Verification of the Prefix Sum Program in an OpenCL Environment

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Abstract

todo: write

Keywords

todo: write

Preface

This project is the continuation of my bachelor thesis project, in which the verification of the prefix sum algorithm has been started. Since only the 'data race free' part has been proven for the first part of the algorithm (the upsweep), the goal of this project is to prove the complete algorithm data race free, and additionally prove the functionality of the algorithm.

The necessary background information will be included in this report to understand the goal and results of the project, but full details of the Bachelor project can be read in the paper of that project [1].

Contents

1 Introduction

1.1 Research domain

todo: verification language, VerCors

1.2 Problem statement

todo: use of verification

1.3 Research question

todo: write

1.4 Approach

todo: verification process and problem solving

1.5 Report structure

todo: introduce chapters

2 Prefix sum algorithm

todo: explain parallel prefix sum, based on bachelorreferaat paper

3   Verifying permissions

todo: verification process of the read/write permissions of the array (initial based on bachelorreferaat, extended to allow functional verification)

4 Verifying functionality

todo: verification process of the functionality of the program

5 Discussion

todo: summary

5.1 Results

todo: result description: verified

5.2 Related work

todo: similar verification projects

6 Conclusion

todo: summary

6.1 Research question answer

todo: works, not for huge programs though

6.2 Limitations and problems

todo: tool limitations, change code for verification process

6.3 Research value

todo: do larger programs, improve tool, concurrency

6.4 Future work

todo: larger programs, improve tool

7 References

[1] T. Wiefferink. Optimization, specification and verification of the prefix sum program in an opencl environment. 2015.