Bachelor Thesis Topic

**Fuzzing of Model Transformation Engines**

**Motivation and Background**
Fuzzing for fuzz testing [1] is an established technique that aims to discover unexpected program behavior (e.g., bugs, security vulnerabilities, or crashes) by feeding automatically generated data into a program under test. However, the application of fuzzing to test Model-Driven Software Engineering (MDSE) tools is still limited due to the difficulty of existing fuzzers to provide syntactically and semantically valid input models that conform to a given meta-model. Recently, MoFuzz [2] has been introduced, a fuzzer suite that is able to efficiently produce input models to fuzz MDSE tools using various model generation and mutation strategies. Although MoFuzz has been evaluated on a set of generic MDSE tools, it is unclear how well it performs on model transformation engines (e.g., Henshin [3] or ATL [4]) which take as input: 1) a model transformation rule and 2) an input model to perform the transformation on.

**Goals**
The goal of this thesis is to extend the original evaluation of MoFuzz to include various model transformation engines (e.g. Henshin [3] or ATL [4]) and compare the results against the baseline techniques.

**Description of the Task**
The specific tasks are:
- Understand the overall approach of MoFuzz and familiarize with its implementation [5].
- Prepare experiments: Select model transformation engines, collect input model transformations, and write test drivers.
- Perform experimental evaluation and comparison against baseline techniques.

**Research Type**
Theoretical Aspects:

Industrial Relevance:

Implementation

**Prerequisite**
The student should be enrolled in the bachelor of computer science program, and has completed the required course modules to start a bachelor thesis.

**Skills required**
Programming skills in Java, understanding of, or willingness to learn, the software engineering methods (like fuzz testing) and tools (e.g., the Eclipse Modeling Framework) needed for the project.

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**References**