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Operating Systems (Fall 2022) Course Outline

Contents

Course Information

- **Course Number:** COMP 3000
- **Term:** Fall 2022
- **Title:** Operating Systems
- **Institution:** Carleton University, School of Computer Science
- **Instructor:** Anil Somayaji (https://people.scs.carleton.ca/~soma) (anil.somayaji at carleton.ca): by appointment via Teams and Tue. and Thu. 1-2 PM via zoom (see

cuLearn for link)
- **Teaching Assistants:**   Your edit was saved.
    - Ali Sadeghi jahromi (alisadeghijahromi at cmail.carleton.ca)
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    - Nareen Khurshid (nareenkhurshid at cmail.carleton.ca)
    - Nilofar Mansourzadeh (nilofarmansourzadeh at cmail.carleton.ca)
- **Lectures:** Tue. and Thu. 11:35-12:55 AM via Zoom
- **Tutorials:** A1: Fri. 4:05-5:25 PM, A2: Mon. 4:05-5:25 PM, A3: Mon. 2:35-3:55 PM
- **Course Website**: https://homeostasis.scs.carleton.ca/wiki/index.php
  /Operating_Systems_%28Fall_2022%29

Course Calendar Description

Operating system implementation course stressing fundamental issues in design and how they relate to modern computer architectures. Assignments involve the modification and extension of a multitasking operating system.

Includes: Experiential Learning Activity

Precludes additional credit for SYSC 4001.
Prerequisites: COMP 2401 with a minimum grade of C- and (COMP 2402 or SYSC 2100).

Learning Outcomes

By the end of this course, students should:

- be able to write C code that uses low-level Linux services and should be able to implement simple Linux kernel extensions (modules),
- have a strong conceptual model of how an operating system works that allows them to determine the relative role of application and operating system code when debugging software, and
- understand the basic use and architecture of virtual-machine based cloud architectures.

Note that in order to achieve these objectives students should have come into this course with a strong background in C programming and general application development.

Grading

The marking scheme for this course is:

- 4% for lecture participatio
- 18% for tutorial participat
- 18% for the assignments
- 25% for the Midterm, Oct. 13th during class
- 35% for the Final Exam (during the final exam period)

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I also calculate grades using alternative marking schemes at the end of the semester, assigning the highest grade for each student from any of the marking schemes. Thus your final grade may be higher than might be suggested by strict following of the above scheme.

The midterm and final will not be proctored but I will conduct selected and randomized post-exam interviews. See Collaboration, below.

Communication, Lectures, and Assignments

The course website page listed above is the canonical source of information on this course. Please refer to it for updates. When significant changes are made to this document it will be either announced in lecture and/or posted in the course discussion forum.

Course discussions will be on Microsoft Teams (https://teams.microsoft.com). While you may discuss assignments there, do not post outright answers to them (unless the solutions have been posted). You may discuss tutorials freely.

Assignment and exam submissions will be through Brightspace (https://brightspace.carleton.ca). Grades will also be posted there.

All lectures will be conducted via Zoom. Lectures will be recorded and links posted to the course wiki. Lecture participation is based on interactions during lecture, such as questions asked and participation in online polls. You do not need to participate in every lecture to get full marks for this; the grade is based on the quality and quantity of your interactions. Note that grades will be calculated so that lecture participation can only improve your grade.

Tutorials

Tutorials are graded based on participation and effort, not correctness. They are marked out of four points. The expectation is that if you make a reasonable attempt at all parts of the tutorial, you will get 4/4 points. Thus for most students tutorials are an easy way to improve your overall grade. However, if you don't do the tutorials, you can significantly harm your grade for the course.

To get credit for tutorials, you must demonstrate to your assigned TA that you have made a reasonable attempt at the questions. This demonstration will typically be through a brief conversation where you show your TA your work, either in person or virtually. If this is not feasible, at your TA's discretion you may submit written answers.

The scheduled tutorial time is a designated time when you can work with TAs and other students together, in person as well as virtual. TAs will generally also be available online during these times as well, so even if you aren't on campus you can still get help and get credit. The Teams tutorial channel is a forum for getting help with tutorials, potentially from other students.

Plan to take a 2-5 hours each week to do the assigned tutorial. Tutorials, however, are accepted with no grade penalty up until the related assignment is due. (For example, Tutorials 1 and 2 must be completed before Assignment 1 is submitted.) Partial attempts will potentially be given partial credit; however, you may improve your tutorial mark as long as it is still being accepted. Exceptions will be made only if there are extenuating circumstances.

While you may collaborate with others and use outside resources, when asked you should indicate who helped you and and the sources you used. When submitting written answers, collaborators and sources should be clearly listed.

Your work should be your own. Please don't represent the work of others as your own, because if you do, you are subject to being reported to the Dean for plagiarism.

Collaboration

Collaboration on all work is allowed except for the midterm and final. Collaboration, however, should be clearly acknowledged. See below for further details.

The midterm and final exams will be open book, open note, open Internet, because they will not be actively proctored. Those outside resources will not be of much use, however, if you have not prepared by completing the tutorials and assignments. Your answers should be your own and you **are not** allowed to collaborate during the exams.

Random and selected exams will be chosen for **10-15 minute interviews**. You may also volunteer to be interviewed. These interviews are to verify grading quality and to make sure that the work is your own. The Dean will be contacted if during an interview it becomes clear that a student is not the sole author of any exam.

