Course Description

The operating system of a computer is the computer’s “government”. It is the system that interfaces with the hardware, that allocates resources, and manages security. It doesn’t directly do any “useful work” itself, and yet it is vital if any work is going to get done. It is the OS that decides which application programs are important and need the system’s full resources, which ones do not matter, and which ones need to be shut down. Also like government, a good operating system is invisible. It is only when it goes rogue that it becomes noticeable.

We will be studying the building blocks of operating systems: how they interact with both the hardware beneath them, and the applications programs above them. We will learn about file systems and how files are organized by the OS. We will learn different techniques for allocating resources such as memory and processors. And we will see how to avoid “deadlocks”: allocation stalemates in which nothing gets done.

One of the most important things we will be studying this semester is parallel processing. Almost every desktop computer sold today is a multiple-core system, able to run many programs at once. Users expect a system to multitask. At the same time, hardware manufacturers are running into serious physical limitations that are slowing the evolution of individual processors. Many people believe that the way to solve this problem is to encourage the development of massively-parallel programs that run on many processors at once. This class will give you experience in that.

Topics Covered

The specific topics we will cover include:

- Running & synchronizing computer processes
- Threads & parallel computation
- CPU scheduling
- Deadlock avoidance
- File storage

Web Page

The class web page will be located at http://mathcs.pugetsound.edu/~adamasmith/cs475/. Valuable info and links will be posted there.

Text

We will be using Operating System Concepts With Java, by Silberschatz, Glavin, and Gagne—known informally as “The Dinosaur Book”. We will use the eighth edition, though previous editions will probably be okay.

Prerequisites

You should have already taken a class in computer architecture, such as CSCI 281.

Course Policies

There will be several assignments over the course of the class—usually one every other week. You are free to talk to others in the class about them, but I expect what you finally turn in to be 100% your own work. Assignments will be penalized by 20% for
each working day (or fraction thereof) they are late, down to 40%. However, you will
have five “extension days” during the semester to extend a deadline by one working
day. They will be used automatically, unless you specify otherwise.

There will also be a self-directed course project expanding on one of the areas we have
covered. One-paragraph proposals will be due just after Spring Break, and the project
itself will be due at the end of the semester. You may work in teams, but I will expect
larger projects.

You all should be aware of the Honor Code at the college. Please do not cheat—it will
not go well for you. *Any suspected cheating will be immediately reported to the proper
college authorities.*

Exams are closed book. You are allowed a calculator (or your phone, so long as it is
in “airplane mode”) and one two-sided, letter-sized page of notes. They will be graded
on a curve, with the highest score considered to be 100%. The final will be cumulative.

### Grading

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<tr>
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<th>Final grades will be determined as follows:</th>
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<tbody>
<tr>
<td><strong>Homework</strong></td>
<td>30%</td>
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<tr>
<td><strong>Project</strong></td>
<td>20%</td>
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<tr>
<td><strong>Midterm</strong></td>
<td>25%</td>
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<tr>
<td><strong>Final</strong></td>
<td>25%</td>
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Class participation and effort may also help, if your final grade is borderline.

### Attendance

I will not be keeping attendance (except on the first day, to make sure that you are
properly enrolled). However, odds are that your attendance will correlate highly with
your final grade.

### Miscellany

If you have any special learning needs, please contact Student Accessibility and Acco-
modation if you have not already done so. Peggy Perno’s extension is x3395. I will be
glad to accommodate you as best I can. E-mail me or talk to me in private.

If there are any special holy days that you will be taking off, please let me know as
soon as you can so that I can work around them.

Please review university emergency preparedness and response procedures posted at
[www.pugetsound.edu/emergency/](http://www.pugetsound.edu/emergency/). There is a link on the university home page. Fa-
miliarize yourself with hall exit doors and the designated gathering area for your class
and laboratory buildings. If building evacuation becomes necessary (e.g. earthquake),
meet your instructor at the designated gathering area so she/he can account for your
presence. Then wait for further instructions. Do not return to the building or class-
room until advised by a university emergency response representative. If confronted
by an act of violence, be prepared to make quick decisions to protect your safety. Flee
the area by running away from the source of danger if you can safely do so. If this is
not possible, shelter in place by securing classroom or lab doors and windows, closing
blinds, and turning off room lights. Lie on the floor out of sight and away from windows
and doors. Place cell phones or pagers on vibrate so that you can receive messages
quietly. Wait for further instructions.

Finally...if there’s anything else I can do to help you, please let me know. I’m willing to go out of my way
to make this a valuable class for you, but I can’t do that unless you talk to me.

I hope we have a good semester!