CS 695

Topics in virtualization and cloud computing

Course Overview

Spring 2022-23

Instructor

- Puru (Purushottam Kulkarni)
  - ~~Sir Puru, Puru Sir, Sir, *Sir*, …~~
  - puru@cse.iitb.ac.in
  - http://www.cse.iitb.ac.in/~puru

- Office hours
  - Knock-on-door policy
  - Will announce slot(s) as well once time-table stabilizes

About CS695

Topics in Virtualization and Cloud Computing

- https://www.cse.iitb.ac.in/~puru/courses/spring22/

- Meeting times
  - Slot 5, Wed. & Fri : 9.30 am to 10.55 am
  - Venue: LA 002 (???)
- Mailing list, announcements, submissions
  - Moodle
- TA(s)
  - K Ashwin (ashkumar@cse.iitb.ac.in), ...

Pre-requisites

CSE UG/DD students — CS224, CS 252, CS333, CS347

CSE PG students — CS744, undergraduate courses in computer networks and OS

No audit offering

If do not meet above criteria but still want to take course

Meet me!

Course goals

Develop an understanding of *Systems/under-the-hood* topics

Background, concepts, advanced topics

- Techniques to design VMMs
- CPU, memory, I/O virtualization
- VM live migration, snapshots, record-replay, resource management
- Containers and serverless architecture
- Cloud applications and cloud storage

Hands-on experience

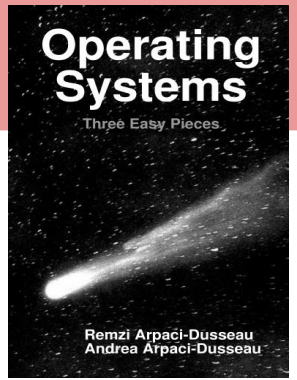
Get familiar with how to read/interpret/use research papers

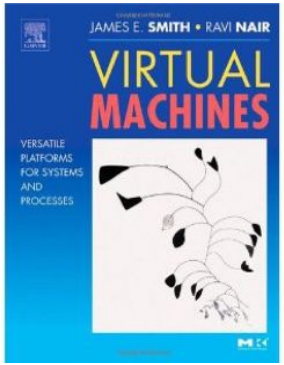
Identify new/open research/problem directions

Course components

- In-class teaching
  - Textbook, papers, online notes
  - Paper discussions
- Programming assignments/project
- Paper reviews (?)
- Guest lectures
- Exams

Course material





No single textbook
- OS Three Easy Pieces
- xv6 book
- Linux Kernel Development
- Virtual Machines: Versatile Platforms for Systems and Processes
- The Definitive Guide to the Xen Hypervisor

Research papers
- ~10 papers over the semester

Assignments and Projects

- Non-trivial component of the course
  - Assignment every ~3 weeks
  - Needs continuous and consistent effort
  - Design, system building, experimentation, demos, report, …

- 1 : x rule
  - Value of **x** in most/all cases is 3+

Evaluation

Class participation : 100%

Answers to questions, questions, explanations from papers, new ideas/problems …

Approximate

- Quiz ~10%
- Exams ~50%
- Assignments ~30%
- Project ~10%
- Participation ~5%

Things to remember!

An interactive/open-ended course

- several self-learning components

Do not cut-copy-paste anything!

Start early

- Paper readings, exercises, project, …

World peace via *Systems*!

Addendum

- ***How to read paper?***
  Srinivasan Keshav
  ACM SIGCOMM Computer Communication Review,
  Volume 37 , Issue 3, July 2007.

- Programming assignment #1

  Available online: before 6th Jan, Friday.

  Functions + HTTP end-points