CIS 3207: Introduction to Systems Programming & Operating Systems

Prof. Qiang Zeng

Spring 2018

1 General Information

Section:

004

Meeting Times and Locations:

Lectures: Monday & Friday 3:30pm–4:50pm, Tuttleman 401A
Labs: Friday 11:00am–12:50pm, SERC 204

Prerequisite:

Grade of C- or better in: C+IN SC 1166 or Math 2196, C+IN SC 2107, and C+IN SC 2168.
The C programming language will be used for laboratory experiments, and students are expected to have elementary experience with programming in C.

Aim of Course:

To introduce the basic concepts of operating systems; with a focus on understanding and evaluating operating systems and the most important computer architectural issues impacting operating system design and implementation. The laboratory portion of the course will be based on experiments and assignments implementing and applying operating system mechanisms and components. The course will be an opportunity to strengthen your software development abilities, your use of the C/C++ languages in problem solution, and introduce you to the use of operating system libraries and system calls.

Instructional Staff:

Prof. Qiang Zeng
Office hours: Friday 1:00pm–3:00pm
Office: SERC 328
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Teaching Assistant:

Fei Zuo
Office hours: Monday 1:00pm–3:00pm
Office: SERC 337
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2   Required Textbooks

Required:

- "Operating Systems: Internals and Design Principles", 9th edition, William Stallings, Pearson, 2018.

- "Computer Systems - a Programmer's Perspective", 3rd edition, Bryant & O'Hallaron, Pearson, 2016. `// The same textbook used in CIS 2107; the 2011 edition is OK`

Optional:

- "The Linux Programming Interface: A Linux and UNIX System Programming Handbook", Michael Kerrisk, No Starch Press, 2011. `// A helpful programming resource for the course`

3   Course Materials

- Stallings, Chapters 1 - 12.

- Bryant & O'Hallaron, Chapters 6, 10, 12.

- Lecture materials and supplemental documents and texts are available through Canvas and the course website.

4 Grading

Midterm: 25%. Closed-book; covers materials up to the date of the exam.

Final: 30%. Closed-book; covers the whole course.

Laboratory projects: 25%. Late submission will lead to a grade of 0.

Quizzes: 20%. Note that quizzes will generally not be announced in advance. There is no makeup for missed quizzes and the grade for a missed quiz is 0. The lowest quiz grade will be dropped.

5 Dates of Importance

- First class: Fri, 1/19
- Last day to add or drop: Mon, 1/29
- Midterm: Fri, 3/2, 3:30–4:50pm
- Spring break: 3/5–3/11
- Last day to withdraw: Wed, 3/21
- Last class: Mon, 4/30
- Final: Wed, 5/9, 1–3pm

6 Introduction to the Course

CIS 3207 is a course about Systems Programming and about Operating Systems. These are two very related topics. One, operating systems, is concerned with the internal software that transforms or manages the devices and resources that comprise the computer system. The other topic, systems programming, is concerned with writing programs that interact with and make direct use of the operating system services.

This semester we will explore the main features and principles of operating systems. In order to pursue this exploration, we will also concern ourselves with computer architecture. We must understand the architecture and devices that make up the computer system to understand software at the level of controlling a computer system.

The C (or C++) programming language will be used for laboratory experiments and students will have to enhance their own C programming

capability (beyond the C programming introduced in CIS 2107. The Canvas '3207 course' includes many C programming references and training materials). The Lynda.com course "C Essential Training" is available through TUPortal and is a valuable resource.

7   Course Topics

- Overview of operating systems

- Operating system principles and computer architecture

- Operating system kernels

- Processes and threads

- Concurrency

- CPU Scheduling and dispatching

- Memory management and virtual memory

- Device management

- File systems

8   Policies

No cheating: Feel free to discuss assignments with your classmates verbally. However, **do not share your solutions with other students; do not copy solutions of others or online**. Such behaviors will be reported to the University and lead to a grade of F.

Grading policy: If you disagree with any grade, send emails to the instructor documenting the reasons; the instructor will respond in email. If you are still dissatisfied with the response, please talk with the instructor. For a grade dispute to be considered, the written grievance must be submitted within two weeks of when the respective grade is given.

Project submissions: Late submissions will be rejected and lead to a score of 0; no excuses. Projects are to be submitted through Canvas.

9 Student Responsibilities

Student's are responsible for reading all assigned text materials, handouts, and referenced sources. Students are responsible for participating in classroom discussions and discussions carried out electronically though Canvas or other class facilities.

The CIS laboratory computer systems are available for use in homework and laboratory exercises. Access to the computer systems in CIS labs is through Temple University AccessNet username and password. SERC laboratories 204, 206, 357, and 359 have dual boot Windows and Linux systems. We will be using the computer systems in room 204 and 206 for in class laboratory assignments, although the same resources are available in each of the CIS SERC labs. (Note that this semester, the TECH Center computers will also be available for work on lab assignments when CIS labs are not available). You can use your own computer systems for your project work. You are responsible for performing and completing all of the laboratory exercises. This includes becoming familiar with, and being able to use, all of the tools and software that are to be used in these exercises.

Much of the source code work in the course will require you to have familiarity with (or become familiar with) the C language and development environments for compiling and building C or C++ programs in both Windows and Linux. Reference material for the C Language is available via the CIS 3207 Canvas site.

Students are responsible for taking all quizzes and exams in the course. All work turned in for grading or review by the instructors of the course must be the students' own work. The objectives of the course can only be met by your doing all of the work and presenting only your work for grading. Presenting work that is not your own will result in disciplinary action and no credit.

Student attendance to each class and each lab is Mandatory. Students who miss the final exam and do not make alternative arrangements with me before the exam, will receive a grade of F.

Accommodations for Students with Disabilities

Any student who has a need for accommodation based on the impact of a documented disability, including special accommodations for access to technology resources and electronic instructional materials required for the course, should contact me privately to discuss the specific situation by the end of the second week of classes or as soon as practical. If you have not done so already, please contact Disability Resources and Services (DRS) at 215-204-1280 in 100 Ritter Annex to learn more about the resources available

to you. I will work with DRS to coordinate reasonable accommodations for all students with documented disabilities. (`http://www.temple.edu/studentaffairs/disability/accommodations/`).

Student and Faculty Academic Rights and Responsibilities

Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has a policy on Student and Faculty and Academic Rights and Responsibilities (Policy #03.70.02) which can be accessed through the following `http://policies.temple.edu/PDF/99.pdf`.

Acknowledgments

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