

Computer Architecture

Lecture 3b: Course Info & Logistics

Prof. Onur Mutlu

ETH Zürich

Fall 2021

7 October 2021

Course Info: Who Are We?



■ Onur Mutlu

- ❑ Full Professor @ ETH Zurich ITET (INFK), since September 2015
- ❑ Strecker Professor @ Carnegie Mellon University ECE/CS, 2009-2016, 2016-...
- ❑ PhD from UT-Austin, worked at Google, VMware, Microsoft Research, Intel, AMD
- ❑ <https://people.inf.ethz.ch/omutlu/>
- ❑ omutlu@gmail.com (Best way to reach me)
- ❑ <https://people.inf.ethz.ch/omutlu/projects.htm>

■ Research and Teaching in:

- ❑ Computer architecture, computer systems, hardware security, bioinformatics
- ❑ Memory and storage systems
- ❑ Hardware security, safety, predictability
- ❑ Fault tolerance
- ❑ Hardware/software cooperation
- ❑ Architectures for bioinformatics, health, medicine
- ❑ ...

Course Info: The Teaching Team

- Teaching Assistants
 - Dr. Mohammed Alser
 - João Dinis Ferreira
 - Rahul Bera
 - Geraldo F. de Oliveira Jr.
 - Can Firtina
 - **Dr. Juan Gomez Luna**
 - Hasan Hassan
 - Konstantinos Kanellopoulos
 - Nika Mansouri Ghiasi
 - Dr. Haiyu Mao
 - Dr. Lois Orosa
 - Dr. Jisung Park
 - Gagandeep Singh
 - Giray Yaglikci
 - **Dr. Mohammad Sadrosadati**
 - Dr. Behzad Salami
 - Dr. Nour Almadhoun Alserr
 - Rakesh Nadig
 - Haocong Luo
 - Roknoddin Azizi

- Get to know them and their research

Some Goals of This Course

- Teach/enable/empower you to:
 - Understand how a computing platform works
 - Understand how decisions made in hardware affect the software/programmer as well as the hardware designer
 - Think critically (in solving problems)
 - Think broadly across the levels of transformation
 - Understand how to analyze and make tradeoffs in design
 - Apply the above in several lab projects and HWs

Review: Major High-Level Goals of This Course

- Understand the principles (of design)
- Understand the precedents
- Based on such understanding:
 - Enable you to evaluate tradeoffs of different designs and ideas
 - Enable you to develop principled designs
 - Enable you to develop novel, out-of-the-box designs
- The focus is on:
 - Principles, precedents, and how to use them for new designs
- In Computer Architecture

Why These Goals?

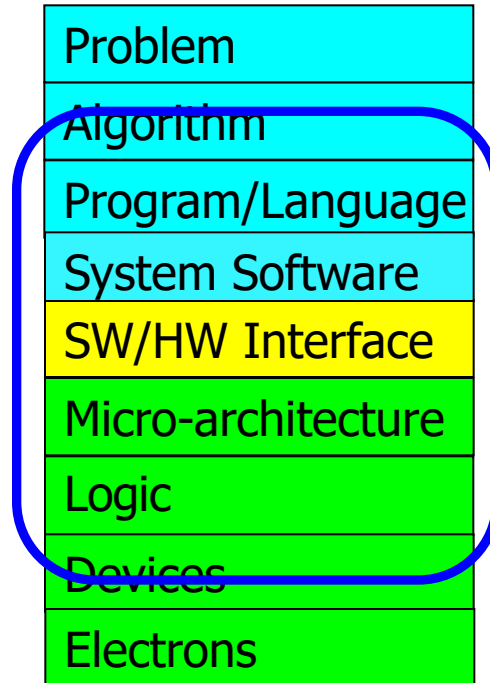
- Regardless of your future direction, learning the principles and methodical analysis techniques we cover will be useful to
 - design better hardware
 - design better software
 - design better systems
 - make better tradeoffs in design
 - understand why computers behave the way they do
 - solve problems better
 - think “in parallel”
 - think critically
 - ...

A Note on Hardware vs. Software

- This course might seem like it is only “Computer Hardware”
- However, you will be much more capable if you master both hardware and software (and the interface between them)
 - Can develop better software if you understand the hardware
 - Can design better hardware if you understand the software
 - Can design a better computing system if you understand both

The Transformation Hierarchy

**Computer Architecture
(expanded view)**



What Do I Expect From You?

- **Required background:** Digital circuits course, programming, an open mind willing to take in many exciting concepts.
- **Learn the material thoroughly**
 - attend lectures, do the readings, do the exercises, do the labs
- **Work hard:** this will be a hard, but fun & informative course
- **Ask questions, take notes, participate**
- **Perform the assigned readings**
- **Participate online (lecture, Moodle)**
- **Start early**
- If you want feedback, come to office hours
- Remember **“Chance favors the prepared mind.”** (Pasteur)



What Do I Expect From You?

- How you prepare and manage your time is very important
- There will be many lab and homework assignments
 - They will take time
 - Start early, work hard
- This will be a heavy course
 - However, you will learn a lot of fascinating topics and understand how a computing platform works
 - And, it will hopefully change how you look at and think about designs around you

How Will You Be Evaluated?

- Lab assignments: 50%
 - Final exam (180 minutes): 30%
 - Homeworks: 20%
-
- Many extra credit possibilities in HWs, Labs, Exam

Course Goals

- Goal 1: To familiarize those interested in computer system design with both **fundamental operation principles and design tradeoffs** of **processor, memory, and platform architectures** in today's systems.
 - Strong emphasis on fundamentals, design tradeoffs, key current/future issues
 - Strong emphasis on looking backward, forward, up and down
- Goal 2: To provide the necessary **background and experience to design, implement, and evaluate a modern processor** by **performing hands-on simulator implementation**.
 - Strong emphasis on functionality, hands-on design & implementation, and efficiency.
 - Strong emphasis on making things work, realizing ideas

Course Website

- <https://safari.ethz.ch/architecture/fall2021/>
- All slides, lecture videos, readings, assignments to be posted
- Plus, other useful information for the course
- Check frequently for announcements and due dates

Homework 0

- Was due Sep 30
 - <https://safari.ethz.ch/architecture/fall2021/lib/exe/fetch.php?media=hw0.pdf>
- Information about yourself
- All future grading is predicated on homework 0

Heads Up

- HW1 is already out
 - Due in ~2 weeks after release
- Lab 1 is already out
 - Due in ~2 weeks after release
- Check the website and your email frequently for assignments and announcements
 - <https://safari.ethz.ch/architecture/fall2021/>
- My goal is to enable your learning and growth, so labs can be done any time until the end of the semester
 - But, please know yourself and plan accordingly

Richard Hamming

“You and Your Research”

Transcription of the
Bell Communications Research Colloquium Seminar
7 March 1986

<https://safari.ethz.ch/architecture/fall2021/lib/exe/fetch.php?media=youandyourresearch.pdf>

Suggested Mentoring Talk

Applying to Grad School
& Doing Impactful Research

Onur Mutlu
omutlu@gmail.com
<https://people.inf.ethz.ch/omutlu>
13 June 2020
Undergraduate Architecture Mentoring Workshop @ ISCA 2021

SAFARI ETH zürich Carnegie Mellon

0:27 / 50:31

Arch. Mentoring Workshop @ISCA'21 - Applying to Grad School & Doing Impactful Research - Onur Mutlu

1,563 views • Premiered Jun 16, 2021

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ANALYTICS EDIT VIDEO

Panel talk at Undergraduate Architecture Mentoring Workshop at ISCA 2021
(<https://sites.google.com/wisc.edu/uar...>)

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