Exam Assignments 10

Useful Compiler Flags

`-Wall`

- Forces the compiler to print all warnings
- Might allow more problems to be found

`-g`

- Makes the compiler generate debug information that can be used by debuggers

`-fsanitize=address`

- Lets the compiler try to detect out-of-bounds accesses, use-after-free and memory leaks
- Helps the developer find some runtime errors at compile time

`-fsanitize=undefined`

- Lets the compiler try to detect undefined behavior
- Helps the developer find some runtime errors at compile time

Intel oneAPI

Intel Compiler

- First of all, oneAPI includes the Intel compiler
- The Intel compiler can optimize some code better than other compilers, allowing the developer to sometimes get faster running code

Intel Inspector

- Intel Inspector is a tool to check one's program for threading and memory correctness
- It can allow the developer to find more bugs like deadlocks and data races in their code

Intel VTune

- Intel VTune is a program performance profiler
- It provides overall performance measures like

- Cycles-per-instruction ratio

- Thread concurrency

- Rate of cache misses

- Used memory bandwidth

- Also allows the developer to find the parts of the code that take the most time, so they can specifically optimize those parts

Premature Optimization

The most important property for the programs we create is correctness. If the program doesn't do what we want it to do, then no amount of optimization will help. The first step should thus always be to get the program up and running, before any type of optimization is done.

And then, when the time for optimization has come, it has to be focused and measured. Only the bottleneck should be optimized, all other optimization is worthless and only makes the code less readable.