

《计算复杂性》

图书基本信息

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前言

The quest for efficiency is ancient and universal, as time and other resources are always in shortage. Thus, the question of which tasks can be performed efficiently is central to the human experience. A key step toward the systematic study of the aforementioned question is a rigorous definition of the notion of a task and of procedures for solving tasks. These definitions were provided by computability theory, which emerged in the 1930s. This theory focuses on computational tasks, and considers automated procedures (i.e., computing devices and algorithms) that may solve such tasks. In focusing attention on computational tasks and algorithms, computability theory has set the stage for the study of the computational resources (like time) that are required by such algorithms. When this study focuses on the resources that are necessary for any algorithm that solves a particular task (or a task of a particular type) , the study becomes part of the theory of Computational Complexity (also known as Complexity Theory) .¹ Complexity Theory is a central field of the theoretical foundations of computer science. It is concerned with the study of the intrinsic complexity of computational tasks. That is, a typical complexity theoretic study refers to the computational resources required to solve a computational task (or a class of such tasks) , rather than referring to a specific algorithm or an algorithmic schema. Actually, research in Complexity Theory tends to start with and focus on the computational resources themselves, and addresses the effect of limiting these resources on the class of tasks that can be solved. Thus, Computational Complexity is the general study of what can be achieved within limited time (and/or other limited natural computational resources) .

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内容概要

《计算复杂性(英文版)》是理论计算机科学领域的名著。书中对计算任务的固有复杂性研究进行了一般性介绍，涉及了复杂性理论的很多子领域，涵盖了NP完整性、空间复杂性、随机性和计数、伪随机数生成器等内容，还在附录里面给出了现代密码学基础等内容。

《计算复杂性(英文版)》内容严谨，可读性强，适合作为高年级本科生、研究生的教材，对涉及计算复杂性的专业人员也是理想的技术参考书。

作者简介

Oded Goldreich 以色列魏茨曼科学研究所 (Weizmann Institute of Science) 计算机科学教授, Meyer W. Weisgal 讲席教授。他是 SIAM Journal on Computing、Journal of Cryptology 和 Computational Complexity 杂志的特约编辑。

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章节摘录

插图：A key step toward the systematic study of the aforementioned question is a rigorous definition of the notion of a task and of procedures for solving tasks. These definitions were provided by computability theory, which emerged in the 1930s. This theory focuses on computational tasks, and considers automated procedures (i.e., computing devices and algorithms) that may solve such tasks. In focusing attention on computational tasks and algorithms, computability theory has set the stage for the study of the computational resources (like time) that are required by such algorithms. When this study focuses on the resources that are necessary for any algorithm that solves a particular task (or a task of a particular type) , the study becomes part of the theory of Computational Complexity (also known as Complexity Theory) .¹ Complexity Theory is a central field of the theoretical foundations of computer science. It is concerned with the study of the intrinsic complexity of computational tasks. That is, a typical complexity theoretic study refers to the computational resources required to solve a computational task (or a class of such tasks) , rather than referring to a specific algorithm or an algorithmic schema. Actually, research in Complexity Theory tends to start with and focus on the computational resources themselves, and addresses the effect of limiting these resources on the class of tasks that can be solved. Thus, Computational Complexity is the general study of what can be achieved within limited time (and/or other limited natural computational resources) .

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媒体关注与评论

“这是一本非常值得关注的书……Goldreich的观点让我耳目一新……本书特别注重概念性问题，是研究人员及专家不可或缺的参考文献。” ——M. Bona，佛罗里达大学

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精彩短评

- 1、这本书概念讲的很清晰，环环相扣，适合用做教材，自学也很好用。有一点提醒注意：第一遍读的时候第一章也要仔细读透，切莫因为有些概念看起来熟悉而跳过。
- 2、与其他同类书籍相比，这本计算复杂性教材的特点是用更多篇幅叙述概念及其相互关系，以能使读者更深入理解复杂性问题的内涵。但是，这本教材仍然稍显晦涩，因为在引入概念、定义和定理时很少有实例和图示说明。特别是定理证明中常常需要构造各类计算模型，但大都是叙述模型构造方法，较少用图例，使初学者难于迅速把握其实质内容。由于复杂性理论的书籍多为大牛所著，这种情况是很普遍的，也难以求全责备。总之，该书是本好书，可能是目前市面上复杂性教材里最好的一本了。
- 3、这是一本学习计算复杂性权威的好书。适合自学。
- 4、复杂性经典
- 5、太难了，毕竟懂的人也不多，虽然比原来的笔记版本的好很多，但是好像还是有错误的地方。

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