CIS 415
Operating Systems
Welcome

Prof. Allen D. Malony
Department of Computer and Information Science
Fall 2015
Objectives

- Course Outline
  - Logistics
  - What is CIS 415?
  - What is expected of you?
  - What will you learn in CIS 415?

- Schedule

- Discussion of lab sessions
Course Logistics

- Lecture time
  - 11560: Tuesday/Thursday: 14:00-15:20, 145 Straub Hall
  - 75 enrolled!!!

- Final schedule
  - Tuesday, December 8, 12:30-14:30, 145 Straub Hall

- Undergraduate course prerequisite
  - CIS 313, CIS 314, CIS 330 (C/C++ and Unix)

- Discussion / Lab
  - 11561: Thursday, 09:00-09:50, 26 Klamath Hall
  - 11562: Friday, 10:00-10:50, 26 Klamath Hall
  - 16582: Friday, 14:00-14:50, 26 Klamath Hall

- Help Desk
  - Wednesday, 13:00-14:00, 100 Deschutes Hall
Who’s involved?

- **Instructor**
  - Allen D. Malony ([malony@cs.uoregon.edu](mailto:malony@cs.uoregon.edu))
    - parallel computing, performance analysis
    - computational science
  - **Office hours**
    - Monday/Wednesday, 13:00-14:00
    - 300 Deschutes Hall

- **Teaching assistant**
  - Jacob Lambert ([jlambert@cs.uoregon.edu](mailto:jlambert@cs.uoregon.edu))
    - see course web page for office hours
  - Jeremy Sigrist ([jsigrist@cs.uoregon.edu](mailto:jsigrist@cs.uoregon.edu))
    - see course web page for office hours
Book Resources

  - This is a new book from last year!!!

- Helpful online support:
  [Recursive Books](http://recursivebooks.com)
  [OSPP](http://ospp.cs.washington.edu)
Online Resources

- CIS 415 web page:
  [http://www.cs.uoregon.edu/classes/15F/cis415](http://www.cs.uoregon.edu/classes/15F/cis415)

- Discussion board on Canvas
  - Login to canvas.uoregon.edu
  - Select “CIS 415” from the “Courses” pulldown menu
  - Direct link:
    [https://canvas.uoregon.edu/courses/20542](https://canvas.uoregon.edu/courses/20542)
  - Will (try to) use Canvas for all discussion
Course Structure

☐ Lectures (Prof. Malony)
  ☐ Focus on core OS concepts
  ☐ Quizzes and exams

☐ Lab sessions (Jacob Lambert, Jeremy Sigrist)
  ☐ Present material needed for programming assignments
    ♦ C and Unix, processes/threads, system calls, signals, and so on
  ☐ Provide programming assignment help
  ☐ Provide tutorials and practice sessions

☐ Grading
  ☐ 5% assignments, quizzes, class participation
  ☐ 25% midterm (November 3, in class)
  ☐ 30% final exam (December 8, 12:30-14:30, 145 Straub Hall)
  ☐ 40% programming projects (3 projects, individual/team)
Course Plan

- Topics covered (roughly 16 lectures, follows OSPP book)
  - Introduction, OS structure, and system calls (2 lectures)
  - Processes, IPC, and RPC (2 lectures)
  - Threads and scheduling (2 lectures)
  - Synchronization and concurrency (3 lectures)
  - Memory management and virtual memory (3 lectures)
  - I/O systems, storage and file systems (2 lectures)
  - Virtual machines (1 lectures)
  - Protection (1 week)

- Schedule lists all relevant readings, assignments, test dates
  - Links to online papers assigned for course readings
  - Supplements to OSPP book

- Check course web page for announcements and updates
Lectures

- OSPP book and online materials are you main sources for broader/deeper OS information
- Lectures will mostly stay close to book content
  - Covers fundamental topics of more importance
  - Cannot cover everything in a single quarter
  - Other materials will be provided for certain topics
- Lectures will complement programming component with respect to overall ideas, but the online materials will be more useful for implementation
What is expected of you?

- **Background**
  - CIS 314 – computer organization and architecture
  - CIS 313 – data structures and algorithms
  - CIS 330 – C/C++ and Unix programming

- **How to look things up from source material, online documentation, books, and the Internet**

- **Persistence**
  - There is a lot of work in the course
  - It is very important to stay on top of it!
What will you get out of CIS 415?

- My goals
  - Provide you with the knowledge to understand the fundamentals of modern operating systems
  - Provide you with in-depth practical experience in working with OS and systems programming tools

- Your goals
  - Commit to a challenging course
  - Keep a sustained effort throughout the quarter
  - Failure to keep up (readings, assignment) will reduce learning

- Pay-off!!!
  - OS knowledge is fundamental
  - Systems programming skills are highly marketable

- You will get out of it what you put into it!
Course Projects

- Best way to understand the material is by doing
- Programming in a Linux environment and understanding systems issues
- There will be 3 projects
  - Project 0 is a refresh of your C and C++ skills
  - Projects 1 and 2 are the main projects
  - All projects are to be done individually
- Learning targets (example):
  - Build a shell environment
  - Create a job scheduler using process control in Linux
  - Develop a publish/subscribe systems using IPC and resource management services
Course Schedule

- CIS 415 web site has a “Logistics” link which will take you to a page with the course schedule
- It shows lectures and gives links to slides
  - Lecture slides will be uploaded before the lecture takes place
- It shows what readings you should start and complete by the next lecture, with links to online documents beyond the book
- It shows assignments and due dates
- There may be changes to the schedule
  - Students are responsible to check the schedule for changes
Acknowledgements

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- I would like to acknowledge these contributions:
  - Prof. Kevin Butler (now at the University of Florida) taught CIS 415 in Spring 2014 and provided excellent lecture material and structure for programming projects.
  - Prof. Joe Sventek taught CIS 415 in Spring 2015 and provided excellent materials and project ideas.
  - Earlier CIS 415 classes used the OSC book and it continues to be a good source of inspiration.
  - Our OSPP book provides instructor materials and slides.
In Memory

- Prof. Karsten Schwan
  - Regents’ Professor
  - College of Computing
  - Georgia Institute of Technology
  - Director of the Center for Experimental Research in Computer Systems (CERCS)
  - Graduated over 70 Ph.D. students

http://www.cc.gatech.edu/fac/Karsten.Schwan/