COS 226, Spring 2026

Algorithms
and
Data Structures

Maryam Hedayati · Gillat Kol · Pedro Paredes

Princeton University

Fine print

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https://algs4.cs.princeton.edu

Intro to COS 226

- *motivation*
- *course structure*
- *grading and assessments*
- *support and resources*

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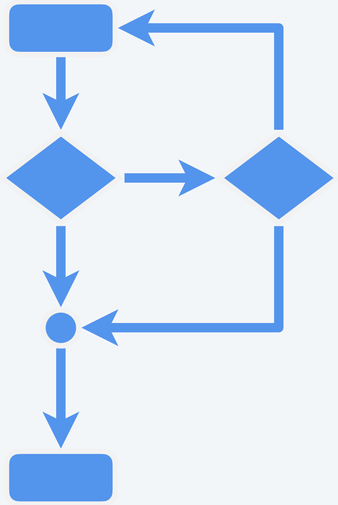
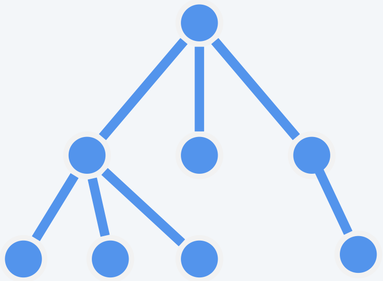
COS 226 course overview

What is COS 226?

- Algorithm: A step-by-step, well-defined procedure for solving a problem.
- Data structure: A way to organize data in a computer for efficient access and update.
- Programming and problem solving, with applications.

