CS4071 SSA Optimiser

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Chapter 1

Introduction

The aim of this assignment is to design and implement an optimiser for ARM7 assembly. The problem has been split up into three parts, one of which will be described in this report. Specifically, we will examine the conversion of an intermediate representation (IR) into SSA (Static Single Assignment) form, various optimisations performed on the IR in SSA form, and conversion back out of this form.

In the Design chapter, we will begin by describing the IR that is passed into our application to be optimised. Then we will examine how conversion into SSA form is achieved. In the following section, we will describe the various optimisations that are performed on the IR in SSA form. Finally, we will look at how conversion out of SSA is completed.

In the Implementation chapter, we will give a brief overview of how the application is implemented, focusing on code structure and any technologies used.

Chapter 2

Design

2.1 Intermediate Representation

2.2 Conversion into SSA

2.3 Optimisations

2.3.1 Dead code elimination

2.3.2 Constant propogation

2.3.3 Aggressive dead code elimination

2.3.4 Conditional constant propogation

2.4 Conversion out of SSA

Chapter 3

Implementation

Chapter 4

Conclusion