CS310: Computer Organization & Programming

Spring 2011

Haran Boral

Why Are You Taking This Class?

- Goals
  - Acquire a basic knowledge of computing platforms
  - Understand principal components of computer systems
  - Learn to program at the most primitive level
- Begins a chain of systems courses
  - CS310 – Intro to Computer Systems
  - CS352 – Computer Architecture
  - CS372 – Operating Systems
  - Other, elective courses: networks, security, …
- Context
- A little more on this in a few minutes

Course Logistics 1

- Grading:
  - Evening tests (2 of 3): 30% (no make-ups)
  - Final exam: 33%
  - Written Hwk (7): 21%
  - Programming assgmts (4): 16%
- Textbooks:
  - Introduction to Computing Systems, Patt & Patel, 2nd ed
- Assignments
  - Out on Monday due following Thursday
  - Ten days (one weekend) to complete it
- All hwk transactions handled in discussion section
  - Handing them in and getting them back
  - Use CS Dep't *turnin* program to submit programs
- Late homework budget of four days for the semester
- One week after homework returned to contest the grade

Course Logistics 2

- Schedule, lecture notes, homework answers, messages, etc. on Blackboard
  - Blackboard's email notification
  - But it's a good idea to check it periodically
  - Lecture notes will posted on a weekly basis
- Staff:
  - Boral
  - TAs
    - Mohamed Fakhreddine
    - Sunil Bandla
  - Proctors
    - Gabriel de Luna
    - Brad Burlage
- Office hours to be posted by week-end
- No discussion sections this week

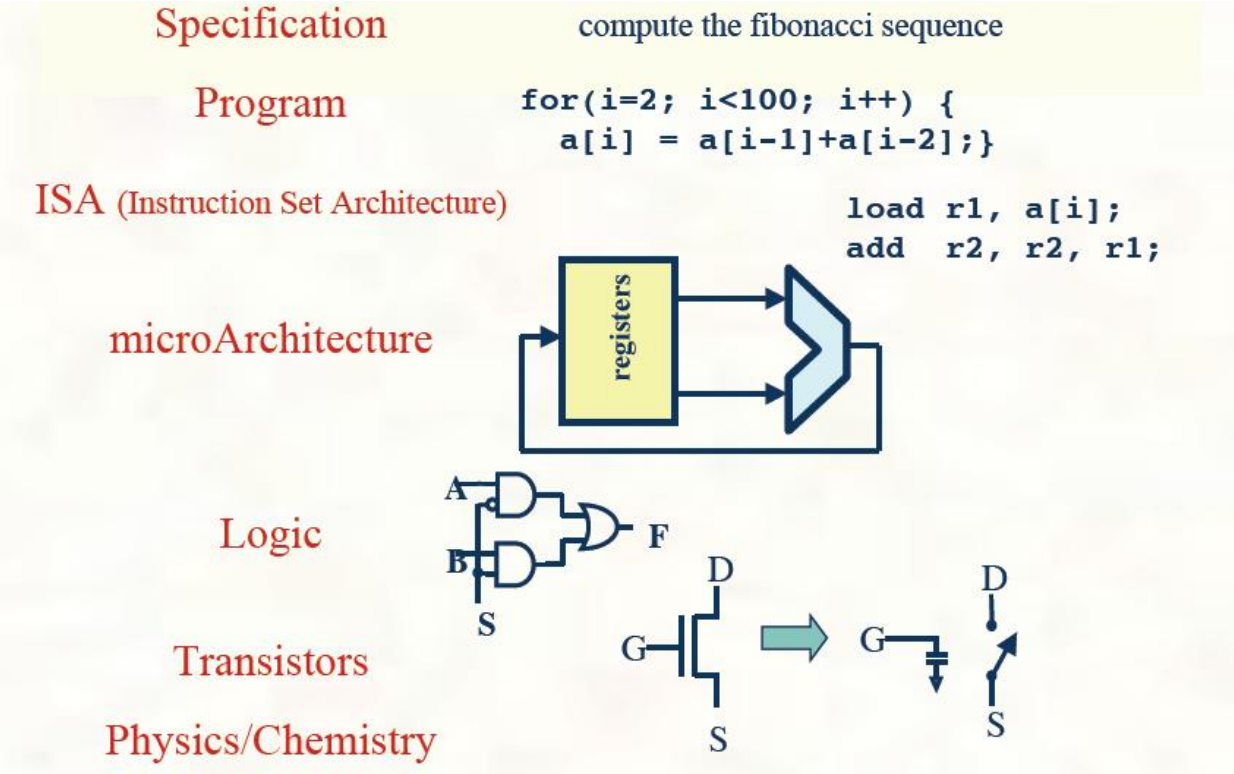
Doing Well in My Class

- Attend lectures
  - Published slides are guides
  - I will use doccam and annotate slides
  - Some real (and imagined) world digressions (as the mood strikes)
- Do the homework & programming assignments
  - 37% of grade!
  - Make sure you get started early
  - Preparation for tests and final exam
- Make use of available resources (TAs, proctors, Me)
  - Participate in discussion section
  - Ask stupid questions
  - Come to office hours
- Conceptually, the material isn't hard
  - Mies van der Rohe: "God is in the details"
  - Don't fall behind
- Academic dishonesty

About Me

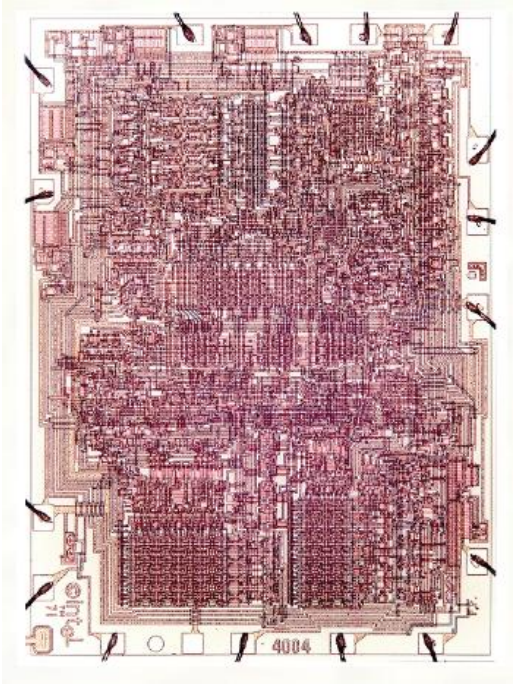
- PhD in CS, Wisconsin, 1981
  - Database management, parallel systems
- Worked here and there
  - Now retired

Course Overview



In The (Not Quite) Beginning

- 1971: Intel 4004
  - 1st microprocessor
- 2,300 transistors
- 10µm process
- 12mm die
- 16 pins
- 108KHz ~10.8µsec cycle
- 8-bit instructions
- 4-bit data words
- 46 instructions
- Original intended use: calculator!



In The (Recent) Present

- 2011: Sandy Bridge
  - Up to 8 cores
- ~1B transistors
- 32nm process
- 2.1 - 3.4GHz
- ~20MB on-chip caches
- 64-bit instructions
- 64-bit data words
- >700 instructions
- Multiple versions spanning applications from mobile devices to high-end servers
- 22nm process (Ivy Bridge) later this year