

Logic Techniques Of Formal Reasoning Second Edition

Perfect for students with no background in logic or philosophy, Simple Formal Logic provides a full system of logic adequate to handle everyday and philosophical reasoning. By keeping out artificial techniques that aren't natural to our everyday thinking process, Simple Formal Logic trains students to think through formal logical arguments for themselves, ingraining in them the habits of sound reasoning. Simple Formal Logic features: a companion website with abundant exercise worksheets, study supplements (including flashcards for symbolizations and for deduction rules), and instructor's manual two levels of exercises for beginning and more advanced students a glossary of terms, abbreviations and symbols. This book arose out of a popular course that the author has taught to all types of undergraduate students at Loyola University Chicago. He teaches formal logic without the artificial methods—methods that often seek to solve farfetched logical problems without any connection to everyday and philosophical argumentation. The result is a book that teaches easy and more intuitive ways of grappling with formal logic—and is intended as a rigorous yet easy-to-follow first course in logical thinking for philosophy majors and non-philosophy majors alike.

"Logic instruction typically takes two forms. The first has the aim of teaching students to solve a certain sort of problem as efficiently as possible. This is the approach adopted by most logic textbooks and truth trees, the most popular method, gives students an algorithm for solving logic problems. The second has as its aim teaching students a certain style of thinking and, thus, concerns itself with how students solve problems. In How Logic Works, Hans Halvorson introduces students to the methods of natural deduction, a method which not only helps them solve problems, but helps them to understand the principles of valid reasoning for themselves. Halvorson uses formal logic to train students in the task of constructing paths between premises and conclusions. The student, then, will become an expert traveller in logical space, quickly recognizing the difference between a safe path (where truth is guaranteed to be preserved) and a hazardous path (where truth might be lost). This approach is premised on the fact that if a student learns natural deduction, she learns a skill that transfers to any domain where valid deductive reasoning is useful."

This book will help you to reason critically; to recognise, analyse and evaluate arguments and to classify them as inductive or deductive. It will introduce you to fallacies (bad arguments that look like good arguments) and, in two optional chapters, to the rudiments of formalisation. Linked to Marianne Talbot's hugely successful Critical Reasoning podcasts (downloaded 4 million times from iTunesU), and full of interactive exercises and quizzes, the book was written to satisfy demand from fans of the podcasts. Marianne is the Director of Studies in Philosophy at Oxford University's Department for Continuing Education.

A decision procedure is an algorithm that, given a decision problem, terminates with a correct yes/no answer. Here, the authors focus on theories that are expressive enough to model real problems, but are still decidable. Specifically, the book concentrates on decision procedures for first-order theories that are commonly used in automated verification and reasoning, theorem-proving, compiler optimization and operations research. The techniques described in the book draw from fields such as graph theory and logic, and are routinely used in industry. The authors introduce the basic terminology of satisfiability modulo theories and then, in separate chapters, study decision procedures for each of the following theories: propositional logic; equalities and uninterpreted functions; linear arithmetic; bit vectors; arrays; pointer logic; and quantified formulas.

Journal on Data Semantics I

Logic

A Guide to Clear Legal Thinking

A Romp Through the Foothills of Logic for the Complete Beginner

A Guide to Formal Logical Reasoning

Reasoning About Knowledge

Writing and Proof Version 2.0

This book introduces the basic inferential patterns of formal logic as they are embedded in everyday life, information technology, and science. It is designed to make clear the basic topics of classical and modern logic. The aim is to improve the reader's ability to navigate both everyday and science-based interactions.

Language in Action demonstrates the viability of mathematical research into the foundations of categorial grammar, a topic at the border between logic and linguistics. Since its initial publication it has become the classic work in the foundations of categorial grammar. A new introduction to this paperback edition updates the open research problems and records relevant results through pointers to the literature. Van Benthem presents the categorial processing of syntax and semantics as a central component in a more general dynamic logic of information flow, in tune with computational developments in artificial intelligence and cognitive science. Using the paradigm of categorial grammar, he describes the substructural logics driving the dynamics of natural language syntax and semantics. This is a general type-theoretic approach that lends itself easily to proof-theoretic and semantic studies in tandem with standard logic. The emphasis is on a broad landscape of substructural categorial logics and their proof-theoretical and semantic peculiarities. This provides a systematic theory for natural language understanding, admitting of significant mathematical results. Moreover, the theory makes possible dynamic interpretations that view natural languages as programming formalisms for various cognitive activities.

