COMP 421:
Operating Systems and Concurrent Programming

Course Syllabus

Course Description

This course provides a basic understanding of the software that manages a computer's hardware resources to provide a powerful abstract interface on which user programs execute. The course focuses on the control and utilization of processor, memory, storage, and network resources. The concepts in this course include operating system structure, process management and scheduling, interprocess communication, synchronization of concurrent processes, deadlock, main and secondary storage management, virtual memory, file systems, protection and security, and an introduction to networking.

The course is structured into two parts, a *principles* part and a *projects* part. The lectures and projects have been sequenced so that by the time you are working on a project, we have covered the concepts involved in that project in the lectures. Your implementation in the projects will help make those concepts "real" and anchor these ideas in your mind

Class Meetings

Tuesday and Thursday, 10:50–12:05, Duncan Hall 1070.

Instructor

Dave Johnson, `dbj@cs.rice.edu`, DH 3007, x3063. Office hours: TBA.

TAs

Niketan Pansare, `np6@rice.edu`, DH 2070. Office hours: TBA.

Anhei Shu, `as43@rice.edu`, DH 1083. Office hours: TBA.

Lei Tang, `lt7@rice.edu`, DH 3006. Office hours: TBA.

Wei-Cheng Xiao, `wx6@rice.edu`, DH 3011. Office hours: TBA.

Prerequisites

Students taking this course should have already taken the two Rice courses COMP 211 (or COMP 212) and COMP 221, or their equivalent. In particular, you must be familiar with data structures and basic computer architecture concepts.

You must also be proficient in C or C++ programming on UNIX/Linux systems. All programming projects in this course must be done in C or C++, and the projects will require a significant amount of programming. If you need to review your programming skills, pay special attention to studying data structures with pointers.

Text

The textbook for the course is *Operating System Concepts*, by Silberschatz, Galvin, and Gagne, *eighth* edition, published by John Wiley & Sons, 2009. Either the original version (2009) or the newer "Update" version (2011) of the Eighth Edition of the textbook is fine. The two versions are essentially identical except for one chapter that we will not use this semester.

The book should be available in Rice's bookstore and is available at various on-line retailers such as Amazon.com. We will cover some topics in more depth than in the book, and will also cover some in a slightly different order. There may also be a few additional reading assignments, to be handed out in class during the semester.

Assignments

There will be 3 programming projects, plus a midterm exam and a final exam.

The exams may cover *any* material covered in the course. This includes the material from the lectures, from the assigned sections of the textbook, from any additional reading assignments handed out, or from the programming projects. The final exam will not be cumulative and will be weighted the same as the first exam in the grading. The exams will be take-home and open-book.

The first programming project must be done *individually*, and the latter two projects will be done in *groups of two students*. For the programming projects done in groups, both partners in a project group must fully understand and participate in designing and programming the solution to the project. For example, there might be a question on the exams that can only be answered well if you have done the projects and understand them.

Grading

Your final grade for the course will be computed based on the following tentative weights for the individual assignments:

10%	First programming project
20%	Second programming project
20%	Third programming project
25%	Midterm exam
25%	Final exam

In addition, your weighted project average and weighted exam average must each be a passing grade in order to pass the course.

Questions about grading on any assignment should first be directed to the person who graded that assignment or question. If you are still not happy after that, see the instructor.

Work Load

This course requires a substantial amount of work, particularly in the projects. My best advice to you is to start each assignment early; don't wait until the last few days to try to do all the work. You will need to start on the programming projects early in order to make good use of your time during the

assignment. The projects can be enriching if you stay on top of them; they can be impossible if you don't.

Course Web Site

The course web site is located at `http://www.clear.rice.edu/comp421/`. This course syllabus as well as other up-to-date information about the course will be available via this web site. Online versions of most handouts distributed in class will also be available there. Course announcements, such as schedule changes, clarifications to the assignments, and reading assignments will also be posted to the course web site. Please check the web site regularly for announcements.

Tentative Schedule

A schedule for all assignments in the course will be maintained on the course Web page. Tentative due dates for all assignments will be posted shortly.

Honor Code Policy

All assignments in the course are conducted under the Rice Honor Code. For programming assignments, students are encouraged to talk to each other, the TAs, the instructor, or anyone else about the assignment. This assistance, though, is limited to discussion of the problem; *each student or project group must produce their own solution to each programming project*. Consulting another student's or project group's solution (even from a previous COMP 421 class) is prohibited, and submitted solutions may not be copied from any source.

Policy on Late Work

Take project deadlines seriously. Late assignments will not be accepted, except when there are extenuating circumstances. If you are aware of unusual circumstances that preclude a timely submission (e.g., you have to be out of town for a wedding or job interview on the submission date) submit the assignment early or contact the instructor in advance to arrange for delayed submission if warranted. After-the-fact explanations will not be treated favorably. Sometimes, of course, unusual circumstances may arise without prior notice, but even in those cases, you should try to alert the instructor (e.g., by email) before the submission deadline.

Students with Disabilities

Any student with a documented disability requiring accommodations in this course is requested to speak with me during the first two weeks of class. All such discussions will remain as confidential as possible. Students with disabilities will also need to contact Disability Support Services in the Ley Student Center.