



Transitions and Trees: An Introduction to Structural Operational Semantics

By Hans Hüttel

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Structural operational semantics is a simple, yet powerful mathematical theory for describing the behaviour of programs in an implementation-independent manner. This book provides a self-contained introduction to structural operational semantics, featuring semantic definitions using big-step and small-step semantics of many standard programming language constructs, including control structures, structured declarations and objects, parameter mechanisms and procedural abstraction, concurrency, nondeterminism and the features of functional programming languages. Along the way, the text introduces and applies the relevant proof techniques, including forms of induction and notions of semantic equivalence (including bisimilarity). Thoroughly class-tested, this book has evolved from lecture notes used by the author over a 10-year period at Aalborg University to teach undergraduate and graduate students. The result is a thorough introduction that makes the subject clear to students and computing professionals without sacrificing its rigour. No experience with any specific programming language is required.

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Transitions and Trees: An Introduction to Structural Operational Semantics By Hans Hüttel Bibliography

- Sales Rank: #3006092 in Books
- Published on: 2010-06-07
- Released on: 2010-04-29
- Original language: English
- Number of items: 1
- Dimensions: 9.72" h x .59" w x 6.85" l, 1.14 pounds
- Binding: Paperback
- 290 pages

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Editorial Review

Review

"Each chapter of the book contains various examples and problems, making it very suitable for teaching purposes. There are more than enough bibliographical directions for starting a thorough study of any of the presented topics. The book does not limit itself to structural operational semantics; it provides introductory information on several related topics. All of these aspects make the book a well-rounded presentation on the subject. The book can be successfully used by students, professionals, and researchers as a good introduction to the semantics of programming languages that will help them describe and reason about the behavior of programs."

G. Ciobanu, Computing Reviews

"Transitions and Trees is a detailed, rigorous, and thorough textbook on structural operational semantics on an advanced undergraduate level. The book's strength is the comprehensive coverage of many aspects of structural operational semantics. Transitions and Trees is generally well written and the large number of examples and interspersed exercises help in understanding the material."

Stephan Falke for SIGACT News

About the Author

Hans Hüttel is Associate Professor in the Department of Computer Science at Aalborg University, Denmark.

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