

<<自动机理论与应用>>

图书基本信息

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前言

This book has three goals:1. To introduce students to the elegant theory that underlies modern computing.2. To motivate students by showing them that the theory is alive. While much of it has been known since the early days of digital computers (and some of it even longer), the theory continues to inform many of the most important applications that are considered today.3. To show students how to start looking for ways to exploit the theory in their own work. The core of the book, as a standard textbook, is Parts I through V. They address the first of the stated goals. They contain the theory that is being presented. There is more material in them than can be covered in a one-semester course. Sections that are marked with a are optional, in the sense that later material does not, for the most part, depend on them. The Course Plans section on page xv suggests ways of selecting sections that are appropriate for some typical computer science courses.

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### 内容概要

本书阐述了计算科学的优美理论基础，通过演示计算理论在现代硬件和软件系统设计中的影响，把理论知识带到了现实实践之中。

本书介绍了关键概念的应用，为读者在实际工作中使用计算理论提供实际指导。

本书讨论的应用包括：程序设计语言、编译器、网络技术、自然语言处理、人工智能、计算生物学、安全性、博弈、商业规则建模、标识语言、Web搜索等。

本书既适合作为自动机理论课程的教程，也是相关专业人员的重要参考用书。

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插图 : 3.2 The Power of Encoding The question that we are going to ask, "Is  $w$  in  $L$  ?

" may seem, at first glance, way too limited to be useful. What about problems like multiplying numbers, sorting lists, and retrieving values from a database ?

And what about real problems like air traffic control or inventory management ?

Can our theory tell us anything interesting about them ?

The answer is yes and the key is encoding. With an appropriate encoding, other kinds of problems can be recast as the problem of deciding whether a string is in a language. We will show some examples to illustrate this idea. We will divide the examples into two categories: Problems that are already stated as decision problems. For these, all we need to do is to encode the inputs as strings and then define a language that contains exactly the set of inputs for which the desired answer is yes. Problems that are not already stated as decision problems. These problems may require results of any type. For these, we must first reformulate the problem as a decision problem and then encode it as a language recognition task.

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