

Planning report

Sebastian Selander
gusselase@student.gu.se

Colubridae

Colubridae¹ is a compiler for a programming language inspired by the simplicity of Python. However, Colubridae will also include a nominal type system, some type inference, as well as being compiled to LLVM IR.

Some notable features (if time allows) of Colubridae will be:

- higher-order functions.
- algebraic data types
- arrays

A large focus of the project will be to develop the compiler using good techniques for the future, e.g trees that grow, bidirectional type checking

To be considered a useful language I would argue that Colubridae needs a garbage collector, but unfortunately that is out of the scope of this project.

Experiences

I just finished my fourth year studying computer science at Gothenburg university. No previous programming experience prior to starting my university studies. This is not the first compiler I make, however, all previous attempts have resulted in compilers that I am not confident in whatsoever, thus this is something I would like to avoid this time.

Techniques

I will be writing the compiler in Haskell, using some standard helpful libraries such as: `lens`, `mtl`, `megaparsec`. I will use the LLVM IR library as well if it still is maintained.

Time plan

Details

Following is a list of that need to be implemented that I know of in advance:

- Parser
- Alpha renamer
- Typechecker
- Desugaring
- Internal intermediate language
- LLVM IR generation phase

More things will probably arise during development, but I can't think of anything else at the moment.

Time plan

Total time available roughly: 8 * 40h

The first month will be spent implementing the basics of the language. That is, parsing, renaming, type checking, and code generating basic expressions and statements. Unfortunately at this point I don't know exactly how long this will take.

¹ Colubridae was chosen as it is a family of mostly non-poisonous (safe) snakes
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I reckon roughly that the following is how my time will be spent:

- 3 * 40 on implementing the basics of the compiler
- 2 * 40 on implementing higher-order functions
- 2 * 40 on implementing algebraic data types and pattern matching
- 1 * 40 on implementing arrays

Time will also be spent refactoring as well as I will make mistakes that need to be corrected for future additions to work.

Please reach out to me if anything is unclear!

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