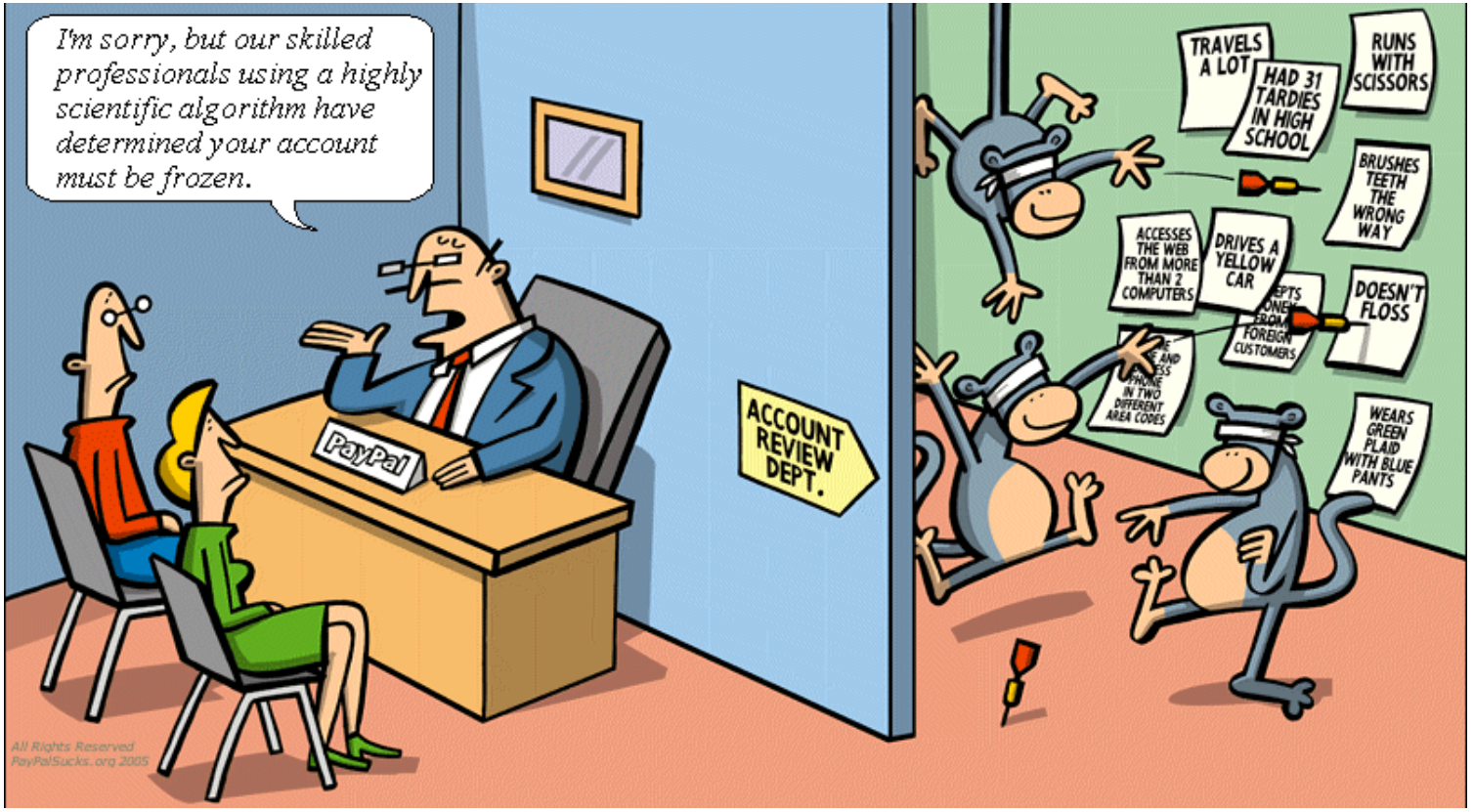
CS 577: Intro. to Algorithms

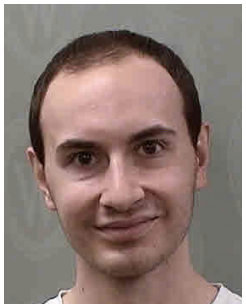


Course staff

Instructor: Prof. Shuchi Chawla

TAs:


