Course Information:

Instructor:  Mark Lanthier (lanthier@scs.carleton.ca)
Class:  Mondays & Wednesdays 4:05pm – 5:25pm
Location:  See public class schedule (was Loeb C264 as of December 19, 2022)
Office Hours:  Mondays and Wednesdays 2:30pm – 3:30pm in my office HP 5380

Lab/Course Coordinator:
Sean Benjamin (SeanBenjamin@cmail.carleton.ca)

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Course Objectives & Overview:

This course provides an introduction to systems-level programming, C programming and the Linux Operating System. A main objective of this course is to teach you the C programming language. The code that you write may be lower-level code than you are used to. Many students struggle with pointers and understanding what goes on behind the scenes when you create variables and call functions. This course will give you a thorough understanding of how variables and stored and accessed and how the computer memory can be managed carefully and correctly. These are concepts that you did not need to worry about in JAVA or Python as it was all handled for you. This course also has the objective of giving you some familiarity with using the Linux operating system. You will use a Virtual Machine and issue direct low-level commands with the underlying operating system. The course will cover the following topics:

- Introduction to Systems Programming
- Working within a Linux environment
- Programming using the C language
- Data Representation (Bit representation, Primitive data types, Compound data types, Pointers)
- Memory Management (Stack and heap, Dynamic memory allocation)
- Arrays and Linked lists
- Concurrent Computing (Concurrent systems, Processes (signals, sockets) and Threads)
- Program Structure (I/O, Procedural program design and organization, Using libraries)
- File I/O, X11 windows and Graphics, Shell scripts

* To take this course, a grade of C- or above MUST have been earned in COMP1406/COMP1006.
* You MUST earn a C- or better in this course to take some required 2nd/3rd year courses!
Course Notes:

There is no textbook assigned to this course. Instead, there is an in-depth set of course notes and coding examples available on Brightspace. All materials created for this course (i.e., course notes, coding examples, lecture recordings, tutorials, tutorial code, assignments, assignment code bases, marking schemes, tests, exams, and test solutions) remain the intellectual property of the instructor. They are intended for the personal and non-transferable use of students registered in the course. Reproducing, reposting, and/or redistributing any course materials, in part or in whole, without the written consent of the instructor, is a copyright violation and is strictly prohibited.

Evaluation:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Details</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorials (optional)</td>
<td>10% bonus</td>
<td>1% each</td>
<td>Weekly, starting Monday, Jan 16th</td>
</tr>
<tr>
<td>Assignments</td>
<td>50%</td>
<td>best 5 of 6 at 10% each</td>
<td>Biweekly, usually due Tuesdays at 11pm</td>
</tr>
<tr>
<td>In-Class Tests</td>
<td>30%</td>
<td>best 2 of 3 at 15% each</td>
<td>Jan 30, Feb 27, Mar 20</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
<td>no flexibility, do well</td>
<td>(to be announced)</td>
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Laboratory Software:

You will be programming in the Linux environment using VirtualBox. Go to this website and follow the instructions to get it all set up: https://carleton.ca/scs/technical-support/virtual-machines/

Once you install the VirtualBox, you need to install the Virtual Machine. The Virtual Machine that we will use is named COMP2401-W23.ova. You need to download that file and then when you run the VirtualBox, you can select Add... from the Machine menu to add the virtual machine. One added, you simply click on the virtual machine that you added (on the left side of the window) and then press the Start button. The username is student and the password is student.

In-class Tests:

There will be 3 in-class tests that will be during the 2nd half of a lecture starting at 4:40pm. They will be 45 minutes in length. You MUST be in class to write the test, otherwise you will receive a grade of zero. If you miss one test, the other two will count for your grade. If you miss two tests ... one will end up with a zero grade. If you miss all three tests ... then you will likely need to withdraw from the course to avoid a grade of F.

Tutorials: ***NEW***

This course section is offering optional self-guided tutorials. You do not have to do them, but if you “complete” one, it adds up to 1% bonus to your final grade. The tutorials are an excellent companion to the course notes in that it walks you through the course material with additional examples. They have been designed to highlight typical problems that occur when coding in C and as a result, they will help you to become a better C programmer.

