Course Organization

CSCI 2021: Machine Architecture and Organization

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UNIVERSITY OF MINNESOTA

Machine Architecture and Organization

Lectures:	M/W/F,	12:20 – 1:10AM	Fraser Hall 101
Recitations:	Th,	08:00AM-08:50AM,	2-260 Keller Hall
	Th,	09:05AM-09:55AM,	530B STSS
	Th,	10:10AM-11:00AM,	530B STSS
	Th,	11:15AM-12:05PM,	2-260 Keller Hall

Instructor: Prof. Antonia Zhai
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E-mail: zhai@cs.umn.edu
Office phone: 612-626-1285
Office hour: Fri. 10:00AM-12:00PM

Machine Architecture and Organization

Web page: http://www-users.cselabs.umn.edu/classes/Spring-2015/csci2021/

Lecture notes access:
user id: csci2021
passwd: organization

Forum/Grades: https://ay14.moodle.umn.edu/course/view.php?id=12383

Textbooks

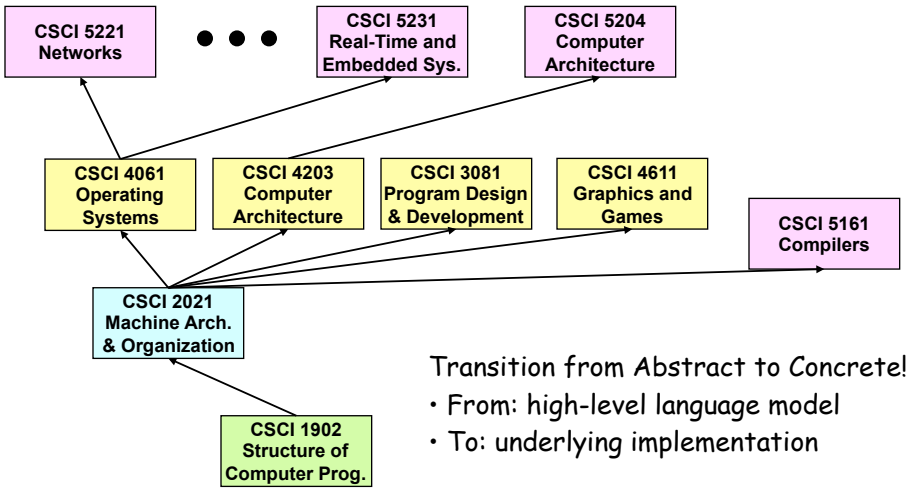
The textbook:

- Randal E. Bryant and David R. O'Hallaron,
  - R. Bryant, D. O'Hallaron. Computer Systems: A Programmer's Perspective 2/E . Prentice Hall, 2011
  - http://csapp.cs.cmu.edu

Any Good "C" Book (here are two examples):

- Brian Kernighan and Dennis Ritchie,
  "The C Programming Language, Second Edition", Prentice Hall, 1988
- A. Kelley, I. Pohl.
  "*C by Dissection*", 4th edition. Addison Wesley, 2001.

Role within Curriculum

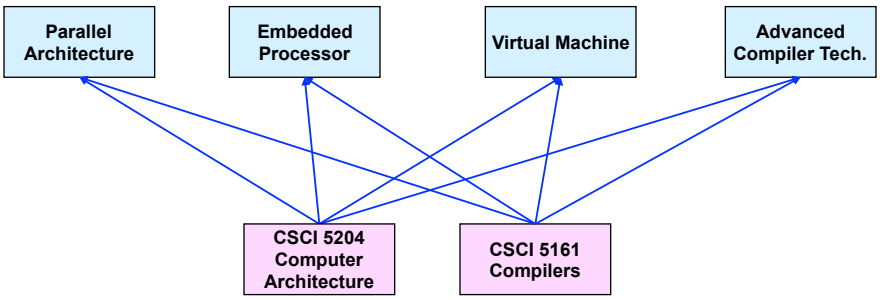


Transition from Abstract to Concrete!

- From: high-level language model
- To: underlying implementation

Computer Architecture & Compiler

A few 8000-level courses



Course Components

- Lectures
  - Higher level concepts and examples;
  - Reviews for quizzes;
  - Quizzes.
- Recitations
  - Applied concepts and more examples;
  - Important tools and skills for programming assignments;
  - Clarification of lectures;
  - Help with the labs and assignments.

Lecture Slides

- Lecture slides will be available on the course webpage before class, however:
  - They are incomplete, and thus
  - You must come to class to find out what is missing.
- The same rules also apply to recitation slides, except for
  - the recitation slides are available after recitations

You cannot survive by just reading the lecture notes!!!

How Do I Pass This Course?

