

Test Program Generation for Microprocessors

Using MicroTESK Technology



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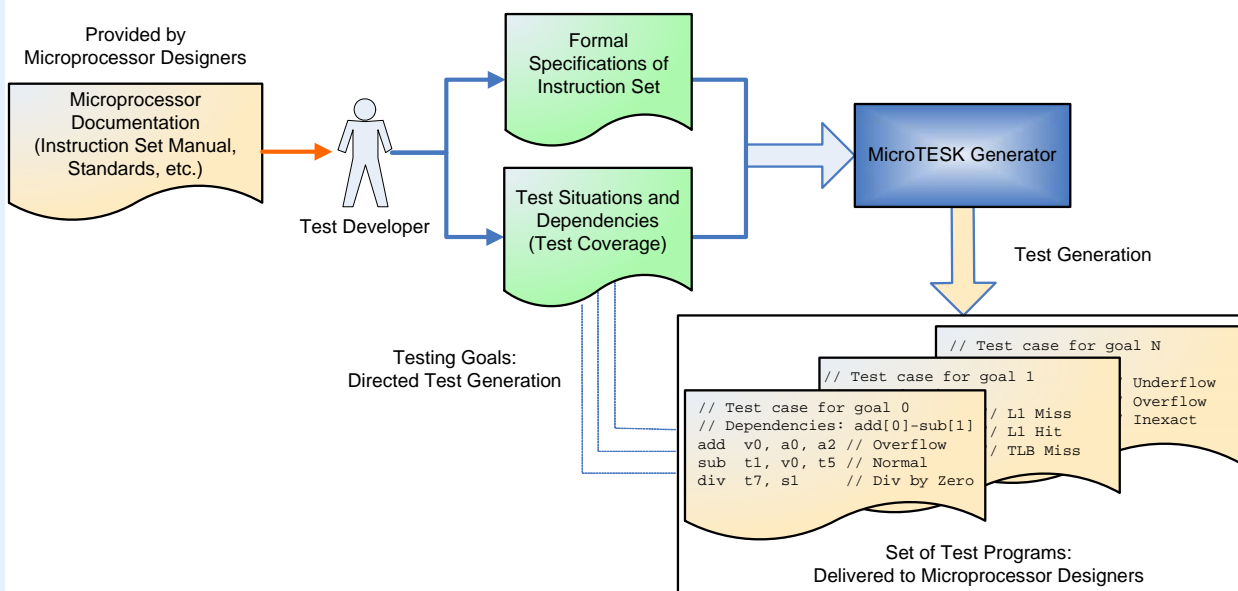
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Overview

MicroTESK is a technology to generate test programs in assembly language for microprocessors and other programmable devices such as arithmetical coprocessors, controllers, etc. MicroTESK significantly improves the quality of verification by systematic construction of various test cases based on light-weight formal specifications of microprocessor instruction set and testing goals in terms of instruction-level test coverage. A set of special test data generation libraries (for integer and floating-point arithmetic, memory management, etc.) simplifies development of test generators and reduces labor cost of microprocessor verification.

Test Development Process



Microprocessor designers provide test developers with documentation on the target microprocessor: instruction set manual, standards, etc. Test developers create formal specifications and define test coverage goals in the form of test situations (arithmetical exceptions, cache hit/misses, and other events) and dependencies between instructions (via registers or memory). Both descriptions are used as inputs for the MicroTESK Generator. The generator automatically builds a set of test programs that cover all specified testing goals.

