COMP 3000 A (Fall 2023): Operating Systems

General Course Information

- Course Registration Number (CRN): 31280 (https://central.carleton.ca /prod/bwysched.p_display_course?wsea_code=EXT&term_code=202330&disp=19032158&crn=31280)
- Classes run: Sep 06, 2023 to Dec 08, 2023
- Weekly schedule: Mondays and Wednesdays, 01:05pm to 02:25pm
- Room: Minto Centre 2000 (MC2000).
- Instructor: Prof. AbdelRahman Abdou (abdou at scs.carleton.ca)
- Office hours: by appointment; email me.
- TAs: Ali Jahromi, Nareen Khurshid, Nilofar Mansourzadeh, Ethan Thompson
- Tutorials.
 - COMP 3000 A1: Tue: 08:35 09:55 at Loeb 270 (LA270).
 - COMP 3000 A2: Fri: 11:35 12:55 at St. Patrick's 303 (SP303).
 - o COMP 3000 A3: Thu: 08:35 09:55 at St. Patrick's 303 (SP303).
- **Material and resources:** Operating Systems: Three Easy Pieces (https://pages.cs.wisc.edu/~remzi /OSTEP/), 2018. Springer. (Textbook by Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseaud).
- Prerequisite(s): COMP 2401 with a minimum grade of C- and COMP 2402.

Course Summary

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.

Grading Scheme

- 9 tutorials: 20%, 2.22% each.
 - With the assigned TAs, check in in person (0.5% each).
 - Submission of answers (1.5% each).
- 4 assignments: 20%, 5% each.
 - Hands-on tasks + short answer questions.
- Midterm exam, in-class: 25%
- Final exam, during the final exam period: 35%

