Meeting Notes and Assignment 7/17/19

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Notes and Assignment

For the next assignment, follow same protocol used for *mand*. For each *osp* sequential implementation was have made, preform a timing analysis with statistical presentation using a baseline problem size of $2 - 5$ seconds.

Osp is the matrix chain product problem. It has application to *bpmax*, *bppart* and *bpmain* in that we are building up to a similar problem in more dimensions that can be space time mapped.

By measuring performance and comparing to the roofline model's expected peak performance, we can find directions of optimization. We want to get as close to peak machine performance as possible for *bpmain* application. This starts with analysis on the *osp* problem to understand the current peak performance of the machines over that found in experiments many years ago.

Operating systems have evolved while machines stayed the same in the CS building. We will redo micro-benchmarks to analyze this point. In micro-benchmarking problems, everything is guaranteed to be in the cache, so we can see raw computational performance without timing cache misses. Micro-benchmarking problems are used for calibration of the roofline model - they tell us how many ops/sec can be delivered with no cache misses.

In all of our *osp* implementations so far, the k loop was the inner most loop. It does not have to be that way, such as in triangular matrix multiplication, the poster.

NormalizeReducation enables more transformations via three dimensional mapping as the reduction has added a third dimension.It may be legal to iterate over k at a different depth as k represents the reduction accumulation order. Unlocking this opportunity comes at the cost of an initialization requirement in the space time mapping.

$k = j$ is one step after $j - 1$. The highest value of k is $j - 1$, so at $k = j$, we can legally copy *main* to C, the answer.

After this analysis, understand the code Sanjay will send about manipulation reductions.

Other Notes

Email Waruna about how to run *.cs* scripts outside of eclipse.