352 - Spring 2013

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TA's: Thierry Moreau (moreau@cs),
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Staff: Raymond Zhang

Some important dates

- There is no class on 4/15, pay your taxes!
- Memorial Day 5/27
- Final exam: June 10th 2:30 - 4:20

Who are you?

- Double major Physics/CE
- 1/5th senior + 1-2 post-senior
- mostly CE,
- other: EE, arch is cool,
- ~ 5 transfer

Who had the most awesome spring break?

- Switzerland
- Yosemite
- GameDev
- Las Vegas (and lost)
- Road trip Las Vegas, SD, Yosemite

Who am I?

- Call me ‘Mark’ please
- Joined faculty in 2001
- Research area is, broadly speaking, systems architecture
- When I’m not working I am:

Why are you here?

- You are forced to be here
- 351 was interesting
- HW is something you have to work even if you want to theoretical computer science
- Want to work with embedded systems
- After peak oil, we want to be able to rebuild society and we need processors

352: Goals

- Understanding digital logic at the gate and switch level
  - Combinatorial
  - Sequential
- Understanding the clock
- Learning how to specify digital logic designs and compile them using modern synthesis tools
- Understanding design and implementation of simple (embedded-like) processor designs.

352 Content

- This class goes bottom up.
  - Start with a simplified CMOS abstraction
  - ...up to gates
  - ...up to combinatorial circuits
  - ...up to sequential logic / state
  - ...up to processors
  - ...up to embedded systems (a little)

352 Content

- Along the way we mix in a few important topics:
  - Technologies: NMOS, CMOS, pass-gate logic, SRAM, DRAM, FPGAs, ASICs, "standard cell", "memory compilers"...
  - Tools: Simulation, modeling, debugging, Verilog, ...
  - Processor design: ALUs, register files, fetch/decode/execute/mem-access/write-back, micro-code, I/O, interrupts, exceptions, ...

352: Logistics

- Things are due when they are due. But you can turn anything in 3 days late if you compose an excuse, in the form of a Haiku and email it to the TA's and myself **on or before the original due date.** Funny Haiku's are preferred. It need not be truthful.
- **THERE IS NO LAB THIS WEEK.**

352: Logistics

- There is a midterm
- There is a final
- There is a little bit of homework
- There is a lot of lab time. You will enjoy it, but get ready to move into the HW lab
- Grading is approximately 15/35/10/40

How to succeed in this class

- Attend lecture and ask a lot of questions. This class will be very boring for everyone if you don't **SPEAK!**
- Do the labs and understand them.
- This class has a lot of diagrams. I do these on the white board freestyle. You should take notes. This is probably the last slide deck we'll use in this class...
- Rarely some pre-canned base notes will be provided. (e.g. some figure we are working on over multiple days).

Reading

- _Right_ _Now_: Read all of Chapter 1. It's good.
  - (well you can wait until after class :-)

What topics do you want to learn about?

- Quantum computing
- Synthetic Biology
- Designing HPC processors
- GPUs
- Multicores
- Fault tolerance