Instructor:	Connor Hillen (He/Him)	Lecture Hours:	**B:** Wed. Fri. 16:05 - 17: 25 **D:** Tue. Thu. 08:35 – 09:55
Email:	connorhillen@cunet.carleton.ca	**Website:**	https://brightspace.carleton.ca
Office Hours:	Posted on Brightspace	**Location:**	Refer to Class Schedule

Carleton University acknowledges the location of its campus on the traditional, unceded territories of the Algonquin nation.

1. About the Course

Calendar Description: Introduction to system-level programming with fundamental OS concepts, procedures, primitive data types, user-defined types. Topics may include process management, memory management, process coordination and synchronisation, inter-process communication, file systems, networking, pointers, heap and stack memory management, and system/library calls.

Prerequisite(s): (COMP 1006 or COMP 1406 or SYSC 2004) with a minimum grade of C-.

Textbooks and Other Resources: In lieu of a textbook, course notes have been made available online.
- M. Lanthier, C. Laurendeau, and D. Nussbaum, *COMP2401 Course Notes. [Online]* https://people.scs.carleton.ca/~claurend/Courses/COMP2401/Notes/
- These notes are also available on the course website.

Objectives: This course is here to introduce you to the C programming language and the introductory concepts of systems programming which underlie your computer programming and computer use. The objective is to introduce you to the principles behind systems programming, gain some proficiency working in the C programming language and building C programs, and be comfortable writing and designing programs which work at a lower level and necessitate working with memory directly.

Topics Covered: While minor areas may be adjusted for time, students who complete all material, attend all lectures, and perform all readings should be able to:

- Implement basic coding practices in the C language (e.g., loops, conditions),
- Selecting appropriate data types to solve problems in C,
- Design and implement static and dynamic data structures in C, such as linked lists,
- Execute builds of C programs using command line and Makefiles,
- Organise program structure to follow clean coding practices in C,
- Perform file input/output tasks,
- Implement concurrent programming techniques, including process management and threads,
- Utilise (or at least understand the capabilities of) graphics libraries and shell scripts.

Technology: All students are required to work using the course virtual machine (VM). Information about the virtual machine will be posted to Brightspace. **Make sure to use the latest VM for COMP2401.** Learn more about VMs here: https://carleton.ca/scs/tech-support/virtual-machines/

Lectures will be held via **Zoom** (requires Carleton login) and **communication** will be primarily handled via **Discord**. Links to the official class Zoom and Discord will be posted to Brightspace.

2.1 Assessments (Assignments)

Grading: There will be **weekly tutorials** (beginning the week of September 11th) graded **best 8 of 10**, there will be **four (4) assignments** (beginning the week of September 18th), with the first assignment worth 5% and subsequent assignments worth 11%, **2 midterm quizzes** (open for the 60-hour periods beginning 06:00 on Oct. 11 and Nov. 22nd, respectively, closing at 18:00 – lectures are cancelled to provide time to write), and a **final project** (working in pairs, assigned November 13th and due December 3rd). Your final grades will be calculated as following:

> Tutorials (Best 8 of 10, 8x1%) 8%
> Assignments (1x5%, 3x11%) 38%
> Midterm Quizzes (Online Asynchronous, 2x16%)..32%
> Progress Check Mini-Quizzes (Online Asynchronous, x10) 2%
> Final Project (Due Dec. 3rd)...20%

- **Assignment 1, Support Cut-Off September 22nd, Due September 24th**
  - **Topic:** Getting familiar with course VM, compiling and executing basic I/O in C
  - One-week completion time to complete than others to provide faster feedback, worth 5%
  - **Can be re-submitted <u>once</u>** before **October 29th at 23:59 (with late standard penalty rules)**.
  - Must achieve a mark 10% higher than the previous Assignment 1 submission for the updated mark to be used. You **must have submitted Assignment 1 during the regular submission time** in order to qualify for resubmission with a minimum grade of 20%; **exceptions due to extenuating circumstances can be requested within one-week of the Assignment 1 submission time.**
- **Assignment 2, Support Cut-Off October 6th, Due October 8th**
  - **Topic:** Working with binary, bits, and bitwise operators
- **Assignment 3, Support Cut-Off <u>October 20th</u>, Due October 29th**
  - **Topic:** Working with Dynamic Memory (Dynamic Arrays) in C
  - Support will not be provided during reading week, but this is provided as an extra week if necessary
- **Assignment 4, Support Cut-Off November 10th, Due November 12th**
  - **Topic:** Working with Linked Lists, Dynamic Memory, and Makefiles in C
- **Final Project, Support Cut-Off December 1st, Due December 3rd**
  - **Topic:** Multithreaded simulations in C; **Working in Pairs**

