Efficient Parser and Pretty Printer Combinators in F2J

Yuteng Zhong, Yi Li and Fan Xia

Department of Computer Science, The University of Hong Kong

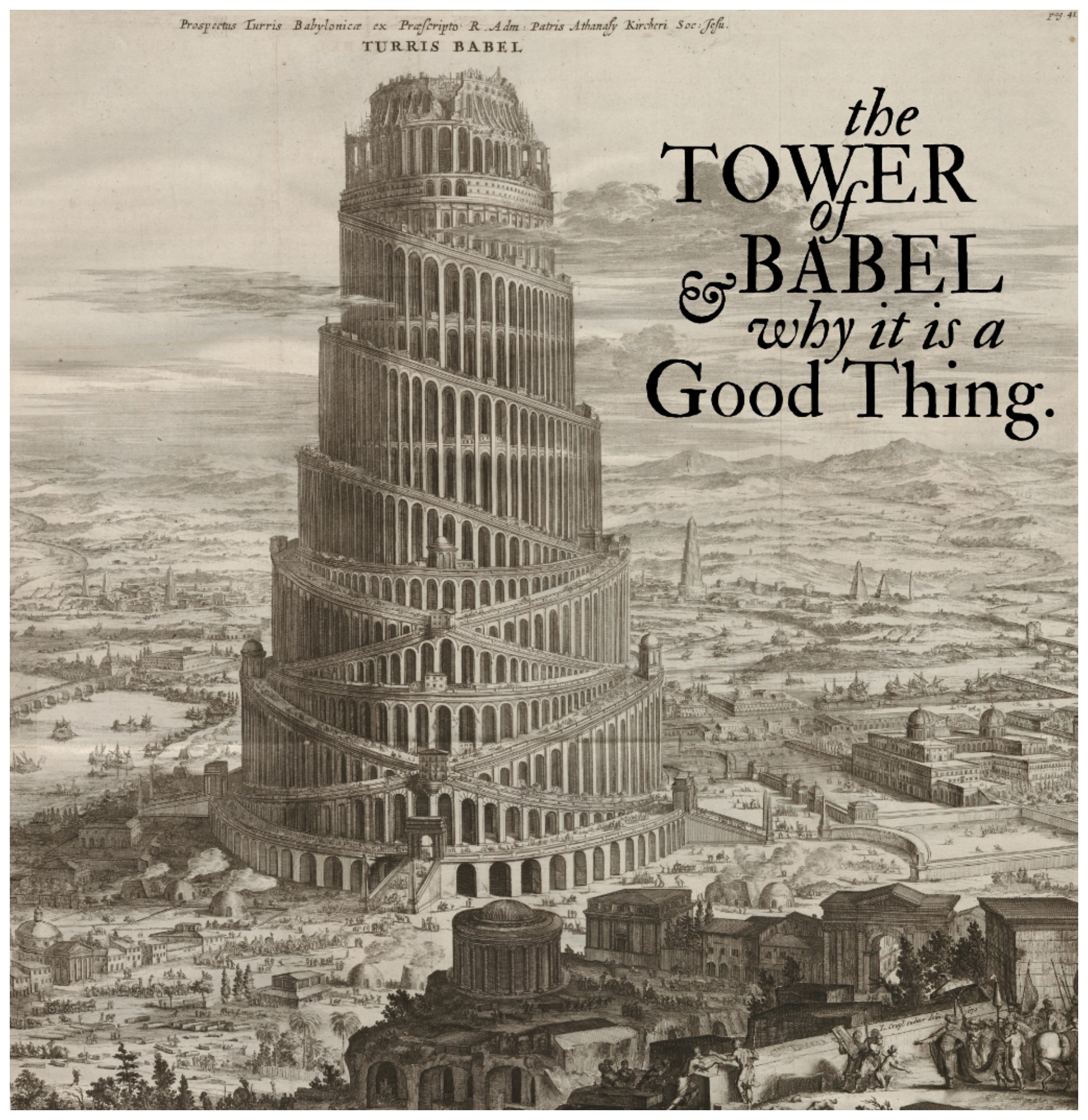

Figure 1: The Tower of Babel

Motivation

At HKU, the Programming Languages group is developing a new JVM-based compiler for functional languages called F2J. The overall goal of this project is to improve support for functional languages on the JVM, as currently existing compilation techniques have several limitations that limit the use of functional programming.

