CSC 246: Operating Systems

(really, Concepts and Facilities of Operating Systems for Computer Scientists)

David Sturgill

NCSU Computer Science

Teaching Staff

- Instructor: David Sturgill
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  - Office: EB2 2294
  - Office Hours
    Tue 11:00 – 1:00 pm (office and online)
    Thu 11:00 – 1:00 pm (office and online)
- Teaching Assistants
  - Yi Hu (yhu34@ncsu.edu)
  - Habib Mohammed (himohamm@ncsu.edu)
  - Office hours at:
    https://pages.github.ncsu.edu/engr-csc246-staff/web/OfficeHours.html

Electronic Resources

- Course Homepage
  - In Moodle
    http://wolfware.ncsu.edu
  - Online support for:
    - Course organization
    - Instructor slides and examples
    - Homework and exercise assignments
    - Grades
  - Assignment submission and feedback return
- Online discussion via Piazza

We Want to Learn

- Execution Environment for User Programs
  - What's provided to programs
  - What form it takes
  - How we're supposed to use it
  - How it's implemented in the OS
- Structure
  - For each major area
    - Basic material, definitions, etc.
    - Examples (some good, some bad, some incomplete)
    - Programming exercises and homework assignments

Grading

Category	Weight
Reading Assignments	5
Homework Assignments	30
Programming Exercises	10
Quizzes	9
First Exam	12
Second Exam	12
Final Exam	22

Points Earned	Letter Grade
96	A+
90	A
87	A-
83	B+
77	B
74	B-
70	C+
65	C
62	C-
58	C+
53	D
50	D-

- Generous cut-offs for B, C and D
- No grade curving needed
  - (but maybe a little help if you're close)

Course Requirements

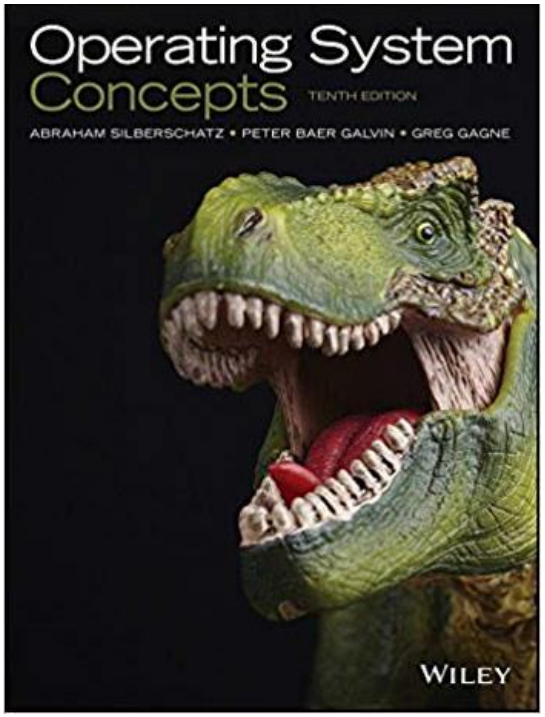
- Prerequisites
  - CSC 230 : C and Software Tools
  - Programming skills in C
  - C programming for most homeworks, lectures and exams (about 60 percent)
  - Some Java (about 40 percent)

Course Requirements

- What to Expect
  - Lots of material (lectures, textbooks, other documentation)
  - Homework assignments
  - Quizzes almost every class meeting
  - Frequent programming exercises
  - Preliminary exams
    - February 13
    - March 27
  - Final Exam, April 24