Concise text begins with overview of elementary mathematical concepts and outlines theory of Boolean algebras; defines operators for elimination, division, and expansion; covers syllogistic reasoning, solution of Boolean equations, functional deduction. 1990 edition. Logic: Techniques of Formal Reasoning, 2/e is an introductory volume that teaches students to recognize and construct correct deductions. It takes students through all logical steps—from premise to conclusion—and presents appropriate symbols and terms, while giving examples to clarify principles. Logic, 2/e uses models to establish the invalidity of arguments, and includes exercise sets throughout, ranging from easy to challenging. Solutions are provided to selected exercises, and historical remarks discuss major contributions to the theories covered.

Critical Reasoning

Logic for the Left

techniques of formal reasoning

A Logic Book

Fundamentals of Reasoning

Introduction to Logic and Critical Thinking

First Steps in Modal Logic

This review of the work done to date on the computer modelling of mathematical reasoning processes brings together a variety of approaches and disciplines within a coherent frame. A limited knowledge of mathematics is assumed in the introduction to the principles of mathematical logic. The plan of the book is such that students with varied backgrounds can find necessary information as quickly as possible. Exercises are included throughout the book.

The papers presented in this volume examine topics of central interest in contemporary philosophy of logic. They include reflections on the nature of logic and its relevance for philosophy today, and explore in depth developments in informal logic and the relation of informal to symbolic logic, mathematical metatheory and the limiting metatheorems, modal logic, many-valued logic, relevance and paraconsistent logic, free logics, extensional v. intensional logics, the logic of fiction, epistemic logic, formal logical and semantic paradoxes, the concept of truth, the formal theory of entailment, objectual and substitutional interpretation of the quantifiers, infinity and domain constraints, the Löwenheim-Skolem theorem and Skolem paradox, vagueness, modal realism v. actualism, counterfactuals and the logic of causation, applications of logic and mathematics to the physical sciences, logically possible worlds and counterpart semantics, and the legacy of Hilbert's program and logicism. The handbook is meant to be both a compendium of new work in symbolic logic and an authoritative resource for students and researchers, a book to be consulted for specific information about recent developments in logic and to be read with pleasure for its technical acumen and philosophical insights. - Written by leading logicians and philosophers - Comprehensive authoritative coverage of all major areas of contemporary research in symbolic logic - Clear, in-depth expositions of technical detail - Progressive organization from general considerations to informal to symbolic logic to nonclassical logics - Presents current work in symbolic logic within a unified framework - Accessible to students, engaging for experts and professionals - Insightful philosophical discussions of all aspects of logic - Useful bibliographies in every chapter

"Formal is an introduction to sentential logic and first-order predicate logic with identity, logical systems that significantly influenced twentieth-century analytic philosophy. After working through the material in this book, a student should be able to understand most quantified expressions that arise in their philosophical reading. This books treats symbolization, formal semantics, and proof theory for each language. The discussion of formal semantics is more direct than in many introductory texts. Although forall x does not contain proofs of soundness and completeness, it lays the groundwork for understanding why these are things that need to be proven. Throughout the book, I have tried to highlight the choices involved in developing sentential and predicate logic. Students should realize that these two are not the only possible formal languages. In translating to a formal language, we simplify and profit in clarity. The simplification comes at a cost, and different formal languages are suited to translating different parts of natural language. The book is designed to provide a semester's worth of material for an introductory college course. It would be possible to use the book only for sentential logic, by skipping chapters 4-5 and parts of chapter 6."--Open Textbook Library.

Provides an essential introduction to classical logic.

Logic for Computer Science

Formal Semantics and Logic

Simply Logical

Handbook of Temporal Reasoning in Artificial Intelligence

Does Mathematical Study Develop Logical Thinking?: Testing The Theory Of Formal Discipline

From Everyday Life to Formal Systems

Informal Logic

An introduction to Prolog programming for artificial intelligence covering both basic and advanced AI material. A unique advantage to this work is the combination of AI, Prolog and Logic. Each technique is accompanied by a program implementing it. Seeks to simplify the basic concepts of logic programming. Contains exercises and authentic examples to help facilitate the understanding of difficult concepts.

