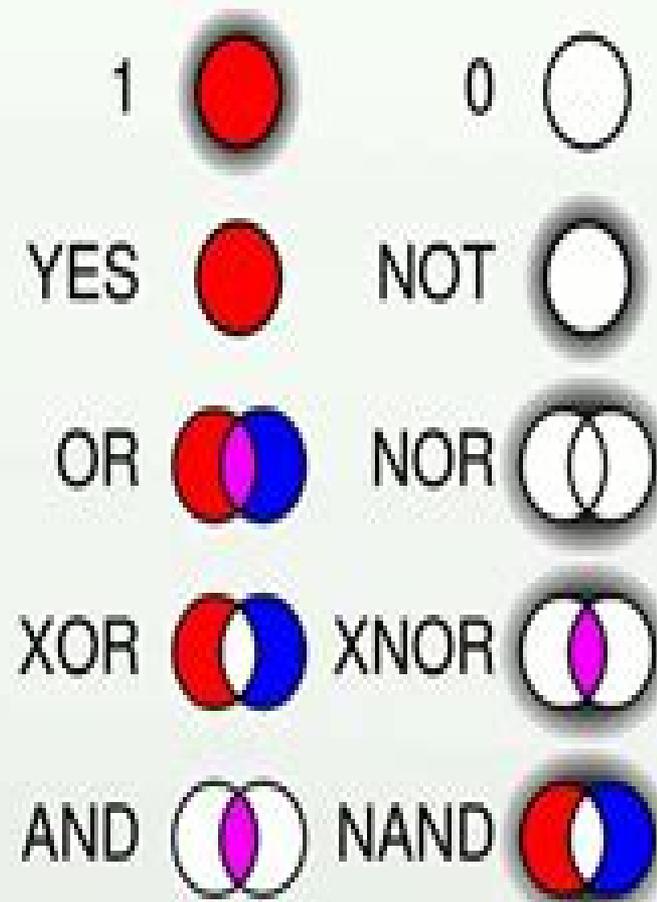


Logic in computer science



Logic From Computer Science

Anita Wasilewska



Logic From Computer Science:

Logic for Computer Scientists Uwe Schöning,2008-01-11 This book introduces the notions and methods of formal logic from a computer science standpoint covering propositional logic predicate logic and foundations of logic programming The classic text is replete with illustrative examples and exercises It presents applications and themes of computer science research such as resolution automated deduction and logic programming in a rigorous but readable way The style and scope of the work rounded out by the inclusion of exercises make this an excellent textbook for an advanced undergraduate course in logic for computer scientists

Logics for Computer Science Anita Wasilewska,2018-11-13 Providing an in depth introduction to fundamental classical and non classical logics this textbook offers a comprehensive survey of logics for computer scientists Logics for Computer Science contains intuitive introductory chapters explaining the need for logical investigations motivations for different types of logics and some of their history They are followed by strict formal approach chapters All chapters contain many detailed examples explaining each of the introduced notions and definitions well chosen sets of exercises with carefully written solutions and sets of homework While many logic books are available they were written by logicians for logicians not for computer scientists They usually choose one particular way of presenting the material and use a specialized language Logics for Computer Science discusses Gentzen as well as Hilbert formalizations first order theories the Hilbert Program Godel s first and second incompleteness theorems and their proofs It also introduces and discusses some many valued logics modal logics and introduces algebraic models for classical intuitionistic and modal S4 and S5 logics The theory of computation is based on concepts defined by logicians and mathematicians Logic plays a fundamental role in computer science and this book explains the basic theorems as well as different techniques of proving them in classical and some non classical logics Important applications derived from concepts of logic for computer technology include Artificial Intelligence and Software Engineering In addition to Computer Science this book may also find an audience in mathematics and philosophy courses and some of the chapters are also useful for a course in Artificial Intelligence

Mathematical Logic For Computer Science (2nd Edition) Zhongwan Lu,1998-08-22 Mathematical logic is essentially related to computer science This book describes the aspects of mathematical logic that are closely related to each other including classical logic constructive logic and modal logic This book is intended to attend to both the peculiarities of logical systems and the requirements of computer science In this edition the revisions essentially involve rewriting the proofs increasing the explanations and adopting new terms and notations

