

ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE

MASTER THESIS

Efficient Deoptimization

Author:
Adrien GHOSN

Supervisor:
Prof. Jan VITEK, Prof. Viktor
KUNCAK

*A thesis submitted in fulfilment of the requirements
for the degree of Master in Computer Science*

in the

LARA
Computer Science

December 22, 2015

Declaration of Authorship

I, Adrien GHOSN, declare that this thesis titled, “Efficient Deoptimization” and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Signed:

Date:

“Thanks to my solid academic training, today I can write hundreds of words on virtually any topic without possessing a shred of information, which is how I got a good job in journalism.”

Dave Barry

ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE

Abstract

Faculty Name
Computer Science

Master in Computer Science

Efficient Deoptimization

by Adrien GHOSN

The Thesis Abstract is written here (and usually kept to just this page). The page is kept centered vertically so can expand into the blank space above the title too...

Acknowledgements

The acknowledgements and the people to thank go here, don't forget to include your project advisor...

Contents

Declaration of Authorship	iii
Abstract	vii
Acknowledgements	ix
1 Introduction	1
2 Related Work	3
2.1 On Stack Replacement, General Principle	3
2.1.1 Definition & Overview	3
2.1.2 The origins: SELF debugging	3
2.1.3 Why is OSR interesting?	3
2.2 On Stack Replacement & Virtual Machines	3
2.2.1 In Java	3
2.2.2 LLVM	3
2.3 A Description of Existing Implementations	3
2.3.1 The OSR points	3
2.3.2 The Transition Mechanism	3
2.3.3 Constraints and Limitations	3
2.3.4 Generating on the Fly VS Caching	3
2.3.5 Discussion	3
3 Theoretical Model	5
3.1 The OSR points	5
3.2 The Transition Mechanism	5
3.3 Constaints	5
4 Implementation	7
A Appendix Title Here	9

List of Figures

List of Tables

List of Abbreviations

LAH List Abbreviations **Here**
WSF What (it) **Stands For**

Physical Constants

Speed of Light $c = 2.997\,924\,58 \times 10^8 \text{ m s}^{-1}$ (exact)

List of Symbols

a	distance	m
P	power	W (J s ⁻¹)
ω	angular frequency	rad

For/Dedicated to/To my...

Chapter 1

Introduction

Chapter 2

Related Work

2.1 On Stack Replacement, General Principle

2.1.1 Definition & Overview

2.1.2 The origins: SELF debugging

2.1.3 Why is OSR interesting?

2.2 On Stack Replacement & Virtual Machines

2.2.1 In Java

2.2.2 LLVM

2.3 A Description of Existing Implementations

2.3.1 The OSR points

2.3.2 The Transition Mechanism

2.3.3 Constraints and Limitations

2.3.4 Generating on the Fly VS Caching

2.3.5 Discussion

Chapter 3

Theoretical Model

3.1 The OSR points

3.2 The Transition Mechanism

3.3 Constaints

Chapter 4

Implementation

Appendix A

Appendix Title Here

Write your Appendix content here.