CMSC216: Finale

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Thu Dec 7 03:06:11 PM EST 2023

Logistics

Goals

- Final Exam Logistics
- Evaluations
- Review

Assignments

- P5 Due Mon 11-Dec-2023
- Dis 13: Threads on Mats
- HW 13: Want one?

Date	Event
Tue 05-Dec	Threads
Thu 07-Dec	Threads
	Review
Mon 11-Dec	Last Discussion
	P5 Due
	Kauffman OH 1-3pm
Tue 12-Dec	Kauffman OH 1-3pm
	Feedback Due
Wed 13-Dec	Final Exam
	4-6pm
	ESJ 0202
	Not normal room

Questions on anything?

Final Exam Logistics

- Final Exam in person in ESJ 0202 (two floors beneath normal lecture hall)
- ~1.5 pages F/B like 3rd Midterm Exam
  Proc Architecture, Memory System, Code Optimization, Virtual Memory / Linking / Object Files, P4 Material
- ~1.5 page F/B Comprehensive Review, tie together concepts that pervaded the semester
  (F/B = Front/Back)
- 2 hours to take Final Exam in person

What have we done?

C Programming

Lowest of the "high-level" languages, gives fairly direct control over capabilities of the machine at the expense of coding difficulty and ease of mistakes

Assembly Programming

Tied directly to what a processor can do, studied x86-64 specifically, exposes processor internals like registers, instructions, operand sizes, etc.

Computing Hardware

Basics components like CPU, Registers, Cache Memory, DRAM, Disks, how they interact

Processing Systems/Environment

Programs exist in an environment including file formats for executables, specifics of loading, virtual memory system to catch errors/link libraries

Did I miss anything?

Further Coursework / Activities

- **CMSC411 Computer Systems Architecture**: Develops hardware/software interface in more detail, study pipelines + superscalar features in more detail, examine multi-core systems
- **CMSC412 Operating Systems**: Study internal design issues associated with operating systems, handling hardware, tradeoffs on different approaches to management, theoretical algorithms around resource coordination.

Winter Practice

Students often ask what they could do during a break to keep up their computing skills. Here are a few ideas.

- READ: The Art of Unix Programming by Eric S. Raymond
  Fantastic philosophical and pragmatic discussion of how to build systems that work especially in the Unix environment. (free online)
- COMPLETE: If you didn't finish a project in this course or another, take some time to do so.
- EXTEND: If you use VS Code, Write an Extension for it that does something interesting. This will teach you MUCH about modern software development
- BUILD: Buy an Arduino Microcontroller ($10) and get a "Blinky" routine to run; it's C code! Adafruit has tons of fun toys with accompanying tutorials.
- REST: Take some time away from the screen for fun. Recharging is as important for people as for phones. Play outside. See some people in person. Breathe.

