodations-academic-courses-or-programs/`.
- If you have any concerns about prohibited harassment or discrimination that may be affecting you or others at Puget Sound, please contact the university's Title IX Coordinator/Equal Opportunity Officer, Wheelock 218, 253.879.3793, website: `https://www.pugetsound.edu/title-ix-equal-opportunity/`, email: `titleix-eoo@pugetsound.edu`. The Title IX Coordinator/Equal Opportunity Officer can explain available options and help address concerns informally or formally.
- If you have a physical, psychological, medical or learning disability that may impact you as a student at Puget Sound, please contact Student Accessibility and Accommodation, Howarth 105, 253.879.3399, website: `pugetsound.edu/saa/`, email: `saa@pugetsound.edu`. They will determine with you what accommodations are necessary and appropriate.