Task 1E: Confusion Hi Confusion He!!

Runtime Analysis

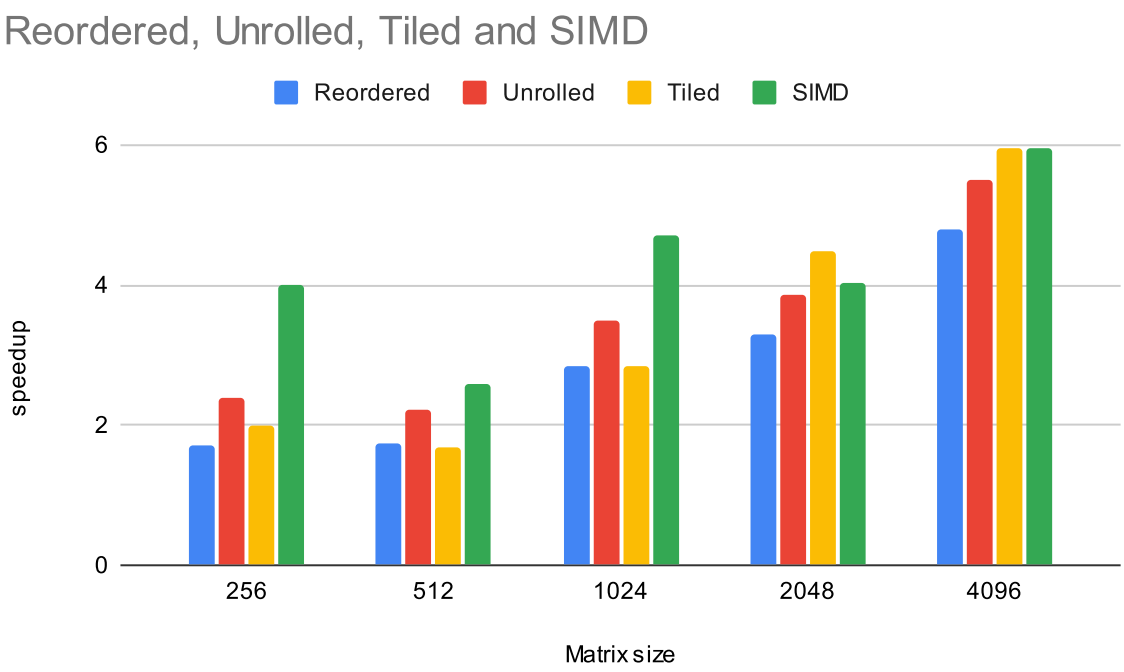

Fig 1. Speedup achieved by different optimizations

For smaller matrices, gains are limited, though SIMD still provides a noticeable boost. As the matrix size increases, all techniques show higher speedup, with SIMD leading for medium sizes and Tiling/Unrolling catching up for larger ones. At the largest size, all methods converge near 6× speedup, while Reordering alone remains slightly behind.

Operations per second

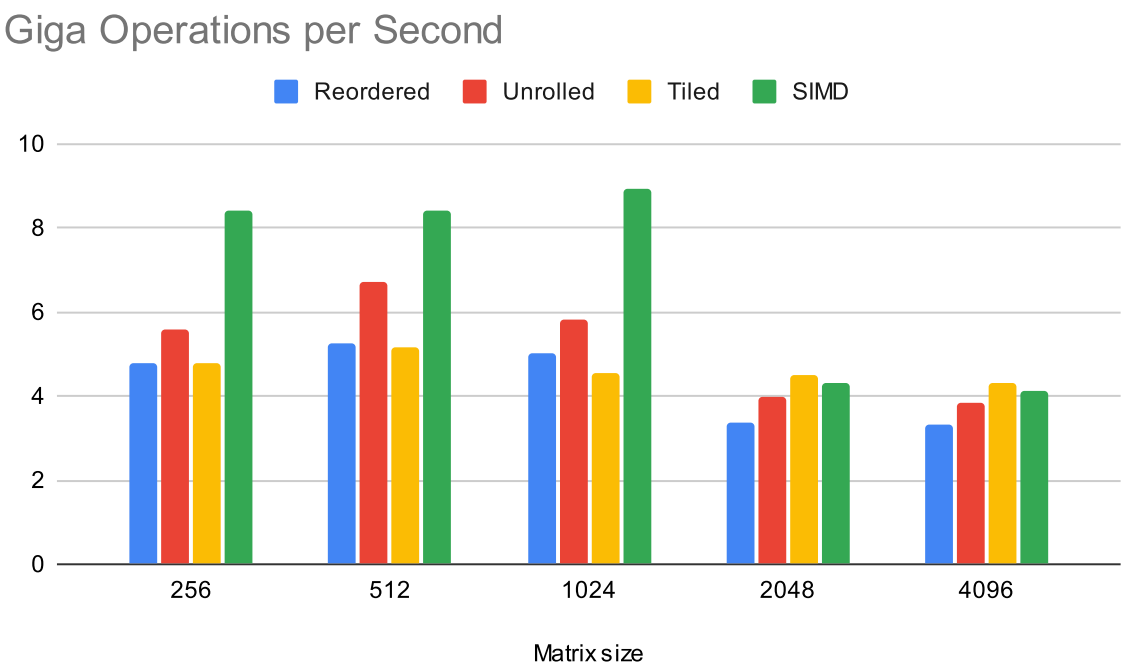

Fig 2. Speedup achieved by different optimizations

Calculated as: $$ giga\ operations\ per\ second = \frac{2n^2}{T * 10^{12}} $$ where, $T = runtime\ in\ ms$.

We see that as we increase matrix size `ops/sec` decreases because we are being more memory limited due to page faults.

Memory Access Pattern and Cache Efficiency

Please check the analysis of 1A to 1D 🙏 nothing meaningful to add here.