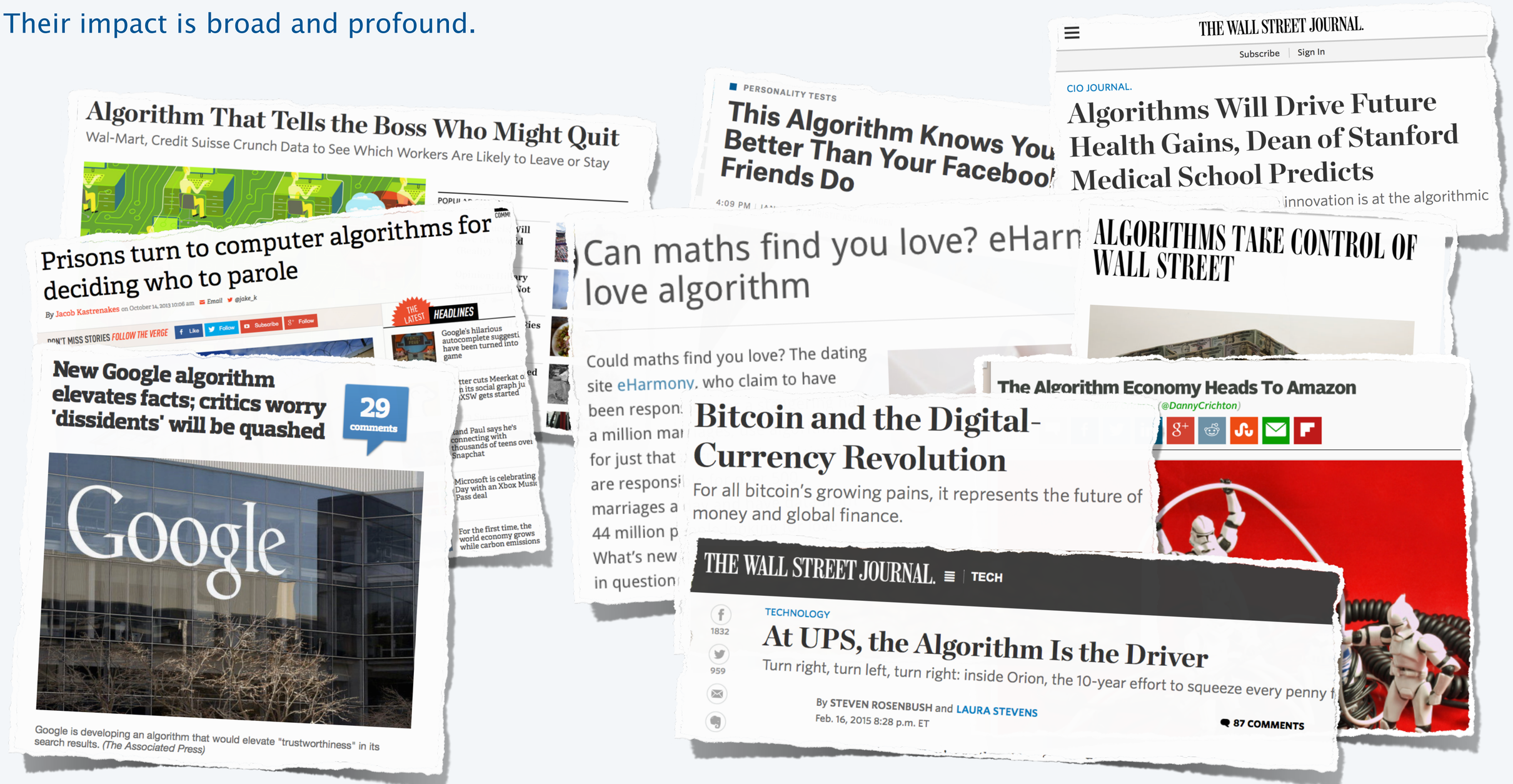


topic	algorithms / data structures 
data types	*stack, queue, union–find*
sorting	*insertion sort, quicksort, mergesort, priority queue*
searching	*BST, red–black tree, hash table, k-d tree*
graphs	*BFS, DFS, Prim, Kruskal, Dijkstra*
advanced	*randomness, multiplicative weights, intractability*



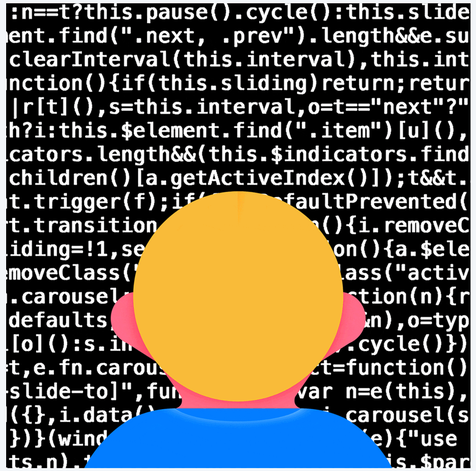
Why study algorithms and data structures?

Their impact is broad and profound.



Why study algorithms and data structures?

To become a strong programmer.



> *“ I will, in fact, claim that the difference between a bad programmer and a good one is whether [they] consider [their] code or [their] data structures more important. Bad programmers worry about the code. Good programmers worry about data structures and their relationships.”*
>
> — Linus Torvalds (architect of Linux and git)

Why study algorithms and data structures?

For intellectual stimulation.

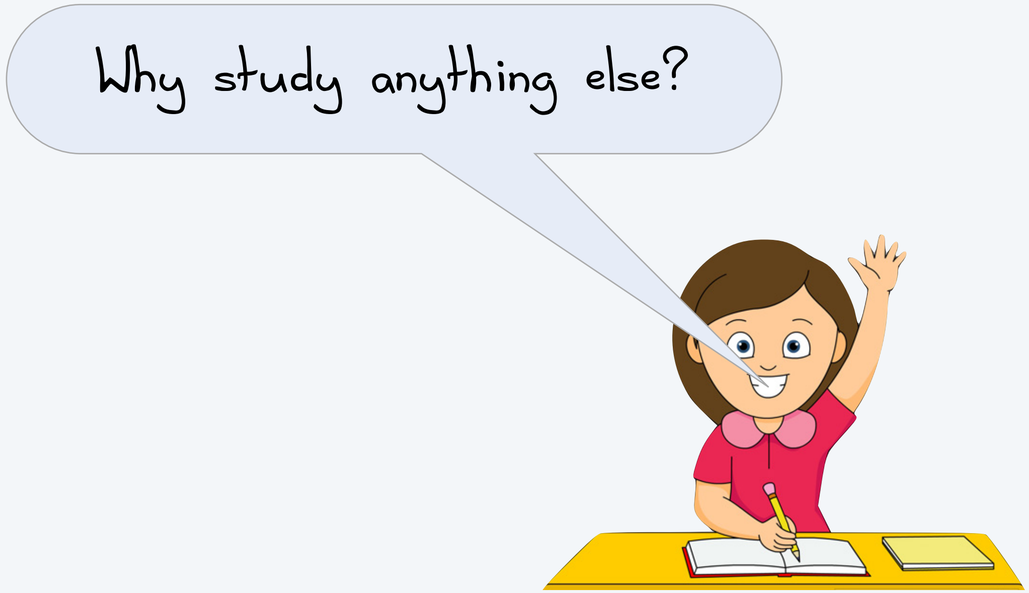
> *For me, great algorithms are the poetry of computation. Just like verse, they can be terse, allusive, dense, and even mysterious. But once unlocked, they cast a brilliant new light on some aspect of computing.*" — Francis Sullivan

