CS 253: Systems Programming
Fall 2024
MW 10:30-11:15, Lab Monday 3:00-5:45

Instructor Information

Name: S. Seth Long, Ph.D
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Office Hours: Monday 1:30-3:00, Thursday 10:30-12:00
Course Website: `https://isoptera.lcsc.edu/seth/cs253`

Course Description

Detailed overview of software development on unix-like operating systems with an emphasis on systems programming using C, C++, or an equivalent systems programming language. This includes an introduction to command-line usage and scripting using a common shell. Students will learn about mechanisms available on POSIX-compliant platforms such as signals, pipes, and file descriptors. Co-requisite: CS211.

Learning Outcomes

At the end of the course, students should understand:

- How to operate a command-line interface.
- How Unix-like operating systems such as Linux are structured.
- C memory management, including pointer arithmetic and heap allocation
- The basics of unix programming using C, including signals, fork/exec, pipes, and related constructs

Textbook

"The Linux Command Line", William Shotts, second edition. Available for free (.pdf only) from `http://linuxcommand.org`

Grading

Your grade will be calculated based on the following items:

Item	Percentage of grade
Midterm Exam 1	10%
Midterm Exam 2	20%
Final	30%
Lab	10% total
Autoquiz	5% total
Active Learning	10% total
Projects	15% total

Grades will be assigned according to a standard curve, that is:

A: 90% +
B: 80%- 90%
C: 70%- 80%
D: 60%- 70%
F: less than 60%

Use of + or - grades (such as B+ or A-) and curves will be at the instructor's discretion.

Deadlines and late work

Late work will not be accepted except by instructor discretion. However, partial credit will be given for partially-completed work. It is better to turn in an unfinished assignment for partial credit than to not turn in something on time and receive a 0.

Attendance

Attendance will not be taken in this class except as required for financial aid purposes. However, all material presented during lecture is "fair game" for the midterm and final, and some of this material may not be in the book as well. There is also the potential for quizzes in class, which cannot be made up. Therefore I recommend that you always attend class.

Academic Dishonesty

Cheating on any assignment will result in failing the class. Some things which constitute cheating in this class are:

- Copying another student's homework
- Turning in homework created by another student
- Reading another student's answers on a test
- Sharing all or part of your completed homework with another student before the assignment is due

Appropriate collaboration on homework involves sharing ideas with other students, but not source code! Although it is often tempting to help another student by showing them how your completed program, script, or command works, this is not helpful to their learning. However, this does not mean you cannot collaborate with other students on homework. Sharing of ideas, principles, and algorithms is permitted and encouraged.

Tentative Course Calendar

Note: Students often take CS253 and CS211 at the same time, which is fully supported. The schedule below emphasizes C once students taking CS211 have had some time to learn the basics of C++. To begin working in the right direction, we'll add in a little bit of C each week starting at the beginning, so that everyone is ready when the class re-focuses on C about halfway through the class.

CS253 Systems Programming Fall 2024 Calendar		
Week	**Course Content**	**Relevant Chapters**
Aug 19	Introduction to Linux, file tree, terminals, SSH	1-3
Aug 26	Input redirection, pipes, more command line usage	4-6
Sep 2	Labor day, Permissions, more advanced shell usage	7-9
Sep 9	Variables Processes and process management, OS structure	10 and 11
Sep 16	Package Management, Installing Programs, Software Development	14 and 22
Sep 23	Midterm Exam 1 and Answers, finding things	16
Sep 30	Archiving, backups	17, 18
Oct 7	Regular Expressions and Text Processing	19, 20
Oct 14	Strings in C, debuggers	TBD
Oct 21	C Memory Management	TBD
Oct 28	Fork/exec process management	TBD
Nov 4	Midterm Exam 2 and Answers, C programming reminders	
Nov 11	Pipes and File Descriptors, Signals	TBD
Nov 18	Remaining C programming topics	TBD
Nov 25	Thanksgiving Break! No class all week	
Dec 2	Topics of Interest or Review	
Dec 9	Final Exam Monday, December 9, at 10:30 AM in MLH 310	