Tibetan Buddhist scholar-monks have long engaged in face-to-face public philosophical debates. This original study challenges Orientalist text-based scholarship, which has overlooked these lived practices of Tibetan dialectics. Kenneth Liberman brings these dynamic disputations to life for the modern reader through a richly detailed, turn-by-turn analysis of the monks' formal philosophical reasoning. He argues that Tibetan Buddhists deliberately organize their debates into formal structures that both empower and constrain thinking, skillfully using logic as an interactional tool to organize their reflections. During his three years in residence at Tibetan monastic universities, Liberman observed and videotaped the monks' debates. He then transcribed, translated, and analyzed them using multimedia software and ethnomethodological techniques, which enabled him to scrutinize the local methods that Tibetan debaters use to keep their philosophical inquiries alive. His study shows the monks rely on such indigenous dialectical methods as extending an opponent's position to its absurd consequences, "pulling the rug out" from under an opponent, and other lively strategies. This careful investigation of the formal philosophical work of Tibetan scholars is a pathbreaking analysis of an important classical tradition.

Reasoning about knowledge—particularly the knowledge of agents who reason about the world and each other's knowledge—was once the exclusive province of philosophers and puzzle solvers. More recently, this type of reasoning has been shown to play a key role in a surprising number of contexts, from understanding conversations to the analysis of distributed computer algorithms. Reasoning About Knowledge is the first book to provide a general discussion of approaches to reasoning about knowledge and its applications to distributed systems, artificial intelligence, and game theory. It brings eight years of work by the authors into a cohesive framework for understanding and analyzing reasoning about knowledge that is intuitive, mathematically well founded, useful in practice, and widely applicable. The book is almost completely self-contained and should be accessible to readers in a variety of disciplines, including computer science, artificial intelligence, linguistics, philosophy, cognitive science, and game theory. Each chapter includes exercises and bibliographic notes.

An understanding of logic is essential to computer science. This book provides a highly accessible account of the logical basis required for reasoning about computer programs and applying logic in fields like artificial intelligence. The text contains extended examples, algorithms, and programs written in Standard ML and Prolog. No prior knowledge of either language is required. The book contains a clear account of classical first-order logic, one of the basic tools for program verification, as well as an introductory survey of modal and temporal logics and possible world semantics. An introduction to intuitionistic logic as a basis for an important style of program specification is also featured in the book.

Logic; Or, The Art of Thinking

A User's Guide

Logic in Computer Science

Trends in Logic

Language in Action

Language, Proof, and Logic

Boolean Reasoning

In 1953, exactly 50 years ago to this day, the first volume of Studia Logica appeared under the auspices of The Philosophical Committee of The Polish Academy of Sciences. Now, five decades later the present volume is dedicated to a celebration of this 50th Anniversary of Studia Logica. The volume features a series of papers by distinguished scholars reflecting both the aim and scope of this journal for symbolic logic.

For centuries, educational policymakers have believed that studying mathematics is important, in part because it develops general thinking skills that are useful throughout life. This 'Theory of Formal Discipline' (TFD) has been used as a justification for mathematics education globally. Despite this, few empirical studies have directly investigated the issue, and those which have showed mixed results.Does Mathematical Study Develop Logical Thinking? describes a rigorous investigation of the TFD. It reviews the theory's history and prior research on the topic, followed by reports on a series of recent empirical studies. It argues that, contrary to the position held by sceptics, advanced mathematical study does develop certain general thinking skills, however these are much more restricted than those typically claimed by TFD proponents.Perfect for students, researchers and policymakers in education, further education and mathematics, this book provides much needed insight into the theory and practice of the foundations of modern educational policy.

This is a mathematics textbook with theorems and proofs. The choice of topics has been guided by the needs of computer science students. The method of semantic tableaux provides an elegant way to teach logic that is both theoretically sound and yet sufficiently elementary for undergraduates. In order to provide a balanced treatment of logic, tableaux are related to deductive proof systems. The book presents various logical systems and contains exercises. Still further, Prolog source code is available on an accompanying Web site. The author is an Associate Professor at the Department of Science Teaching, Weizmann Institute of Science.

This is a first course in propositional modal logic, suitable for mathematicians, computer scientists and philosophers. Emphasis is placed on semantic aspects, in the form of labelled transition structures, rather than on proof theory.

