TECHNISCHE UNIVERSITÄT DARMSTADT

DEEDS Group

Bachelor's/Master's Thesis

Testing the Impact of Hostile Environments on Software Stability

Background

In order to run efficiently on a large variety of different platforms and to provide features tailored for various use cases, most software systems are highly configurable. A common way for configuring an application to perform well in a specific execution environment is reading *environment variables*. For instance, the content of the CPATH environment variable affects the search path of the gcc pre-processor when it is invoked.

Unfortunately, the reliance on environment variables for software configuration and context-aware adaptation also poses several challenges to software quality assurance. While the problem of *debugging* misconfigurations once they occur has been addressed in a number of research articles, the question how to detect such misconfigurations in the first place has not been adequately addressed.

Objectives

The goal of this thesis is to develop two approaches for configuration testing, both of which can be based on *elektrify-getenv*, an existing automated approach to intercept getenv invocations (POSIX's method to read environment variables) in binaries. The first approach should follow a random testing scheme to serve as a baseline to compare the second approach against. The second approach can follow one of several possible strategies. It can be either based on a model of (il)legitimate values derived from observed or specified configurations, implement a learning based approach that selects new tests based on the results of earlier tests, or rely on code analyses to calculate the likelihood of provoking a software failure.

Prerequisites

Candidates should have basic familiarity with Linux/UNIX programming (preferably in C) and fundamental knowledge of software testing. The thesis will be written in English.

Start

Immediate

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Literature	Analysis	Implementation	Awesomeness
			

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