Point Loma Nazarene University
CSC 314: Operating Systems (4 units)
Spring 2016

Instructor:

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Office hours:

MWF 8:15-9:45, 1:00-1:30 TTh 10:30-12:00

Course Time and Location:

MWF 10:55-12:05 RS 13

Texts:

Silbershatz et.al, Operating System Concepts Essentials. and Andersen, Paul, Just Enough Unix, Fifth ed. You will need both books right away!

Course Catalog Description:

A systems course focusing on operating systems, topics include basic operating system design, process management, device management, memory management, and file systems. Students are introduced to the basics of software evolution, reliability, concurrency, security and protection in the context of single-core, multi-core, distributed, and virtual environments. Class members gain experience using both GUI and command-line interfaces. In the course of implementing the CPU scheduling simulation, students understand the importance of thorough system testing and attention to system specs as they try to make parts of their systems work with those designed by their teammates.

Class Learning Outcomes

- Students will understand the interaction between hardware and software.
  - Students will be able to explain the purpose of the Operating System, and where it fits into the computer system as a whole
  - Students will be able to evaluate how a change in one part of the operating system will affect the operating system as a whole.
  - Students will develop a working knowledge of the UNIX/Linux operating systems
  - Students will be able to take from theory to design to implementation a module of an operating system.
- Students will have an understanding of the historical development, contemporary progress and societal role of computer science.
  - Students will be able to list the 5 tasks of the operating system, describe what each is, and justify why it is important.
- Students will be able to collaborate effectively in teams

Course Organization:

Lectures: Cover the highlights of chapters assigned – not a substitute for reading. Student versions of the lecture slides can be obtained from Canvas. These slides will contain homework assignments and due dates.

Friday activities: Most Fridays there will be some kind of in-class activity reviewing what was learned the following week. Each activity will be graded. It may be a quiz, it may be an essay question, it may be a group activity. One Friday activity grade will be dropped. Friday activities cannot be made up. If there is an exam in a particular week, there will not also be a Friday activity. Homework problems will help prepare you for these activities. Homework problems are optional.

Labs: Frequent labs based on the Linux operating system, from the book, *Just Enough Unix* and other sources will be assigned. Lab sessions are mandatory. Unless otherwise stated, labs are due by the beginning of the next

class period. If the lab requires a demonstration, you will be given one opportunity to demonstrate it. It will either be signed off as correct, or I will make notes regarding what worked and what didn't. **No late labs are accepted** but I will drop the lowest lab grade. An unfinished lab may be turned in on time for partial credit.

Exams: There will be 2 exams in addition to the final exam. These will only cover material presented since the last exam. If you will miss an exam for a school function, you must arrange to take it in advance. **If you ever miss an exam without giving me prior notice, there is a good chance you will receive a zero unless, of course, there was clearly an emergency.** Exam 1 is scheduled for **Feb. 15.** It will cover chapters 1 – 4 plus the appropriate chapters in the Unix book. Exam 2 is scheduled for **April 8** and will cover chapters 5-8 in your text. **Final Exam:** Cumulative exam with an emphasis on material covered in the last part of the semester. The final is scheduled April 29 with a take-home portion due **Monday of finals week at 10:30 PM**.

The **final exam date and time** is set by the university at the beginning of the semester and may not be changed by the instructor. Only in the case that a student is required to take three exams during the same day of finals week is an instructor authorized to change the exam date and time for that particular student.

Simulation Proje**ct:** A 5 week programming project based on process scheduling will be assigned. The entire project is due March 30, but there will be several intermediate due dates as well. In order to get full credit, all intermediate dates must be met as well as the final date. **Most aspects of this project (exceptions will be noted) must be completed using basic Linux/UNIX tools (non-GUI)**. Programs will be written in C++ using the basic Linux Operating System (command-line) and g++ compilers. All written projects will be completed using a Linux/Unix text editor.

Grading:

Friday activities	10%	Scheduling Project	15%
Exams	30%	Final	25%
Labs	20%		

Final grades will be determined as follows:

100-93%	A	80-82.9%	B-	67-69.9%	D+
90-92.9%	A-	77-79.9%	C+	63-66.9%	D
87-89.9%	B+	73-76.9%	C	60-62.9%	D-
83-86.9%	B	70-72.9%	C-	0-59.9%	F

University Mission:

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission:

The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

Attendance:

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day. Regular and punctual attendance at all classes in which a student is registered is considered essential to optimum academic achievement. Therefore, regular attendance and participation in each course are minimal requirements to be met. There are no allowed or excused absences except as approved in writing by the Provost for specific students participating in certain university-sanctioned activities. Excused absences still count toward the 10%-20% limits, but allow students to make up work, quizzes, or tests missed as a result of a university-sanctioned activity. Activities of a unique nature, such as labs or other activities identified clearly on the syllabus, cannot be made up except in rare instances when instructors have given advanced, written approval for doing so.

