edition to improve its usability. Please e-mail comments and corrections to me at **sipserbook@math.mit.edu**. All original suggestions will be acknowledged in the final edition. A world wide web site is being developed that will contain a list of corrections as well as other good stuff. The location for this site is

http://www-math.mit.edu/~sipser/book.html .

I for one am looking forward to examining the book in more detail for a rather self-serving reason: the table of contents maps almost to a $\mathcal{T}$ the way I like to teach the course, and the preliminary edition of the book, at least, reaches exactly the point at which I run out of time during a semester.

Logout

From Bozeman, where in waist-deep snow high on Tollman Ridge near Lone Mountain in the Madison Range of the Rockies, the elusive elk keep just one patch of timber ahead and out of sight, while the Madison River valley shimmers, white and quiet, far below in the light blue haze of a cold January dawn...

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Introduction to the Theory of Computation

Michael Sipser

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Preface (Abridged)

This book is intended as an upper level undergraduate or introductory graduate text in computer science theory. It contains a mathematical treatment of the subject, designed around theorems and proofs. I have made some effort to accommodate students with little prior experience in proving theorems, though more experienced students will have an easier time.

My primary goal in presenting the material has been to make it clear and interesting. In so doing, I have emphasized intuition and the big picture in the subject over some lower level details.

For example, even though I present the method of proof by induction in Chapter 0 along with other mathematical preliminaries, it doesn't play an important role subsequently. Generally I do not present the usual induction proofs of the correctness of various constructions concerning automata. If presented clearly, these constructions convince and do not need further argument. An induction may confuse rather than enlighten because induction itself is a rather sophisticated technique that many find mysterious. Belaboring the obvious with an induction risks teaching students that mathematical proof is a formal manipulation instead of teaching them what is and what is not a cogent argument.

A second example occurs in Parts II and III, where I describe algorithms in prose instead of pseudocode. I don't spend much time programming Turing machines (or any other formal model). I believe that students today come with a programming background and find the Church-Turing thesis to be self-evident. Hence I don't present lengthly simulations of one model by another to establish their equivalence.

Besides giving extra intuition and suppressing some details, I give what might be called a classical presentation of the subject material. Most theorists will find the choice of material, terminology, and order of presentation consistent with that of other widely used textbooks. I have introduced original terminology in only a few places, when I found the standard terminology particularly obscure or confusing. For example I introduce the term *mapping reducibility* instead of *many-one reducibility*.

Practice through solving problems is essential to learning any mathematical subject. In this book, the problems are organized into two main categories called *Exercises* and *Problems*. The Exercises review definitions and concepts. The Problems require some ingenuity. Problems marked with a star are harder. I have tried to make both the Exercises and Problems interesting challenges.

Preliminary Edition

This edition of *Introduction to the Theory of Computation* is a preliminary edition of the final book, due out in late 1996. My intent in producing this edition is to test the treatment of most of the material with a widespread audience so that adjustments can be made in the final edition to improve its usability. Please e-mail comments and corrections to me at `sipserbook@math.mit.edu`. All original suggestions will be acknowledged in the final edition. A world wide web site is being developed that will contain a list of corrections as well as other good stuff. The location for this site is `http://www-math.mit.edu/~sipser/book.html` .

My current plans for the final edition include several additional chapters on complexity theory: Chapter 8 on space complexity; Chapter 9 on provable intractability; and Chapter 10 on advanced topics, including approximation algorithms, alternation, cryptography, and parallel computing. Chapter 6, currently on the recursion theorem, will be expanded to include other advanced topics in computability theory, including Turing reducibility, Kolmogorov complexity, and the decidability and undecidability of some logical theories.

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