Amanda


Andrew

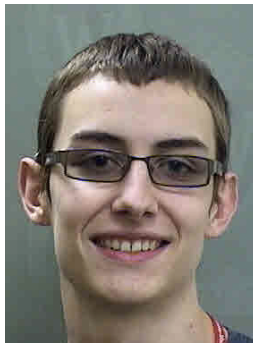

Drew

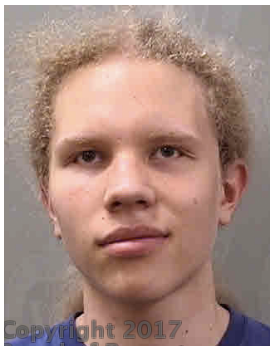

Gautam


Tianyu

Peer mentors:


Willa


Marcus



Newton

Textbook

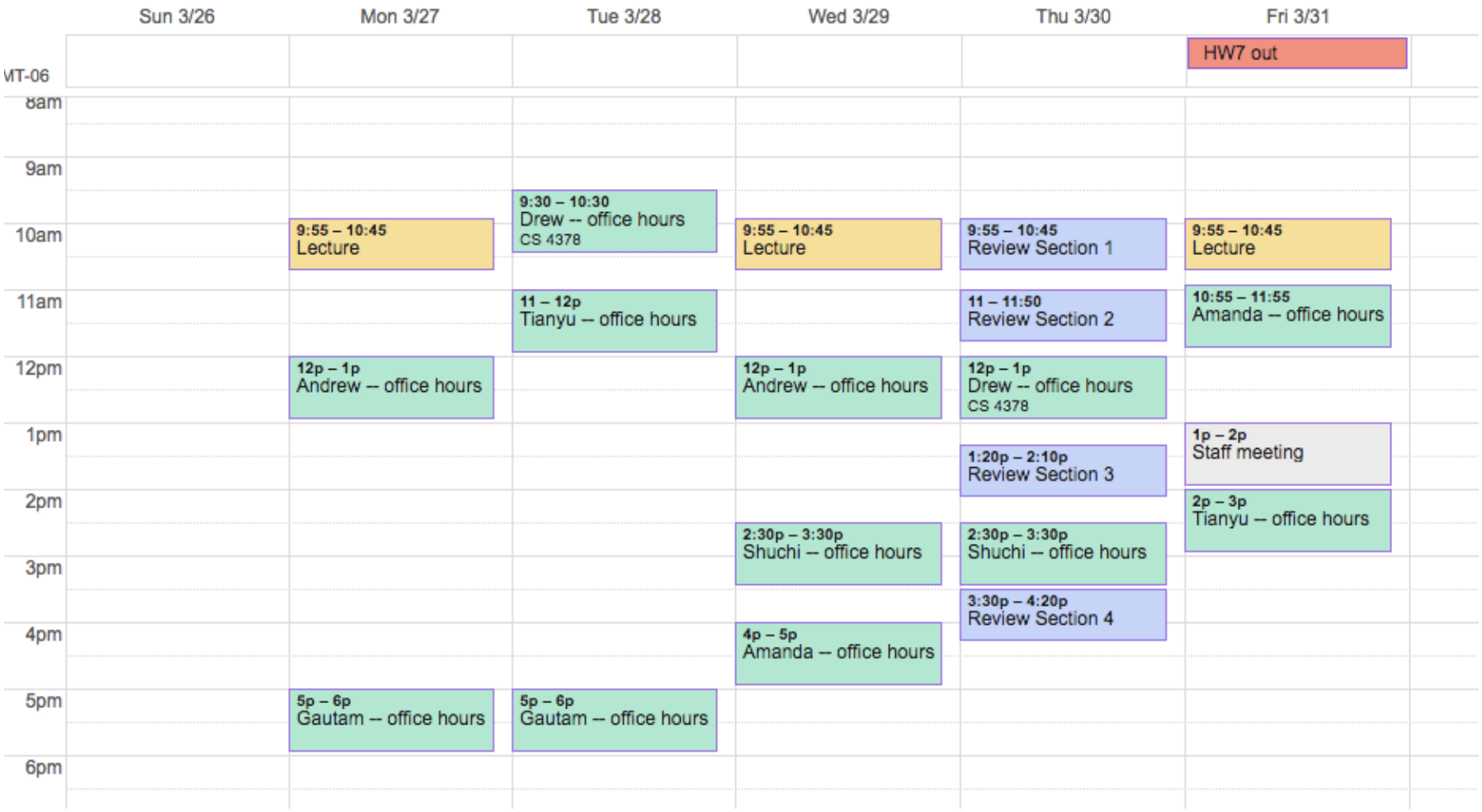
- Primary text: “Algorithms, Etc.” by Jeff Erickson

