Spring 2019

COSC 301

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Syllabus

COSC 301, Operating Systems, Spring 2019

Course Overview
This course focuses on the major requirements and design challenges of operating systems—software that safely and fairly shares hardware resources (CPU, memory, disk, etc.) among multiple, simultaneously running applications. Through a combination of activities, you will learn the theory and application of:

- CPU sharing and scheduling
- Memory virtualization and management
- Persistent storage devices and filesystems
- Primitives for supporting concurrent program execution

You’ll also learn and gain experience using the:

- C programming language
- Linux command shell
- Git version control system
- Valgrind and GDB debugging tools

Instructor: Aaron Gember-Jacobson
Email: agemberjacobson@colgate.edu
Office: McGregory 310
Office Hours: Mondays 12:15pm-1:45pm, Wednesdays 1:15pm–2:45pm, or by appointment

Meeting Times & Locations
Class: MWF 10:20am–11:10pm in McGregory 314
Lab: A) T 1:20pm–3:10pm in McGregory 315
       B) T 3:20pm-5:10pm in McGregory 315

Materials & Resources
Moodle Site: https://moodle.colgate.edu/course/view.php?id=11223
A schedule of topics, all assignments (including readings, pre-class questions, and projects), and other materials (including class notes and examples) will be posted on Moodle.

Required Textbooks
- The Book of C. Joel Sommers.
  This text is free and available in HTML (https://jsommers.github.io/cbook/) or as a single PDF (https://jsommers.github.io/cbook/cbook.pdf).
  This text is free, and each chapter is available as a PDF (http://pages.cs.wisc.edu/~remzi/OSTEP). If you want a printed or e-reader version, follow the links on the OSTEP website.

Learning Activities

Readings
The textbooks are intended to serve as a complement to class meetings. Before each class period you should read the sections listed on Moodle to prepare for discussions and problem solving during class. It may also be useful to review relevant sections of the textbook when studying for exams or working on projects and labs.
Pre-class Questions
Before each class period you should complete the pre-class questions posted on Moodle. The questions will ask you to recall/apply concepts from the reading and previous class periods. You should view the questions as a guide to what parts of the reading are most important for you to remember/understand. Answering the questions will help ensure you are ready to engage in deeper learning and problem solving in class.

Class
Each class period will feature a mix of interactive lecture and active problem solving (on your own and in small groups). You are expected to attend class, respond to questions, solve problems, and respect and support your fellow classmates. In exchange, I will strive to make class fun and engaging.

Labs
Labs will explore course topics in the context of real systems through experimentation and implementation. The labs are designed to be completed with a partner during the approximately two-hour lab period. If you do not complete the lab during the lab period, you must complete the lab by Wednesday at 11pm.

Programming Projects
Projects will require you to write code (in C) that implements concepts discussed in class. There will be five projects throughout the semester. Projects must be completed with a partner. You may switch partners between projects, but you must select a new partner at least one week before the project is due.

Exams
There will be three exams during the semester plus a cumulative final exam. The exams are scheduled for the following days:

- **Exam 1**: Wednesday, February 20 during the regularly scheduled class time
- **Exam 2**: Wednesday, March 20 during the regularly scheduled class time
- **Exam 3**: Wednesday, April 10 during the regularly scheduled class time
- **Final Exam**: Thursday, May 13 3pm–5pm

Please let me know in advance if you will be unable to take one of the exams on the scheduled day.

Policies

Academic Honesty
You are expected to abide by Colgate’s academic honor code ([http://colgate.edu/offices-and-services/deanofthecollege/academichonorcode](http://colgate.edu/offices-and-services/deanofthecollege/academichonorcode)). Pre-class questions should be completed on your own and projects and labs should be completed with a partner.

In general, you may share ideas with other students, but you may not share code. If you discuss a problem with other students and you collectively agree on an approach for solving the problem, it is okay to write pseudo-code together (for example, on a whiteboard or paper), but the full code you submit must be your own. If you arrive at a solution as a result of discussing with others or doing some additional reading online, you must cite the source to remain in compliance with Colgate’s Honor Code. An appropriate form of citation would be to include a comment at the top of the affected source code file(s) and briefly note (1) the source and (2) what information from the source was used.

I strongly discourage the use of Stack Exchange and similar sources for finding “answers” to problems. Even if cited properly, “answers” found through these sources tend to mislead more often than not. Come to office hours instead.

If you are unsure what constitutes plagiarism, please contact me as soon as possible.
Accommodations
If you have special circumstances that you believe may affect your learning and performance in this class, please contact me as soon as possible so appropriate arrangements can be made. You should also contact Lynn Waldman, Director of Academic Support and Disability Services (http://colgate.edu/cltr/academic-support-and-disability-services) who reviews documentation to determine and help coordinate reasonable and appropriate accommodations. Any information you share will be kept confidential.

Attendance
Attendance will not be taken. However, a significant portion of class time will be spent solving problems similar to exam questions, so attending and participating in class is in your best interest. Experience (and research\(^1\)) has shown that students who regularly attend class learn more and perform better.

If you miss class due to illness or other obligations, you should be sure to (1) read the relevant sections of the textbook and other materials posted on the course website, (2) ask a classmate for a copy of their notes, and (3) talk to me in-person to ask questions about things from class which are unclear.