Why study algorithms and data structures?

For fun—and, eventually, profit.

Why study algorithms and data structures?

- Their impact is broad and profound.
- To become a strong programmer.
- For intellectual stimulation.
- For fun—and, eventually, profit.



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Lectures

Live lectures. We introduce new material.

What	When	Where	Who	Office Hours
L01	TTh 1:20–2:40pm	Friend 101	Gillat Kol Maryam Hedayati Pedro Paredes	*see course website*

Prof. Maryam Hedayati

Prof. Gillat Kol

Questions. Please raise your hand and ask. ⟵ *carpe diem!*

Electronic devices. Only for supporting the lecture (viewing slides, taking notes, iClickers).

Prof. Pedro Paredes

iClicker (required). To earn participation credit:

- Create an iClicker Cloud account. ← *use your Canvas-preferred email*
- Answer multiple-choice questions during lecture. ← *must answer 75% of questions*
  please enable location sharing!

https://www.iclicker.com

If you could have more of one of the following, which would you choose?

A. Fame. ⭐⭐⭐

B. Fortune. 💰💰💰

C. Friends. 💛💛💛

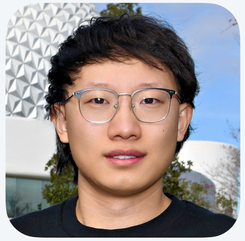
D. Free time. ⏳⏳⏳

Precepts

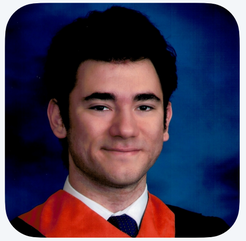
Active learning. Problem solving, discussion, assignment preparation, …


Prof. Maryam Hedayati


Jiatong Yu


Yang Duan


Frederick Qiu


Alkin Kaz

Lacey DeLucia


Andy Nguyen


Patty Liu

Special precept P04. Friday 1:20–2:40pm.

- Intended for students seeking a more advanced treatment of the material.
- Covers topics beyond the scope of the course.
- Add/drop via TigerHub.


Prof. Pedro Paredes

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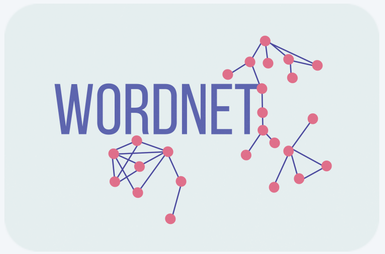
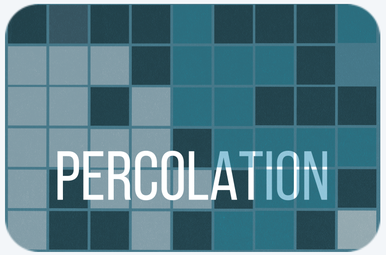
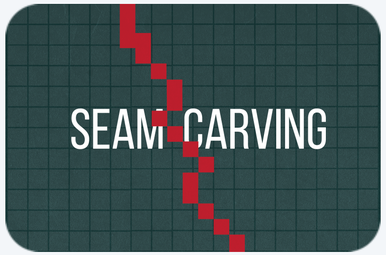
Programming assignments

Implement efficient algorithms and data structures.



Apply “textbook” algorithms to interesting applications.



