11:58:02 From Gibbs, Matthew Leigh to Everyone: normal lecture today or test stuff?

Today is/was strictly OHs. No Live Lecture. The questions can be on the test or on a project.

12:01:13 From Huy Trieu to Everyone: Quiz 5 is cancelled, but are we able to see the questions and answers for study from?

No, because I never wrote any questions, knowing that I was going to cancel the quiz. Sorry.

12:01:41 From Abhi Balijepalli to Everyone: its free points!

It is. You should all see 10 points under Quiz #5 on Canvas.

12:02:52 From Huang, Yi-Chan to Everyone: I could not use rand_r in visual studio 2019 in project3, could I use rand() instead?

Yes.

12:04:38 From Shivam to Everyone: Will there be any "type your answer in the box" type question on the test?

No, everything is multiple choice.

12:07:29 From Shivam to Everyone: And every question will have only one correct answer, right?

Yes, one “most correct” answer. If you are like me and read too much into the question and answers, there might be more than one that is technically correct, but there will be one that is most correct. Choose that one.

12:08:52 From Smith, Ryan Jeffery to Everyone: I forget, is the test open notes?

Yes.

12:17:29 From Lucas to Everyone: Can atomic only be used for a single line?

Yes.

12:18:40 From Headrick, David Joshua to Everyone: Do GPUs have atomic?

They have a compare and exchange instruction, like OpenMP’s atomic uses. I don’t think they have something they call “atomic”.

12:19:31 From Lucas to Everyone: If you needed an atomic operation that spans multiple lines would you use a ‘critical’ if it must be threadsafe?

Yes.

12:22:36 From Patrick to Everyone: How does a critical section keep other threads from accessing data in that segment?

It basically acts like an unnamed mutex.
12:35:47 From Morello, Zachary D to Everyone: violating temporal coherence sounds so badass

Civil disobedience at its very best.

12:37:14 From Ricardo Wu to Everyone: is that creating sequential list a strategy [the array of node structures from the cache notes]?

Creating the sequential list of nodes that are available for use (where you might normally have used malloc or new) just means that, at least at first, all the nodes will be stored in the same part of memory.

12:39:46 From Lucas to Everyone: Does false sharing occur on L1 or L2 cache or both?

L2. L1 pulls from L2 and so doesn’t have the back-to-memory-and-then-reload problem that L2 has.

12:40:17 From Seki, Akiri to Everyone: For confirmation, are cache lines chunk of data stored in a cache?

Cache Lines are 64-byte chunks of memory. The cache itself consists of some number of those 64-byte chunks. We think of memory as having cache line dividers in it, even though that is more visualization than reality. In memory, a cache line really begins wherever a memory address has its six bottom bits 000000.

12:45:35 From Ricardo Wu to Everyone: for proj.3, I can’t use SQR to calculate tempFactor & precipFactor in Visual Studio, any substitution/suggestion?

It’s defined elsewhere in the project handout. It is just my way of avoiding calling pow(X,2.) when X*X is so much faster.

12:46:40 From Taylor, Donald M to Everyone: What’s wrong with the pow function?

It uses log and exp so that the exponent can be a non-whole number, e.g., y = pow(X, 3.14159);.

\[ pow(X, Y) \text{ is implemented as } e^{Y \log(X)} \]

Those two transcendental functions are costly.

12:47:11 From Huy Trieu to Everyone: for project 4, the simd code you give us the SSE code that will calculate the array multiplication. When we write our own c++ code, what do you mean by reduction code?

A for-loop where the innards are sum = sum + a[i]*b[i]

12:49:05 From Patrick to Everyone: HT?

Hyperthreading is where a core keeps two states internally so that two threads can swap very quickly.

12:49:23 From Seki, Akiri to Everyone: When we use "#pragma omp parallel sections", do we need not to define private and shared values?

You need to define them if you have them. In our case, there are no variables in the parallel sections, just function calls.

12:52:28 From Patrick to Everyone: You mentioned the 4 way HT which is neat, I didn’t know 4 threads per core was a thing

It can be a thing if the threads can swap fast enough. That’s what hyperthreading lets them do.
12:55:38 From Lucas to Everyone: Do we already have access to the gpu machines mentioned in the notes? [Rabbit and the DGX].

Yes.

12:57:35 From Patrick to Everyone: Asking for a friend, what do you guys do with the equipment when you replace something?

By the time we trickle the equipment down all the way, you probably wouldn’t want it. Usually we would then send it over to OSUsed, the university’s surplus store on 13th Street, https://surplus.oregonstate.edu/ and https://fa.oregonstate.edu/surplus/public-sales/osused-store. You could look there. The physical store is closed during the pandemic, but I think they still have an online presence. Although, you all have pretty decent expectations on machine quality, which our surplus stuff probably doesn’t have anymore.

BTW, a trip to OSUsed is always fun. You never know what you will find there. Remind me to tell you their jockstrap story sometime.

13:01:34 From Ricardo Wu to Everyone: for assembly language, are we referring to ILP?

No, the assembly language is the language of the machine, and is what the compiler produces. At times, you can write better assembly code than the compiler can produce, although that gets rarer and rarer these days.

13:15:07 From Weiner, Christopher Charles to Everyone: why was the name Rabbit picked for the gpu server?

I name all of my machines after Winnie-The-Pooh characters. pooh.eecs.oregonstate.edu is in my Kelley office.

13:50:47 From Huy Trieu to Everyone: For performance [in Project #4], do we do Size of array / (time1-time0)?

Yes, but the units will either be multiplies/second or multiply-adds/second, depending on which test it is.

13:53:17 From Huy Trieu to Everyone: my [Project #4] program crashed with I did size 1M, is this normal?

In this case, it was because the three arrays were defined as local variables, which overflowed the stack, the literal meaning of “Stack Overflow”. Changing them to globals fixed the problem.

[Remember that Project #4 is asking you graph speedups, not performances:
14:03:58 From Bailey, Mike to Everyone: SpeedUp = Psimd / Pnon-simd]