Term-Indexing for the Beagle Theorem Prover

Timothy Clarence Richard Cosgrove

A subthesis submitted in partial fulfillment of the degree of
Bachelor of Science (Honours) at
The Department of Computer Science
Australian National University

July 2013

Typeset in Palatino by TEX and LATEX 2ε.

Except where otherwise indicated, this thesis is my own original work.

Timothy Clarence Richard Cosgrove
13 July 2013

For Dana.

Acknowledgements

Thank you to my Supervisor and all...

Abstract

This should be the abstract to your thesis...

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Chapter 1

An Introduction to My Thesis

1.1 The Basis for this Work

1.1.1 A Theoretical Framework

Chapter 2

Background

2.1 First-Order Logic and Notation

As stated, *beagle* is a *first-order logic* theorem prover. Thus in order to understand its purpose and functions a basic understanding of this logical system is required. This section provides a rudimentary overview of FOL syntax and uses; but also includes an explanation of any specialised notation used throughout the paper.

- Variables
- Symbols
- Predicates
- Quantifiers
- Positions

2.2 Automated Reasoning and Theorem Proving

Automated Reasoning is a rapidly growing field of research where computer programs are used to solve problems stated in first order logic statments or other formal logics.

2.3 Term Indexing

2.4 Fingerprint Indexing

Fingerprint

2.5 The Beagle Theorem Prover

2.5.1 The Weak Abstraction with Heirachic Superposition Calculus

2.6 Scala

As mentioned above *beagle* is written in *Scala*, the Scalable Language. Scala is a functional language and may be confusing to those who are not familiar with the functional programming paradigm. This thesis will contain occasional snippets of Scala code; but note that any snippets used will be accompanied by an explanation and in general an understanding of Scala is not required.

```
{case ing => foreach do 1 "lol"}
   case
   Case
   new Douglas
          space
             more case space
```

Listing 1: Example of a listing.

We add a few blank pages here to illustrate section headings on odd pages (other than the first page in a new chapter).

Also, here is an example of a citation [Lamport 1994], and another one [Knuth 1986], and another [Goossens et al. 1994]. If in the context, it makes sense to talk about the work of an author in a more integrated way, like Lamport [1994], that can be done too. Because the information on this page is *so* important, it has been indexed too (see the index at the back of this thesis).[1]

[1] However, it is *strongly* advisable to leave indexing until the thesis is complete. Donald Knuth says to allow about a day for the task of indexing. In my experience he was spot-on.

Chapter 3

Implementing Fingerprint Indexing

3.1 Initial Implementation

3.1.1 Refactoring Current Implementation

3.1.2 Initial Problems

3.2 Tailoring to Beagle

Chapter 4

Results

4.1 Why I Did It

4.2 What I Did

Chapter 5

Conclusion

5.1 Why this is a Very Clever Thesis

Appendix A

Some Other Stuff

A.1 Why I Did It

Appendix B

More Stuff

Bibliography

Goossens, M., Mittelbach, F., and Samarin, A. 1994. *The LaTeXCompanion*. Addison Wesley. (p. 4)

Knuth, D. E. 1986. *The TeXbook*, Volume A of *Computers and Typesetting*. Addison Wesley. (p. 4)

Lamport, L. 1994. *LaTeX: A Document Preparation System—User's Guide and Reference Manual* (2nd ed.). Addison Wesley. (p. 4)

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