Handbook of Practical Logic and Automated Reasoning

Philosophy of Logic

An Ethnomethodological Inquiry into Formal Reasoning

An Introduction to Formal Logic

Categories, Lambdas and Dynamic Logic

Mathematical Reasoning

Give Them an Argument

Recent years have seen the development of powerful tools for verifying hardware and software systems, as companies worldwide realise the need for improved means of validating their products. There is increasing demand for training in basic methods in formal reasoning so that students can gain proficiency in logic-based verification methods. The second edition of this successful textbook addresses both those requirements, by continuing to provide a clear introduction to formal reasoning which is both relevant to the needs of modern computer science and rigorous enough for practical application. Improvements to the first edition have been made throughout, with extra and expanded sections on SAT solvers, existential/universal second-order logic, micro-models, programming by contract and total correctness. The coverage of model-checking has been substantially updated. Further exercises have been added. Internet support for the book includes worked solutions for all exercises for teachers, and model solutions to some exercises for students.

This collection represents the primary reference work for researchers and students in the area of Temporal Reasoning in Artificial Intelligence. Temporal reasoning has a vital role to play in many areas, particularly Artificial Intelligence. Yet, until now, there has been no single volume collecting together the breadth of work in this area. This collection brings together the leading researchers in a range of relevant areas and provides a coherent description of the breadth of activity concerning temporal reasoning in the field of Artificial Intelligence. Key Features: - Broad range: foundations; techniques and applications - Leading researchers around the world have written the chapters - Covers many vital applications - Source book for Artificial Intelligence, temporal reasoning - Approaches provide foundation for many future software systems

ComputerScienceandtheinternationalcomputersciencesresearchand-velopment community, we receive quite a few proposals for new archive journals. From the successful launch of workshops or conferences and publication of their proceedings in the LNCS series, it might seem like a natural step to approach the publisher about launching a journal once this specific field has gained a certain level of maturity and stability. Each year we receive about a dozen such proposals and even more informal inquiries. Like other publishers, it has been our experience that launching a new journal and making it a long-term success is a hard job nowadays, due to a generally difficult market situation, and library budget restrictions in particular. Because many of the proceedings in LNCS, and especially many of the LNCS post-proceedings, apply the same strict reviewing and selection criteria as established journals, we started discussing with proposers of new journals the alternative of devoting a few volumes in LNCS to their field, instead of going through the painful Sisyphean adventure of establishing a new journal on its own.

Mathematical Reasoning: Writing and Proof is a text for the first college mathematics course that introduces students to the processes of constructing and writing proofs and focuses on the formal development of mathematics. The primary goals of the text are to help students: Develop logical thinking skills and to develop the ability to think more abstractly in a proof oriented setting; develop the ability to construct and write mathematical proofs using standard methods of mathematical proof including direct proofs, proof by contradiction, mathematical induction, case analysis, and counterexamples; develop the ability to read and understand written mathematical proofs; develop talents for creative thinking and problem solving; improve their quality of communication in mathematics; better understand the nature of mathematics and its language. Another important goal of this text is to provide students with material that will be needed for their further study of mathematics. Important features of the book include: Emphasis on writing in mathematics; instruction in the process of constructing proofs; emphasis on active learning. There are no changes in content between Version 2.0 and previous versions of the book. The only change is that the appendix with answers and hints for selected exercises now contains solutions and hints for more exercises.

Mathematical Logic for Computer Science

An Illustrated Book of Bad Arguments

The Laws of Truth

How Logic Works

Modelling and Reasoning about Systems

Logic for Lawyers

The First International Symposium

Have you read (or stumbled into) one too many irrational online debates? Ali Almosawi certainly had, so he wrote An Illustrated Book of Bad Arguments! This handy guide is here to bring the internet age a much needed dose of old-school logic (really old-school, a la Aristotle). Here are cogent explanations of the straw man fallacy, the slippery slope argument, the ad hominem attack, and other common attempts at reasoning that fall short—plus a beautifully drawn menagerie of animals who (adorably) commit every logical faux pas. Rabbit thinks a strange light in the sky must be a UFO because no one can prove otherwise (the appeal to ignorance). And Lion doesn't believe that gas emissions harm the planet because, if that were true, he wouldn't like the result (the argument from consequences). Once you learn to recognise these abuses of reason, they start to crop up everywhere from parliamentary debate to YouTube comments—which makes this geek-chic book a must for anyone in the habit of holding opinions. It's the antidote to fuzzy thinking, with funny animals!