Course Outline

Week 1Sep 6 Sep 8(No class)Week 2Sep 11 Sep 13Intro to course: Building a small computerWeek 3Sep 13 Sep 20Introduction to Operating SystemsWeek 4Sep 25 Sep 27AbstractionWeek 5Oct 2 Oct 4Facilities for Users/ProgrammersWeek 6Oct 9 Oct 11File Systems and Storage ManagementWeek 7Oct 16 Oct 18File Systems and Storage ManagementWeek 8Oct 23 Oct 24File Systems and Storage ManagementWeek 9Oct 16 Oct 18Mid-term test (in class)Week 9Oct 23 Oct 25Fall Break (No classes)Week 9Oct 30 Nov 1A3 starts (due: Nov 19) Inter-Process Communication and ConcurrencyWeek 10Nov 6 Nov 8Kernel ModulesWeek 11Nov 13 Nov 15Memory ManagementWeek 12Nov 20 Containerization and Virtualization		Торіс		Date (2023)	Week
Sep 8 Intro to course: Building a small computer Week 2 Sep 11 Sep 13 Introduction to Operating Systems Week 3 Sep 18 A1 starts (due: Oct 8) Abstraction Week 4 Sep 25 Facilities for Users/Programmers Week 5 Oct 2 File Systems and Storage Management Week 6 Oct 9 A2 starts (due: Oct 29) Thanksgiving (No class) Oct 11 File Systems and Storage Management Week 7 Oct 16 File Systems and Storage Management Week 8 Oct 23 Fall Break (No classs) Week 9 Oct 30 A3 starts (due: Nov 19) Inter-Process Communication and Concurrency Week 10 Nov 6 Kernel Modules Week 11 Nov 13 Memory Management Week 12 Nov 20 A4 starts (due: Dec 5) Containerization and Virtualization		(No class)		Sep 6	Wook 1
Week 2Sep 13Introduction to Operating SystemsWeek 3Sep 18A1 starts (due: Oct 8)Sep 20AbstractionWeek 4Sep 25Facilities for Users/ProgrammersWeek 5Oct 2File Systems and Storage ManagementWeek 6Oct 11File Systems and Storage ManagementWeek 7Oct 16File Systems and Storage ManagementWeek 8Oct 18Mid-term test (in class)Week 8Oct 23Fall Break (No classes)Week 9Oct 30A3 starts (due: Nov 19)Nov 1Inter-Process Communication and ConcurrencyWeek 10Nov 8Week 11Nov 13Nov 15Memory ManagementWeek 12Nov 20A4 starts (due: Dec 5)		Intro to course: Building a small computer		Sep 8	WCCK I
Week 3 Sep 18 A1 starts (due: Oct 8) Sep 20 Week 4 Sep 25 Facilities for Users/Programmers Week 5 Oct 2 File Systems and Storage Management Week 6 Oct 11 Week 7 Oct 16 Oct 18 Mid-term test (in class) Week 8 Oct 23 Oct 25 Week 9 Oct 30 A3 starts (due: Nov 19) Nov 1 Week 10 Nov 6 Nov 8 Week 11 Nov 15 Week 12 Nov 20 A4 starts (due: Dec 5) Abstraction Facilities for Users/Programmers File Systems and Storage Management Mid-term test (in class) Fall Break (No classes) Fall Break (No classes) Fall Break (No classes) Meek 10 Nov 13 Memory Management Memory Management Containerization and Virtualization		Introduction to Operating Systems		Sep 11	Week 2
Week 3Sep 20AbstractionWeek 4Sep 25 Sep 27Facilities for Users/ProgrammersWeek 5Oct 2 Oct 4File Systems and Storage ManagementWeek 6Oct 19 Oct 11A2 starts (due: Oct 29)Thanksgiving (No class)Week 7Oct 16 				Sep 13	
Sep 20 Week 4 Sep 25 Sep 27 Week 5 Oct 2 Oct 4 File Systems and Storage Management Week 6 Oct 11 Week 7 Oct 16 Oct 18 Week 8 Oct 23 Oct 25 Week 9 Oct 30 Nov 1 Week 10 Nov 1 Week 11 Nov 20 A4 starts (due: Dec 5) Actilities for Users/Programmers Facilities for User		Abstraction	A1 starts (due: Oct 8)	Sep 18	Week 3
Week 5 Sep 27 Week 5 Oct 2 Oct 4 Week 6 Oct 9 Oct 11 Week 7 Oct 18 Week 8 Oct 23 Oct 25 Oct 20 Oct 18 Week 8 Oct 23 Oct 25 Week 9 Nov 1 Week 10 Nov 15 Week 12 Nov 20 A2 starts (due: Oct 29) File Systems and Storage Management Mid-term test (in class) Fall Break (No classes) Inter-Process Communication and Concurrency Memory Management Memory Management Facilities for Users/Programmers File Systems and Storage Management File Systems and Storage Management Inter-Process Communication Mid-term test (in class) Fall Break (No classes) Fall Break (No classes) Memory Management Memory Management Memory Management Containerization and Virtualization				Sep 20	
Sep 27 Week 5 Oct 2 Oct 4 Week 6 Oct 9 Oct 11 Week 7 Oct 18 Week 8 Oct 23 Oct 25 Week 9 Oct 30 Nov 1 Week 10 Nov 1 Week 11 Nov 20 A2 starts (due: Oct 29) File Systems and Storage Management Mid-term test (in class) Fall Break (No classes) Inter-Process Communication and Concurrency Kernel Modules Memory Management Containerization and Virtualization Containerization and Virtualization		Facilities for Users/Programmers		Sep 25	Week 4