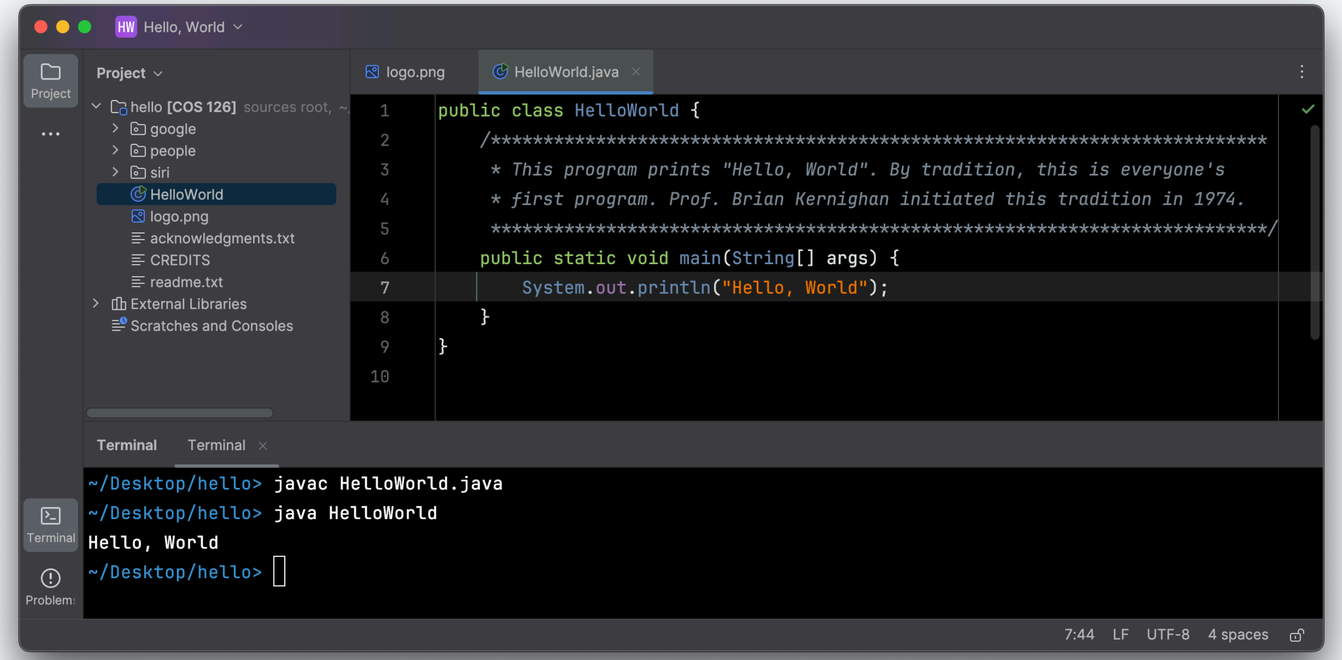


Pair programming is encouraged on designated assignments.

Programming environment (IntelliJ)

Recommended IDE: custom IntelliJ 2025.2 environment. ← *use our fall 2025 version (see lab TAs for troubleshooting)*

- Embedded terminal (Bash).
- Highlights common errors as you type.
- Automatic formatting, imports, and code completion.
- …



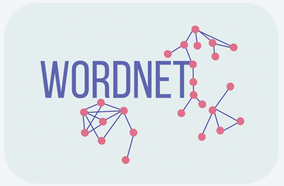
Programming assignment grading

Completion credit (7%).

- Earned by submitting any code that compiles by the completion deadline (1% per assignment).
- You will receive autograder feedback for any code you submit by the completion deadline.
- Autograder feedback is helpful for making sure your code works, so we highly encourage submitting the complete assignment on time.
- Your grade doesn't depend on autograder feedback

Code review credit (28%).

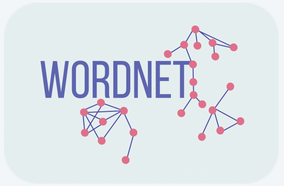
- Earned by demonstrating your understanding of your code during a one-on-one code review with a TA (4% per assignment).
- Code reviews are 20 minutes with a TA, dates listed on assignments pages.
- The TA is not trying to trick you, and the questions should be easy if you wrote your own code.
- 25% partial credit per component for acknowledging incomplete work.



