

CSE 306

Operating Systems Introduction

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Paperwork

- ✦ I am handing out a survey on your background as well as an intellectual honesty policy statement.
- ✦ Fill both out and return them before you leave
 - ✦ More in a bit

What is an OS?

- ✦ All of the stuff between you/your application and the hardware
 - ✦ Kernel
 - ✦ Device Drivers
 - ✦ API libraries
 - ✦ UI
- ✦ Our focus is mostly on the kernel, with some attention to the others

Why Operating Systems?

- ✦ Primary Goal: Demystify how computers work
 - ✦ Lots of abstractions and heuristics between your application and the hardware
 - ✦ A good computer scientist should understand what happens inside the system when one types a command
- ✦ Secondary: Learn how to write robust programs
 - ✦ Oses like Linux have many users and work on a wide range of hardware
 - ✦ Deal with subtle issues: concurrency, consistency, etc.

Labs: Learn by doing

- ✦ This course is **coding intensive**
 - ✦ You should know C, or be prepared to remediate quickly
 - ✦ You will learn basic, inline x86 assembly
 - ✦ You must learn on your own/with lab partner
- ✦ You will write substantial applications in C
- ✦ Final project will involve substantial modifications to the Linux kernel
 - ✦ Challenging, but a very marketable skill

Lab Teams

- ✦ Lab 1: Everyone does this lab alone
- ✦ Lab 2 and 3: May work with a partner or alone
- ✦ Lab 4: May work in a team up to 4 students

Lab Teams

- ✦ Can work alone, but better with help
 - ✦ No need to be a hero
- ✦ Choose your own partners
 - ✦ Course mailing list good for finding them
- ✦ Same for entire course
 - ✦ Changes only with instructor permission
 - ✦ For lab 4, you can only join with another team

Challenge Problems

- ✦ Each lab may include challenge problems, which you may complete for bonus points (generally 5—10 points out of 100)
 - ✦ Unwise to turn in a lab late to do challenge problems
 - ✦ Can complete challenge problems at any point in the semester—even on old labs
- ✦ Indicate any challenge problems completed in challenge.txt file

Required Readings

- ✦ Primarily from the class textbook
- ✦ **Should be completed before the lecture**
- ✦ Required reading material may appear on the exams, even if not discussed in lecture
- ✦ Several recommended texts will be posted
 - ✦ Several free on SBU safari online site
 - ✦ Papers you can print out or read electronically
 - ✦ Others on reserve at library

Lectures

- ✦ Discuss and supplement reading material
- ✦ An important chance to clarify issues
 - ✦ Questions are encouraged!
- ✦ I expect you to arrive prepared to answer and ask questions about the reading material
- ✦ Everything in lectures may appear on the exams, even if not in the book

Prerequisites

- ✦ CSE 219 (CS III) or CSE 260 (CS B, Honors)
- ✦ CSE 220 (Systems-level Programming) or ESE 380 (Embedded Microprocessor Design I)
- ✦ The background courses are necessary
- ✦ In some cases, industry experience is ok
 - ✦ In-class quiz, due before you leave
 - ✦ If you can't answer 50% of these questions you are not prepared
- ✦ C programming
- ✦ Basic Unix command-line proficiency

C Programming

- ✦ You should have learned C in the prerequisite courses
- ✦ If you have not and want to take the course, you should read "The C Programming Language" by Kernighan and Ritchie cover to cover this week
 - ✦ And complete all exercises in the book
- ✦ If you can do this, you will be prepared to complete this course on schedule

Course email list

- ✦ Sign up at <http://lists.cs.stonybrook.edu/mailman/listinfo/cse306>
- ✦ This is the primary announcement medium
- ✦ And for discussions about course work
 - ✦ Do not post code here or other solutions
 - ✦ Goal: Everyone can learn from general questions
- ✦ Material discussed on the mailing list can be an exam question

Other administrative notes

- ✦ Read syllabus completely
- ✦ Subscribe to the class mailing list
- ✦ 2 exams cover: lectures, labs, mailing list
- ✦ Every student will get a VM for lab work
 - ✦ You may use your own computer, staff can't support it
- ✦ All staff email goes to cse306ta@cs.stonybrook.edu
 - ✦ Except private issues for instructor only

Special Offer!

- ✦ You can write your own exam questions
 - ✦ Send them to me in advance of the test, if I like them, I will use them
 - ✦ Do NOT share with anyone else

VM Assignments

- ✦ Your VM is cse306-USER, where USER is your netid
- ✦ Each VM is hosted on the server esx1sc--esx4sc
 - ✦ You should receive an email with your server and initial password
- ✦ The account is csec06
- ✦ Once it is powered on, it will listen for ssh on port 130
- ✦ **Change the password immediately**

Academic Integrity

- ✦ I take cheating very seriously. It can end your career.
- ✦ In a gray area, it is your job to stay on right side of line
- ✦ Never show your code to anyone except your partner and course staff
- ✦ Never look at anyone else's code (incl. other universities)
- ✦ Do not discuss code; do not debug each other's code
- ✦ Acknowledge students that give you good ideas

Why do we care?

- ✦ Analogy: This is the programming dojo
 - ✦ If you don't do your exercises, you will be unprepared for battle
 - ✦ You've wasted your money and both of our time
 - ✦ It brings dishonor on the dojo when you lose every battle
- ✦ Similarly, a lot of what I have to teach (and what will make you a valuable employee when you graduate) has no short cut
 - ✦ How do you learn to punch through a board?
 - ✦ You punch a board over and over until your fist goes through it

Productive Frustration

- ✦ One of the “meta skills” that distinguishes an excellent programmer is the ability to get un-stuck
 - ✦ Fixing a “heisenbug” has this property
- ✦ How do you learn this skill?
 - ✦ Get stuck on a hard, but solvable problem
 - ✦ Learn which strategies will get you moving again
- ✦ If you take a quick cheat, you won't learn the skills to solve truly hard problems

Integrity Handout

- ✦ Each of you must initial each bullet on the integrity handout and sign at the bottom
- ✦ I need a record that you have read and understood the policies of this course
- ✦ I will not grade your assignments or assign a final grade until I have received this from you
- ✦ **I will check this**

Lateness

- ✦ Each student gets 72 late hours
 - ✦ List how many you use in slack.txt
 - ✦ Each day after these are gone costs a full letter grade on the assignment
 - ✦ If you work in a team, each member loses 1 hour for each hour late
- ✦ It is your responsibility to use these to manage:
 - ✦ Holidays, weddings, research deadlines, conference travel, Buffy marathons, release of the next Zelda game, etc.
- ✦ 3 Exceptions: illness (need doctor's note), death in immediate family, accommodation for disability

Lab 1 assigned

- ✦ Due Friday, 2/15 at 11:59 pm, eastern.
- ✦ Instructions on website
- ✦ Start early!

Getting help

- ✦ TA's will keep office hours (TBD)
 - ✦ Sourabh and Nipun
 - ✦ Very knowledgeable and friendly grad students
- ✦ Instructor keeps office hours
 - ✦ Note that “by appointment” means more time available on demand

Questions?

- ✦ Remember:
 - ✦ Hand-in survey and honesty policy
 - ✦ Assignment 1 out (work alone)
 - ✦ Reading assigned for Thursday