352 - Spring 2013
Instructor: Mark Oskin (oskin@cs)
TA’s: Thierry Moreau (moreau@cs),
      Matthew Miller (millerk@cs),
      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.
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)
• 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).
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