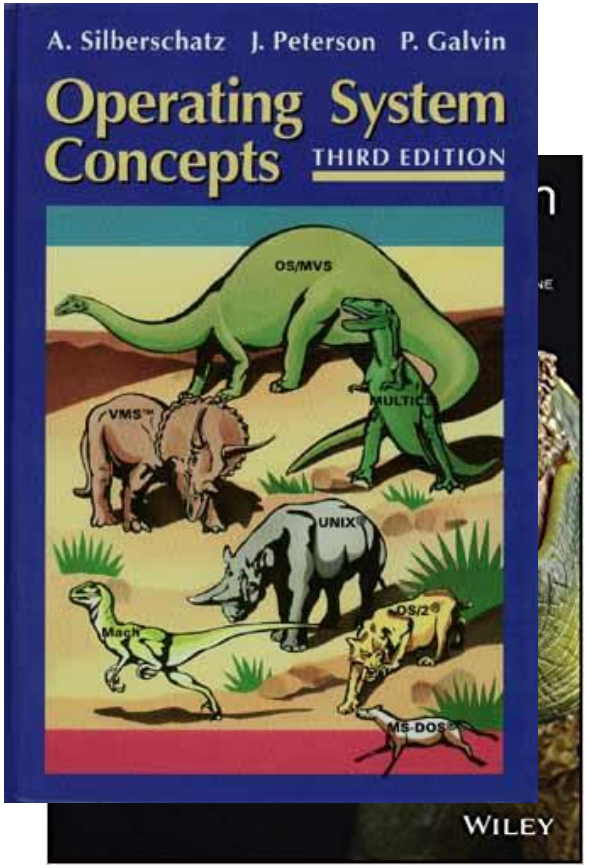
Required Textbook

- Silberschatz/Galvin/Gagne
  Operating System
  Concepts, 10th Edition
  zyBook



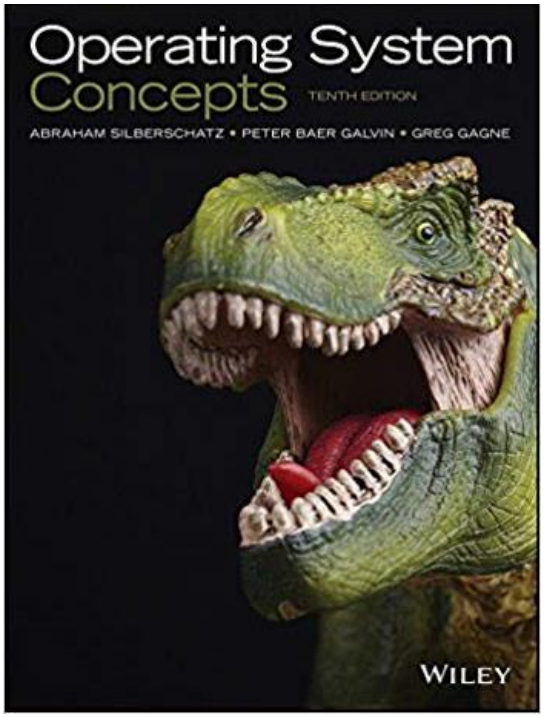
Required Textbook

- Silberschatz/Galvin/Gagne Operating System Concepts, 10th Edition zyBook
- I had the 3rd edition when I was in school
  - The dinosaurs were all named after operating systems.



Required Textbook

- Weekly reading assignments due on Fridays
- Participation Activities in the text
- Due on Fridays
- Double reading assignment due on January 17



Topics

- Processes and Threads
- CPU Scheduling
- **Synchronization** and Deadlock
- **Memory Management and Virtual Memory**
- Distributed Systems
- Protection and Security
- File and Storage Systems

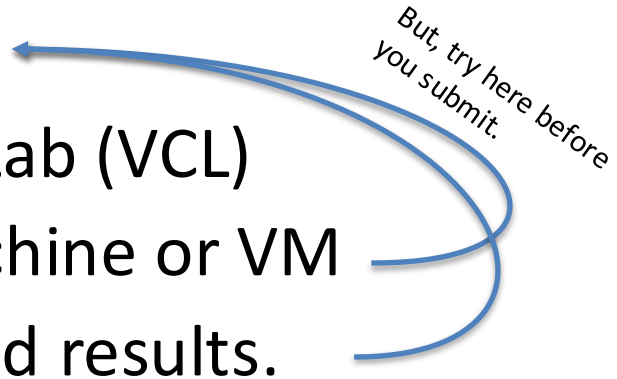
- Course Syllabus and reading schedule available in Moodle