Programming assignment recommendations

Our recommendation.

- Write your own code from scratch and aim to finish by completion deadline
- Start early to give yourself time to debug
- Use the autograder to catch bugs and check completeness
- When you're stuck, use course resources (Ed, office hours, lab TAs)
- Honest partial progress is better than code you don't understand



Quizzes

PrairieLearn platform.

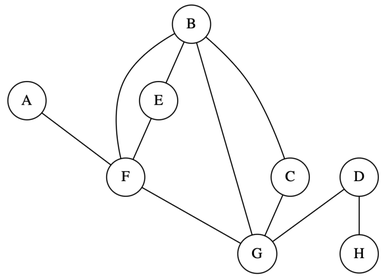
- 2–3 short questions after each lecture.
- Solve using pencil and paper (not GenAI).
- Unlimited attempts per question. ← *different variant each attempt; short delay between attempts*
- Your score = best score over all attempts.

Q7.2. Breadth-First Search Trace

Consider the following adjacency-lists representation of a graph with **8** vertices and **10** edges:

```
A:  F
B:  G E C F
C:  G B
D:  H G
E:  B F
F:  G A B E
G:  B C F D
H:  D
```

Here is a graphical representation of the same graph:



Run breadth-first search (using the adjacency-lists representation) from vertex A. Give the sequence in which the vertices are dequeued from the FIFO queue.

*Your answer should be a sequence of **8** uppercase letters starting with A, separated by whitespace.*

dequeued =

Save & Grade *2 attempts left* | Save only

Additional attempts available with new variants

Can only be graded once every 2 minutes

PrairieLearn

Midterm and final

Written exams.

- Questions drawn from lectures, precepts, programming assignments, and quizzes.
- Emphasizes conceptual questions rather and code-writing.

3. **Data structures. (6 points)**

(a) Consider the following *parent-link* representation of a *weighted quick union* (link-by-size) data structure.

	0	1	2	3	4	5	6	7	8	9
`parent[]`	4	5	4	5	?	5	2	5	8	5

Which of the following values could be `parent[4]`?

Fill in all checkboxes that apply.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Grading breakdown ~~A+~~

Programming assignments (35%).

- Completion credit & code reviews
- Due at 11:59pm on Mondays (2 optional late days per assignment).
- Collaboration/lateness policies: see course website.

Quizzes (10%).

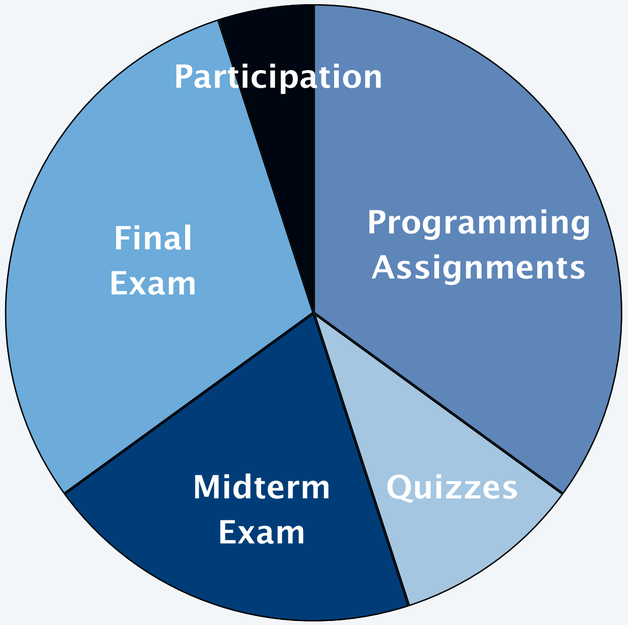
- Due at 11:59pm on Saturdays.
- Collaboration/lateness policies: see course website.

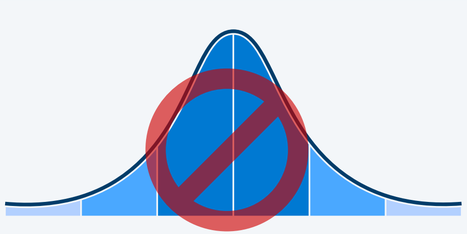
Written exams (50%).

