Festschrift

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Wolfgang Ahrendt
Bernhard Beckert
Richard Bubel
Einar Broch Johnsen (Eds.)

The Logic of Software

A Tasting Menu of Formal Methods

Essays Dedicated to Reiner Hähnle on the Occasion of His 60th Birthday

Lecture Notes in Computer Science 13360

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Quo Vadis Formal Methods? I can see clearly now . . .

Preface

Distinguished, multi-valued reader, welcome to this festschrift to celebrate the 60th anniversary of our dear colleague Reiner Hähnle. As your hosts, it is our pleasure to introduce the menu. With a focus on certified modularity and variability, we present you with a history-based and resource-aware, carefully curated experience. The contributions mostly draw on seasonal, local products with the occasional exotic contribution in a cooperative and hopefully bug-free manner. With this festschrift, we can accommodate most allergies with fair constraint merging, except for the abstraction allergy.

For the aperitif, we propose the liberalised adventures of Alice and a dash of dynamic and unbounded clairvoyance, bridging the gap between formal and informal knowledge. For starters, we recommend a transparent treatment of loops to incrementally validate the boundary between the verified and the unverified. This is followed by the orderly resolution of contracts, both their design and their programming. We then consider the symbolic execution of locally abstract, globally concrete semantics of eternal, adaptable and evolving railway operations with anti-links and commodious axiomatization.

The *trou normand* of this festschrift will be saturated by information flow and soundness leaks, inferring secrets by guided experiments in Re-CorC-ing with a focus on naturalness. After that, we present a many-valued symphony of partiality and abstraction, spanning from the Karlsruhe Java Verification Suite, via JML, COSTA, KeY, KIV, Stipula, Łukasiewicz logic, AF-algebras, MaxSAT and MinSAT, to Snap! As for abstraction refinement and incremental validation to enable reuse and transformation, we are afraid that selection is no longer available at this point, without explicit dependency information.

To facilitate symbolic digestion, the grand finale offers a dash of automatic complexity analysis, an injection of sound and complete reasoning about actors and a note on their idleness. By suggesting normal forms for knowledge compilation, the menu is curated to facilitate lifelong learning and to better understand research quality.

We are proud to offer to you a menu with a wide variety of ingredients and preparation styles, reflecting the great repertoire of the master chef Reiner Hähnle, a repertoire of formal methods that he developed during his long journey as a scientist, which brought him from being a young PhD student working on many-valued logics to his long tenure as an eminent researcher in formal methods. Reiner's mastery inspired and influenced many chefs in their cooking, and their commitment to the best end-user gourmet experience.

We hope you will enjoy this tasting menu!

April 2022

Wolfgang Ahrendt
Bernhard Beckert
Richard Bubel
Einar Broch Johnsen

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