CS 423
Operating System Design: Introduction

Professor Adam Bates
Fall 2016
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
The Team

Adam Bates (Instructor)
Office: 4306 SC
Office Hours: Mondays 11:00-12:00
Tel: 217.300.4653 (office hours only)
batesa@illinois.edu

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
CS 423 Requirements

• 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
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
  • 1st offense: get zero
  • 2nd 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 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
https://courses.engr.illinois.edu/cs423/

Go here for...
• Course Schedule
• Lecture Slides
• Links to other resources
Your To-Do List

**Today:**
- Visit the class webpage and check out all the info
  - [https://courses.engr.illinois.edu/cs423/](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](http://www.lysator.liu.se/c/bwk-tutor.html)

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