- 80-minute midterm exam on Tuesday, March 3.
- 3-hour in-person final exam on Saturday, May 9.

Active participation (5%).

- iClicker participation in lectures.
- Collaborative participation in precepts.





grade	score
A	93.0%
A–	90.0%
B+	87.0%
⋮	⋮

course grades and uncurved (no rounding of percentages)

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Required textbook

Textbook readings. From *Algorithms* 4^{th} *edition* by R. Sedgewick and K. Wayne, Addison–Wesley Professional, 2011, ISBN 0–321–57351–X.

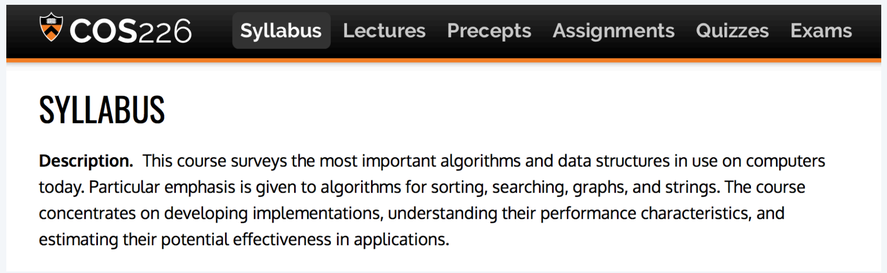
⟵ *eCampus, Amazon, …*

4^{th} edition (2011)

Online resources

Course website.

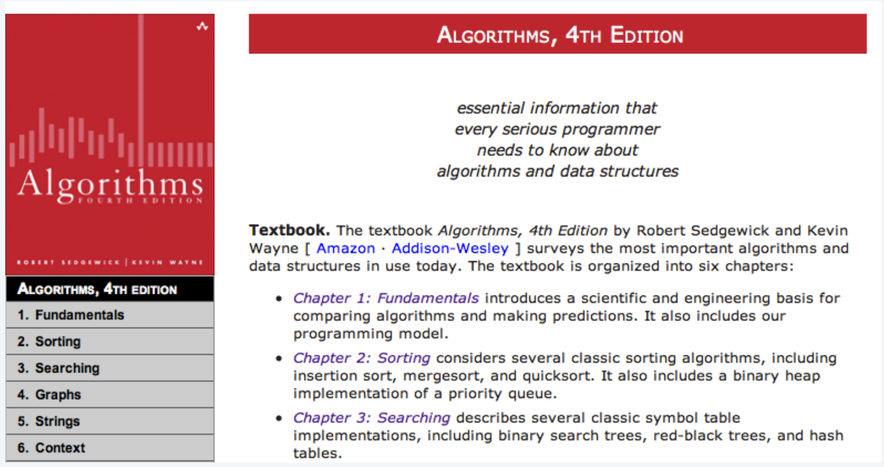
- Syllabus and course policies.
- Lecture slides.
- Precept worksheets.
- Programming assignments.
- Quizzes.
- Exam archive.



https://www.princeton.edu/~cos226

Book website (booksite).

- Brief chapter summaries.
- Downloadable code from the book.
- APIs and Javadoc.



