

TIL-Script Typechecker

Filip Peterek

Technical University of Ostrava

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Project goals

- ▶ Create a working typechecker for TIL constructions
- ▶ Plot typechecking graph to an image
- ▶ Write extensible code to allow further development

Accomplished goals

- ▶ Working typechecker
- ▶ Graph plotting
- ▶ TIL-Script parser
- ▶ Context recognition

Implementation

- ▶ Kotlin
- ▶ Gradle
- ▶ Antlr

Parser Implementation

- ▶ TIL-Script grammar has been modified
- ▶ Parser is generated using Antlr
- ▶ Resulting AST is converted to a custom structure

Typechecker Implementation

- ▶ For typechecking to succeed, all names must be defined
- ▶ This is ensured in a separate step
- ▶ If at least one undefined name is found, processing ends
- ▶ Errors are printed to stdout

Typechecker Implementation

- ▶ Recursive implementation
- ▶ Aliases are expanded, expansions are compared
- ▶ Double execution is ignored
- ▶ Trivializations force construction of independent scopes
- ▶ Type deduction is unsupported
- ▶ Errors are, yet again, printed to stdout

Context Recognition

- ▶ Context recognition is also supported
- ▶ Recursive implementation
- ▶ No errors can be detected at this point

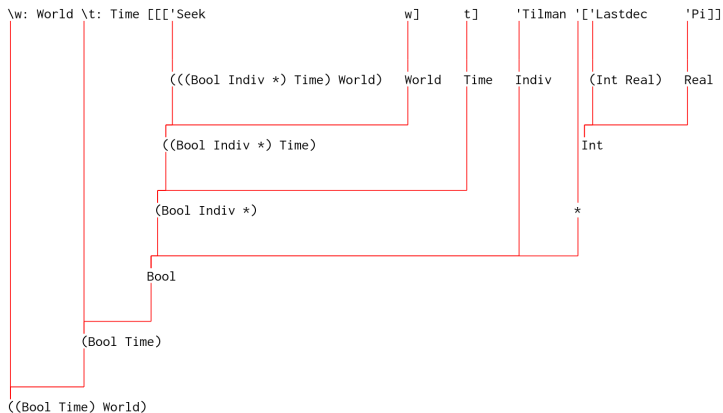
Program Output

- ▶ Errors are printed to stdout
- ▶ Script information is written to a JSON file
 - ▶ Constructions
 - ▶ All subconstructions of said constructions
 - ▶ Definitions
 - ▶ Constructed type
 - ▶ Type of TIL-Script statement
 - ▶ Context
- ▶ Typechecking graph is created as an SVG image

Graph Plotting

- ▶ No third party libraries
- ▶ Indentation is necessary due to lengths of type ids
- ▶ Monospace font

Graph Plotting



Possible Improvements

- ▶ LSP
 - ▶ Text editor integration
 - ▶ Code completion
 - ▶ Error reporting
 - ▶ Refactoring
 - ▶ Supported by all major editors (Vim, Emacs)

Possible Improvements

- ▶ Interactive browser application
 - ▶ Web application available online
 - ▶ Allows online text editing
 - ▶ Provides on-the-fly syntax and type coherence checking
 - ▶ Opportunity to utilize graphs

The End

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