MicroTESK Features

- *Directed test generation* – test programs are generated according to specified goals
- *High automation* – technology provides high level of automation
- *Self-checking tests* – test programs contain checks of microprocessor behavior
- *Java language* – formal specifications are developed in widely-adopted Java
- *Generation libraries* – there are ready-to-use test generators for typical instructions
- *Graphical interface* – generator has graphical user interface

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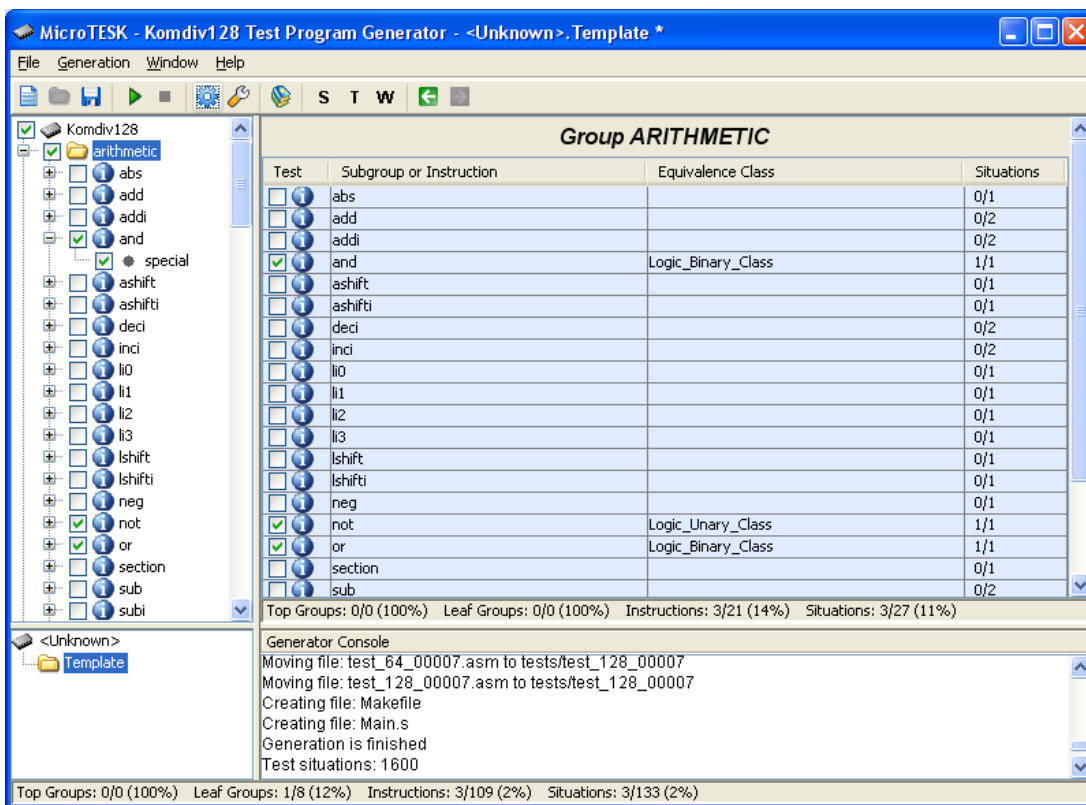
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MicroTESK Generator

The main components of the MicroTESK Generator that are responsible for construction of test cases form a generator core. Apart from the core components, the generator has a number of libraries which simplify development of microprocessor specifications and include many ready-to-use components like iterators, test data generators, etc. To facilitate using the MicroTESK Generator, it has graphical user interface.



About Us

Presented tools and technologies were developed at the Software Engineering Department of the Institute for System Programming, Russian Academy of Sciences (ISPRAS). The Institute performs both academic research and industrial development projects as well as provides advanced services and consulting in various areas of software engineering, information technologies and computer science.

One of the main directions of the Software Engineering department is advanced verification and testing of software and hardware systems. Since 1994, experts of the department have been participating in projects on automated test development for complex industrial software and hardware under cooperation with such companies as Nortel Networks, Microsoft, Intel, VIA Technologies, Linux Foundation, NIISI RAS, Luxoft, VimpelCom, etc. Based on the experience gained from these and other projects, experts of the department created a number of innovative methods and corresponding technologies and tools for automated development of various types of tests, which are united under UniTESK technology stack. These methods, technologies and tools have proved their efficiency for formal specification and testing of operating systems, compilers, implementations of telecommunication protocols, HDL hardware models, and other types of systems. While we always take opportunities to further improve and enrich them using feedback from new on-going projects.

More information about our technologies can be found at www.unitesk.com.

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