

15:750
Algorithms in the Real World

Instructors
Prof. Daniel Sleator and Prof. Rashmi Vinayak

Lecture 1

Today

- Introduction
- Course overview
- Logistics
- Start with the topics

Course Staff

Instructors:

Daniel Sleator

Rashmi Vinayak

TAs:

Runtian Zhai

Yixuan Mei

Instructors

Daniel Sleator

sleator@cs.cmu.edu

<http://www.cs.cmu.edu/~sleator/>

Rashmi Vinayak

rvinayak@cs.cmu.edu

<http://www.cs.cmu.edu/~rvinayak/>

Course content overview

Learning goals

Cover algorithms and tools that give students the ability to

- recognize which tool or method to apply to problems,
- to become reasonably proficient at using these tools, and
- to be able to reason about the correctness and performance of the resulting algorithms

Topics

- A refresher on basic algorithmic principles:
 greedy, divide-and-conquer, dynamic programming, and their applications
- Hashing and Randomization
- String algorithms
- High-dimensional data: dimensionality reduction, nearest neighbor
- Flows and Cuts
- Linear Programming and Duality
- Convex Programming
- Error Correcting Codes
- Compression
- Optimization
- ...

Required preliminaries

Basic linear algebra and probability

E.g., matrix/vector operations, conditional probability

Basic algorithms

Any undergraduate level algorithms course

Course website has some resources

Course logistics

Communication

Piazza: all course related communication

- All technical questions should be discussed via Piazza
- Let's not use private messages unless necessary—if you have a question it is very likely other students have it too! (You can be anonymous to other students, of course.)

Office hours

- TA office hours: Shown on the calendar on the course webpage
- Instructors' office hours will be by appointment
 - Catch us after the lecture OR
 - Send a private Piazza message or email along with a brief description of what you would like to discuss

Course materials

- No mandatory textbook
- We will provide lecture notes / reading from books / slides on the course website
 - <https://www.cs.cmu.edu/~15750/>
- Course website lists some good books that you can use as reference
- Lecture materials will be added after each lecture

Evaluation

32% for take-home midterm (**October 10**)

32% for take-home finals (**December 6**)

32% for homeworks (~6 HWs, roughly one every 2 weeks)

4% for attendance/class participation in lecture or Piazza

Homework policy

- Need to write own solutions. Cite all sources!
- Submissions on Gradescope
- For each homework, there will be a two-day (48 hours) no-questions-asked extension.
 - Can use this extension for any valid reason **without having to ask the instructors.**
 - No additional extensions

Questions?