Mathematical Logic for Computer Science Mordechai Ben-Ari,2012-06-16 Mathematical Logic for Computer Science is a mathematics textbook with theorems and proofs but the choice of topics has been guided by the needs of students of computer science The method of semantic tableaux provides an elegant way to teach logic that is both theoretically sound and easy to understand The uniform use of tableaux based techniques facilitates learning advanced logical systems based on what the student has learned from

elementary systems The logical systems presented are propositional logic first order logic resolution and its application to logic programming Hoare logic for the verification of sequential programs and linear temporal logic for the verification of concurrent programs The third edition has been entirely rewritten and includes new chapters on central topics of modern computer science SAT solvers and model checking

Mathematical Logic For Computer Science Zhongwan Lu,1989-07-01 This book describes the aspects of mathematical logic related to computer sciences The materials adopted in this book are intended to attend to both the peculiarities of logical systems and the requirements of computer science

Essential Logic for Computer Science Rex Page,Ruben Gamboa,2019-01-08 An introduction to applying predicate logic to testing and verification of software and digital circuits that focuses on applications rather than theory Computer scientists use logic for testing and verification of software and digital circuits but many computer science students study logic only in the context of traditional mathematics encountering the subject in a few lectures and a handful of problem sets in a discrete math course This book offers a more substantive and rigorous approach to logic that focuses on applications in computer science Topics covered include predicate logic equation based software automated testing and theorem proving and large scale computation Formalism is emphasized and the book employs three formal notations traditional algebraic formulas of propositional and predicate logic digital circuit diagrams and the widely used partially automated theorem prover ACL2 which provides an accessible introduction to mechanized formalism For readers who want to see formalization in action the text presents examples using Proof Pad a lightweight ACL2 environment Readers will not become ACL2 experts but will learn how mechanized logic can benefit software and hardware engineers In addition 180 exercises some of them extremely challenging offer opportunities for problem solving There are no prerequisites beyond high school algebra Programming experience is not required to understand the book s equation based approach The book can be used in undergraduate courses in logic for computer science and introduction to computer science and in math courses for computer science students

Logic in Computer Science Michael Huth,Mark Ryan,2004-08-26 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

Computer Science Logic Leszek Pacholski,Jerzy Tiuryn,1995-07-18 This volume contains revised refereed

versions of the best papers presented during the CSL 94 conference held in Kazimierz Poland in September 1994 CSL 94 is the eighth event in the series of workshops held for the third time as the Annual Conference of the European Association for Computer Science Logic The 38 papers presented were selected from a total of 151 submissions All important aspects of the methods of mathematical logic in computer science are addressed lambda calculus proof theory finite model theory logic programming semantics category theory and other logical systems Together these papers give a representative snapshot of the area of logical foundations of computer science

Logic for Computer Science and Artificial Intelligence Ricardo Caferra,2013-02-04 Logic and its components propositional first order non classical play a key role in Computer Science and Artificial Intelligence While a large amount of information exists scattered throughout various media books journal articles webpages etc the diffuse nature of these sources is problematic and logic as a topic benefits from a unified approach Logic for Computer Science and Artificial Intelligence utilizes this format surveying the tableaux resolution Davis and Putnam methods logic programming as well as for example unification and subsumption For non classical logics the translation method is detailed Logic for Computer Science and Artificial Intelligence is the classroom tested result of several years of teaching at Grenoble INP Ensimag It is conceived to allow self instruction for a beginner with basic knowledge in Mathematics and Computer Science but is also highly suitable for use in traditional courses The reader is guided by clearly motivated concepts introductions historical remarks side notes concerning connections with other disciplines and numerous exercises complete with detailed solutions The title provides the reader with the tools needed to arrive naturally at practical implementations of the concepts and techniques discussed allowing for the design of algorithms to solve problems

Logic And Language Models For Computer Science (Third Edition) Dana Richards, Henry Hamburger,2017-09-08 This text presents the formal concepts underlying Computer Science It starts with a wide introduction to Logic with an emphasis on reasoning and proof with chapters on Program Verification and Prolog The treatment of computability with Automata and Formal Languages stands out in several ways The style is appropriate for both undergraduate and graduate classes

Computer Science Logic Leszek Pacholski, Jerzy Tiuryn,1995 *Computer Science Logic* ,2003 **Mathematical**

Logic in Computer Science B. Dömölki, T. Gergely,1981-02-12 This volume contains 31 papers prepared for the Colloquium on Mathematical Logic in Programming held in Salg tarj n Hungary Main topics of the Colloquium include Model theoretical universal algebra and category theoretical approaches to program semantics Logical and model theoretical approaches to program verification data representation and problem specification Logical and model theoretical approaches to theorem proving automatic programming and automatic problem solving Very high level logical based programming languages

