EE382V– Systems Programming
Option III Course Syllabus

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General Information

Classroom	Commons Building(CMS) at the Pickle Research Campus
Contact	ramesh@mail.utexas.edu
Pre-requisites	EE422C
Time	Fri-Sat TBD
Website	UT Canvas
TAs	TBA

Course Overview

This is a Computer Systems Course with emphasis on Software. We will start by looking at tools like compilers, linkers, loaders and debuggers that an Operating System provides and how they work. We will explore the POSIX System-Call API that all modern OSs implement with focus on processes, threads, I/O and inter-process communication. The second part of the class is on the design and implementation of an Operating System with focus on Process and Memory Virtualization, Concurrency.

Text
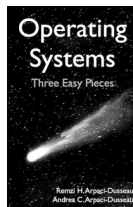
[Operating Systems: Three Easy Pieces](#)
Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau
Arpaci-Dusseau Books , March, 2015 (Version 0.90)
The book is free online. However, you can buy a hardcover for $36, softcover for $24 or an electronic PDF-version for $10 (my recommendation).

There will be supplementary material from the book, "Computer Systems – A Programmer's Perspective", by Bryant and O'Hallaron. Third edition – ISBN978-0-13-409266-9 (http://www.csapp.cs.cmu.edu/)

Grading Criteria

Assignment	Percentage
Programming Projects (4)	80%
5 Quizzes	20%

All programming assignments will be in C on Linux.

Late Policy

All programming projects have a strict deadline. However, you can turn in any programming assignment by the deadline for the last programming assignment to earn a maximum of 75%. So, say you did not turn in Project1 at the scheduled deadline. You may turn it in any time before the

deadline for the last Project and earn a maximum of 75 points on it. The TA will not be obliged to grade a late submission before the last project. Please note that some projects depend on previous projects and so deferring your submission may not always be feasible.

Honor Code

Programming assignments, examinations must be the product of work performed exclusively by you. You may discuss problem sets in a group but your submission must be your own work. Allegations of Scholastic Dishonesty will be dealt with according to the procedures outlined in Appendix C, Chapter 11, of the General Information Bulletin, http://www.utexas.edu/student/registrar/catalogs/

Tentative Lecture Schedule

Date	Topics
Week 1 (Fri-Sat)	Compilers, Interpreters, Linkers, Loaders, Profilers, Debuggers and Memory-leaks – Code Relocation, Binding, Optimization and Portability.Valgrind. Project 1: Analyze a given code by profiling using Valgrind; Modify it to fix leaks and optimize for performance (C)
Week 2 (Fri-Sat)	Boot Loading, The Shell; The Process API (fork, exec, wait), pThreads, Signals, IPC using pipes, shared memory, Sockets. Project 2: Writing a custom shell (C)
Week 3 (Fri-Sat)	Processor and Memory Virtualization – Scheduling and Virtual Memory Project 3: Enhance a given VM system to accommodate a Translation Lookaside Buffer (TLB) (Python or C)
Week 4 (Fri-Sat)	Concurrency – Synchronization using Locks, Condition Variables and Semaphores. Producer-Consumer problem, Concurrent Data Structures, Deadlocks. Project 4: Enhance a given Vector data structure by making it deadlock-free. (C)
Week 5 (Th-Fri)	Advanced Topics – Multiprocessor Scheduling, Concurrency in Distributed Systems, Distributed File Systems.

Disclaimer

Instructor reserves the right to modify course policies, the course schedule, and point values and due dates.

Additional Details

The deadline for dropping without possible academic penalty is ****

The University of Texas at Austin provides, upon request, appropriate academic adjustments for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4241 TDD, or the College of Engineering Director of Students with Disabilities, 471-4321.