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Abstract

The book includes an introduction to the basic areas of application of logic in computer science. The indicative topics covered in the book include an introduction to the subject of logic in general (categorical logic), as well as the range of its applications in computer science (programming semantics, automatic proof, system modeling, algorithm verification). Emphasis is placed on formal methods, which are a typical example of the application of logic in programming and software technology in general. Topics covered include issues related to classical and non-classical logics, lambda calculus, type theory, models, program and specification correctness, functional programming, theorem proving, logical programming, proofs as programs, semantics of programming languages and system specifications, equational logic, algebraic specifications of systems. Also, techniques for specifying and verifying the properties of programs and systems. The algebraic specification language CafeOBJ is used as an example of a logic-based language (combination of equational logic systems) and is used in software modeling applications. Other logic-based languages and their applications are also presented briefly, such as functional programming languages (Lisp). It is worth noting that this course is considered particularly important internationally in the study of computer science and applied mathematics in computer science.

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