The tutorials will be available on Brightspace as quizzes and will take a varying amount of time ranging roughly from 75 minutes to 110 minutes. The tutorials will only be available during a week-long range, so you must do them sometime within the designated time range. However, you do not have to do the tutorial all at once. You may pause the tutorial and continue at another time as long as you submit by the due date.

The tutorials are self-guided. You will NOT need any help from the TAs. You will simply follow the instructions and do everything it indicates. You will only get a grade for the tutorials if you submit them (within the time range allotted) AND if you spend enough time on them. If you attempt to simply race through a tutorial by selecting the answers without taking the time to do the tutorial properly, you WILL NOT receive any bonus for that tutorial. Brightspace times your answers for each question. A TA will be checking to confirm that you spent enough time on each question of the tutorial.
Assignments:

There will be assignments in this course which will be available on the course web page.

Lateness: Assignments must be handed in before or on the due date and time. For every 15 minute interval that an assignment is late, there will be a deduction of 1% off the grade. Hence, for example, an assignment that is late by 3 hours and 5 minutes will have a deduction of 13%. After 25 hours ... the deduction is 100% and the assignment will not even be graded. Being “sick” on the day an assignment is due is not a valid excuse for not handing anything in. You have 13 days to do each assignment (a little less for the last assignment). If you do not start your assignment the first week ... and then get too sick to work on it the last week ... you will end up with zero. So, start early and submit partially completed versions so that if you get sick, you will at least have part of it done and submitted. Keep in mind that being sick, does not give you permission to miss an assignment.

Submission: Assignments will be submitted on Brightspace. DO NOT email your assignments to any TAs. If you are at home trying to submit and you cannot get it to work, you will be late with your assignment and will be subject to late submission deductions. So … make sure that your internet connection is reliable. If not, maybe a family member could let you connect to a WiFi hotspot through their phone so that you can connect and submit. If you get your grade back and realized that you did not submit the proper files … you cannot re-submit anything again to get remarked, despite how long you spent on the assignment. Please, therefore, verify that what you handed in is what you wanted to hand in by downloading it yourself right after you hand it in. Lastly, if you submit any version AFTER the due date, it will be late with deductions accordingly.

Backups: Keep a backup of your work, perhaps on a USB flash drive or by sending yourself an email with your assignment files attached.

Marking Issues: It is your responsibility to ensure that your marks on Brightspace are correct. Keep in mind that TAs can make mistakes. All complaints regarding assignment marks should be brought to the attention of the TA who marked it. Only if the TA does not address the problem to your satisfaction should you bring the matter to the instructor. This MUST be done no later than two weeks after the assignment has been graded. After this time, no remarking will be done.

Cheating and Plagiarism (University Policies):

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.

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 penalty guidelines can be found here.

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". Your assignment code WILL BE COMPARED with others in the course.

You are NOT allowed to:

- copy & edit any portion of another student's code, nor from any websites, but you may use code from the course notes.
- give your code (or portions of it) to another student.
- work on your assignment with other students, nor with friends, parents, relatives, etc..
- post full or partial assignment solutions on discussion boards or websites (e.g., github, facebook, etc.).
- share assignment or quiz specifications or post them online (to sites like Chegg, CourseHero, OneClass, etc.).

You are NEVER permitted to post, share, or upload course materials without explicit permission from your instructor.
Undergraduate Academic Advisors:

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

SCS Computer Laboratory

Students taking a COMP course can access the SCS computer labs. The lab schedule and location can be found at: https://carleton.ca/scs/tech-support/computer-laboratories/. All SCS computer lab and technical support information can be found at: https://carleton.ca/scs/tech-support/. Technical support staff may be contacted in-person or virtually, see this page for details: https://carleton.ca/scs/tech-support/contact-it-support/.

University Policies:

For information about Carleton’s academic year, including registration and withdrawal dates, see Carleton’s Academic Calendar.

Pregnancy Obligation: 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.

Religious Obligation: 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 https://carleton.ca/equity/focus/discrimination-harassment/religious-spiritual-observances/.

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.

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 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: carleton.ca/sexual-violence-support

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 provided to students who compete or perform at the national or international level. 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 the policy.

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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 refer to the course outline statement or the instructor concerning this issue.
Sickness:

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 a 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 indoors, particularly if physical distancing cannot be maintained. It may become necessary to quickly reinstate 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 Winter 2023 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.