Rev. ed. of: Language, proof, and logic / Jon Barwise & John Etchemendy.

The predominant strategy of this text is to move from the simple to the complex. It includes topics such as categorical and sentential logic, informal fallacies, inductive logic, and extended arguments. With a non-technical approach, this book leads students step-by-step through simple demonstrations and then on to more complex material as their comfort level increases. Well designed examples, sample problems, explanatory charts and diagrams, and exercises abound.

One-stop reference, self-contained, with theoretical topics presented in conjunction with implementations for which code is supplied.

50 Years of Studia Logica

An Algorithmic Point of View

Logic as a Tool

Techniques of Formal Reasoning

Non-axiomatic Logic

The Logic of Boolean Equations

A Model of Intelligent Reasoning

Many serious leftists have learned to distrust talk of logic and logical fallacies, associated with right-wing "logicbros". This is a serious mistake. Unlike the neoliberal technocrats, who can point to social problems and tell people "trust us", the serious Left must learn how to argue and persuade. In Give Them an Argument, Ben Burgis arms his reader with the essential knowledge of formal logic and informal fallacies.

A concise and systematic guide for understanding and using classical logic This textbook, written in a user-friendly style, will guide students to learn, understand and master the use of classical logic as a tool for doing correct reasoning. It offers a systematic and precise exposition of classical logic with many examples and exercises, and only the necessary minimum of theory. The book explains the grammar, semantics and use of classical logical languages and teaches the reader how grasp the meaning and translate them to and from natural language. It illustrates with extensive examples the use of the most popular deductive systems -- axiomatic systems, semantic tableaux, natural deduction, and resolution -- for formalising and automating logical reasoning both on propositional and on first-order level, and provides the reader with technical skills needed for practical derivations in them. Systematic guidelines are offered on how to perform logically correct and well-structured reasoning using these deductive systems and the reasoning techniques that they employ. Key Features: Concise and systematic exposition, with semi-formal but rigorous treatment of the minimum necessary theory, amply illustrated with examples. Emphasis both on conceptual understanding and on developing practical skills. Solid and balanced coverage of syntactic, semantic, and deductive aspects of logic. Includes extensive sets of exercises, many of them provided with solutions or answers. Supplemented by a website including detailed slides, additional exercises and solutions. Written in a clear, precise and user-friendly style, Logic as a Tool: A Guide to Formal Logical Reasoning is intended for undergraduates in both mathematics and computer science, but will also be useful for students studying philosophy.

This book provides a systematic and comprehensive description of Non-Axiomatic Logic, which is the result of the author's research for about three decades.Non-Axiomatic Logic is designed to provide a uniform logical foundation for Artificial Intelligence, as well as an abstract description of the OC laws of thoughtOCO followed by the human mind. Different from OC mathematicalOCO logic, where the focus is the regularity required when demonstrating mathematical conclusions, Non-Axiomatic Logic is an attempt to return to the original aim of logic, that is, to formulate the regularity in actual human thinking. To achieve this goal, the logic is designed under the assumption that the system has insufficient knowledge and resources with respect to the problems to be solved, so that the OC logical conclusionsOCO are only valid with respect to the available knowledge and resources. Reasoning processes according to this logic covers cognitive functions like learning, planning, decision making, problem solving. This book is written for researchers and students in Artificial Intelligence and Cognitive Science, and can be used as a textbook for courses at graduate level, or upper-level undergraduate, on Non-Axiomatic Logic."

Logic: Techniques of Formal Reasoning, 2/e is an introductory volume that teaches students to recognize and construct correct deductions. It takes students through all logical steps—from premise to conclusion—and presents appropriate symbols and terms, while giving examples to clarify principles. Logic, 2/e uses models to establish the invalidity of arguments, and includes exercise sets throughout, ranging from easy to challenging. Solutions are provided to selected exercises, and historical remarks discuss major contributions to the theories covered.

Forall X

An Introduction to Logic

Being the Port Royal Logic

Decision Procedures

Intelligent Reasoning by Example

A Concise Introduction to Logic

The Computer Modelling of Mathematical Reasoning