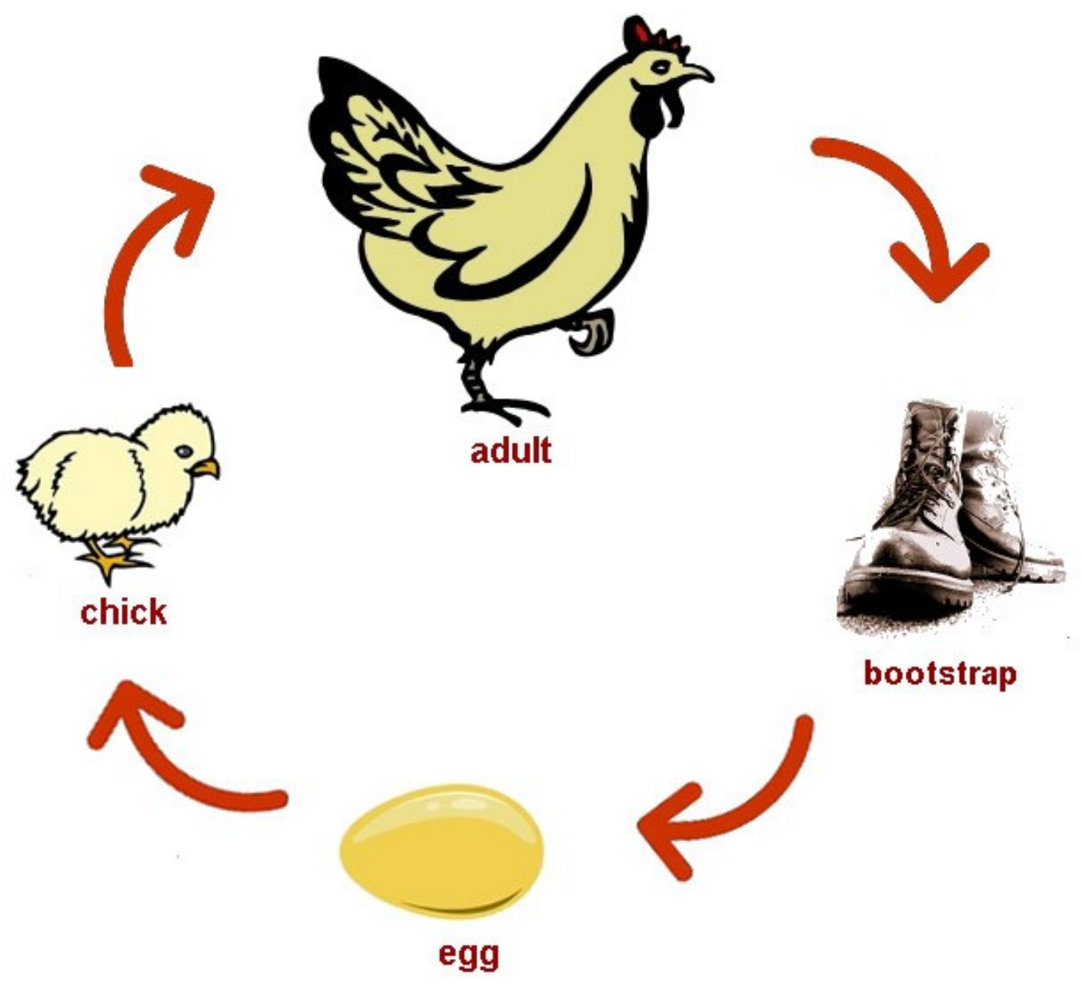

Figure 2: Bootstrapping

In order to make a selfhosting compiler, in other word, a **bootstrapped compiler** for F2J, we will need a parser combinators library. In this process, we could also build a combinators library for pretty printing with a similar approach, which is a reversed process of parsing.

Introduction

Parser combinators are a set of higher-order functions that accepts several parser as input and then return a parser as output. In this context, a parser is a function accepting strings as input and returning some structure as output, typically a parse tree or a set of indices representing locations in the string where parsing stopped successfully. Parser combinators enable a recursive descent parsing strategy that facilitates modular piecewise construction and testing. This parsing technique is called combinatory parsing. Parser and Pretty Printer combinators are an alternative to tools used in compiler constructions, such as lex, yacc or antlr. They have the advantage of being a library instead of a code generator tool.

Methods

Algebra of programming:
Monadic:
Pacrat:

Important Thing

Optimisation

Parser
Pretty Printer

- Algebra: Everything is based on a single concatenation operator that is associative.
- Expressiveness: Only five interfaces are given to users: text, nest, line, group, pretty
- Optimality: Optimal and Bounded

Case Study

XML F2J FWJava

Conclusion

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Additional Information

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References

Acknowledgements

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Contact Information

- Web: http://www.university.edu/smithlab
- Email: john@smith.com
- Phone: +1 (000) 111 1111

PLACEHOLDER LOGO

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