

Proof-Based Math Readings

Session: Algorithms*

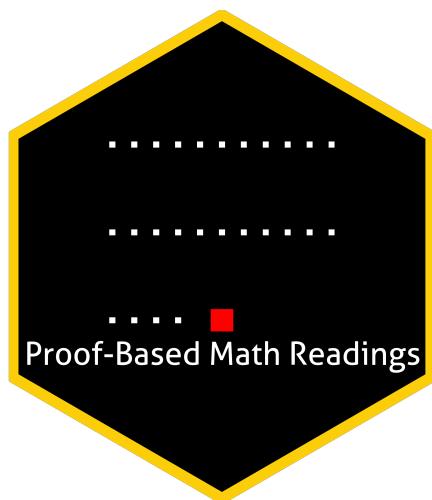
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Table of contents

0 Motivation	2
1 Prerequisites and Format	2
2 Resources	2
2.1 Main Book and Main Book's Playlist	2
2.2 Supplementary	2
2.2.1 Python	2
2.2.2 Algorithms	2
2.2.3 Proof Techniques	2
3 Reading Schedule	3



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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 and Format

- 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.
- 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 .

2 Resources

2.1 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)

2.2 Supplementary

2.2.1 Python

-  Introduction to CS and Programming using Python - Ana Bell (2022)

2.2.2 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

2.2.3 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)

3 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	