Design of Algorithm: Introduction

Mohammad Javad Dousti

Changelog

- Rev. 1
  - Finalized exam 1 and exam 2 dates (slide 11.)
- Rev. 2
  - My office location has changed (slide 3.)
- Rev. 3
  - Updated grading based on the current situation (slide 10.)
- Rev. 4
  - Updated exam dates (slide 11.)

Instructor Info

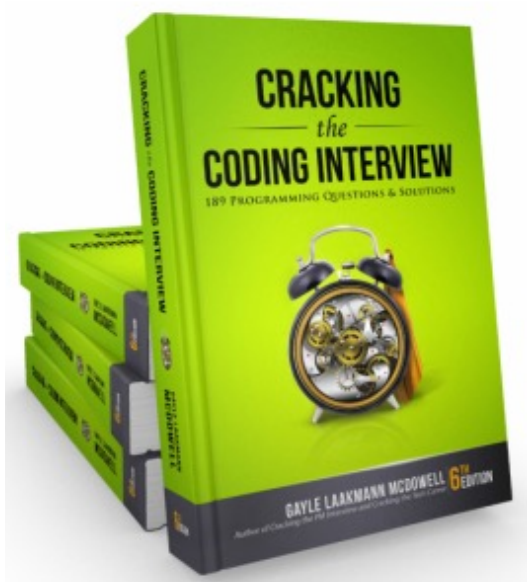
- Mohammad Javad Dousti
- **Office:** ECE Building 2; Room 719 (Note that this has changed recently.)
- **Office Hours:** Saturdays and Mondays 10:30am – 11:30am
- **Email:** mjdousti@ut.ac.ir (I'll try my best to respond within one business day)

Class Info

- When: Saturdays & Mondays 9:00am – 10:30am
- Where: Class #10
- Class web page:
  - E-Learn: http://elearn.ut.ac.ir
  - Discussion group:
    - Telegram group: https://t.me/+AecR2-X4nzZhMGIx
  - Quera group for uploading computer assignments https://quera.org/course/add_to_course/course/11842/ (use DA14011 as password)
    - Make sure to use your *full name* and *correct student ID*.

Course Objectives

- This course is the keystone of computer science & engineering majors.
- You'll get familiar with important algorithms and learn how to solve algorithmic problems efficiently.
- This course makes you stand out from someone who learns programming on their own.



- You'll need concepts of this course to be able to pass *standardized interviews*, especially, those for tech giants (i.e., Amazon, Apple, Google, Facebook, and Microsoft).
- I strongly encourage you to take a look at the "***Cracking the Coding Interview***" book. It's an extremely popular book to prepare candidates for tech giants interviews. The book simply teaches how to solve algorithmic problems. That's exactly what you'll learn in-depth in this very course.

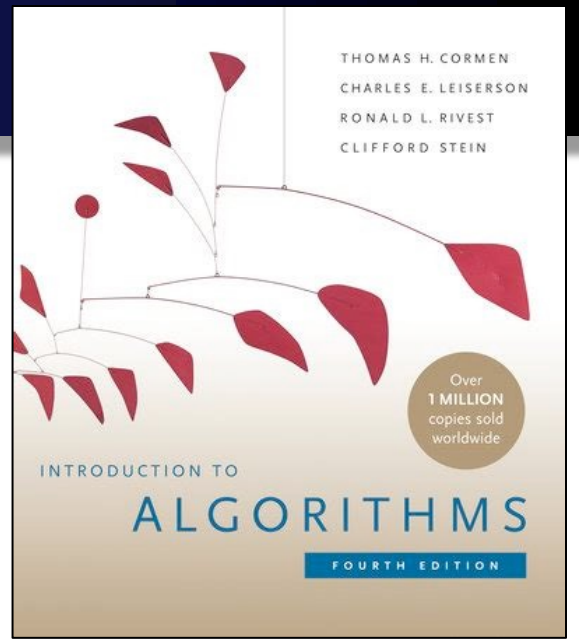
Prerequisites

- Data structures and algorithms course
- Passion & dedication

Course Content

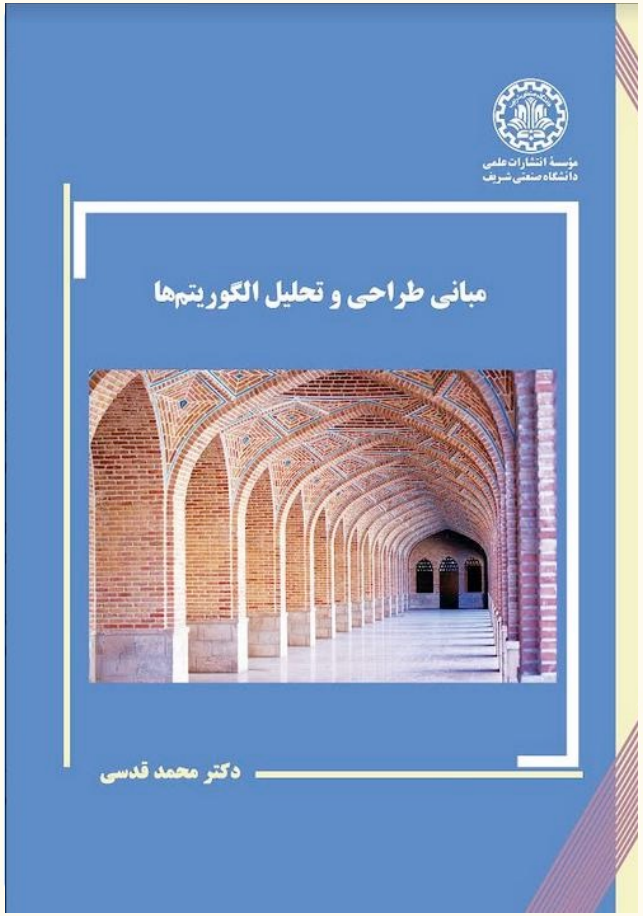
- In this course, we'll walk you through 6 major topics:
  - Divide and conquer
  - Dynamic programming
  - Greedy algorithms
  - Graph algorithms (shortest paths)
  - Maximum flow network
  - NP-completeness and branch & bound