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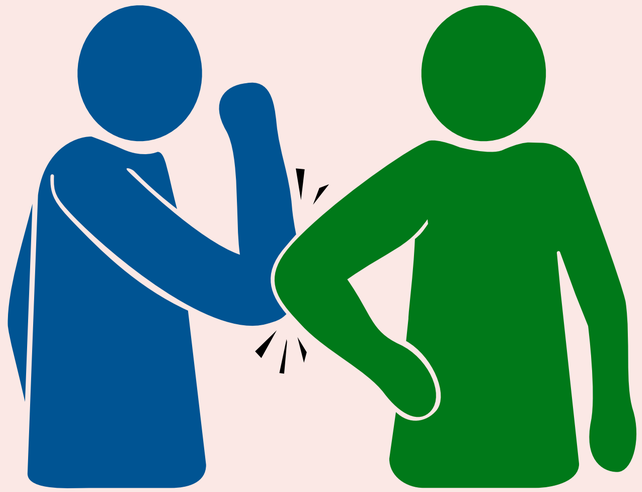
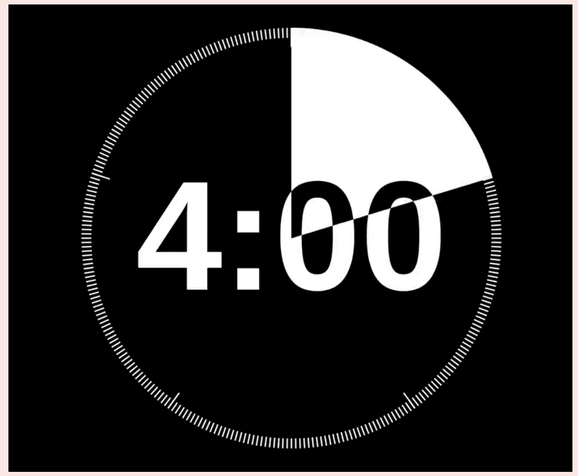
Your classmates

Have you already met the person sitting next to you?

A. Yes.

B. No.





People support

Ed discussion forum.

⟵ *please use Ed, not email*

- For quick questions.
- Designate post as private only when necessary.
- Read the Ed FAQ for guidelines.

https://edstem.org/us/courses/94725/

Office hours.

- For longer discussions.
- See the course website for the schedule.

https://www.princeton.edu/~cos226

Intro COS lab.

- Run by undergrads.
- For help with debugging.
- See the course website for the schedule.

https://introlab.cs.princeton.edu

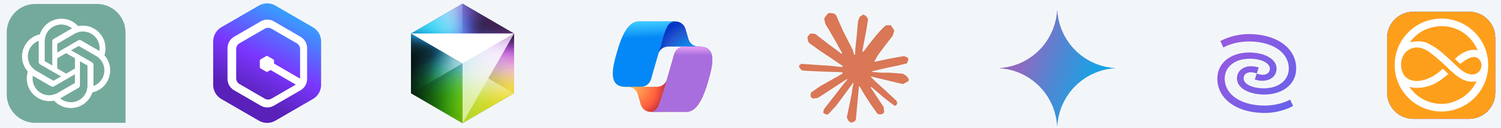
Ed tech

Platform	What it's for
Ed	*discussion forum, precept lessons*
IntelliJ	*Java IDE (programming environment)*
PrairieLearn	*quizzes*
TigerFile	*assignment submissions*
Gradescope	*exam grading and feedback*
Canvas	*grades*
iClicker	*in-lecture polls and participation*

also use for communication with course staff (do not email)

Non-resources: generative AI tools

GenAI policy. Using GenAI is not permitted on exams and quizzes, and highly discouraged on assignments