Course Feedback

Course Exit Survey on Canvas

- Open on Canvas, due by Tue 12-Dec
- 1 Engagement Point for Completing it

Student Feedback on Course Experiences Surveys Now Open

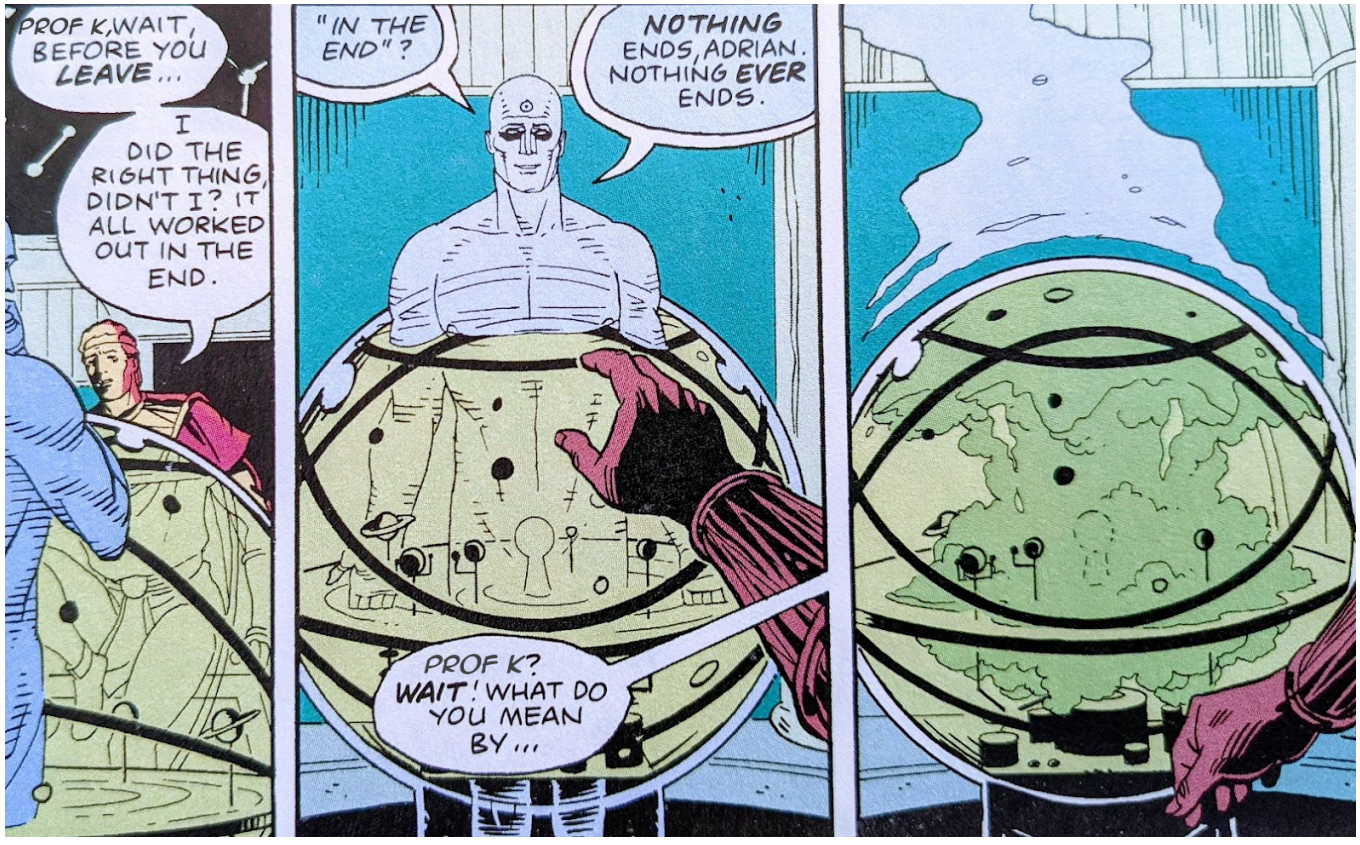
e.g. Rate your Professor

- https://www.courseexp.umd.edu/
- Due Tuesday 12-Dec
- **If response rate reaches 80% for all sections...**
- **by Sunday 10-Dec 11:59pm...**
- **I will reveal a Final Exam Question**
- No answers but public discussion welcome

Practice Final

- Take a few minutes to look this over on your own then together
- Kauffman will answer a few questions on it and post solutions later today

