

Proof-Based Math Readings

Session: Algorithms

2025 Summer

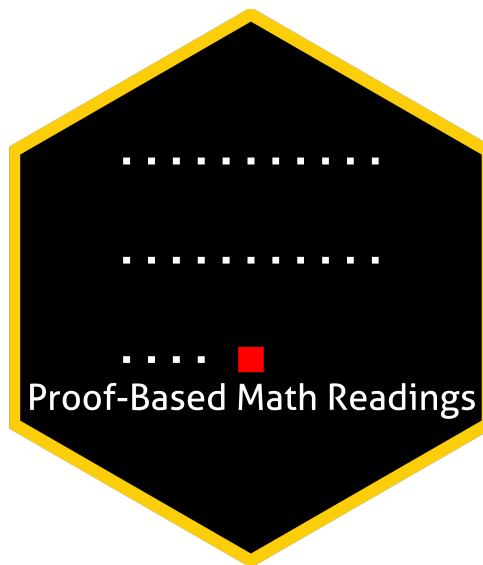
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0 Motivation

- *Proof-Based Math Readings* is a free, independent online reading group where we study the mathematics required for economics master's and PhD programs through an intuitive approach. Active since May 2023.
- This session of the reading group is on *Algorithms*.

1 Prerequisites

- Supplementary Python and one of the Algorithms resources below.
- Please use the  [Application Form](#) to join our reading group; you will receive a response within a week.






2 Format

- This session takes 12 weeks. We do not have face-to-face/online meetings due to the size of the group.
- Members read the main book and discuss the topics/exercises in the Proof-Based Math Readings Discord .

3 Resources

3.1 Main Book and Main Book's Playlist

Introduction to Algorithms - T. Cormen, C. Leiserson, R. Rivest, C. Stein (4th Edition, 2022) is our main book for this session because it is well-written and well-structured.







-  Introduction to Algorithms - T. Cormen, C. Leiserson, R. Rivest, C. Stein (4th Edition, 2022)
-  [Introduction to Algorithms - T. Cormen, C. Leiserson, R. Rivest, C. Stein \(4th Edition, 2022, Playlist\)](#)
-  [Introduction to Algorithms - T. Cormen, C. Leiserson, R. Rivest, C. Stein \(4th Edition, 2022, Errata\)](#)
-  [Introduction to Algorithms - T. Cormen, C. Leiserson, R. Rivest, C. Stein \(4th Edition, 2022, Selected Solutions\)](#)
-  [Introduction to Algorithms - T. Cormen, C. Leiserson, R. Rivest, C. Stein \(3rd Edition, 2009, Solutions by M. Bodnar, A. Lohr\)](#)

3.2 Supplementary

3.2.1 Python

-  [Introduction to CS and Programming using Python - Ana Bell \(2022\)](#)

3.2.2 Algorithms

-  Grokking Algorithms - Aditya Bhargava (2nd Edition, 2024) → Easier to read
-  [Grokking Algorithms - Aditya Bhargava \(2nd Edition, 2024, Errata\)](#)
-  Data Structures and Algorithms in Python - M. T. Goodrich, R. Tamassia, M. H. Goldwasser (2013)
-  [Problem Solving with Algorithms and Data Structures using Python - B. Miller, D. Ranum, R. Yasinovskyy \(3rd Edition, 2023\)](#)
-  [Problem Solving with Algorithms and Data Structures using Python - B. Miller, D. Ranum, R. Yasinovskyy \(3rd Edition, 2023, Playlist by Gerry Jenkins\)](#)
-  [leetcode.com](#)

3.2.3 Proof Techniques

-  [Book of Proof - Richard Hammack \(3.4 Edition, 2025\)](#)
-  [Book of Proof - Richard Hammack \(3.4 Edition, 2025, Playlist by Jeremy Teitelbaum\)](#)
-  [Book of Proof - Richard Hammack \(3.4 Edition, 2025, Playlist by Michael Penn\)](#)

4 Reading Schedule

- **CLRS** is the abbreviation of **Introduction to Algorithms - T. Cormen, C. Leiserson, R. Rivest, C. Stein (4th Edition, 2022)**.

CLRS **Week 01**

Appendix A: Summations
Appendix B: Sets, Etc.
Appendix C: Counting and Probability
Appendix D: Matrices

CLRS **Week 02-03**

Chapter 1: The Role of Algorithms in Computing
Chapter 2: Getting Started
Chapter 3: Characterizing Running Times

CLRS **Week 04-05**

Chapter 4: Divide-and-Conquer
Chapter 5: Probabilistic Analysis and Randomized Algorithms

CLRS **Week 06-07**

Chapter 6: Heapsort
Chapter 7: Quicksort
Chapter 8: Sorting in Linear Time
Chapter 9: Medians and Order Statistics

CLRS **Week 08-09-10**

Chapter 10: Elementary Data Structures
Chapter 11: Hash Tables
Chapter 12: Binary Search Trees
Chapter 13: Red-Black Trees

CLRS **Week 11-12**

Chapter 14: Dynamic Programming
Chapter 15: Greedy Algorithms