

MicroTESK ARMv8 Edition: Specification-Based Test Program Generator

<http://forge.ispras.ru/projects/microtesk>



<http://hardware.ispras.ru>

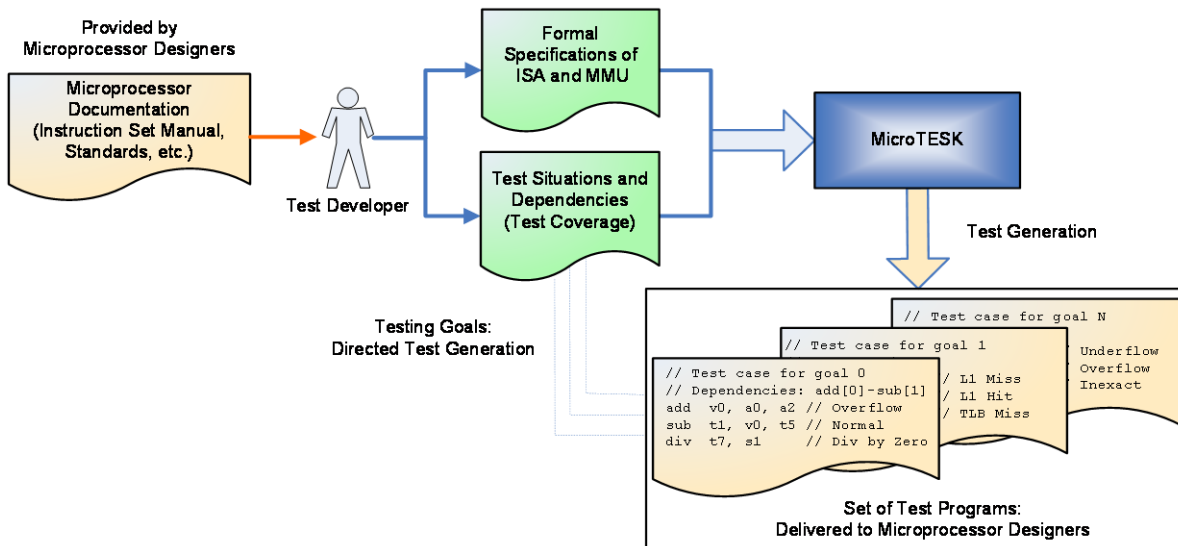
Overview

MicroTESK is a specification-based framework for generating test programs in assembly language for microprocessors. The main advantage over similar solutions is that it offers a simple and flexible way to describe the target microprocessor architecture, thus, minimizing the effort needed to adapt the generation environment to new designs. Light-weight formal specifications used to configure the framework for a particular design also serve as a source of knowledge about situations to be covered by tests. A convenient Ruby-based test template description allows specifying test cases in terms of test coverage goals based on knowledge extracted from formal specifications, which helps improve test coverage and reduce the effort required to create tests.

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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 test templates that are based on test coverage goals expressed in terms 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 MicroTESK that automatically builds a set of test programs covering all specified testing goals.

MicroTESK Features

- **ISA specifications** – instruction set architecture configuration that includes syntax and semantics of instructions is described in nML
- **MMU specifications** – memory management unit properties such as address types, memory segments, buffers, and control logic for handling loads and stores are described in a special language
- **Coverage model extraction** – information about test situations is automatically extracted from formal specifications
- **Test templates** – test cases are described in Ruby extended with MicroTESK libraries
- **Directed test generation** – test programs are generated according to specified goals
- **ARMv8 support** – formal specifications of ISA and MMU of ARMv8 and basic test templates are available

About Us

The MicroTESK test program generation framework is 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. More information about ISPRAS can be found at <http://www.ispras.ru>.

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