

# SV-COMP Benchmarks for Weak Memory Models

Bachelor Thesis

SV-COMP is the International Competition on Software Verification [1]. It serves as a platform for the research community to evaluate tools targeting verification of C and Java programs. A total of 28 tools from 11 different countries participate in SV-COMP'20.

The simplest (and strongest) model of computation for concurrent programs is sequential consistency (SC), i.e. interleaving semantics. However, for performance reasons, mainstream processors perform optimisations that results in more possible executions than those allowed by SC. This new execution can result in bugs in the program which are hard to detect. All executions which are valid according to a certain processor are specified by its memory model.

We aim to create a new category in SV-COMP dealing with memory models. We currently have a collection of more than twelve thousand benchmarks that were used to validate the formalisation of the memory models of x86, ARM and POWER processors and the LINUX kernel. Those benchmarks are written in the `*.litmus` format, which is only support by a small number of tools.

The goal of this thesis is to port the benchmarks from the `*.litmus` format to C code. DARTAGNAN [2] is a verification tool with support for memory model that can already parse all such benchmarks. What is required, is to implement an exporter from DARTAGNAN's intermediate representation of programs to C.

**Requirements:** Good programming skills (preferably Java).

## References

- [1] International Competition on Software Verification (SV-COMP). <https://sv-comp.sosy-lab.org/>.
- [2] The DAT3M tool suite. <https://github.com/hernanponcedeleon/Dat3M>.