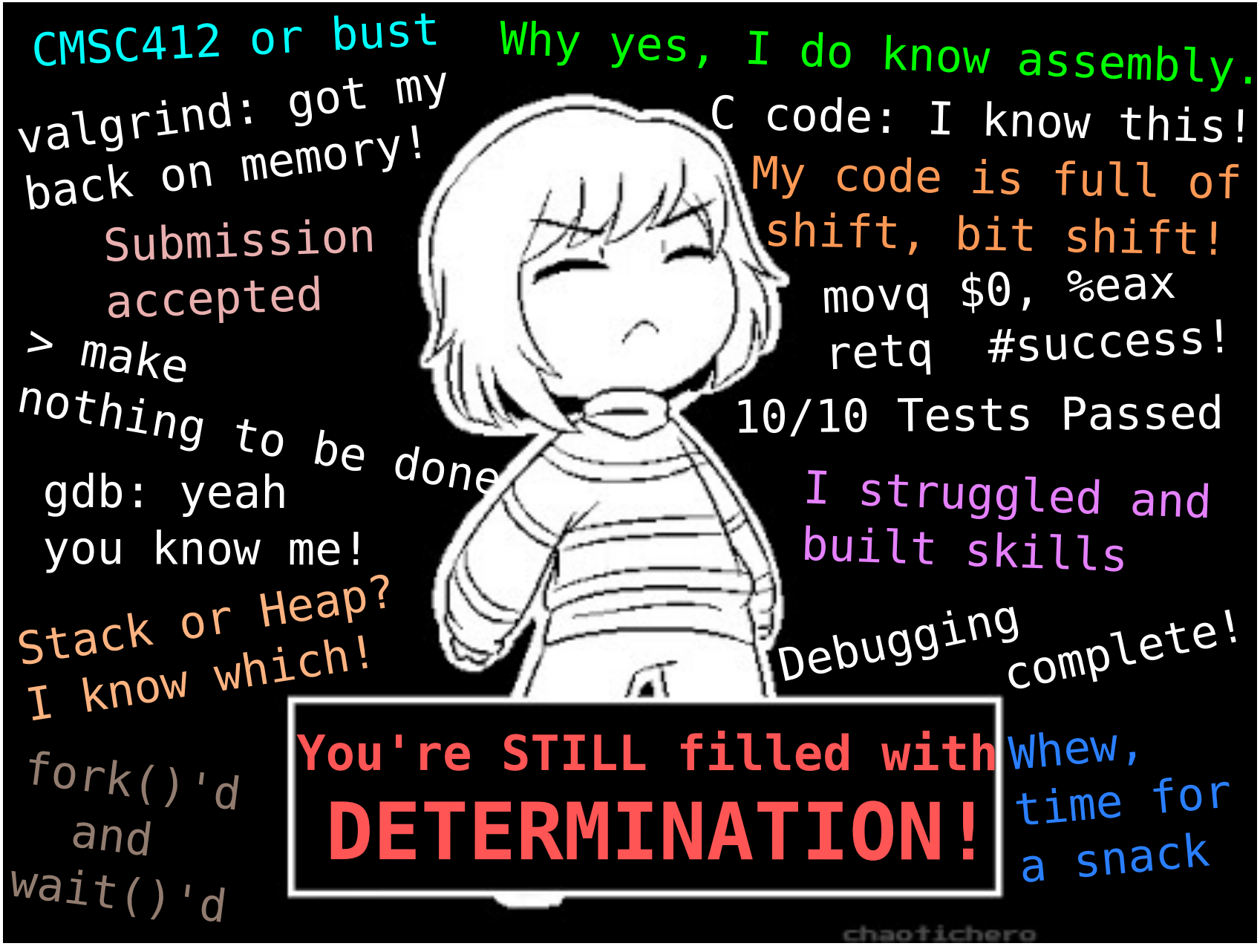
Nothing Ever Ends



- What you learned will recur in your career at some point and demonstrate whether you learned it well the first time or need another pass.
- Some of it will change in the future and make you feel old.
- Expect this and stay determined.

Conclusion

It's been a hell of a semester.
I'm proud of all of you.
Keep up the good work.
Stay safe. Happy Hacking.


CMSC412 or bust
valgrind: got my back on memory!
Submission accepted
> make
nothing to be done
gdb: yeah you know me!
Stack or Heap? I know which!
fork()'d and wait()'d
Why yes, I do know assembly.
C code: I know this!
My code is full of shift, bit shift!
movq $0, %eax
retq #success!
10/10 Tests Passed
I struggled and built skills
Debugging complete!
You're STILL filled with DETERMINATION!
Whew, time for a snack
chaotichero