CSCE 313 – Introduction to Computer Systems
Spring 2016

Course Logistics

1. **Time and Place**
   a. **Lecture**: Tue-Thu 11:10am – 12:25pm Room: ETB 2005
   b. **Lab**: Various
      i. Section 509: Tue 9:10-10:50am RDMC 111C
      ii. Section 510: Thu 9:10-10:50am RDMC 111C
      iii. Section 511: Fri 3:00pm-4:40pm RDMC 111C
2. **Course Page (eCampus)**:
   https://ecampusprod.tamu.edu/webapps/blackboard/execute/modulepage/view?course_id=_62979_1&cmp_tab_id=_118316_1&editMode=true&mode=cpview#
3. **Course Discussion Forum (Piazza)**: https://piazza.com/class/ijkurzhq5lm6z
4. Machine Problem Submissions (Vocareum): TBD
5. **Instructor**: Aakash Tyagi, HRBB-515A, 979-845-5480
6. **Teaching Assistant (TA): Tanzir** Sarker Ahmed
7. **Peer Teachers (PT)**:
   a. Ana Briones
   b. Cody Taylor
   c. Austin Hamilton
   d. Joshua Higginbotham
   e. Zach Brown
8. **Office Hours**
   a. Aakash: Appointment by e-mail (tyagi@cse.tamu.edu)
   b. Tanzir: TBD
   c. Grader: TBD
   d. Ana: TBD HRBB 129 (Peer Teachers Central)
   e. Cody: TBD HRBB 129 (Peer Teachers Central)
   f. Austin: TBD HRBB 129 (Peer Teachers Central)
   g. Joshua: TBD HRBB 129 (Peer Teachers Central)
   h. Zach: TBD HRBB 129 (Peer Teachers Central)

Prerequisites

- CSCE 312 (Computer Organization)
- Familiarity with C/C++ programming

Description

The objective of this course is to provide you with a general understanding of what system software is involved for an application program to run, both on a single node and over a network, and how this system software is to be used. In support of this, the course will prepare you to do system-level programming. This course will show you how to "use" (as

opposed to "design") system components, such as memory, file systems, process control, inter-process communication, and networking. By the end of this course you will have an understanding of the problems and pitfalls typically encountered in the design and implementation of multithreaded and networked applications and systems. More specifically, by the end of this course you should be fairly good at making full use of the services provided by the underlying operating system by programming directly at the operating system interface level. We will review the following aspects of a computer system, in no particular order:

- What is an operating system; what are its components; why system calls?
- Execution of a program; function calls; interrupts.
- The OS application interface; file system; process control; etc.
- Concurrency, Threads, Process/Thread Synchronization
- Inter-process communication
- Network Socket Programming
- Security threats in centralized and distributed systems; authentication, authorization, confidentiality; security mechanisms.

Textbooks

- **Text**: Operating Systems: Principles and Practice, Second Edition, Thomas Anderson and Michael Dahlin, Recursive Books, 2014.
- **Reference**
  - Advanced Programming in the UNIX Environment, Third Edition, W. Richard Stevens and Stephen A. Rago, Addison-Wesley Professional Computing Series, 2013.
  - Understanding Unix/Linux Programming A Guide to Theory and Practice, Bruce Molay, Pearson Education Inc., 2003

Other Interesting Readings

- **Computer Systems**
  - *Computer Systems: A Programmer's Perspective*, Randal E. Bryant and David R. O'Hallaron, Prentice Hall, 2011
- **Operating Systems**
  - *Operating Systems, A Modern Perspective*, Gary Nutt, Addison Wesley
  - *Operating System Concepts*, Eighth Edition, Silberschatz, Galvin, Gagne, John Wiley and Sons, Inc.

Lectures

During lectures we will be covering Operating Systems and Systems Programming concepts and case studies. The material covered in the lectures will provide the background and foundation for you to appreciate the lab assignments and to succeed in them. Reading of assigned portions in the textbook and other related material is your responsibility. You are also expected to follow instructions and be aware of announcements made during lectures.

Quizzes

Quizzes will be conducted in class and will be aligned with key topic learnings. Most topics take 2-3 lectures to finish so you may expect quizzes at that beat rate. Regular attendance, in-class participation, and diligent offline follow-up on key concepts will be key to doing well on these quizzes.

Labs

A very important part of this course is the Lab, where you will put into practice the material learned in the lectures, and where you will acquire a working knowledge of the UNIX/LINUX operating system. We will meet weekly for an in-lab session, where we will be presenting a new problem, or go over problems you may be encountering. After an introductory session to familiarize you with the particular environment that we will be using, there will be a continuing series of machine problems of moderate difficulty level, which will exercise different parts of the operating system: memory management, file system, process and thread management, inter-process communication, networked execution, and so on.

There will be a total of 6 Machine Problems assigned roughly on a bi-weekly basis. **Students will form teams of two to work on machine problems**. Unless otherwise stated, Machine problems will be described in lab on week 'x' and will be graded in lab during week 'x+2'. Lab attendance is necessary to ensure you understand the problem, actively hash the problem out with your teammate, and clarify with lab TA. The lab evaluations will be demo-based where you must show the program compile and execute as required. Grades will be recorded by the TA on the spot. Both partners for all teams must be present in the lab for the demo. TA will randomly quiz teams on inner workings of the program to ensure good understanding of the problem.

Assessment Method (Subject to Minor Changes!):

The course will have two exams and a series of quizzes and machine problems. The grade allocation is as follows:
1. Exams (Midterm and Final) = 100 Points
2. Machine Problems (approx. 6) = 80 points
3. Announced Quizzes (various) = 20 points

The grading scale is as follows:
- 180 – 200: A
- 160 – 179: B
- 140 – 159: C
- 110 – 139: D
- 109 and below: F

Late Submission Policy

Penalty: Unless stated otherwise, lateness is penalized as a simple linear function of minutes late. **You lose a percentage point of the score for every hour you are late.** Roughly speaking, if you are 4 days late you end up losing all the points for that assignment.

Examinations

There will be one midterm and one final examination. The midterm will be in-class during the scheduled class time. The final examination will be in class during the allocated time in the Final's Week. All exams will be closed-book.

Communication Policy

Instructor, Teaching Assistants, and Peer Teachers for this course will do their best to communicate relevant administrative information (deadlines, information about posted material, details about projects, locations of tutorials, and so on) in an effective and timely manner. We will be using announcements in class, and material and communication related postings on Piazza. E-mails listed on course roster are used in Piazza. If you are not receiving Piazza updates, please contact the instructor. **Please use Piazza for all correspondence related to the course**. You can post Public or Private. This is a very convenient and potentially effective way to communicate with instructor and TA.

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do." For additional information, please visit: http://aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu.

Acknowledgments

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