



CS350

Algorithms and Complexity

Winter 2019

David Lu

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Time and Location: Section 004 Mon, Wed 4:40–6:40 PM EB102

Section 006 Mon, Wed 6:40 – 8:30 PM ASRC001

Instructor Info:

Office Location: TBA

Office Hours: Mon after class, Wed 3:30–4:30 PM

TA: Neil Babson

TA Email: nbabson@pdx.edu

TA Office Hours: Tues, Thurs 2:00–3:00 PM in the fishbowl

Course Description: (From the PSU course webpage): Techniques for the design and analysis of algorithms. Case studies of existing algorithms. NP-completeness.

Goals: To develop a group of useful algorithms which can be used to solve common problems. The development of tools and principles for analyzing the time and space used by these algorithms. The course will include case studies of existing algorithms (sorting, searching, graph algorithms, greedy programming, string alignment and approximation algorithms). An introduction to NP-complete sets and approximation algorithms for some languages in NP is given.

Outcomes

- Analyze the running time and space complexity of algorithms.
- Use the big Oh notation. (e.g., $O(n \lg n)$.)
- Describe how to prove the correctness of an algorithm.
- Use the mathematical techniques required to prove the time complexity of a program/algorithm. (e.g., limits and sums of series.)
- Perform inductive proofs.
- Prove and apply the Master Theorem.
- Describe the notions of P, NP, NPC, and NP-hard.
- Compare the rates of growth of functions.
- Apply algorithmic complexity principles in the design of programs.
- Design divide and conquer and dynamic programming algorithms.

Prerequisite(s): CS250; CS251.

Textbook: Introduction to the Design and Analysis of Algorithms (3rd Edition)

Author: Anany Levitin

Year: 2011

Course Website: <https://davidjlu.github.io/CS350/>

(Optional Slack Channel:) cs350pdx.slack.com

Course Policies:

- **Academic Dishonesty** Students are expected to do their own work in this course. To use another writer's ideas with giving credit by means of standard documentation is plagiarism, and will be reported to the Office of Student Affairs
- **Academic Accommodations** If you have now or develop during this semester a physical or a learning disability and you want your instructors to make reasonable accommodations, please visit the PSU disability resource center. They can guide you through the process of applying for academic accommodations.
- **How to Succeed**
 - Come to class and be an active participant
 - Read the textbook thoughtfully and purposefully
 - Work through the HW problems and practice problems in the textbook as much as you can on your own before looking up solutions
 - Practice your Google-fu
 - Come to office hours if you need help
 - Keep a file on everything and anything that interests you
- **Collaboration** All homework handed in must be solely the product of individual effort. While you are encouraged to discuss the assignments with your classmates, try to focus such discussions more on understanding the problems and not on creating specific solutions. Once all members of the discussion have completed solutions independently, feel free to compare those solutions as you see fit.
- **Exams** For all exams you are allowed to bring a note sheet. It must be hand-written on a stand size sheet of paper. You are permitted to use both sides of the page

Grade Basis:

Homework	33%
Midterm	33%
Final	34%

Letter Grade Distribution:

≥ 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	≤ 59.99	F