For assignments, while you may get help from others and even collaboratively solve technical problems, the code and answers submitted should all be your own work. For example, you *may not* divide an assignment into parts, give a part to another student or anyone else to solve, and then submit that work as your own. You have to have participated in the creation of every part of your submitted work. An easy way to make sure this happens is never share files regarding coursework or copy and paste answers into email. Instead, meet together (virtually) to work on an assignment and then separate to write up your solutions.

Similarity between submitted assignments and projects that has not been appropriately documented will be treated as plagiarism - the same as copying on a midterm or a final - and will be submitted to the Dean for disciplinary action.

Course Notes/Multimedia

Video from lectures will be available via the lecture pages on the main course website within a day after lectures are delivered. These same pages will also contain code and notes given in class.

Do not rely upon the lectures and notes to cover all material related to this class. Mastery of the tutorial material is essential for doing well on the assignments and exams. Textbook and other outside readings should be used as supplements to help you understand concepts covered in lecture and tutorial.

Required Textbooks

The course will be using the textbook Operating Systems: Three Easy Pieces (http://pages.cs.wisc.edu/~remzi/OSTEP/). The chapters of this textbook are available for free online; you can also buy a full epub, PDF, or paper copy if you wish.

Individual chapters will be linked with the lectures associated with them. You should plan on reading the assigned chapters **before** coming to class, as the material in lectures will be easier to understand then. The lectures are designed to supplement the textbook, not replace them.

This course focuses much more on reading code rather than writing code. Thus, John Aycock's book, Reading and Modifying Code (http://pages.cpsc.ucalgary.ca/~aycock/reading-and-modifying-code.pdf), is worth reading to better understand how reading code differs from writing code.

Course Software

In this course we will be working with the Ubuntu (http://www.ubuntu.com/) Linux distribution. You may use other Linux distributions in the tutorials to complete the assigned work; there will be differences, however, in some aspects (such as installing software), particularly if you use a distribution not based on Ubuntu or Debian.

Undergraduate Academic Advisor

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP; or by email at scs.ug.advisor@cunet.carleton.ca. The undergraduate advisors can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisors will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and Writing Tutorial Services.

SCS Computer Laboratory

SCS students can access one of the designated labs for your course. The lab schedule

can be found at: https://carleton.ca/scs/tech-support/computer-laboratories/. All SCS computer lab and technical ~~support~~ found at: https://carleton.ca/scs/technical-support/. Tech~~~~ room HP5161 Monday to Friday from 9:00 until 17:00 or by emailing SCS.Tech.Support@cunet.carleton.ca.

University Policies & Resources

For information about Carleton's academic year, including registration and withdrawal dates, see Carleton's The Academic Year (https://calendar.carleton.ca/academicyear/).

Pregnancy, Religious, or other Obligation

For pregnancy, religious, or other equity-related obligations please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit Equity Services (https://carleton.ca/womensstudies/resources-and-links/equity-services/) and Religious/Spiritual Observances (https://carleton.ca/equity/focus/discrimination-harassment/religious-spiritual-observances/).

Academic Accommodations for Students with Disabilities

Academic Accommodations for Students with Disabilities If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the Paul Menton Centre website (http://carleton.ca/pmc).

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit Sexual Assault Support Services (https://carleton.ca/sexual-violence-support).

Accommodation for Student Activities

Accommodation for Student Activities. Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a

student participating in activities beyond the classroom experience. Reasonable accommodation must be p   ompete or perform at the national or international lev   uctor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the policy (https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf).

Student Academic Integrity Policy

Student Academic Integrity Policy. Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Examples of punishable offences include: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found here (https://carleton.ca/registrar/academic-integrity/).

Plagiarism

As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science. Standard pentaly guidelines can be found here (https://science.carleton.ca/academic-integrity/).

Unauthorized Co-operation or Collaboration

Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis".

Please see above for the specific collaboration policy for this course.

Special Information

It is important to remember that COVID is still present in Ottawa. The situation can change at any time and the risks of new variants and outbreaks are very real. There are number of actions you can take to lower your risk and the risk you pose to those around you including being vaccinated, wearing a mask, staying home when you're sick, washing your hands and maintaining proper respiratory and cough etiquette.

Feeling sick? Remaining vigilant and not attending work or school when sick or with symptoms is critically important. If you feel ill or exhibit COVID-19 symptoms do not come to class or campus. If you feel ill or exhibit symptoms while on campus or in class, please leave campus immediately. In all situations, you must follow Carleton's symptom reporting protocols.

Masks: Carleton has paused the COVID-19 Mask policy, but continues to strongly recommend masking when ⬚ Your edit was saved. ⬚ ysical distancing cannot be maintained. It may become ⬚ ⬚ ate the mask requirement if pandemic circumstances were to change.

Vaccines: While proof of vaccination is no longer required as of May 1 to attend campus or in-person activity, it may become necessary for the University to bring back proof of vaccination requirements on short notice if the situation and public health advice changes. Students are strongly encouraged to get a full course of vaccination, including booster doses as soon as they are eligible, and submit their booster dose information in cuScreen as soon as possible. Please note that Carleton cannot guarantee that it will be able to offer virtual or hybrid learning options for those who are unable to attend the campus.

All members of the Carleton community are required to follow requirements and guidelines regarding health and safety which may change from time to time. For the most recent information about Carleton's COVID-19 website and review the Frequently Asked Questions (FAQs). Should you have additional questions after reviewing, please contact covidinfo@carleton.ca.

Doctor's note or medical certificate: in effect for Fall 2022 term. In place of a doctor's note or medical certificate, students are advised to complete the self-declaration form available on the Registrar's Office website to request academic accommodation for missed course work including exams and assignments. Students should also discuss with the course instructor the required accommodations arising from the COVID-19 situation.

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