

Master Thesis Proposal

???

Advisor:

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1 Motivation & Problem Statement

Model checking vs test, what is it an over approx, because I know it's cause and its not minimal?, what to do with other mechanism

In any program there is a bug, and this bug can be of two types, deterministic or non deterministic. The deterministic one is easy to debug, but the more problematic are the non deterministic. Those kind of bug can pass a test, and without any change can fail the test, and those kind of bugs are very hard to find and also problematic. [1]

Thus, we want to find a way in which we can determine the occurrence of such a bug, and also try to fix it.

2 Aim of the Work

The aim of this work is to provide a tool that giving a program in C++ can determine the cause of the Heisenbugs.

In plus, we also include a Coq formalization of the theory underlying Heisenbugs Causes.

3 Methodological Approach

The thesis is composed of two parts: theoretical and practical.

Formalization in a theorem prover

- 1.

Tool for detecting causes

4 Structure of the Work

1. Introduction
2. Preliminaries
 - (a) Coq / Lean as a theorem prover
 - (b) Heisenbugs Causes (Scheduler, Distributed systems)
3. Formalization of Heisenbugs Causes in Coq
 - (a) Choosing correct types
 - (b) Translate definitions
 - (c) Proving Theorems
4. Test based Tool for detecting Heisenbugs Causes
 - (a) concurrency (is it the same as scheduling?)
 - (b) other cause TBD.
5. Model checking support
6. Conclusion

5 State-of-the-Art

There is P Program that can detect a Heisenbugs but cannot determin the cause??? (not sure)

6 Relevance to the Curricula of Logic and Computation

To be continued

References

- [1] A Formalization of Heisenbugs and Their Causes