Homework Assignments

- Goals
  - Understand and use basic OS services
  - Acquire systems programming experience and skill: processes, threads, synchronization, memory, file systems, encryption, communication
- Plan
  - Seven individual homework assignments
  - Electronic submission
    - Early submission? ☺
    - Late submission? 😐
      48 – hour late window
      -25 percent on the problem(s) you submit late.

Homework Assignments

- Structure
  - Short questions
  - Small- to medium-sized problems to solve
  - Medium-sized programming problems
- Facilities
  - EOS Linux systems
  - Virtual Computing Lab (VCL)
  - Your own Linux machine or VM
  - osX machine? Mixed results.



Programming Expectations

- First, your programs need to compile
- You'll need to comment and consistently indent
- Try for 20% - 25% of the source code as comments
- You can use external sources
  - Textbook, my examples, manual pages, other examples
  - You **must** credit any sources, even if you modify the source
  - You still **must** write most of your program

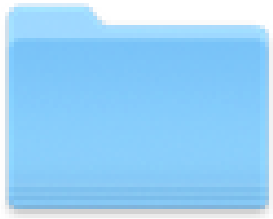
Programming Exercises

- Little, frequent programming problems
- Due on Monday evening, at 11:59 pm
- An effort to:
  - Make the homeworks a little smaller
  - Try out more parts of the OS
  - Get a little more practice
- Same languages: C and Java
- Same execution environment: EOS Linux machines
- You get to drop your three lowest
  - Then 5 percent of what's left

Quizzes

- A quiz for almost every day
  - At the end of class
  - Answer some questions about the lecture
  - … or solve some simple problems.
  - A reason to attend lecture and pay attention
  - A chance to earn some easy points
- You get to drop your three lowest
  - Then 5 percent of what's left

Your Sympathy Folder



- A catch-all for anything I can't grade
  - Submission past deadline ☹
  - Forgot to submit a file ☹
  - A small mistake that prevented a program from working ☹
- All of this may help you out at the end of the semester

Communication

- Course Website
  - For getting course materials and other resources
- Discussion Forums on Piazza
  - For asking questions outside class
  - … and getting answers from teaching staff
  - … and other students
- Online Office Hours

Special Circumstances

- Extension on a project
  - Email subject **Extension**
- Reschedule exam
  - Email subject **Exam**
- Regrade request
  - Email subject **Regrade**
- Sympathy folder item
  - Email subject **Sympathy**

You'll need some kind of documentation for these.

About Me

- Ph.D. from Cornell University
- 14 years at Baylor University
- Joined NCSU in Fall 2011

- Outside this class
  - CSC 230 (C and Software Tools)
  - CSC 492 (Senior Design)
  - Programming team coach
    - Practice 5:20 – 7:10 Monday
      EB2 1203A
  - Runner
  - Trombone player
  - Unicycle non-expert
  - Daughter in grad school (computer science)
  - Another daughter starting engineering next year
  - Pet parrot

How to Succeed in Operating Systems

- Do the homework
  - Get started early
  - Ask questions in class
- Come to lecture
  - Earn easy points on quizzes
  - Be engaged in class
    - Expect to understand everything
    - Ask questions if you don’t
  - Opportunity to practice some material

How to Enjoy Operating Systems

- Use available resources
  - Moodle pages, textbook, lecture slides, examples
  - Office hours (or just stop by)
  - Online resources, manual pages
- Don’t forget the terms
- Let me know if I need to
  - Speak more loudly
  - Slow down (or speed up)
- Much of this material is easy
- Some of it is tricky: synchronization, memory