- **Assignments (10%)**
  - Five homework assignments, each corresponds to one quiz;
  - Work through all problems, but only have to submit solutions for two.
- **Labs (30%)**
  - Five labs;
  - important concept of this class;
  - You are expected to spend a lot of time on the labs.
- **Quizzes (20%)**
  - Two 45-minute in-class quizzes;
  - Make-up quizzes will NEVER be granted. For each quiz you miss, the weight of your final exam will increase by 10%.
- **Final Exam (40%)**
  - One final exam scheduled during the final exam period.

Homework Assignments

- The TA will discuss the homework assignments in recitation, and work through select problems
- You should solve ALL problems in all homework assignments
  - Quiz and exam questions are similar to homework questions
- You will submit solutions for only selected problem
- Feel free to discuss homework problems in the class forum
  - The TAs will be monitor the forum and answer questions
- Homework assignments are turned in on paper, and due at the beginning of lecture on the day specified on the course schedule, and they must be turned in at the lecture for which you are registered. (If you're registered for the early lecture, and you go to the afternoon lecture, it doesn't mean you get to turn your assignment in later.)

Labs

- Work groups
  - You must work alone on all labs
- Submission
  - All labs are due at 11:55pm (i.e., just before midnight) on the date specified on the course schedule, and are turned in electronically with Moodle.
- Doing a lab should result in practical new skills and concepts
- You are encouraged to discuss the labs/assignments in the class forum, however
  - DO NOT POST SOLUTIONS
  - If you post C or assembly codes that are part of the solution, it is considered CHEATING! However, pseudo-codes are okay!
  - The TAs will be monitoring the class forum and answer questions

Late submission

- Late lab and homework submissions will receive a reduction of 15% of the maximum possible score for each day (or any fraction) they are late, and no credit is available after three days. (Other than excused absences such as illness.)

Labs

- Five labs (difficulty level increases as we learn more)
  - Data lab: computer arithmetic, digital logic;
  - Bomb lab: assembly language, using a debugger;
  - Buffer lab: understand internet worms;
  - Architecture lab: understanding microprocessor details;
  - Cache lab: improve cache performance.

Facilities

- Labs will use the Linux machines in the cselabs --- you must have an cselabs account
- For a list of Linux machines, visit the cselabs webpage
- Getting help with the cluster machines:
  - cselabs webpage
  - Please direct questions to your TAs

Quizzes and Final Exam

- Quizzes will take place during regular lecture hour;
- Each quiz is 45 minutes long and cover portion of the class
- The exam will cover the entire course
- Open book and open notes: All quizzes and exams will be open book. You are not expect to memorize; we'll try to design the tests so that if you've keeping up in class, all the information you need is included in the test. You may not use calculators, phones, or other electronics. Note that this means electronic books are not allowed. You can bring any books, handwritten notes, photocopies, or printouts.

Cheating

Cheating will NOT be tolerated!!!

- What is cheating?
  - Sharing code: either by copying, retyping, looking at, or supplying a copy of a file.
- What is NOT cheating?
  - Helping others use systems or tools.
  - Helping others with high-level design issues.
  - Helping others debug their code.

Appealing

- After each quiz and programming assignment is graded, we will send a notification to the class forum.
- You have seven calendar days from the date we send the email to appeal your grade.
- If you have questions about the grade you received on an assignment or a quiz, please talk first to the person in charge of the assignment, who will be clearly identified in the course schedule.
- If you are still not satisfied, please come and visit Professor Zhai. She will re-grade the ENTIRE quiz/programming assignment.

Final Grades

To compute final grades in the course,

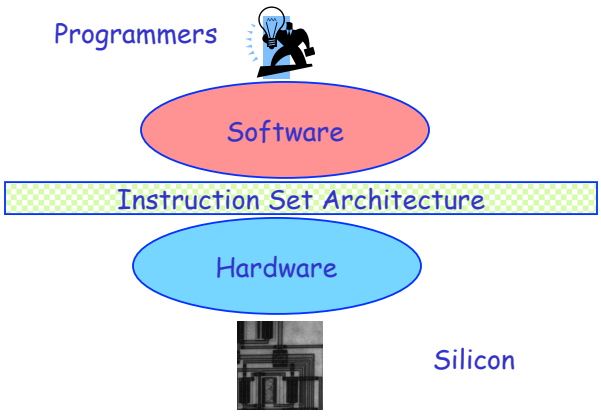
- we'll start by computing a numeric average using the percentages mentioned above. If your numeric score is at least 90%, 80%, or 70%, your letter grade will be at least A-, B-, or C- respectively.
- But we may also apply a curve, to help improve the consistency of grades between different offerings of the course. The curve will apply only in students' favor
- But if student performance is similar to previous years, we expect to have a similar distribution of grades as previous years.

I expect everyone to work hard!!!

If the entire class did well, I will give everybody an "A"!