  Available online at http://jeffe.cs.illinois.edu/teaching/algorithms/

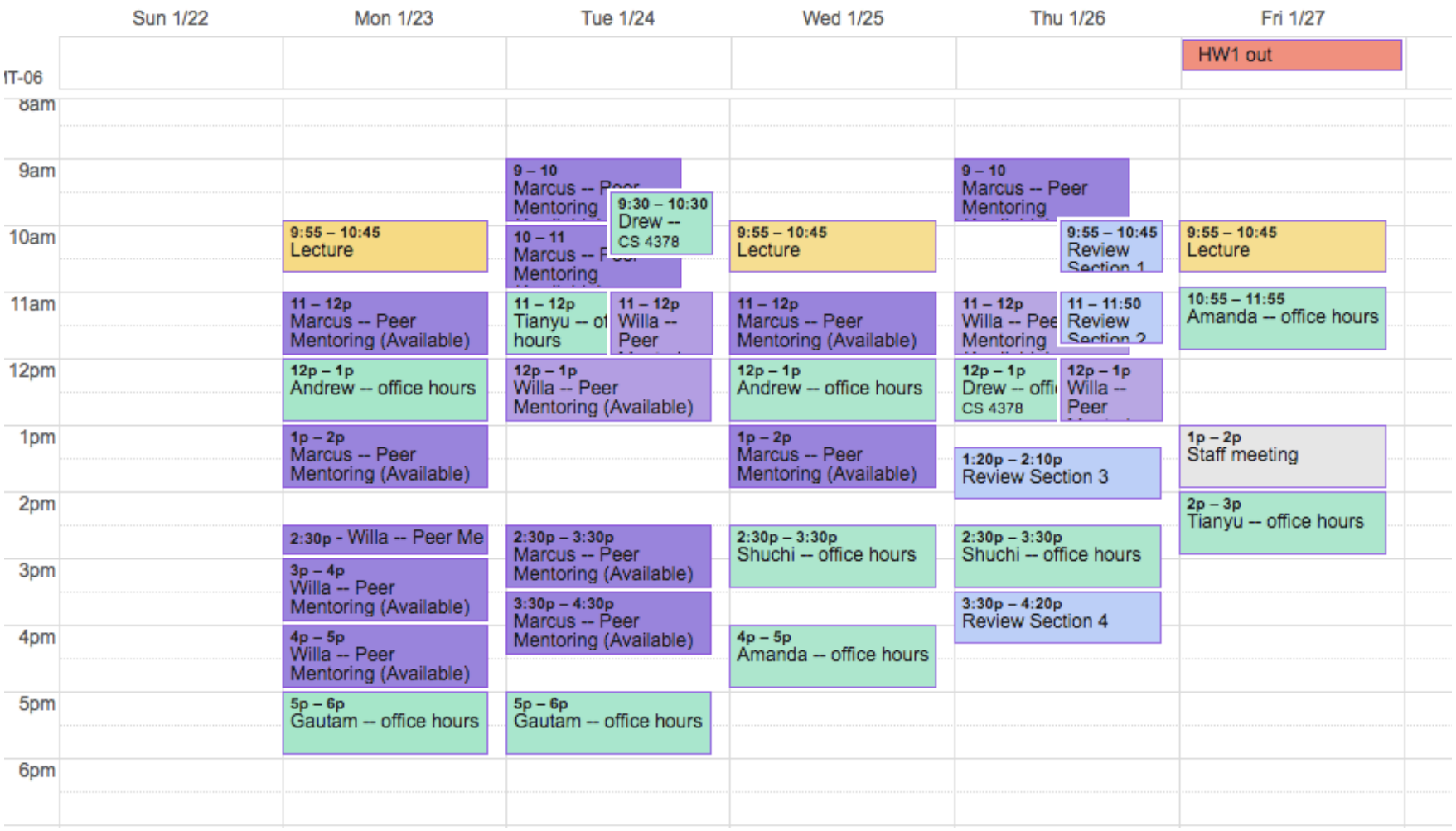
- Supplementary/alternate text: “Algorithm Design” by Kleinberg and Tardos

- You will do fine consulting either one of these sources.

A typical week



A typical week



Homework

- 10 weekly homeworks in all
- 5 problems each week
  - 2 review problems: discussed in the following review session.
  - 1 self-graded problem: discussed in review; to be self-graded by you during the review and turned in; worth 1 point; have to be present to earn the point.
  - 2 graded problems: to be turned in the following Friday at the beginning of lecture; graded by us; worth 2 points each.

