

Week7

Compilers

0. Overview of Compilers: gcc, clang, msvc, icc...
1. An absolute minimum for all C/C++ programmers: `-Wall -Werror -Wextra -Wpedantic -Wconversion`
2. A useful place to inspect your code: Compiler Explorer
 - Benefits of using multiple compilers

Debugger

1. vscode debugging
2. gdb and lldb
3. How to use gdb
 - How to start your program
 - How to abort and resume
 - How to set/delete a break point
 - How to view stack/register
 - How to disassemble a function

System Call Debugger

1. strace in Linux
2. dtrace in Mac
 - I'm still trying to figure out how to use this one

Static Analysis

1. clang-tidy
 - `clang-tidy filename`
 - `.clang-tidy`

Profiling

CPU Profiler

1. There are a bunch of tools for profiling
 - perf
 - callgrind
 - VTune
 - gperftools (our focus)
2. gperftools
 - What is it?
 - How to install?
 - How to use it?

Memory Profiler

1. `sanitizer`
 - Address Sanitizer (detect memory issue: leaks, dangling pointers)
 - Undefined Behavior Sanitizer
 - Thread Sanitizer (useful for detecting data races)
2. `leaks` in MacOS
 - MallocStackLogging
3. `valgrind` in Linux

Code Coverage

1. `gcov` + `lcov` + `genhtml`

Benchmarking

1. Hyperfine
 - Compare different programs
2. Write your own benchmark
 - Compare different functions

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