



Software Verification and Analysis: An Integrated, Hands-On Approach

By Janusz Laski, William Stanley

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Software Verification and Analysis: An Integrated, Hands-On Approach By Janusz Laski, William Stanley

“The situation is good, but not hopeless” (Polish folk wisdom) The text is devoted to the Software Analysis and Testing (SAT) methods and s- porting tools for assessing and, if possible, improving software quality, specifically its correctness. The term quality assurance is avoided for it is this author’s firm belief that in the current state of the art that goal is unattainable, a plethora of “gu- anteed” solutions to the problem notwithstanding. Therefore, the rather awkward phrase “improving correctness” is to be understood as an effort to minimize the number of residual programming faults (“bugs”) and their impact on the software’s behavior, that is, to make the faults tolerable. It is clear that such a minimalist approach is a result of frustration. Indeed, having spent years developing software and teaching (preaching?) “How to do it right,” I still do not know how to go about it with any degree of certainty! It appears then I probably should stop right now, for who with a modicum of common sense would reach for a text that does not offer salvation but (as will be seen) hard work and misery? If I intend to continue, it is only that I suspect there are many professionals out there who have similar doubts. And they are the intended audience of this project. The philosophical underpinning of the text is the importance of sound engine- ing practices in software development.

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Editorial Review

Review

From the reviews:

"Software verification is a set of important activities in the software development process that leads to determining whether the software product fulfills requirements. ... It could also be very useful to software engineering researchers and practitioners. The quality of the book is enhanced by the wide range of examples that illustrate various problems and offer appropriate solutions. The physical quality of the book is extremely high." (M. Ivanovic, ACM Computing Reviews, June, 2009)

"Software verification and validation are conducted to help ensure that programs perform correctly. ... While this book's subtitle indicates a 'hands-on approach,' it really takes a formal mathematical approach to describing software verification. ... The book includes plenty of diagrams and figures, and it explains verification concepts with examples. This work is useful as a complement to hands-on testing books to detail the mathematical foundations of software verification. Summing Up: Recommended. Upper-division undergraduates through professionals." (H. J. Bender, Choice, Vol. 47 (3), November, 2009)

From the Back Cover

This book advocates the integrated and tool supported use of all available verification methods to improve software correctness. The following major software verification techniques and their supporting tools, based on sound mathematical models, are discussed:

- Correctness by construction, using the Vienna Development Method-Specification Language (VDM-SL) and its supporting CSK's Toolbox.
- Static program analysis supported by the PRAXIS' SPARK toolset and SofTools' System for Testing And Debugging (STAD 4.0).
- Program proving supported by SPARK.
- Dynamic program analysis supported by STAD.

VDM-SL Toolbox and SPARK illustrate, respectively, the correctness by construction and program proving paradigms. The author demonstrates that while both methods are powerful, errors are inevitable and detecting these may be more difficult than in the case of an informally developed program. Consequently, error detection must be an integral part of the entire life cycle of a programming project. Black-Box (specification based) and Structural (code based) testing are covered and supported by STAD (including 5 testing criteria). STAD also features a quite powerful descriptive and proscriptive static analysis.

Software engineers, students and computer scientists will find that the book provides the reader with a comprehensive understanding of software verification issues. STAD's outputs allow the user to implement and test their own ideas.

The most recent version of STAD can be downloaded from <http://www.stadtools.com>.

About the Author

William D. Stanley is an Eminent Professor Emeritus at Old Dominion University and was the recipient of the State Council of Higher Education in Virginia Outstanding Faculty Award. He received his Bachelor of Science in Electrical Engineering degree at the University of South Carolina. Mr. Stanley also received both his Master of Science in Electrical Engineering and a Ph.D. in Electrical Engineering at the University of North Carolina. Dr. Stanley is a registered professional engineer and a member of IEEE and ASEE.

Users Review

From reader reviews:

Ernest Ainsworth:

Spent a free time and energy to be fun activity to do! A lot of people spent their free time with their family, or their own friends. Usually they performing activity like watching television, about to beach, or picnic inside park. They actually doing same task every week. Do you feel it? Do you need to something different to fill your personal free time/ holiday? Could be reading a book may be option to fill your free time/ holiday. The first thing that you ask may be what kinds of publication that you should read. If you want to attempt look for book, may be the e-book untitled Software Verification and Analysis: An Integrated, Hands-On Approach can be very good book to read. May be it is usually best activity to you.

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Katherine Khan:

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Crystal Thomas:

On this era which is the greater man or who has ability to do something more are more special than other. Do you want to become one among it? It is just simple approach to have that. What you should do is just spending your time very little but quite enough to have a look at some books. Among the books in the top checklist in your reading list is Software Verification and Analysis: An Integrated, Hands-On Approach. This book and that is qualified as The Hungry Inclines can get you closer in getting precious person. By looking upward and review this e-book you can get many advantages.

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