Cornell University

Operating Systems

CS 4410

Spring 2020

Lorenzo Alvisi

[Bracy, Schneider, Sirer, van Renesse]

- Who is who
- Before you take this class..
- Lecture
- Getting help
- Grades & Policies

Where I am from

Street Cred

- Cornellian wife
  - Teaches FWS in Romance Studies
- Two daughters
  - One born in Ithaca
  - The other a senior

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CS 4410

- Research
  - scalable and dependable distributed systems
- Fellow of ACM, IEEE
- Chair of SOSP '18
  - Symposium on Operating Systems Principles

All work and no play...

- Classical music
- Hiking
- Travel
- Motorcycles (4) 😊

Who are the TAs?

- Sameer Arora
- Yuwen Can
- Burcu Canakci
- Sowmya Dharanipragada
- Eric Feng
- Abhimanyu Kompella
- Mindy Lee
- Yitian Susan Lin
- Rudy Nicolo Peterson
- Mueed Ur Rehman
- Nikhil Saggi
- Isabel Siergiej
- Neil Sethi
- Florian Suri-Payer
- Firas Trabelsi
- Yuxin Xu
- Jia Wei
- Xinzhe Yang
- Yunhao Zhang

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Prerequisites

- CS 3410, CS 3420 or equivalent
- Otherwise (or if in doubt):
  - Come and talk to me; explain your situation and request permission

About ECE 3420 #SettingExpectations

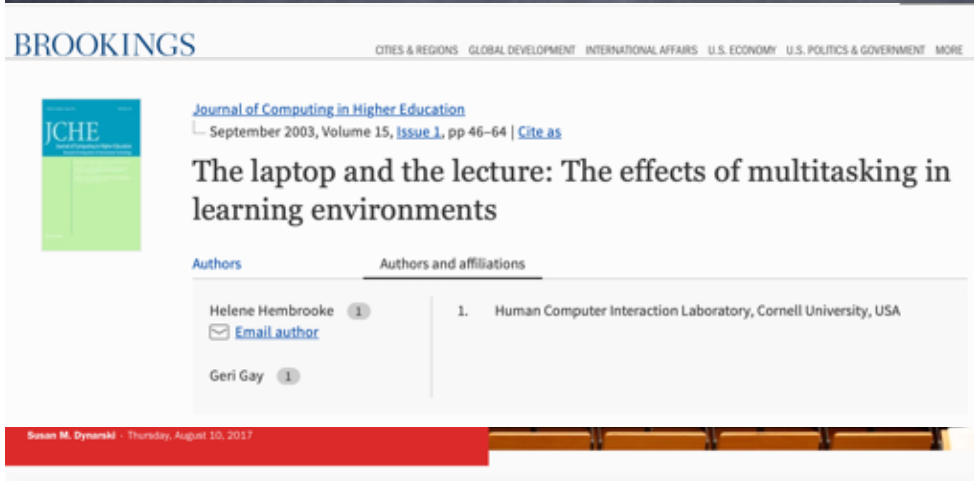
- Lots of overlap with 4410!
  - process, threads, CPU scheduling
  - virtual memory
  - Synchronization (Mutual Exclusion, R/W, Semaphores, Monitors
  - deadlocks
- Some new topics
  - File systems; a week on computer security; one-two weeks on networking or distributed computing

Worth it?

Textbook

- Free online
- Can buy PDF or printed copy

Lectures



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Office Hours

- Lorenzo
  - T/TH: 3:00pm - 4:00pm
  - Gates 413a
- Course Staff
  - Please fill the following whenisgood poll:
    - http://whenisgood.net/cs4410oh

Online Resources

- Webpage: http://www.cs.cornell.edu/courses/cs4410/
  - Schedule, exams, and due dates
  - Lecture notes
  - Evolving
- Github for code: https://github.coecis.cornell.edu
- CMS for assignments: https://cmsx.cs.cornell.edu
  - Autograders, grades, and regrades
- Gradescope for exams
  - Grades and regrades

Online Help

- Webpage
- Piazza
  - For 99% of all communication
    - Private posts should be visible to all course staff
    - Do not contact staff by other means (FB, texts…)
- cs4410-staff@cornell.edu: time sensitive matters
  - Goes to Lorenzo and staff leads
- cs4410-prof@cornell.edu: sensitive matters
  - Goes to Lorenzo

Please no email to personal email accounts

Other Resources

Engineering Advising	www.engineering.cornell.edu/resources/advising	Academic advising for engineering students
Arts College	https://as.cornell.edu/academic-advising	Listing of general support services for a variety of concerns
Health Services	https://health.cornell.edu	Cornell University Health Service
CAPS	https://health.cornell.edu/services/counseling-psychiatry	If you experience emotional distress, please contact Counseling and Psychological Services
Student Disability Services	sds.cornell.edu	Ensures all aspects of student life are equitable accessible, and inclusive of those with disabilities. Send accommodation letters to Coralia Torres (ct635, Gates 401) by Feb 15.

Email cs4410-prof@cornell.edu
Get help. Get documentation. The earlier the better.
Also, please look out for each other

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Course Content

Three Components

- Lectures and Readings
- Exams
- Assignments

You are expected to keep up with all three

Draft Syllabus

- Introduction
- Architectural Support for OSs
- Processes and Threads (A1)
- Synchronization (A2)
- Deadlocks
- Scheduling
- Memory Management

3/12: Prelim 1

- Virtual Memory (A3)
- File systems
- Security
- Networking

4/23: Prelim 2

- Distributed Systems

5/10 Final Exam

Grading Policies

Late Policy

- Each person has a total of 4 "Slip days"
- Max of 2 slip days for any assignment
  - Cannot ever submit later than 48 hours late
- I really do not budge

Regrade policy

- Within 1 week of assignment (or exam's) return

Homework

- 3 programming assignments
  - build a "shell"
  - "easy" synchronization problems
  - "hard" synchronization problems
- 4 or so reading assignments
  - easy but seminal papers in systems
  - together counts as much as a programming assignment

The UNIX Time-Sharing System†

by D. M. RITCHIE and K. THOMPSON

(Manuscript received April 3, 1978)

UNIX* is a general-purpose, multi-user, interactive operating system for the larger Digital Equipment Corporation PDP-11 and the Interdata 8/32 computers. It offers a number of features seldom found even in larger operating systems, including

(i) A hierarchical file system incorporating demountable volumes,
(ii) Compatible file, device, and inter-process I/O,
(iii) The ability to initiate asynchronous processes,
(iv) System command language selectable on a per-user basis,
(v) Over 100 subsystems including a dozen languages,
(vi) High degree of portability.

This paper discusses the nature and implementation of the file system and of the user command interface.

I. INTRODUCTION

There have been four versions of the UNIX time-sharing system. The earliest (circa 1969-70) ran on the Digital Equipment Corporation PDP-7 and -9 computers. The second version ran on the unpro-

First reading assignment

- Due next Thursday
- Write 200-300 word report
  - What did you like/learn?
  - What did you dislike (or didn't understand)?
- Graded on how thoughtful your comments are
  - don't write generic banalities – be specific
- WARNING:
  - Garbage in? Garbage out!

Semester Grades

40% Assignments, 10% each

60% Exams (best 2 of 3)

- Goal is to give everyone an A
- Help us achieve this!

Academic Integrity and Honor Code

All submitted work must be your own

- All programming assignments must be your own independent work
- OK to discuss concepts together (with the Game of Thrones rule) but
- Never look at someone else's code (fellow student, or online, or...)
- Do not share your code with anyone
- If in doubt, ask

Violations are easy to detect & will be prosecuted

- Closed book exams, no calculators