Homework

- 10 weekly homeworks in all
- 5 problems each week; worth 5 points each
  - Graded homework problems must be done and submitted in pairs.
  - Submit each problem on a separate sheet of paper.

- No extensions for homework under any circumstances
- We will use your 9 best HW scores for final grading (least score dropped)

You may not consult any material other than your lecture notes and the course text or reference books. The use of materials (such as homework solutions) from previous versions of the course or from the Internet is considered plagiarism and will warrant strict action in accordance with university policy.

Review sessions

- TA-led
- Not mandatory but highly recommended.
- All four sessions are identical; attend any one.

Format:

- Two homework problems discussed and solved
- Problem solving strategies reiterated and discussed
- Solution to third homework problem presented
- 5-10 mins to self-grade and turn in your third homework problem

Exams

- Midterm on Thursday, March 16, 7:15-9:15 PM.
  - worth 24 points
- Final exam on Tuesday, May 9, 5:05-7:05 PM.
  - worth 30 points

Grading

- 100 points divided as:
  - 36 points for graded homework – 9x4
  - 10 points for self-graded homework
  - 24 points for midterm
  - 30 points for final exam

- >85 guarantees you an A
- >60 guarantees you a B
- The median grade will be a B
- Actual cut-offs may vary and will be decided after the final exam is graded.

Peer mentors

Goal: get extended help on topics that you are struggling with

Do not ask peer mentors for help on homework!

- Check mentors' availability on course calendar
- Send email to cs577.mentors@gmail.com to sign up for ½ to 1 hr slots – mentors will respond to confirm your appointment
- Sign up at least 1 day in advance.
- Mentors can help up to 2 students at a time.

Piazza

- Sign up if you didn't already.
- Primary location where we post homework, supplementary material for lectures, announcements, etc.
- Use this to ask general questions about the course, or anything that you don't need an urgent answer on.
- You may post anonymously or privately to instructors.
- Read other answers before asking a question – your question may already have been answered.

How to seek help

- Quick help on homework → office hours
- Questions re: grading → office hours of the relevant TA
- General/longer help on material or problem solving strategies → peer mentors
- Clarification on homework/lecture material; general clarification questions → Piazza
- Feedback → Piazza (can post anonymously)

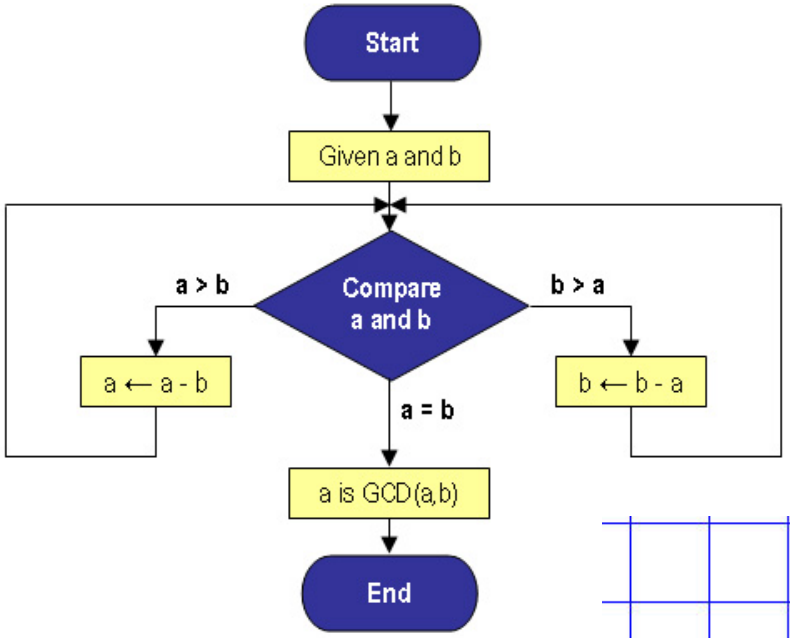
How to succeed in this class

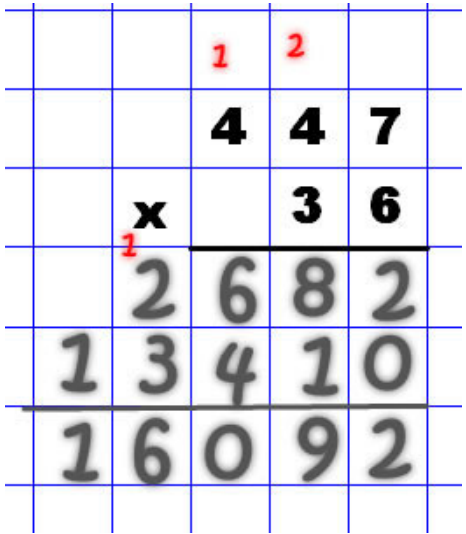
- Practice, practice, and practice
  - Attempt review problems before attending the review session
- Be regular
- Seek timely help

