CS 5523 Operating Systems

Instructor: Dr. Tongping Liu
Department Computer Science
The University of Texas at San Antonio

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Acknowledgement

Many of these slides are borrowed from Dr. Dakai Zhu of UTSA.
Big Data and Parallelization
Our Recent Publications

- Memory Security
  - CCS’17: secure memory allocator
  - ICSE’16: detecting memory vulnerabilities, such as overflows, use-after-frees
  - Ongoing projects: Watcher and Sampler

- Performance of Parallel Programs
  - EuroSys’17: synchronization performance issue
  - CGO’16: false sharing issue

- Reliability of Parallel Programs
  - ASE’17: deadlock detection and prevention
  - Ongoing projects: identically reproduce errors
General Information

- **Self introduction**
  - Research interests: security, reliability and performance of Big Data systems and parallel systems (Software Research Group)

- **Class Web**
  - Syllabus, class schedule and slides/handouts

- **Prerequisites:**
  - CS 3733: Operating Systems or equivalent
  - CS 4753: Architecture or equivalent
  - Working knowledge of C/C++/Java
General Information (cont.)

- **Required textbook:**

- **Recommend Reading:**
SGG vs. TS

Operating System Concepts
Abraham Silberschatz
Peter Baer Galvin
Greg Gagne
Ninth Edition

Distributed Systems
Principles and Paradigms
Andrew S. Tanenbaum
Maarten Van Steen
Second Edition
Contact Information

Office: NPB 3.328

Office hours:
- Monday: 3:00pm – 4:45pm
- Or by appointment

Email: Tongping.Liu @ utsa.edu
- Best way to reach me!
- Common questions should be posted at Blackboard forum.
Grade Distribution

Homework and Programming projects (30%)
- A few writing homework (3) may be expected
- Two/three projects may be expected
- Discussions are allowed but no code-copying/cheating
- Project demonstration may be required

Two Mid-Term Exams (15% each)
- Closed books, closed notes

One Final Exam (35%)
- Dec 13 (6pm – 8:30pm): fixed date and time
- Comprehensive, closed books, closed notes

Attendance & class participation (3%)
- Asking and answering questions on the class and the blackboard forum. (2 points)
- File the evaluation (1 point)
Grading Policy

- Final letter grade:

- No late assignment submission without prior consent

- No early/makeup exam without university sanctioned excuse or prior consent

- **Zero** tolerance on cheating!!
  - A direct fail on the plagiarism on homework or project.
Course Objectives

- Better understanding of basic OS concepts;
- Learn the principles behind the design of operating systems, both centralized and distributed;
- Discuss on “solved” and “open” problems in OS design and recent OS trends;
- Gain hands-on programming experiences
  - Multithreaded/network programming
  - Distributed system design and implementation
Topics to be covered (and schedule)

- Operating system overview: history, components, design principles and different types of OS
- Process and memory management
- *Threads, concurrency and synchronization*
- Inter-Process Communication (IPC) and networks
- Distributed/Remote Objects and RMI
- Name and Directory Services
- Security/Protection and Fault Tolerance
- Distributed File Systems
- Advanced OS topics: depending on time
1st Homework

- Change email on Blackboard to your favorite email:
  - For future important notices etc;
  - Get used to Blackboard system