Course Organization

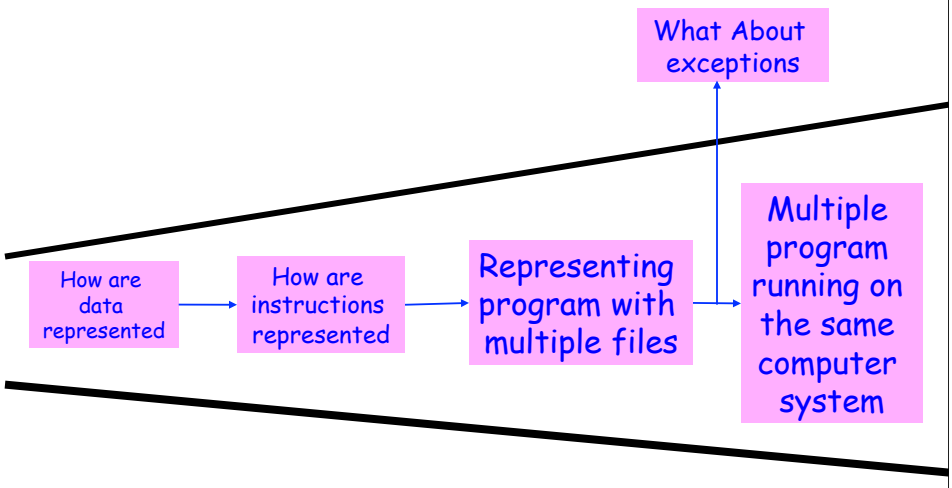
Course Outline

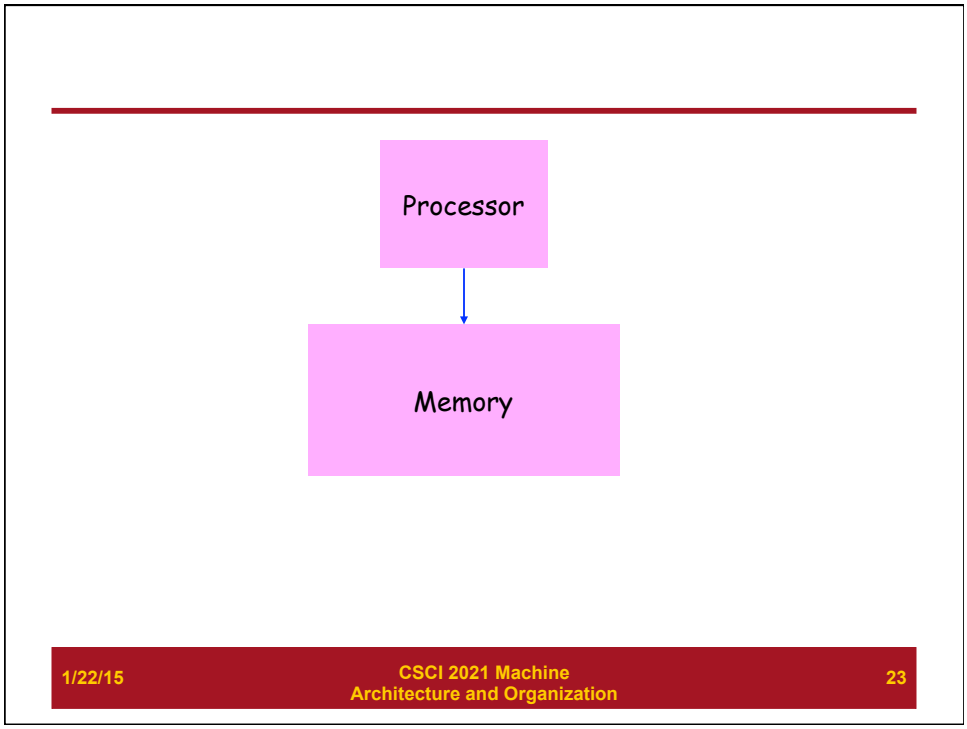


Course Outline

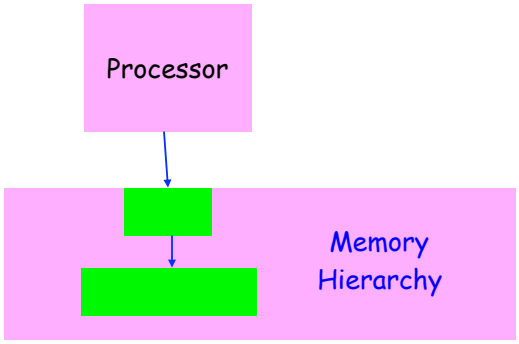
- Part I: Programmer perspective
- Part II: Hardware perspective
- Part III: Logic Design

Part I: Programmer Perspective





Part II: Hardware Perspective



Next Lecture …

- Data Representation I:
  - Bits and Bytes
  - Binary numbers
  - Integer representation