Logical Foundations of Computer Science S. I. Adiān,1997-05-28 A Sobolev gradient of a real valued functional is a gradient of that functional taken relative to the underlying Sobolev norm This book shows how descent methods using such gradients allow a unified treatment of a wide variety of problems in differential equations Equal emphasis is placed on

numerical and theoretical matters Several concrete applications are made to illustrate the method These applications include 1 Ginzburg Landau functionals of superconductivity 2 problems of transonic flow in which type depends locally on nonlinearities and 3 minimal surface problems Sobolev gradient constructions rely on a study of orthogonal projections onto graphs of closed densely defined linear transformations from one Hilbert space to another These developments use work of Weyl von Neumann and Beurling

LOGICS FOR COMPUTER SCIENCE, SECOND EDITION SINGH, ARINDAMA, 2018-06-01 Designed primarily as an introductory text on logic for computer science this well organized book deals with almost all the basic concepts and techniques that are pertinent to the subject It provides an excellent understanding of the logics used in computer science today Starting with the logic of propositions it gives a detailed coverage of first order logic and modal logics It discusses various approaches to the proof theory of the logics e g axiomatic systems natural deduction systems Gentzen systems analytic tableau and resolution It deals with an important application of logic to computer science namely verification of programs The book gives the flavour of logic engineering through computation tree logic a logic of model checking The book concludes with a fairly detailed discussion on nonstandard logics including intuitionistic logic Lukasiewicz logics default logic autoepistemic logic and fuzzy logic The Second Edition includes applications of compactness theorem to many interesting problems relevant to mathematics and computer science It also presents the undecidability of first order logic inexpressibility of truth and incompleteness of Peano s Arithmetic in a comprehensive and lively manner Besides students of Computer Science those offering courses in Mathematics and Philosophy would greatly benefit from this study

KEY FEATURES Provides numerous worked out examples which not only illustrate the concepts and theory developed but also give a lead to the succeeding notions Exercises at the end of each section aim at reinforcing and mastering the techniques raising issues and preparing background for further development of the subject Problems of theoretical nature which are important for learning the subject are included at the end of each chapter The reader is constantly provoked to work out the details promoting interactive learning

Logic for Computer Science Steve Reeves, Michael Clarke, 1990 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

Computer Science and Multiple-Valued Logic David C. Rine, 2014-05-12 Computer Science and Multiple Valued Logic Theory and Applications focuses on the processes methodologies and approaches involved in multiple valued logic and its relationship to computer science The selection first tackles an introduction to multiple valued logic lattice theory

of post algebras multiple valued logic design and applications in binary computers smallest many valued logic for the treatment of complemented and uncomplemented error signals and chain based lattices Discussions focus on formulation representation theory theory and circuit design logical tables and unary operations The text then examines multiple valued signal processing with limiting development of multiple valued logic as related to computer science p algebras and an algorithm for axiomatizing every finite logic The book takes a look at completeness properties of multiple valued logic algebras computer simplification of multi valued switching functions and minimization of multivalued functions Topics include generation of prime implicants realizations minimization algorithms decomposition algorithm for multi valued switching functions and relation between the sum of products form and array of cubes The selection is aimed at computer engineers computer scientists applied mathematicians and physicists interested in multiple valued logic as the discipline relates to computer engineering and computer science Logic and Discrete Mathematics Winfried Karl Grassmann, Jean-Paul Tremblay, 1996 For one two semester sophomore level courses in Discrete Mathematics This text covers all the traditional topics of discrete mathematics logic sets relations functions and graphs and reflects recent trends in computer science *Computer Science and Multiple-valued Logic* David C. Rine, 1984 *Applied Logic for Computer Scientists* Mauricio Ayala-Rincón, Flávio L. C. de Moura, 2017-02-13 This book provides an introduction to logic and mathematical induction which are the basis of any deductive computational framework A strong mathematical foundation of the logical engines available in modern proof assistants such as the PVS verification system is essential for computer scientists mathematicians and engineers to increment their capabilities to provide formal proofs of theorems and to certify the robustness of software and hardware systems The authors present a concise overview of the necessary computational and mathematical aspects of logic placing emphasis on both natural deduction and sequent calculus Differences between constructive and classical logic are highlighted through several examples and exercises Without neglecting classical aspects of computational logic the authors also highlight the connections between logical deduction rules and proof commands in proof assistants presenting simple examples of formalizations of the correctness of algebraic functions and algorithms in PVS *Applied Logic for Computer Scientists* will not only benefit students of computer science and mathematics but also software hardware automation electrical and mechatronic engineers who are interested in the application of formal methods and the related computational tools to provide mathematical certificates of the quality and accuracy of their products and technologies

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