Today

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

**Instructors:** Rashmi Vinayak

**TAs:**
Yash Savani
Billy Yan
Instructors

Rashmi Vinayak
http://www.cs.cmu.edu/~rvinayak/

TheSys Lab
Research on both Theory and Systems

On Information & Coding Theory:
We formulate & solve theory problems based on real-world system challenges
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
- Streaming algorithms (a.k.a. algorithms for big data)
- High-dimensional data: dimensionality reduction, nearest neighbor
- Flows and Cuts
- Linear Programming and Duality
- Convex Programming
- Error Correcting Codes
- Compression
- Optimization (including gradient descent)
- ... potentially more topics...
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
- Rashmi Vinayak’s office hours will be by appointment
  - Please send Rashmi a private Piazza message 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 12)
32% for take-home finals (December 8)
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 (except for exceptional circumstances)
Questions?