CS 423
Operating System Design: Introduction

Professor Adam Bates
Spring 2017
Adam Bates

Research Interests:

➢ **Provenance-Aware Operating Systems** (WWW’17, CCS’16, SecDev’16, Security’15, TaPP’15, SENT’14, CODASPY’13)
➢ **Communications Security** (NDSS’12, Security’15, JCS’14)
➢ **Embedded Device Security** (CCS’16, Security’16, ACSAC’15, NDSS’14)
➢ **Mobile Phone Security & Privacy** (Security’15)
➢ **SSL/HTTPS Trust Enhancements** (CCS’14, IMC’14)
➢ **Cloud Computing Security** (IJIS’14, CCSW’13)

Career Highlights:

2. 18 Peer-Reviewed publications (9 Conference Majors)
3. Program Comm Chair, TaPP’17 Organizing Comm, IEEE SP ’16-‘18 Program Comm, ACSAC’15, NDSS’17
Learning Objectives

Before CS 423:
• Knowledge of C/C++
• Basic knowledge of Linux/POSIX APIs and functions

After CS 423:
• In-depth knowledge of how basic OS functions work
• Knowledge of virtual machines
• Introduction to advanced OS topics
  • Distributed system issues, embedded system issues, Map/Reduce, etc.
• Ability to modify OS code
Adam Bates (Instructor)
Office: 4306 SC
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TAs: Saad Hussain, Bo Teng, Yisong Yue
TA Office hours will be announced on class Webpage
https://piazza.com/illinois/spring2017/cs423/

Go here for announcements and to ask questions.

Instruction team will be checking forums regularly!
There is not a required textbook for this course, however...

- **Recommended:** Internals and Design Principles (8th Edition), William Stallings, 2014


- **Optional:** Virtual Machines, James E. Smith and Ravi Nair, Elsevier / Morgan Kaufmann, 2005

*Not* on hold at bookstore —> purchase online
• Come to class, MWF, 10-10:50am
  • Please participate actively...

• 4 programming assignments:
  • Teams of 3-4. Same team for all four assignments

• Midterm: March 6th

• Two homeworks:
  • (i) “prereqs”, (ii) “practice final”
  • Work on homework independently

• Final Exam: Date TBD

• Grads taking class for 4 credits: Project & Presentation
Grading

Final Exam: 30%
Mid-term Exam: 25%
Homework (2 total): 10%
  5%, 5%
Team Machine Problems (4 total): 25%
  4%, 7%, 7%, 7%
Participation: 10%
Class/Forum involvement
Pop quizzes
• My goal is to make this course challenging but fair.
• I will offer midterm teaching evaluation so I can adjust my teaching to your feedback.
• Feedback also welcome in office hours.

Note: Grade Grubbing != feedback : )
Policies

• **No screens in class!**
  • Distracts you (sorta bad)
  • Distracts others (really bad)
  • Inhibits discussion
  • Because science

• If/when you forget, a TA will ask you to put your device away.
• No late homework/MP submissions
• 1 week window for re-grades from return date
• Cheating policy: Zero tolerance
  • 1\textsuperscript{st} offense: get zero
  • 2\textsuperscript{nd} offense: fail class
• Example: You submitted two MPs in which solutions were not your own. Both were discovered at the same time. You fail class.
• What is an operating system?
• What is an operating system?
• What is it for?
• What is an operating system?
• What is it for?
• What are virtual machines?
• What is an operating system?
• What is it for?
• What are virtual machines?
• What special applications need additional support?
Course Objectives

• Obtain advanced knowledge of components of an operating system and their internal design.
  - (CS 241 is a prerequisite)

• Acquire an understanding of the functionality of various virtualization architectures

• Explore advanced topics in operating systems

• Write, compile, debug, and execute modifications to operating system code
Go here for...

• Course Schedule
• Lecture Slides
• Links to other resources

https://courses.engr.illinois.edu/cs423/
Your To-Do List

Today:
• Visit the class webpage and check out all the info
  • https://courses.engr.illinois.edu/cs423/
• Refresh your system programming skills (e.g., review CS 241 and see C language tutorial below)
  • http://www.lysator.liu.se/c/bwk-tutor.html

Soon:
• Team up for solving programming assignments
• Familiarize yourself with Piazza