Assignments: You are expected to work on your assignments **consistently** upon release and upload your progress to the submission periodically (ideally, at least **once every 48 hours**). As you are expected to submit periodically and consistently, technical issues near the submission deadline will not be considered for exemptions. **If you are experiencing extenuating circumstances** requiring additional accommodations (for example: ongoing medical issues), you may **petition the Associate Dean's office. Please note**: Assignment support should **not be expected** after Fridays at 17:00 until the following Monday. As such, prepare ahead and get questions in before the weekend. **Always** aim to have a submission in by Friday at 17:00, even if only partial, to minimize weekend technical issues.

Assignment Execution: Be aware that it is essential to have compiling, executing code. Code which does not compile or execute correctly to demonstrate coded behaviours will be subject to **severe penalties**. Make compiling and executing a top priority. Complete functionality in small increments, verify it works, submit, and continue working.

72-Hour Extension: Students are provided a single 72-hour extension for one of assignments 1-4 for any reason without request. Submit to the "Assignment Extension" submission on Brightspace within 72 hours of the deadline. Standard late penalties will apply. Further accommodation for a single assignment may be requested via a self-declaration for sent to the instructor within one week of the assignment deadline.

Late Penalty: After the Sunday at 23:59 deadline, assignments will officially be considered **late**. Late submissions will receive a 5% deduction for every hour late up to a maximum of 10 hours past the submission deadline. Once this 10-hour time window has elapsed, the Brightspace submission link will expire, and no further submissions or corrections will be accepted. You have **24 hours** to request an earlier submission be graded instead of the latest submission if you accidentally broke your submission on resubmission by emailing the instructor.

Regret Clause: If you believe that you have committed academic misconduct while completing an assignment and regret this decision, you may email the instructor **within 48-hours** of the submission deadline to receive a mark of zero on the assignment. You will not face any sanctions for this case, although other parties involved will still be forwarded to the dean. The case of will not be forwarded to the dean unless a future case of misconduct is suspected.

2.2 Assessments (Use of AI)

Unacceptable Use of AI: AI may **not** be utilized for any purpose during **tutorials, midterm quizzes, or progress check mini-quizzes**. Realistically, outside of the classroom you must be able to demonstrate your knowledge and practice outside of AI-accessible environments. As such, tutorials offer an opportunity for engage in low-stakes exercises to experiment with new concepts and quizzes offer an opportunity to receive feedback for what you have learned and where more time needs to be spent. Use of generative AI, such as ChatGPT or GitHub Copilot, is considered **academic misconduct**, and provides both you and the instructor with an incorrect view of where additional support needs to be provided.

Permitted Use of AI: In this course, the use of AI tools such as ChatGPT and GitHub Copilot are **permitted** for the completion of assignment and final project work. Note that GitHub Copilot is freely available to students. **Importantly, learning to use AI effectively to work and learn is a skill**, and I intend to provide instruction on the use of these tools during class and encourage asking questions about them. Please be aware of the following:

- All code generated by an AI **must be cited**, including the date that the AI was utilized and the service that was used in the comments of the code and a brief human-written description of what the generated code does. All code which is authored by an AI, but is not cited, is **considered misconduct**.
- If you utilized AI during your assignment for information gathering or code generation, **you must** provide an "AI Discussion" section in your accompanying README file which details the prompts used to generate your code or potentially face major deductions.
- Do not **trust** what these AI systems generate – even text generation AI with citations can misrepresent what is being cited. Verify claims and information from AI with other sources and perform extensive testing and review of code generated by a text generation AI. You are responsible for any errors or omissions provided by the tool, and it generally works best with topics you already understand.
- Please be aware that online generative AI tools will often collect data of users for commercial purposes and will often request identifiable information during sign-up. Ownership over content created via generative AI is still an evolving legal landscape and use of these tools may forfeit ownership of the inputs and outputs.
- **Please place learning as a top priority.** Do not submit code that you do not understand and if you choose to use these tools, use them **intentionally:**
  - Never copy/paste pieces of an assignment specification, reword and decompose the problem at hand,
  - Only generate small amounts of functionality at a time, integrate, and test, rather than generating large amounts of code at once,

- o   Utilize Chat AI to help overcome technical challenges like working with a command line or understanding compiler errors, but utilize knowledge from the course notes to "prime" it appropriately,
- o   Be careful to follow the constraints and requirements of assignments; generative AI will often utilize techniques outside the scope of the course, and it is important to ensure that you are still utilizing course techniques in the assignments to receive full marks.

This course provides essential foundations needed for many of your future courses in computer science and foundational knowledge for communicating about programming and technology in your careers. If you are ever concerned that the use of AI may be inadvertently hindering your learning or that you are retaining less information about the course, please feel free to reach out to the instructor to check-in and discuss via office hours.

2.3 Assessments (Tutorials and Quizzes)

Tutorials: You **must** attend the tutorial session for which you are registered. There will be ten (10) tutorials, with the best eight (8) counted toward your final grade. Tutorials will take place on the class Discord, information available on Brightspace. Your tutorial mark will be graded based on a mixture of attendance and making steady progress on the tutorial questions during the tutorial session. **If you are unable to attend** the tutorial, you may submit a **fully completed** tutorial to Brightspace alongside a brief video recording of your completed tutorial (information on recording can be found here: https://carleton.ca/kaltura/kaltura-video-assignment/) within one week of your tutorial time. Tutorials also provide an opportunity to work while chatting with peers to meet each other prepare for the paired final project.

Midterm Quizzes: Quiz participation is **mandatory**. Quizzes will be conducted online using Brightspace. Quizzes can be completed any time within the 60-hour period. During the days that the quiz is running, no lectures will be held - you may use the regularly scheduled time to complete the quiz, if you choose, although no additional support can be provided during this time; you will not be able to communicate with the TAs or instructor, any office hours during this period will be cancelled, and Discord communication may be temporarily disabled. Midterm quizzes **must be worked on individually** and are **closed book**. Use these as an opportunity to gauge your understanding with the material and receive feedback on where you need additional support.

Progress Check Mini-Quizzes: Progress checks are mini-quizzes use to evaluate student progress through the weekly course material. There will be a total of 10 progress checks available on Brightspace, beginning September 15th until the final PCMQ which opens November 24th. Each week, the progress check will open for three (3) days, beginning Fridays at 18:00 and closing Mondays at 18:00 and must be submitted within that time period. Each check consists of five (5) questions and will earn a Pass/Fail grade, with a Pass if you correctly answer four (4) of the five (5) questions correctly. You will have three (3) attempts at each progress check quiz to earn a passing grade. Your **final** progress check grade will be calculated as follows:
- 2/2: Earned a passing grade on 9 or 10 progress checks,
- 1/2: Passing 5 to 8 progress checks, inclusively,
- 0/2: Passing 0 to 4 progress checks, inclusively.

> **Quiz Exemptions:**
> If you are ill during the period of a midterm quiz or progress check mini quiz, you may be granted an exemption, reschedule, or makeup (at instructor discretion) only if you submit a copy of Carleton's official **Self-Declaration Form** (in lieu of a medical certificate) available online here: https://carleton.ca/registrar/cu-files/covid-19-self-declaration-form/
>
> Students **cannot for any reason** be exempted from **more than one (1) midterm quiz.**
> A self-declaration form must be emailed to the instructor within seven days of the missed quiz.
>
> Students **cannot for any reason** be exempted from **more than one (2) progress check mini-quizzes.**
> A self-declaration form must be emailed to the instructor within seven days of the missed quiz.

