# DEPARTMENT OF INFORMATICS

TECHNISCHE UNIVERSITÄT MÜNCHEN

Master's Thesis in Informatics)

# Formal Verification of an Earley Parser

Martin Rau

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# Formale Verifikation eines Earley Parsers

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|---|---|
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I confirm that this master's thesis in informatics) is my own work and I have documented all sources and material used.


Munich, 15.06.2023                                    Martin Rau

# Acknowledgments

TODO: Acknowledgments

# Abstract

TODO: Abstract

# Contents

# 1 Introduction

$\llbracket P; Q \rrbracket \implies P \wedge Q$

**datatype** $'a\ cfg = CFG\ ('a\ list)\ ('a\ list)\ (('a \times 'a\ list)\ list)\ 'a$

## 1.1 Motivation

some introduction about parsing, formal development of correct algorithms: an example based on earley's recogniser, the benefits of formal methods, LocalLexing and the Bachelor thesis.

## 1.2 Structure

standard blabla

## 1.3 Related Work

see folder and bibliography

## 1.4 Contributions

what did I do, what is new

## 1.5 Isabelle/HOL

take closest pair paper section and add additional notation as needed

# 2 Earley's Algorithm

illustrate with derivation rules and text, first only the recogniser then the parser

# 3 Fixpoint Recogniser

# 4  Earley Recogniser

# 5 Earley Parser

# 6 Examples

# 7 Conclusion

## 7.1 Summary

## 7.2 Future Work

# 8 Templates

## 8.1 Section

Citation test [**latex**].

### 8.1.1 Subsection

See Table 8.1, Figure 8.1, Figure 8.2, Figure 8.3.

Table 8.1: An example for a simple table.

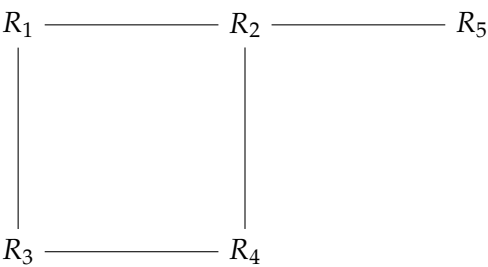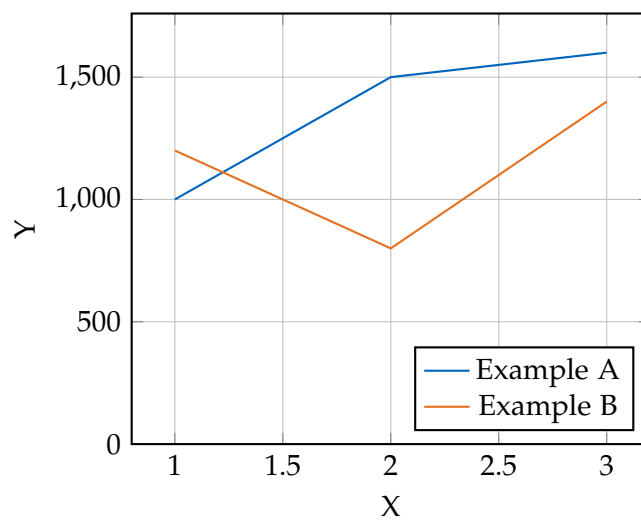| A | B | C | D |
|---|---|---|---|
| 1 | 2 | 1 | 2 |
| 2 | 3 | 2 | 3 |



Figure 8.1: An example for a simple drawing.

Figure 8.2: An example for a simple plot.

```
SELECT * FROM tbl WHERE tbl.str = "str"
```

Figure 8.3: An example for a source code listing.

# List of Figures

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