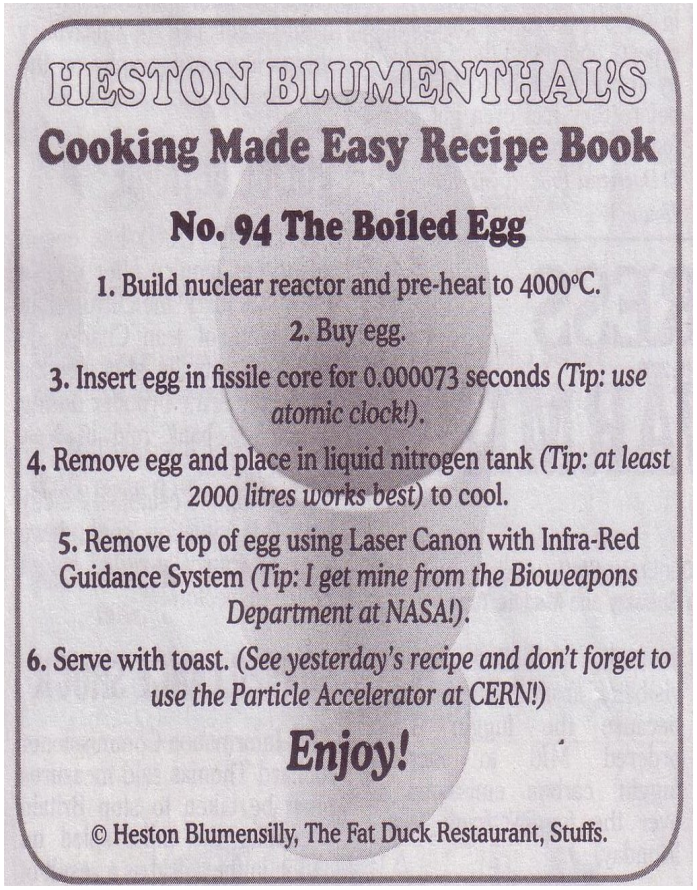
Algorithms: what and why

...And that, in simple terms, is how you increase your ranking on search engines."

Algorithms: recipes for problem solving







HESTON BLUMENTHAL'S

Cooking Made Easy Recipe Book

No. 94 The Boiled Egg

1. Build nuclear reactor and pre-heat to 4000°C.
2. Buy egg.
3. Insert egg in fissile core for 0.000073 seconds *(Tip: use atomic clock!)*.
4. Remove egg and place in liquid nitrogen tank *(Tip: at least 2000 litres works best)* to cool.
5. Remove top of egg using Laser Canon with Infra-Red Guidance System *(Tip: I get mine from the Bioweapons Department at NASA!)*.
6. Serve with toast. *(See yesterday's recipe and don't forget to use the Particle Accelerator at CERN!)*

Enjoy!

Why study algorithms?

- Fundamental in many areas of computer science
- Play a big role in modern technological innovation

> "Everyone knows Moore's law – a prediction made in 1965 by Intel cofounder Gordon Moore that the density of transistors in integrated circuits would continue to double every 1 or 2 years… in many areas, performance gains due to improvement in algorithms have vastly exceeded even the dramatic performance gains due to increased processor speed."
> – Excerpt from *Report to the President and Congress: Designing a Digital Future*, December 2010 (page 71).

Why study algorithms?

- Fundamental in many areas of computer science
- Play a big role in modern technological innovation
- “New language” of science
- Challenging
- Fun & addictive

What you will learn

- Algorithmic techniques & ideas
- What to apply where
- How to describe algorithms – precise but not overly formal

- Proofs versus intuition

  but, you will improve your algorithmic intuition
- Constructing counterexamples

- Cool examples – some of the greatest hits in CS
- Limitations of algorithm design

What you will not learn

- How to write better code
- How to optimize or debug your code

- The “science” of designing algorithms
  - Designing algorithms is still an art, not a science (cf. P vs NP)