CSE 506: Operating Systems

Introduction
Today’s Lecture

• Course Overview
• Course Topics
• Grading
• Logistics
• Academic Integrity Policy
• Key concepts from Undergrad Operating Systems
Course Overview (1/3)

• Caveat 1: This is the 4\(^{\text{th}}\) time I teach this class.
• Caveat 2: The 2\(^{\text{nd}}\) time I taught it, it was too hard.
• Caveat 3: The 3\(^{\text{nd}}\) time I taught it, it was too easy.
• Caveat 4: Much of my setup was lost in a disk crash.
  – Most of it had to be recreated. Untested: beware of bugs.

• Operating Systems are
  the \textit{software}
  that \textit{managers}
  computers’ \textit{resources}
Course Overview (2/3)

• Ever wonder what the OS does, anyway?

• Operating System is an umbrella term
  – Kernel: resource manager
  – Standard Libraries: APIs to interface with the kernel
  – Utilities: tools to work with system

• This course is mostly about the kernel
  – What’s inside the kernel
  – What interface this presents to libraries and software
Course Overview (3/3)

• This course is hard, roughly like CSE 502
  – In CSE 502, you learn what’s inside a CPU
  – In CSE 506, you learn what’s inside an OS

• This is a project course
  – Learn why things are the way they are, first hand
  – We will build an operating system
  – If you don’t know C, you need to learn it quickly
  – If you do not work hard on the project, you will fail
Course Topics

- Intro/Review
- What Software Expects of the OS
- What Hardware Provides to the OS
- **Virtual Memory**
- **Scheduling**
- **Storage**
- Networking
- Multi-threading
- Multi-processing

Will devote most attention to items in **bold**
## Grading (Standard Option)

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Due Date</th>
<th>Points</th>
<th>Grading</th>
<th>Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Homework</td>
<td>October 8</td>
<td>20</td>
<td>Subjective</td>
<td>No</td>
</tr>
<tr>
<td>3 Warm-up Projects</td>
<td>Sep 12, 21, 28</td>
<td>10,10,10</td>
<td>Curve</td>
<td>No</td>
</tr>
<tr>
<td>1 Course Project</td>
<td>Last class</td>
<td>100</td>
<td>See below</td>
<td>Yes</td>
</tr>
<tr>
<td>1 Final</td>
<td></td>
<td>30</td>
<td>Absolute value</td>
<td>No</td>
</tr>
<tr>
<td>Participation</td>
<td></td>
<td>10</td>
<td>Linear</td>
<td>No</td>
</tr>
</tbody>
</table>

### Course Project (Cooperative multi-tasking OS)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preemptive multi-tasking</td>
<td>+10 pts</td>
</tr>
<tr>
<td>Signals (INT on <code>^C</code>, ALARM, SEGV) and pipes</td>
<td>+10 pts</td>
</tr>
<tr>
<td>On-disk r/w file system</td>
<td>+10 pts</td>
</tr>
<tr>
<td>On-disk swap and paging</td>
<td>+10 pts</td>
</tr>
<tr>
<td>TCP/IP Networking (lwIP)</td>
<td>+10 pts</td>
</tr>
<tr>
<td>Multi-core</td>
<td>+20 pts</td>
</tr>
</tbody>
</table>

Without curve, need 100 points to get an A
Grading (Research Option)

• If you are...
  – Pursuing a PhD
  – Pursuing an MS thesis
  – Planning to take 523/524 with me

• You may select a research option for the grade
  – Only available with instructor’s approval

• When selecting this option...
  – Must work alone on everything
  – Attain at least 60 points of the Standard Option
  – Grade will be based on subjective research progress

Note: Of the two, this is the harder option
Logistics (1/4)

• Project milestones
  – There are no official project milestones
  – If you need milestones, send me a milestone schedule
    • I will deduct 5 points for each milestone you miss

• Books
  – Design and Implementation of the FreeBSD Operating System by McKusick, Neville-Neil, and Watson.
  – The C Programming Language by Kernighan and Ritchie (definitive guide to C)
  – Operating System Concepts by Silberschatz, Galvin, Gagne (tried and true)
  – Operating Systems: Principles and Practice by Anderson and Dahlin (beta)
Logistics (2/4)

• Working in groups
  – Permitted on everything except Final
  – Groups may range in size from 1 to 199 people
    • Points deducted on group work are multiplied by group size
    • Permission of instructor is needed for group size greater than two

• Attendance
  – Optional (but highly advised)
  – No laptop, tablet, or phone use in class
    • Don’t test me - I will deduct grade points
      – How will I remember? I’ll take pictures of the classroom.
Logistics (3/4)

• Blackboard
  – Only used for posting grades

• Course Mailing List
  – Subscription is required
    https://piazza.com/stonybrook/fall2017/cse506/home

• Late Policy
  – All deadlines are before the start of lecture on due date
  – 1-point deducted for each late day (in 24-hour increments)
    • Multiplied by number of group members
Logistics (4/4)

- Wait list is currently full
- Grad students always over-enroll
  - Space likely to open up in the first week
  - If you want in, keep showing up for a few lectures
- Worst case: 506 with Prof. Zadok in the spring
  - Offered every semester
Academic Integrity Policy

• Summary: don’t cheat
• Details: don’t take code from anyone for any reason
  – Unmodified third-party open-source libraries permitted
  – You may not look at code from previous years
  – You may not look at code from courses at other schools

I will enforce this policy very strictly
Questions?