Advanced Operating Systems

COSC 5352.001
Department of Computing Sciences
Texas A&M University - Corpus Christi
M. W BH-201 17:30 - 18:45
http://www.sci.tamu.edu/~mscherger/AOS

Instructor: Dr. Michael C. Scherger

- Office: CI-304
- Office Hours: M, W 14:00 - 16:00 or by appointment
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Text

- Required

- Optional / Reference

Prerequisites

- The prerequisite for this course is Advanced Computer Architecture (COSC 5331) or an equivalent undergraduate course in Operating Systems. Strong knowledge of C/C++ programming.

Description

- Introduction to advanced concepts in operating systems and distributed systems. Topics include distributed system architectures, Interprocess communication, distributed mutual exclusion, distributed synchronization and deadlock, agreement protocols, distributed scheduling and process

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management, distributed shared memory, distributed file systems, multiprocessor system architectures and operating systems, recovery and fault tolerance.

Student Learning Outcomes:

- Upon completion of this course, students will be able to...
  - Define what a distributed computing system is and analyze various distributed computing system models.
  - Comprehend and evaluate the basic fundamentals and design issues of distributed operating systems.
  - Recognize and evaluate various types of computer networks, communication protocols, and internetworking technologies.
  - Comprehend various methods and design issues for inter-process communication using message passing and remote procedure calls in a distributed system.
  - Explain the design and implementation issues for distributed shared memory, consistency models, replacement strategies, and thrashing.
  - Explain and analyze distributed operating system principles of clock synchronization (physical, logical, and vector), event ordering.
  - Explain and analyze various algorithms for distributed mutual exclusion.
  - Explain and analyze various algorithms for distributed deadlock.
  - Comprehend distributed system design issues for database systems and atomic transactions.
  - Explain and analyze concurrency control, scheduling, process migration, and load distribution in distributed operating systems.
  - Research specialized design issues in real-time operating systems, clusters, high availability systems, and disaster recovery methods.

Course Webpage, Contacting the Instructor

- The webpage for the class is http://www.sci.tamucc.edu/~mscherger/AOS.
  - The web page will contain links to the following course materials:
    - contact information
    - course syllabus (a link to this page)
    - tentative schedule and semester calendar
    - lecture notes
    - homework assignments
    - programming projects
    - exam study guides
    - supplemental materials

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The simplest way to contact me is via e-mail. If you need to talk to me in person - see me during my office hours or make an appointment via e-mail.

Student Evaluation

■ Homework and Quizzes (15%): There will be approximately 4-6 homework assignments during the semester. The homework assignments will be pencil-and-paper based but may involve some programming. No late homework assignments will be accepted. In addition, there may be a pop quiz from time-to-time.

■ Projects (40%): There will be approximately 4-5 programming projects. Unless otherwise directed, the programming projects must be written in C/C++. The projects can be submitted electronically and the details on project submission will be given to you together with the project assignment. Late projects will be accepted with a penalty of 10% per calendar day.

■ Note 1: You will have adequate time to complete each assignment. However, you should begin working on each assignment early so that you will have plenty of time for debugging which may take significantly longer than the initial code writing. Waiting to start coding until the night before the project is due is a bad idea.

■ Note 2: All homework and programming projects are due by the assigned date and time. Furthermore, all programming projects must be graded "in order" (i.e. you cannot turn in project 3 without having a grade for project 2).

■ Exams (45%): There will be three exams (on approximately the 6th, 11th, and finals week). No late exams; no make-up exams.

■ Grading Scale

| Grade | A: 100-90 | B: 89-80 | C: 79-70 | D: 69-60 | F: 59-0 |

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Course Policies

Class Attendance

Students are required to attend lecture. Attendance and active participation during a lecture will help you succeed in the course.

Collaboration Policy

Unless otherwise stated on the assignment sheet, all graded material must be completed individually. Students may give each other general advice, but they may not share algorithms, final answers, or program source code.

Academic Integrity

Student-teacher relationships are built on trust. Students must trust that teachers have made appropriate decisions about the structure and content of the courses they teach, and teachers must trust that the assignments which students turn in are their own. Acts that violate this trust undermine the educational process. Academic dishonesty in any form will be penalized by assigning a grade F for the course and be reported to the department chair, college dean, and academic provost.

Cooperation on Homework Assignments and Programming Projects

For both homework assignments and programming projects, I strongly believe that discussion with your peers is an excellent way to learn. If you don’t understand something, discussing it with someone who does can be far more productive than beating your head against the wall.

Having advocated discussion, then, I must be about clear what is allowed, and what is not. In general, students are allowed to cooperate as follows: you are allowed to discuss with other students the assignment, and general methods for solving the assignment. However, you are not allowed to work with someone else to actually solve the assignment, or to write code (even pseudocode) for a program, and you are certainly not allowed to copy anyone else’s solution; doing any of these things will be considered cheating, and will constitute grounds for failing the course.

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Note that there is a fine line between discussion and cheating. If you are unsure what is allowed and what isn't, feel free to discuss the distinction with me, but if something feels uncomfortable, it's probably not allowed.

Finally, you should be careful not to give others access to your code. This means that you shouldn't keep your program in a publicly accessible directory, you shouldn't leave your terminal unattended, and you shouldn't forget to pick up your printouts.

Student Security Statement

Please read the Student Security Statement.

Students with Disabilities

The Computer Science Program complies with the American with Disabilities Act in making responsible accommodation for qualified students with disabilities. If the student needs disability accommodations in this class, he/she should see the professor as soon as possible, with the accommodation letter from TAMU-CC Services for Students with Disabilities Office. If the student suspects that he/she may have a disability (physical impairment, learning disability, psychiatric disability, etc), please contact the Services for Students with Disabilities Office (located in Driftwood 101) at 825-5R16. It is important that the student contact them in a timely fashion as it may take several days to review requests and prepare accommodations.