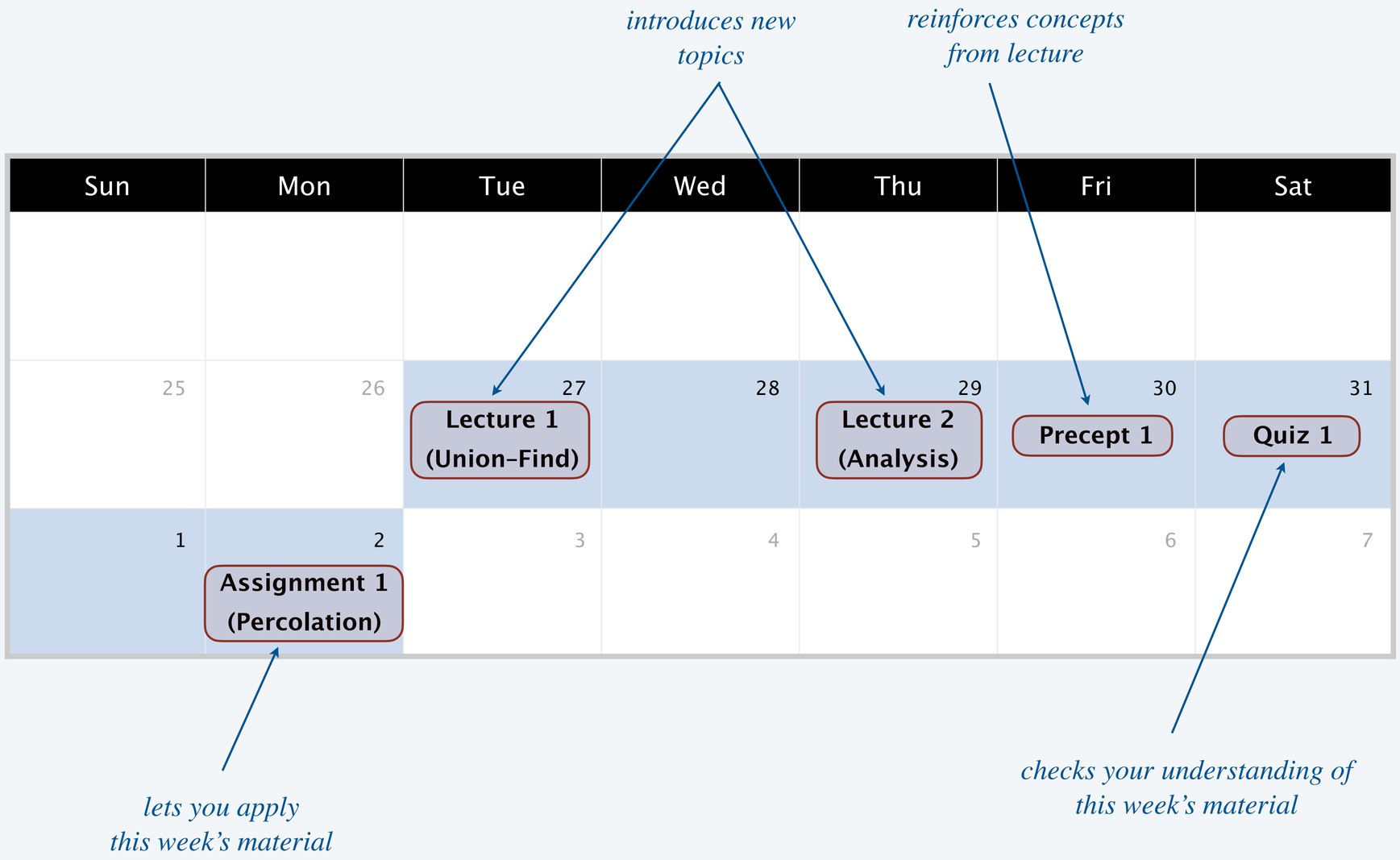
Pedagogical rationale.

- Build a strong foundation in programming.
- Strengthen critical-thinking and problem-solving skills.
- Prepare to use GenAI effectively and responsibly in the future.
- Crush exams and technical interviews.

Grade incentive.

- Code reviews require you to understand how your code works and was written.
- Partial credit for honest incomplete work.

A typical week in COS 226 (including this one!)



Administrative questions

Not yet registered? Register today. ← *must be enrolled to access various platforms*

Change your precept? Use TigerHub.

All non-conflicting precepts closed? Contact our course admin, Kobi Kaplan.

Kobi Kaplan

Placed out of COS 126 / ECE 115? Review Sections 1.1–1.2 of Algorithms 4/e.

Haven't completed the COS 226 prerequisites? See the COS placement officer.

Additional administrative questions? Ask now, after class, or any time in Ed Discussion.

Credits

image	source	license
THX Eclipse Deep Note	THX Ltd.	
Wireframe Tiger	Audrey Cheng ’20	by author
Programmer	Wall Street Journal	
Student Raising Hand	classroomclipart.com	educational use
Hands Raising Smarphones	Adobe Stock	education license
A is for Algorithms	comtechpass.com	
Assignment Logos	Kathleen Ma ’18	by author
Normal Distribution	Adobe Stock	education license
Pair Programming	Adobe Stock	education license
Office Hours	clipground.com	CC BY 4.0
COS Lab TAs	Pulkit Singh ’20	by author
Question Marks	pikpng.com	non-commercial use
Elbow Bump	The Noun Project	CC BY 3.0
Countdown Timer	YouTube	