You may miss one lab—due to illness or other obligations—without penalty. However, you must complete the lab on your own by Wednesday at 11pm, or you will receive a zero for the missed lab. You will automatically receive a zero for any subsequent missed labs.

Deadlines and Time Management
Pre-class questions must be completed by the start of each class period. You may not complete the questions later. There will be more pre-class questions offered than are required for full credit in this grading category, so you can still earn full credit even if you do not complete a few sets of questions.

Projects will typically be released a few weeks before they are due. Deadlines will be clearly noted on the course website and on the project description. Late projects will not be graded, unless you have made prior arrangements with me due to extenuating circumstances.

Time management is an important skill you’ll need to apply (and develop) in this course. Projects will involve writing and debugging relatively large amounts of code, which takes time. I tend to make more mistakes after I have been programming for a long stretch of time or when I am under pressure to meet a deadline. I expect you will do the same. Consequently, you should start projects shortly after they are released, so you can work on the project over multiple sessions and have an opportunity to ask questions if you get stuck.

Grading
Class
Your class grade will be determined as follows (each item within a category is weighted equally):

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-class questions (up to 300 points)</td>
<td>10%</td>
</tr>
<tr>
<td>Projects (5)</td>
<td>45%</td>
</tr>
<tr>
<td>In-class exams (3)</td>
<td>30%</td>
</tr>
<tr>
<td>Final exam</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Lab
Your lab grade will be separate from your class grade. All labs will be weighted equally.

Scale
Grading is on an absolute scale (i.e., no curve). Letter grades will be assigned as shown below. However, I reserve the right to make adjustments; any such adjustments will only raise your grade, never lower it.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>≥ 100</td>
</tr>
<tr>
<td>A</td>
<td>99-93</td>
</tr>
<tr>
<td>A-</td>
<td>92-90</td>
</tr>
<tr>
<td>B+</td>
<td>89-87</td>
</tr>
<tr>
<td>B</td>
<td>86-83</td>
</tr>
<tr>
<td>B-</td>
<td>82-80</td>
</tr>
<tr>
<td>C+</td>
<td>79-77</td>
</tr>
<tr>
<td>C</td>
<td>76-73</td>
</tr>
<tr>
<td>C-</td>
<td>72-70</td>
</tr>
<tr>
<td>D+</td>
<td>69-67</td>
</tr>
<tr>
<td>D</td>
<td>66-63</td>
</tr>
<tr>
<td>D-</td>
<td>62-60</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 60</td>
</tr>
</tbody>
</table>

Getting Help
You are welcome to drop in during my office hours (noted at the top of this syllabus) or arrange an appointment with me—just send me an email (agemberjacobson@colgate.edu) with a few times you’re available, and we’ll find a time that works well for both of us.

There are also many campus resources that can assist you with academic, personal, or other needs, including:

- **Administrative Dean** ([https://colgate.edu/offices-and-services/deanofthecollege/administrativeadvising](https://colgate.edu/offices-and-services/deanofthecollege/administrativeadvising)): Each student is assigned an Administrative Dean who can advise you regarding personal and/or academic matters. Administrative deans often assist students to understand policies and procedures, navigate personal challenges, work with faculty, and engage with parents. They have open office hours weekday afternoons (McGregory 116) or you can call (315-228-7368) to make an appointment.

- **NASC Liaison Group** ([https://colgate.edu/nasc](https://colgate.edu/nasc)): NASC liaisons are a group of natural science and mathematics faculty members dedicated to providing science-interested students from underrepresented groups with mentorship, motivation, and individualized support as they navigate their paths in the sciences at Colgate. NASC liaisons do not replace the role of an academic advisor or offer formal academic advising. Rather a NASC liaison may meet one-on-one with a student to give another perspective on their academic plan; give tips on effective studying; or introduce a student to upper-class peers, alumni, or other faculty members that might be able to help them. The roles of NASC liaisons will depend on students’ needs, and we encourage students to reach out for mentorship and moral support.

- **Counseling Center** ([https://colgate.edu/counseling](https://colgate.edu/counseling)): The counseling center staff are trained to help students manage a wide array of emotions. The counseling center meets with over half the student body for clinical services at some point during their four years at Colgate. You can arrange an appointment online or by phone (315-228-7385). For emergencies, a counselor is available 24/7 by calling campus safety at 315-228-7333 and asking for the counselor on call.

- **Student Health Services** ([https://colgate.edu/offices-and-services/studenthealthservice](https://colgate.edu/offices-and-services/studenthealthservice)): Student Health Services provides high-quality, accessible, convenient, cost-effective, non-judgmental, and confidential health care for all students. You can arrange an appointment at the main clinic (next to Community Memorial Hospital) by phone (315-228-7750), or visit the satellite walk-in clinic (lower level of Curtis Hall) for assessment of minor injuries and illnesses.

- **Information Technology Service Desk** ([https://colgate.edu/offices-and-services/information-technology/getting-help/support-for-students](https://colgate.edu/offices-and-services/information-technology/getting-help/support-for-students)): Help desk consultants assist all students with problems concerning email, Portal, Moodle, and problems with your personal laptop. You can contact the Service Desk in person (3rd floor of Case-Geyer Library), by phone (315-228-7111), or by email (itshelp@colgate.edu). Contact me if problems with your personal computer are affecting your ability to get your work done.