

Visualization of program execution in gforth

Proposal

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eingereicht von

Mario Gastegger

Matrikelnummer 0726289

an der
Fakultät für Informatik der Technischen Universität Wien

Betreuung: Ao.Univ.Prof. Dipl.-Ing. Dr.techn. Martin Ertl

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BACHELOR'S THESIS

submitted in partial fulfillment of the requirements for the degree of

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in

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by

Mario Gastegger

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to the Faculty of Informatics
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Advisor: Ao.Univ.Prof. Dipl.-Ing. Dr.techn. Martin Ertl

Abstract

Problem definition

In software engineering, an important part is to verify the functional correctness of a program. The difficulty of this task grows with the size and the complexity of a program. Thus the task of finding faulty code consumes a considerable amount of time and the efficiency of finding, understanding and fixing this faulty code is of major concern. A very efficient way to keep up code quality is to make developers understand how the code really works. In this thesis I'm going to implement a visualization of the program execution of Forth programs in Gforth and will analyse the improvement of user experience during debugging and time consumption of the process with example programs.

Expected results

Improvement of awareness of what's happening during the execution of a program and efficiency of finding faulty code.

Methodology and approach

As a first step I'm going to evaluate means of implementing a transparent way to generate a program trace by modification of the Gforth code. The next step is to visualize manipulation of the stack and accessed memory. Once a satisfying visualization is implemented, I'm going to debug example programs with and without the visualization to verify my assumption.

State of the art

Current methods of locating faults are

Print debugging

Words like `. . .`, `. "` and `~~` print information directly to the terminal.

Gforth debugger

Stepping through program execution with dbg.

Writing test cases

Writing test cases for words to narrow down the actual location of the fault.

Relation to Software engineering

- Software quality assurance (testing, dynamic analysis, debugging)
- Software development methodology (prototyping, agile)
- Stack-based language(forth)

Timetable

1. research on program execution/trace visualization
2. research on forth
3. research on architecture of gforth
4. research on “debugging” in forth/gforth
5. research of similar approaches
6. extracting several technical approaches to accomplish the task(hooks, word-wrapping, level of implementation)
7. evaluation of the approaches(automation?, performance, feasibility)
8. prototyping the approaches in order of quality
9. evaluation visualization methods
10. implementation of one method

References

- print debugging
- visualization of program execution/traces
- debugger