

Specification and Seamless Verification of Embedded Real-Time Systems - Focus on Isabelle



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The purpose of this thesis is to create a coupling of the formal specification framework Focus in the generic theorem prover Isabelle/HOL, a logical framework based on Higher-Order Logic. The main focus of this work is on specification and verification of systems that are especially safety critical - embedded real-time systems. The specification and verification/validation methodologies are treated as a single, joined, methodology with the main focus on the specification part. The key contributions of the thesis are + Embedding of that part of the framework Focus, which is appropriate for the specification of real-time systems, into Isabelle/HOL. "Focus on Isabelle" enables to validate and verify system specifications in a methodological way. + Syntax extensions for Focus for the argumentation over time intervals: a special kind of tables, timed state transition diagrams, and a number of new operators. The deep embedding into Isabelle/HOL includes all these extensions. + Schemata for automatic correctness proofs in Isabelle/HOL of the syntactic interfaces for specified system components.

作者介绍:

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