Live Lecture Chat Window

April 19, 2023

15:35:31 Is it possible to be loading row 2, for instance, into a cache while you're working on row 1?

Yes! It is called “prefetching”, and we will talk about it next week.

15:37:01 When prefetching is it better to fetch the row immediately after or better to prefetch the last row and work from both sides?

There is a concept called the “Prefetch Distance”, or PD. It is how far ahead you are prefetching and depends on how time-consuming the computation is. Your goal is to get a cache line to arrive into the cache just before you are ready to use it.

15:44:29 Why is Cache Line B labeled as Shared after it has flushed back to memory? Is it still accessing the cache line after flushing?

Yes, the hardware assumes that both cores still have some use for that cache line.

15:51:04 Is it computationally cheap to make uninitialized arrays like int pad[NUMPAD] ?

Takes no time to set it up. The real downside is that it consumes memory.

15:51:25 Why does the performance go down on 4 threads between [NUMPAD=] 13 and 14?

I believe that is just an anomaly. I see no logical reason for it.

15:56:43 Is Hyperthreading === Multithreading?

Not exactly. Hyperthreading is keeping more than one thread state within the core’s silicon on the CPU chip. That way, two threads can be on the same core with minimal overhead when swapping between them.

16:03:12 Is the max number of threads per core 2 or can there be more?

You can ask for (almost) any number with OpenMP, but if the number of threads on a core exceeds the core’s ability to keep their states locally, then the threads’ states must be sent to memory when they are swapped out. I believe this is why so many of you see a big performance cliff at NUMT=24 on flip.

16:11:36 Are there ever use cases or hardware with more than 2 hyperthreads per core?

The experimental Intel Xeon Phi CPU had 4 hyperthreads per core. I think this has been discontinued, however. As far as I know, that is the only architecture that has gone above 2.

16:23:25 Will we use Tasks in a future assignment?

No. We run out of quarter before we run out of really-good projects to do. 😊