Week 5 Oct 4 Week 6 Oct 9 Oct 11 Week 7 Oct 16 Oct 18 Week 8 Oct 23 Oct 25 Week 9 Oct 30 Nov 1 Week 10 Nov 6 Nov 8 Week 11 Nov 15 Week 12 File Systems and Storage Management Mid-term test (in class) Fall Break (No classes) Inter-Process Communication and Concurrency Kernel Modules Memory Management Containerization and Virtualization				Sep 27	
Week 6 Oct 4 Week 6 Oct 19 Oct 11 Week 7 Oct 16 Oct 18 Mid-term test (in class) Week 8 Oct 25 Week 9 Oct 30 Nov 1 Week 10 Nov 6 Nov 8 Week 11 Nov 13 Nov 15 Week 12 Oct 4 Thanksgiving (No class) Tile Systems and Storage Management Mid-term test (in class) Fall Break (No classes) Inter-Process Communication and Concurrency Kernel Modules Memory Management Containerization and Virtualization		File Systems and Storage Management		Oct 2	Wook 5
Week 6 Oct 11 Week 7 Oct 16 Oct 18 Mid-term test (in class) Week 8 Oct 23 Oct 25 Fall Break (No classes) Week 9 Oct 30 Nov 1 Inter-Process Communication and Concurrency Week 10 Nov 8 Week 11 Nov 13 Nov 15 Week 12 Nov 20 A4 starts (due: Dec 5) File Systems and Storage Management Mid-term test (in class) Fall Break (No classes) Containerization and Virtualization				Oct 4	Week 3
Oct 11 Week 7 Oct 16 Oct 18 Mid-term test (in class) Week 8 Oct 23 Oct 25 Week 9 Oct 30 Nov 1 Nov 1 Week 10 Nov 8 Week 11 Nov 13 Nov 15 Nov 20 A4 starts (due: Dec 5) File Systems and Storage Management Mid-term test (in class) Fall Break (No classes) Inter-Process Communication and Concurrency Memory Management Containerization and Virtualization		Thanksgiving (No class)	A2 starts (due: Oct 29)	Oct 9	Wook 6
Week 7Oct 16 Oct 18Mid-term test (in class)Week 8Oct 23 Oct 25Fall Break (No classes)Week 9Oct 30 Nov 1A3 starts (due: Nov 19) Inter-Process Communication and ConcurrencyWeek 10Nov 6 Nov 8Kernel ModulesWeek 11Nov 13 Nov 15Memory ManagementWeek 12Nov 20A4 starts (due: Dec 5)		File Systems and Storage Management		Oct 11	week 6
Week 8 Oct 23 Oct 25 Fall Break (No classes) Week 9 Oct 30 Nov 1 Nov 1 Week 10 Nov 8 Week 11 Nov 13 Nov 15 Memory Management Nov 20 A4 starts (due: Dec 5) Mid-term test (in class) Fall Break (No classes) Inter-Process Communication and Concurrency Memory Management Containerization and Virtualization		File Systems and Storage Management		Oct 16	Wook 7
Week 8 Oct 25 Week 9 Oct 30 Nov 1 Week 10 Nov 6 Nov 8 Week 11 Nov 13 Nov 15 Memory Management Nov 20 Ad starts (due: Dec 5) Fall Break (No classes) Inter-Process Communication and Concurrency Memory Management Containerization and Virtualization		Mid-term test (in class)		Oct 18	Week /
Week 9 Oct 30 Nov 1 Nov 6 Nov 8 Week 11 Nov 13 Nov 15 Memory Management Nov 20 A4 starts (due: Dec 5) Nov 20 A3 starts (due: Nov 19) Inter-Process Communication and Concurrency Memory Management Containerization and Virtualization		Fall Break (No classes)		Oct 23	Week 8
Week 9 Nov 1 Week 10 Nov 6 Nov 8 Week 11 Nov 13 Nov 15 Memory Management Nov 20 A4 starts (due: Dec 5) Containerization and Virtualization				Oct 25	
Week 10 Nov 6 Nov 8 Week 11 Nov 13 Nov 15 Week 12 Nov 20 A4 starts (due: Dec 5) Containerization and Virtualization		Inter-Process Communication and Concurrency	A3 starts (due: Nov 19)	Oct 30	Week 9
Week 10 Nov 8 Week 11 Nov 13 Nov 15 Memory Management Week 12 Nov 20 A4 starts (due: Dec 5) Containerization and Virtualization				Nov 1	
Nov 8 Week 11 Nov 13 Nov 15 Memory Management Week 12 Nov 20 A4 starts (due: Dec 5) Containerization and Virtualization		Kernel Modules		Nov 6	Week 10
Week 11 Memory Management Nov 15 Nov 20 A4 starts (due: Dec 5) Containerization and Virtualization				Nov 8	
Nov 15 Week 12 Nov 20 A4 starts (due: Dec 5) Containerization and Virtualization		Memory Management		Nov 13	Week 11
Week 12 Containerization and Virtualization				Nov 15	
VVEEK 12 CONTRAINENZATION AND VILLUANZATION		Containerization and Virtualization	A4 starts (due: Dec 5)	Nov 20	Week 12
Nov 22				Nov 22	
Week 13 Nov 27		Security and Additional OS Topics		Nov 27	Wook 12
Nov 29				Nov 29	Week 15
Week 14 Dec 4 Week 14			Dec 4	Wook 14	
Dec 6				Dec 6	vveek 14
Week ∞ TBD Final Exam		Final Exam		TBD	Week ∞

