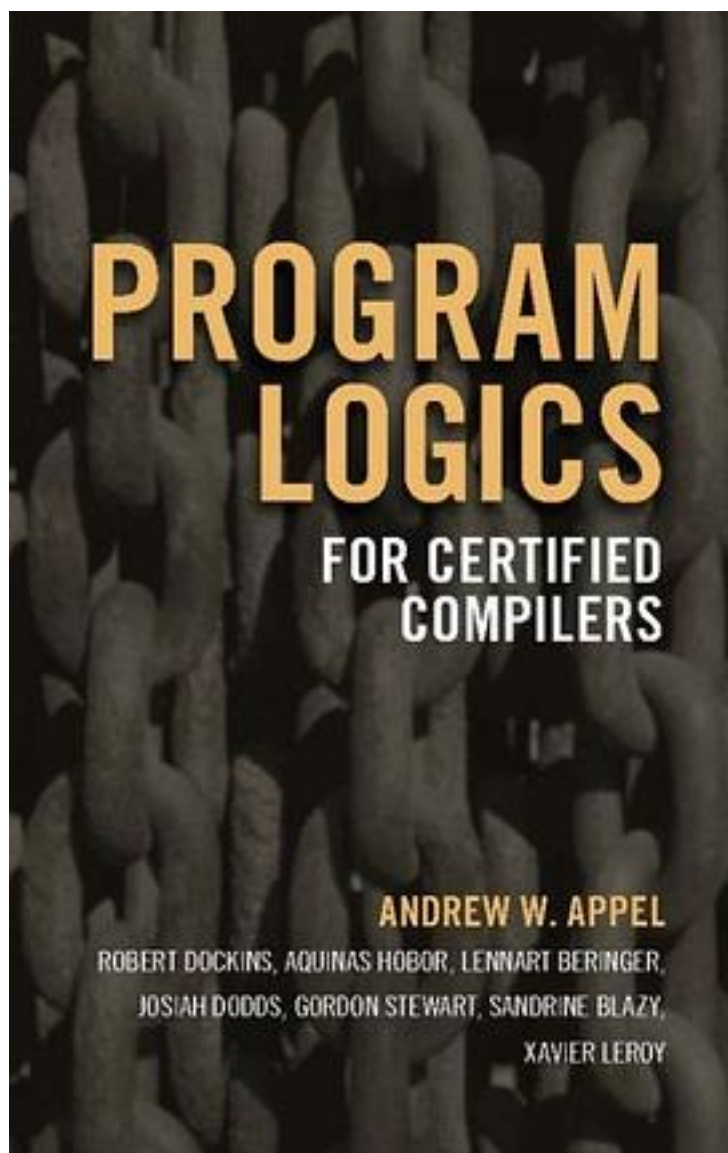# Program Logics for Certified Compilers

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Separation Logic is the twenty-first-century variant of Hoare Logic that permits verification of pointer-manipulating programs. This book covers practical and theoretical aspects of Separation Logic at a level accessible to beginning graduate students interested in software verification. On the practical side it offers an introduction to verification in Hoare and Separation logics, simple case studies for toy languages, and the Verifiable C program logic for the C programming language. On the theoretical side it presents separation algebras as models of separation logics; step-indexed models of higher-order logical features for higher-order programs; indirection theory for constructing step-indexed separation algebras; tree-shares as models for shared ownership; and the semantic construction (and soundness proof) of Verifiable C. In addition, the book covers several aspects of the CompCert verified C compiler, and its connection to foundationally verified software analysis tools. All constructions and proofs are made rigorous and accessible in the Coq developments of the open-source Verified Software Toolchain.

作者介绍:

Andrew W. Appel is the Eugene Higgins Professor and Chairman of the Department of Computer Science at Princeton University, where he has been on the faculty since 1986. His research is in software verification, computer security, programming languages and compilers, automated theorem proving, and technology policy. He is known for his work on Standard ML of New Jersey and on Foundational Proof-Carrying Code. He is a Fellow of the Association for Computing Machinery, recipient of the ACM SIGPLAN Distinguished Service Award, and has served as Editor in Chief of ACM Transactions on Programming Languages and Systems. His previous books include Compiling with Continuations (1992), the Modern Compiler Implementation series (1998 and 2002) and Alan Turing's Systems of Logic (2012).

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