CHALMERS

A Generator of Divide-and-Conquer Lexers

A Tool to Generate an Incremental Lexer from a Lexical Specification

Master of Science Thesis [in the Programme MPALG]

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Göteborg, Sweden, July 2013

An not to long headline describing the content of the report
A Subtitle that can be Very Much Longer if Necessary
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with page reference to detailed information in this essay.

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Abstract

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Acknowledgements

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The Authors, Location 11/9/11

Contents

1

Introduction

This master-thesis is carried out at Chalmers, on the department of computer science.

1.1 Background

Editors normally have regular-expression based parsers, which are efficient and robust, but lack in precision: they are unable to recognize complex structures. Parsers used in compilers are precise, but typically not robust: they fail to recover after an error. They are also not efficient for editing purposes, because they have to parse files from the beginning, even if the user makes incremental changes to the input. More modern IDEs use compilerstrength parsers, but they give delayed feedback to the user. Building a parser with good characteristics is challenging: no system offers such a combination of properties

1.2 Scope of work

*Usage of BNFC *With help of regexp build a finit state machine that will lex a code string. *Give finite states with corresponding Monoid data type. *Flag for errors from the Lexer, give meningfull info to the user, and stop the worklow after lexer, until new updated text. *If no errors, handel layout *Parse the Monoid data type tree, AKA integrate the result with an existing parser. *Smile and be happy!

2

Lexer

#Some Text describing what the report will illuminate in this chapter.

2.1 Lexer

A Lexer, lexical analyzer, is a program which jobb is to convert a string of a formal language into a sequence of tokens. #Hitta REF. This can be done by using regular expressions, regular sets and finite automata. Which are centerel consepts in formal language theory. [1]

2.1.1 Languages

Formal Languages

Regular Languages

Like any formal language, a regular language is a set of strings. In other words a sequence of symbols, from a finite set of symbols. Only some formal languages are regular; in fact, regular languages are exactly those that can be defined by regulat expressions. [2]

2.1.2 Regular Expressions

Regular expressions are used to describe a patterns in a string. In a regular language, a programming language, this is usefull. Since these languages are build on very strict rules on how strings must follow a pattern. #Ref på detta!!

Definition 2.1.1 (Regular Expressions [1])**.**

1. The following characters are meta characters $\{'|','(',')','*'\}$.
2. A none meta character a is a regular expression that matches the string a.

3. If r_1 and r_2 are regular expressions then $(r_1|r_2)$ is a regular expression that matches any string that matches r_1 or r_2.

4. If r_1 and r_2 are regular expressions. $(r_1)(r_2)$ is a regular expression of the form that matches the string xy iff x matches r_1 and y matches r_2.

5. If r is a regular expression the $r*$ is a regular expression that matches any string of the form $x_1, x_2, \ldots, x_n, n \geq 0$. Where r matches x_i for $1 \leq i \leq n$, in particular $(r)*$ matches the empty string, ε.

6. If r is a regular expression, then (r) is a regular expression that matches the same string as r.

Many parantheses can be reduced by adopting the convention that the Kleene closure operator $*$ has the highest precedence, then concat and then or operator $|$. The two binary operators, cancat and $|$ are left left-associative. [1]

2.1.3 Finite State Machine

2.1.4 Known Solutions

2.2 FingerTree

2.3 BNF

2.4 Yi

2.5 Haskell

2.6 Monoid (data type)

3

Incremental Lexer

Bibliography

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[2] A. Ranta, M. Forsberg, Implementing Programming Languages, College Publications, London, 2012, pp. 38–47.