Whenever the number of accumulated absences in a class, for any cause, exceeds ten (10) percent of the total number of class meetings, the faculty member should send an e-mail to the student and the Vice Provost for Academic Administration (VPAA) warning of attendance jeopardy. If more than twenty (20)

percent of the total number of class meetings is reported as missed, the faculty member or VPAA may initiate the student's de-enrollment from the course without further advanced notice to the student. If the date of de-enrollment is past the last date to withdraw from a class, the student will be assigned a grade of W or WF consistent with university policy in the Grading section of the catalog. There are no refunds for courses where a de-enrollment was processed. For more details see the PLNU catalog:
http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Class_Attendance

Class Enrollment:

It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

Academic Accommodations:

While all students are expected to meet the minimum academic standards for completion of their courses as established by the instructors, students with special needs may require academic accommodations. At Point Loma Nazarene University, students requesting academic accommodations must file documentation with the Disability Resource Center (DRC), located in the Bond Academic Center. Students can also reach the Disability Resource Center by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. Once the student files documentation, the Disability Resource Center contacts the student's instructors and provides written recommendations for reasonable and appropriate accommodations to meet the individual needs of the student. This policy assists the university in its commitment to full compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities (ADA) Act of 1990, and ADA Amendments Act of 2008, all of which prohibit discrimination against students with special needs and guarantees all qualified students equal access to the benefits of PLNU programs and activities. For more details see the PLNU catalog:
http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Academic_Accommodations

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

Academic Honesty

The Point Loma Nazarene University community holds the highest standards of honesty and integrity in all aspects of university life. Any violation of the university's commitment is a serious affront to the very nature of Point Loma's mission and purpose. Violations of academic honesty include cheating, plagiarism, falsification, aiding academic dishonesty, and malicious interference. The details of PLNU's meaning of each of these words can be found in the PLNU catalog at:
http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Academic_Honesty

A student remains responsible for the academic honesty of work submitted in PLNU courses and the consequences of academic dishonesty beyond receipt of the final grade in the class and beyond the awarding of the diploma. Ignorance of these catalog policies will not be considered a valid excuse or defense. Students may not withdraw from a course as a response to a consequence. A student who is caught cheating on any item of work will receive a zero on that item and may receive an "F" for the semester. See the PLNU Catalog for a further explanation of the PLNU procedures for academic dishonesty (http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Academic_Honesty).

Copyright Protected Materials:

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

Credit Hour:

In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 4 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

Tentative Schedule

Mon	Tues	Wed	Thurs	Fri
Syllabus 1.1-1.2, 1.6-1.9	Jan 12 Mon sched <-	13 Historical development of OS + more ch 1.3-1.5, 1.10-1.13	14	15 Friday activity on ch 1 Intro to Linux
18 MLK	19	20 Unix ch 6, file system: linux lab 2	21	22 Friday activity on Unix file system, 2.1-2.3, C lab
25 C quiz -OS chapt 2.4-2.5, systems calls, Systems calls lab	26	27 OS chapt 2.6-end: Lab: Emacs & C++ labs	28	29 Friday activity on ch 2 Finish c++ lab
Feb 1 Chapter 3.1-3.4	2	3 Compiling, linking, make	4	5 Makefile Tutorial
8 OS ch 4: threads Fibonacci fun lab	9	10 More on threads Review Fibonacci lab Race Horse Lab	11	12 Go over racehorse Friday activity on threads Exam review sheet
15 Exam 1 (OS and Unix written)	16	17 Go over exam, present proj Intro to Sched algorithms 5.1-5.3.1 FCFS and SJF_NP	18	19 Test cases for FCFS and SJF due 5.3.2 & 3 (SJF, priority, RR)
22 More on chapter 5	23	24 Work on stubs and driver	25	26 SJF and RR test cases
Feb 29 SJF and RR test cases due Driver, .h, makefile due -	Mar 1	2 More ch 5	3	4 FCFS module due Start work on SJF
7 Spring Brk	8 Spring Brk	9 Spring Brk	10 Spring Brk	11 Spring Brk
14 Start chapter 6 Concurrency lab	15	16 Concurrency lab due More chapter 6 (crit sec)	17	18 SJF module due Friday activity chapter 6
21 Chapter 6 deadlock	22	23 Start chapter 7 through paging	24 Easter	25 Easter
28 Easter	29	30 More ch 7 - more paging and segmentation RR module due	31	Apr 1 Friday activity More chapter 7 Chapter 8 - demand paging
4 Chapter 8 - allocation of frames, thrashing	5	6 Finish chapter 8, review	7	8 Exam 2
11 Review exam, shells and scripting labs	12	13 Chapter 9 - files	14	15 Chapter 10 - file allocation
18 Chapter 11 - disk management	19	20 Chapter 13 - protection	21	22 More on networking
25 Chapter 14 - security	26	27 HW/SW exercise review	28	29 Final exam
Take-home due				