# <<计算复杂性>>

## 图书基本信息

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作者：Oded Goldreich

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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

复杂性理论是计算机科学的理论基础的核心。
本书是著名计算机科学家Oded Goldreich的力作，书中对计算任务固有复杂性研究进行了概念性介绍，全面分析了复杂性理论的现代主题。

本书涉及复杂性理论的很多子领域（如难度放大、伪随机性及概率证明系统等），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，还在附录里面介绍了现代密码学基础等。

本书内容严谨，可读性强，适合作为高年级本科生、研究生的教材。
同时，书中展示了复杂性理论的很多子领域，也适合领域专家参考。

## 作者简介

Oded Goldreich 以色列魏茨曼科学研究院（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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## 书籍目录

## 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）.

## 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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