Readings



- Main Textbook:
  - T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, "*Introduction to algorithms*," MIT press, 2022 (the CLRS book.)
- Recommended Readings:
  - U. Manber "*Introduction to algorithms: a creative approach,*" Addison-Wesley, 1989.
  - J. Kleinberg and É. Tardos, "*Algorithm design*," Pearson Education, 2006.
  - S. Dasgupta, C. Papadimitriou, and U. Vazirani, "*Algorithms*," McGraw-Hill Higher Education, 2008.
  - J. Erickson, "*Algorithms*," 2019.

Readings (cont'd)



عنوان: مبانی طراحی و تحلیل الگوریتم ها
نویسنده: دکتر محمد قدسی
نوبت چاپ: اول
سال چاپ: ۱۴۰۰
قطع: وزیری
تعداد صفحات: ۳۶۰

ناشر: مؤسسه انتشارات علمی دانشگاه صنعتی شریف
توضیحات: ارسال از ۹ اسفند ۱۴۰۰
قیمت: ۱۲۰۰۰۰ تومان

افزودن به سبد خرید

دریافت فایل pdf همراه کتاب

Book page: http://sharif.edu/~ghodsi/?page=da-alg-book
Purchase link: https://book.sharif.ir/user/getDocInfo/442

Grading

- Analytical homeworks (HW): 4.5 pts
- Computer assignments (CA): 4 pts
- Midterm exam: 4 pts
- Final exam: 8 pts
- Late HW/CA will be penalized at the rate of 10% per day or fraction thereof for the first two days. After that (two days), no late HW/CA will be accepted.

Exams

- Exam dates:
  - Midterm exam: **Saturday 1401/9/19 (۱۹ آذر ۱۴۰۱); 9am – 10:30pm**
  - Final exam: **1401/11/2 (۲ بهمن ۱۴۰۱); 14pm – 17pm**

Course Policies

- You are responsible for all assigned readings and information presented in the class, including due dates, assignments, exams and so forth.
  - Make sure to always download latest copies of course slides. I may revise them over time with more up-to-date info or fix errors over time. I use a versioning system by attaching `_rev#` postfix to slide names and add a changelog slide to the very beginning of each slide deck.
- You are expected to attend *all* classes. I won't take notes of absentees but you will be responsible for anything said verbally or done in the class. Also, you need to attend classes in order to take quizzes.

Teaching Assistants

- Chief TA: Borna Tavassoli (borna.tavassoli@gmail.com)
- Computer assignment quality assurance: Sara RezaeiManesh (sara.rezaeimanesh2000@gmail.com)
- Algorithmic competition: Adib Rezaei (Adibrezaeish@gmail.com)

#	Subject	Homework & Computer Assignment	
1	**Divide & Conquer**	AmirMohammad Khosravi (amirmohammadkhsv@gmail.com)	Ava MirMohammadi (avamir80@gmail.com)
2	**Dynamic Programming**	Moeen Karami (moein2000n@gmail.com)	Mohammad Mohajjel Sadeqi (msadegi007@gmail.com)
3	**Greedy Algorithms**	Hessam Asadzadeh (hesam.as.sa.as@gmail.com)	Pasha Barahimi (pashabarahimi@gmail.com)
4	**Graph Algorithms**	Aryan Soltani (arysoltani@gmail.com)	Maryam Jafarabadi Ashtiani (maryamjafarabadi88@gmail.com)
5	**Network Flow**	Mohammad Farahi (farahim.1379@gmail.com)	Ali Hodaei (ali.n.hodaei@gmail.com)
6	**NP and B&B**	Sepehr Azardar (sepehr81sepehr@gmail.com)	-

Problem Solving Classes

- Content:
  - Advanced programming skills (e.g., code profiling)
  - One session for each topic
  - One review session before each exam
- Location: Class #7
- Time: Saturdays 13pm – 14pm
  - Classes will be held on certain weeks. TAs will inform you about the schedule.
  - Attending these classes is optional but highly recommended.

Educational Fairness

- We have a ***zero-tolerance policy*** for any form of ***plagiarism*** in this course.
  - Plagiarism: The practice of taking someone else's work or ideas and passing them off as one's own.
    - Needless to say, this includes copying solutions or codes from the Internet.
  - First and foremost, note that plagiarism makes the course unfair to others.
  - You'll pickup a BAD habit which will hunt you down at some point in your life.
  - For the first time, you'll get a zero in the related work and for the second time, you will fail the course with the lowest grade.
  - All parties involved in plagiarism will be punished.
  - I really discourage it in any form. It isn't really worth it. You have been warned! ☠

Educational Fairness (cont'd)

- Extreme situations:
  - If you need any extra accommodations, feel free to raise your concern during my office hours or through email.
  - I'll do my best to provide *reasonable* accommodation as long as the concern is raised in a timely manner.
    - Do **NOT** wait until the end of semester or when you get a bad grade. In this case, you probably won't get any accommodation.

Course Calendar

- Please refer to the calendar uploaded to Elearn.