



Memory Profiling and Optimization

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Lectures

- Part 1: Memory System Introduction
- Part 2: Memory Architecture and Coherency
- Part 3: Memory and Performance
- Part 4: Memory Performance Monitoring
- Part 5: Memory Optimizations

Exercises

- Exercise 1: Linux `perf` profiling of a scaled-transpose kernel
- Exercise 2: memory-level parallelism with dependent and independent pointer chains
- Exercise 3: locality, loop interchange, and blocking/tiling
- Exercise 4: false sharing, counter placement, and local accumulation

Audience and Requirements

- **Who Should Enroll:** Anyone who is working with data, memory, parallelization, and want more performance on their applications.
- **Prerequisite:** Familiarity with C++
- **Tools, libraries, frameworks used:** Linux environment with a C++17 compiler, Python 3, Linux `perf`, and the Python plotting dependencies used by the supplied scripts is expected.
- **Learning Objectives:**
 - Profiling applications and analyzing their behavior in terms of memory.
 - Optimization strategies for memory.

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