3. Plagiarism Policy

If you are unsure of the expectations regarding academic integrity (how to use and cite references, if 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** (at any time, **even after the course has concluded**).

You are never permitted to post, share, or upload course materials (even for portfolio purposes) without receiving 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/.

There is a separate plagiarism policy document for this course that can be found on the course website. **Students must read this document thoroughly** and **must agree to adhere to this policy** (and all policies stated in this course outline).

In the event that a student has been **found to have committed an instructional offence**, a penalty will be applied to that student's final grade. **If the penalty applied** by the Office of the Associate Dean is **less than the total value of the assignment**, the **remaining weight** is **shifted onto the weight of the final exam**. Consider the following example: if the course has an assignment worth 10% and a final worth 40% and a student plagiarizes and receives a 50% deduction to his or her assignment, their final exam would be worth 45% of the final mark and the **plagiarized assignment would be worth nothing**. To clarify, 50% of the 10% allocated to the assignment was lost and the remaining 50% of the 10% allocated to the assignment was shifted to the final.

Students are invited to **discuss any concerns with the instructor at the earliest opportunity**.

4. Laptop Requirement (School of Computer Science)

Every student that has been enrolled in a 1000-level (i.e., first year) course offered by the School of Computer Science after the 2020/2021 school year is required to have a laptop. For more information, please visit https://carleton.ca/scs/scs-laptop-requirement/ and then review the requirements at https://carleton.ca/scs/scs-laptop-requirement/laptop-specs/.

5. Important Course Policies

Communication Policy: In order to reduce the volume of emails and expedite responses, the only emails that should be sent to the instructor, teaching assistants, or lab coordinators should **require confidentiality** or is personal in nature and be handled via direct email from a Carleton email address.

Students are expected to **check their Carleton email addresses <u>daily</u> for announcements.** Reminders for upcoming assignment deadlines will be handled using the default Brightspace notifications system, so if you require reminders, check that your Brightspace settings will send notifications.

Students should only **expect responses within 3 business days** during **business hours (8:30AM - 5:30PM, Monday - Friday)**. <u>Plan ahead</u> - questions asked over the weekends may go unanswered until the following week.

To make sure communication is handled in a timely manner, follow these guidelines:

1. Any **email communication** must include **your name, student ID, and course code** and must be sent from an official Carleton email address. Confidential communications (involving grades, personal matters) may only be sent via an official Carleton email address. Private messaging on Discord will be ignored.
2. **Assignment questions** should *first* be dealt with by discussing with a TA during office hours or via the Discord forums.
3. **Course material assistance** can be handled via Discord forums or, if time allows, during instructor office hours.
4. **For technical issues,** first look on the Discord forums or the course resources, then check the [SCS technical support page](#), then inquire with teaching assistants who may forward your concern to the instructor**.**
5. **Students <u>must</u> behave in a professional manner in all communications.** Any communication that is seen as abusive, discourteous, or unprofessional may be moderated, ignored, or reported to the university for disciplinary action.
6. **Discord does not imply real-time responses.** Please be aware that the Discord is provided to facilitate professional and respectful student discussion but does **not** mean that there will be real-time responses from teaching assistants. Teaching assistants are allocated a small amount of time each day to respond to or highlight messages on Discord and will only be active within those periods.
7. **Report bad conduct immediately.** If you see bad conduct on the Discord that has not been attended to, please email the instructor immediately to resolve this.

Grade Disputes: It is **your responsibility** to ensure that quiz, tutorial, and assignment marks posted to Brightspace are accurate and correct **within one week** of the date the marks were released. Concerns must first be communicated to the teaching assistant that graded the assessment, then if the result is unsatisfactory, can be forwarded to the instructor. After one week, **no further consideration will be offered, and marks will not be changed.**

Office Hours: TA Office hours are available to help with material, assignment disputes, or assignment clarification. TA office hours schedules will be posted and made available to the course website. If you require additional support with the course material, you may request office hours with the instructor following the instructions posted to the course website. While I encourage requesting office hours to get the support you need early, please understand that availability is limited and not all requests may be fulfilled. **Note:** Additional instructor office hours may be opened during the term and posted to Brightspace.

