CprE 308: Operating Systems, Principles and Practice
Spring 2018

Instructor

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Syllabus

Aim and Learning Objectives:
This course is an introduction to the basic principles underlying current operating systems. Operating systems have evolved over a few decades and have led to a few well accepted abstractions. We will study those concepts and how they fit together: the purpose of an operating system, processes and threads, synchronization between multiple processes, process scheduling, deadlocks, the address space concept, virtual memory, file systems, I/O systems, security, and the basics of networking. The corresponding (weekly) labs cover the "practice" portion of the class, where the students are required to write programs which interact with the operating system, and implement simplified versions of some of the OS modules. The labs require a knowledge of the C programming language and a working knowledge of the Linux operating system, which is introduced in the first lab.

Lectures:
Attendance in the lectures is expected, and we welcome active participation.

Textbook:
The required text for the course is Modern Operating Systems by Andrew S. Tanenbaum, 4th Edition, (ISBN 9780133591620).

Labs:

- Attendance is compulsory (there is credit for attendance)
- Lab reports are due the week after the lab, unless otherwise stated.

Grading:
The grading breakup will be as follows:

- Weekly labs: 25%
- Two programming projects: 10 % (5 % each)
- Homework will not be graded, but there will be in-class quiz based on homework, and these quizzes make up 20% of the grade.
- Two mid-term exams: 20%

- Final Exam: 25%
- Class Attendance (as bonus boints): 3%

Current grades can be checked using Canvas.

Academic Integrity

All your work (including the labs) should be done individually unless otherwise specified. You are not allowed to use work done by others, or obtain the answers directly in any form (such as from the web). If you have any questions about what is allowed/not allowed, please contact the instructor or the TAs.

Any cases of cheating will be dealt with the strictest possible measures allowed by the university, please refer to the university policies on academic dishonesty.

Lab Safety Policy:

All personnel (faculty, staff, students, and visitors) who use laboratory facilities at Iowa State University shall follow the procedures detailed in the ISU Laboratory Safety Manual. Successful completion of appropriate safety training as specified in Safety Training Curriculum for Laboratory Personnel is required prior to beginning work in a laboratory. Please follow the link below to find more info:

https://www.ece.iastate.edu/the-department/safety/

Links

- A History of Unix
- Getting started, good reference for basic commands (ls, mkdir)
  http://www.cs.wayne.edu/labPages/Unix_T/start.html
- Another basic Unix tutorial, also has information on redirecting output (pipes)
  http://www.ee.surrey.ac.uk/Teaching/Unix/
- Information on Unix System Calls, mostly uses info from man pages, but still useful
  http://www2.cs.uregina.ca/~hamilton/courses/330/notes/unix/unix.html
- List of System Calls, good information but not well organized
  http://www.softpanorama.org/Internals/unix_system_calls_links.shtml
- Unix system calls and processes, fork(), exec() and wait()
  http://www.scit.wlv.ac.uk/~jphb/spos/notes/processes.html
- Unix process management
  http://heather.cs.ucdavis.edu/~matloff/UnixAndC/Unix/Processes.html
- Posix thread programming
  http://www.llnl.gov/computing/tutorials/workshops/workshop/pthreads/MAIN.html
- List of signals and their numbers
  http://linux.about.com/library/cmd/blcmdl7_signal.htm
- Beej's Guide to Unix Interprocess Communication
  http://www.ecst.csuchico.edu/~beej/guide/ipc/
- Shared Memory, Semaphores, and Message Queues
  http://www.princeton.edu/~psg/unix/Solaris/troubleshoot/ipc.html

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