CSE 550:
Systems for All

Ratul Mahajan ratul@cs

Lequn Chen lqchen@cs

Who we are

Ratul

Lequn
"q" pronounces like "ch"

Shanghai Jiao Tong University -> UW
Research: ML Model Serving (Advisor: Arvind
Krishnamurthy), interested in building systems /
writing code in general.
Hobbies: Cooking, Outdoor activities
Fun fact:

Course structure

CSE 550: Systems for All

Quals course that covers foundational systems topics from:
    Operating Systems, Networks, Distributed Systems, Databases

No "real" prerequisites
    Designed to allow first-year grads from other areas to engage
    Functional knowledge of real systems will be helpful

Gateway course to CSE 551, 552, and 561 or a terminal course for students desiring breadth

Goal: A thorough understanding and appreciation of the work your systems colleagues are doing!

Course organization

1. Read papers
   - Deeply read 1-2 per class
   - Shallow reads (optional)

Check out: https://derekchia.com/how-to-read-a-research-paper-3-pass-approach/
   - Deep read = All three passes
   - Shallow read = 1st pass

Course organization

2. Discuss papers
- For each lecture, we will post a small set of questions on the assigned papers.
  - We'll create one thread per discussion question set.
  - You're required to add a comment to the discussion for each of the threads by 9am on the day of the class (to give time for everyone to read the responses before class.)
  - For each thread, pick one of the questions in the question set to answer.

- Free-form discussion

Course organization

3. Lead paper discussion in groups of 2
- Understand the key ideas and state of the art
- Rough presentation content
  - What problem is being solved?
  - Paper's key solution idea(s) / insights
  - Other ways to solve the problem (one source: optional readings)
  - State of the art (one source: optional readings)
  - Incorporate Ed discussion
  - In-class discussion questions
- Sign up sheet on the course Web page

Ratul will do a short intro to the topic prior to that
Send your slides and other materials to Lequn after the class

Course organization

4. Two assignments

- Meant to clarify the nature of systems contributions and tooling issues (a defining feature of Systems)

- Done in groups of 2 or 3

- Already posted (or will be soon)

Course organization

5. Project 3

- Independent research project or in-depth assignment from us

  - Seed ideas will be posted soon

- Groups of 2 or 3

- Conclude with writeup of results.

Course organization

No exams!

Tools

Canvas for projects/assignments

Ed for discussions

Slides posted on the Web page after the lecture

- Adapted from Arvind and Kurtis

Feedback:

- email/chat
- mid-quarter eval (anonymous)
- feedback.cs.washington.edu (anonymous)

Office hours

Opportunity to have more personal interactions with us

- Ratul: Immediately after class, and on-demand
- Lequn: Wed 2:30pm - 3:30pm at Allen 220

Grading

- Online discussions: 10%
- In-class discussion leading and participation: 10%
- Two assignments: 25% + 25%
- Project: 30%

Late policy, getting off-track

Each **person** gets three late days for reading responses.

If your assignments/projects will be late, reach out to us beforehand

Special circumstances: Come talk to us

Class attendance

It is a discussion-oriented class, so attending in person is important

But if you cannot make it, attend via Zoom

- Link on Canvas calendar

Recording will be available

- Quality might vary (again, class discussions)

Questions?

Course content

Dictionary

Search for a word

sys·tem
/ˈsistəm/

See definitions in:

(All) (Physiology) (Computing) (Science) (Gambling) (Music)

noun

plural noun: **systems**

1. a set of things working together as parts of a mechanism or an interconnecting network.
   "the state railroad system"

   Similar: (structure) (organization) (order) (arrangement) (complex) (⌄)

2. a set of principles or procedures according to which something is done; an organized scheme or method.
   "a multiparty system of government"

   Similar: (method) (methodology) (technique) (process) (procedure) (⌄)

Definitions from Oxford Languages   *Feedback*

(⌄   Translations and more definitions)

Our focus

Software systems
- Though the overlap with hardware is large!

Understand how software systems achieve a specific external behavior
- e.g., deliver videos, online social network, email, ML execution

Comprises of many components
- Components interact and cooperate to provide overall behavior
- They typically have (well) specified interfaces

Large-scale, running across thousands or millions of hardware devices

Let's build a social network together

Assume that you have computer hardware

Common themes across systems

Correctness – does it work as advertised?

Reliability – stay functional as components fail

Performance

Scalability

Efficiency

Security