Seminar Programmiersprachen im Verlgeich - Zig

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Contents

Introduction

Language

- build system
  - same language for build-system
  - build.zig is generated
  - good C interoperability
- manual memory management
  - allocators have to be manually passed
  - deallocate by `defering` `deinit` procedures
  - memory leaks are automatically detected in debug mode
- minimal standard library
  - no unicode string support, only functions for operating on slices e.g. std.mem
  - utf-8 string libraries are 3rd party
- exhaustive switch statements
  - useful for enums
- generics are just comptime functions operating on types
- inferred struct literal type `.{}`
- if enum type is known the type can be omitted, `.variant` is sufficient
- errors as values
  - error union explicit or implict
  - try: return on error
  - catch: handle error
- slices
  - pointer and length by default: []u8
  - sentinel terminated, for example null terminated: [*0]u8
  - exclusive ranges for slicing: my_slice[0..2]
- somewhat immature ecosystem
  - missing regex library
  - async not available in `0.11` self-hosted compiler
- unclear crash messages, even in debug mode
  - just memory addresses
  - this is a bug when linking libc

Development process

Single threaded optimization

Line by line matching

Whole text matching for performance

- to avoid allocating iterator for every line
- then avoid using iterator anyway

Line by line matching with fixed size buffer

- no multiline matches
- easier to implement
- lines need to be iterated anyway for line numbers

Whole text matching for performance with fixed size buffer

- the rust regex `find` functions has extremely high startup overhead on unicode word-character patterns
- avoided to some extend by searching the whole text buffer instead of just line by line slices

Parallelization

- Two worker thread pools
  - One for walking the file tree
  - One for searching files
- Walking the filetree uses a shared stack for depth first searching
- A shared queue is used to pass to be searched files
- A shared sink synchronizes writing to stdout

Conclusion