6. Important Considerations

1. **Verifying the correctness of assignment submissions is your responsibility.**
    a. You are expected to **submit regularly** as you work on the assignment.
    b. You are expected to **download and test your submission** to make sure it is both complete and correct. If your submission is missing files, or if your code can not be run, or if your code can not be opened and read for marking purposes, you may receive a grade of zero.
    c. You are expected to **verify all submission requirements** (e.g., file types, file names) are met. If files are named incorrectly or packaged incorrectly, you may be penalised up to receiving a zero.
    d. You are expected to submit long before the final deadline; technical issues around the deadline will **not** be considered a valid reason for extension. If you are experiencing technical issues, please make use of the SCS computer labs (information below) to complete your assignment.
    e. **Make regular backups.** One way to maintain backups of your work is to **submit often** to Brightspace, utilizing version control tools like Git and online repositories like GitHub, or utilizing the Carleton and SCS provided Microsoft OneDrive or NextCloud services. This ensures that if you experience technical issues, you can still recover your work to continue.
2. **You can expect to spend at least eight (8) hours per week on this course, in addition to lecture time.**
3. **Questions should be posted on official course discussion boards.** As per the communication policy, all email communication should be kept to a minimum and utilised only if the nature is private or personal.
4. **All materials created for this course remain the intellectual property of the instructor.** These materials are intended for the personal and non-transferable use of students registered in the current offering of the course. Reposting, reproducing, or redistributing any course materials, in part or in whole, without the written consent of the instructor is **strictly prohibited.**

7. Course Modality

All lectures in this course will be held **Online, Via Zoom** (link posted to Brightspace). These lectures will be recorded, but synchronous attendance is expected. The recordings will be made available **at minimum** one week following lecture and should not be relied upon for up-to-date information on the course. If you are ill or otherwise unable to attend the lecture, you may reach out via email to request the lecture recording early, but you may only make **three** such requests during the term. If you have an unexpected and ongoing circumstance that makes attendance impossible, we may discuss additional accommodations.

A microphone is required for participation in group discussions. A **webcam, turned on, is very strongly encouraged.** Note that I will be attempting to keep lectures in "Focus Mode", meaning that even with a camera on, your peers can only see your camera in Breakout rooms or if you are "Spotlighted" by the instructor. This helps to maintain attention, give the instructor an idea of how the information is being understood, allow the instructor to get to know the class better, all while avoiding potentially distracting video feeds from other students.

Please note that by participating in these lectures that you may be included in these recordings. When attending on Zoom, Zoom will always notify meeting participants that a meeting is being recorded. It is not possible to disable this notification.

*These recordings will only be available to the members of this class, and **I ask that everyone be respectful and not allow others to view the recordings**. At the end of the course, the recordings will be deleted.*

Please note that recordings are protected by copyright. The recordings are for your educational use, and you are not permitted to publish to third party sites. **If you have concerns about being recorded**, please email the instructor directly so we can discuss these.

8. School of Computer Science Information

Undergraduate Advisor: The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP, by telephone at 520-2600, ext. 4364 or by email at undergraduate_advisor@scs.carleton.ca.

The undergraduate advisor can assist with information about prerequisites and preclusions, course substitutions or 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.

You are also **required** to **read** the information at:
http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/

SCS Computer Laboratory: Under normal circumstances, students from the School of Computer Science (SCS) can also access one of the designated computers labs for their courses. The lab schedule can be found at: https://carleton.ca/scs/tech-support/computer-laboratories/.

Further information about the computer labs and technical support can be found at: https://carleton.ca/scs/technical-support/. Technical support is also available in room HP5161 Monday to Friday from 9:00 until 17:00 or by emailing SCS.Tech.Support@cunet.carleton.ca.

9. University Policies

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

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:

https://carleton.ca/womensstudies/resources-and-links/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. For information, visit:

https://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 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:

https://carleton.ca/sexual-violence-support

University Policies

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, see the policy at:

https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

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 at:

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 penalty guidelines can be found at:

https://carleton.ca/registrar/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 refer to the course outline statement or the instructor concerning this issue.

...And I hope you enjoy the course and have a great term!