If you are unsure of the expectations regarding academic integrity (how to use and cite references, if unauthorized collaboration with lab- or classmates is permitted (and, if so, to what degree), then you must ASK your instructor. Sharing assignment or quiz specifications or posting them online (to sites like Chegg, CourseHero, OneClass, etc.) is ALWAYS considered academic misconduct. You are NEVER permitted to post, share, or upload course materials without explicit permission from your instructor. Academic integrity offences are reported to the office of the Dean of Science. Information, process and penalties for such offences can be found on the ODS webpage (https://science.carleton.ca/students/academic-integrity/).

Late assignments are never accepted for any reason. Assignments submissions are handled electronically (i.e., through Brightspace) and there is no "grace period" with respect to a deadline - an assignment submitted even one minute after the deadline is late and will receive a mark of zero.

Notes on Al Tools

Many of the assessed activities in this course were designed to be completed by an individual working alone. Unless it is explicitly stated otherwise, the use of any will be considered academic misconduct. This includes, but is not limited to, chatbots (e.g., ChatGPT, Google Bard, Bing Chart), research assistants (e.g., Elicit), and image generators (e.g., Stable Diffusion, Dall-E).

References to any material you use but did not originate must use the IEEE/APA/MLA citation style. Failure to reference materials correctly can result in severe penalties, and the use of manufactured (i.e., falsified) or misleading references will be treated as evidence of plagiarism and considered academic misconduct.

Everything you submit for evaluation (e.g., assignments, quizzes, tutorials, and examinations) must be the result of your own work and only your own work. If you use more than five consecutive words from a single source without providing a valid reference, then that is considered plagiarism and an example of academic misconduct.

School of Computer Science Policies

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 (mailto: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.

Graduate Academic Advisors The Graduate Advisors for the School of Computer Science are available in Room 5302 HP; or by email at grad.scs@carleton.ca (mailto:grad.scs@carleton.ca). The graduate advisors can assist with understanding your academic audit and the remaining courses required to meet graduation requirements.

University Policies

Academic Accommodations. Carleton is committed to providing academic accessibility for all individuals. Please review the academic accommodation available to students here (https://students.carleton.ca/course-outline/).

Academic Integrity.

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 sanctioned with penalties which range from a reprimand to receiving a grade of F in the course, or even being suspended or expelled from the University. Examples of punishable offences include plagiarism and unauthorized collaboration. Any such reported offences will be reviewed by the office of the Dean of Science. More information on this policy may be found on the ODS Academic Integrity page (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. More information and standard sanction guidelines can be found here (https://science.carleton.ca/students/academic-integrity/).

Unauthorized 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".

© 2015-23 AbdelRahman Abdou