

CGSC 1005B – Computational Methods in Cognitive Science
DEPARTMENT OF COGNITIVE SCIENCE, CARLETON UNIVERSITY
Winter 2024

Lecture dates:	Tuesdays and Thursdays, January 8th – April 9th, 2024
Lecture time:	2:35pm – 3:55pm
Tutorials:	B1: 1:05 - 2:25, Friday (TA: TBA) B2: 11:35 - 12:55, Friday (TA: TBA) B3: 4:05 - 5:25, Friday (TA: TBA)
Instructor:	Kasia (Katarzyna) Muldner, Ph.D.
Office:	DT 2205
E-mail:	kasia.muldner@carleton.ca
Office Hours:	TBA or by appointment
TAs:	Elmira Adeeb (ElmiraAdeeb@cmail.carleton.ca) Veronica Chiarelli (VeronicaChiarelli@cmail.carleton.ca) Landon Liu (LandonLiu@cmail.carleton.ca)
TA Office Hours:	By appointment

Course Description

Introduction to computational methods, with an emphasis on programming. No prior programming background required. Programming is inherently a creative problem-solving activity that requires computational thinking. We will approach programming using the lens of cognitive science, namely that programming involves finding appropriate *representations* for the problem at hand and implementing *operations on those representations*.

On the representation side, we will cover *variables, standard data types (e.g., numeric, strings, Boolean), data scope, advanced data structures (e.g., lists)*. On the operation side, we will cover standard programming building blocks needed to create operations on these representations, including *iteration, conditional execution, and functional abstraction*.

The skills that we will emphasize during the class include *program design*, by discussing various algorithms and approaches to solving problems, *program implementation*, by writing Python code, and *debugging*, namely the ability to identify errors in programs through pattern matching and code tracing.

Hardware + software requirements

All students taking CGSC 1005 are required to either own or have daily access to a computer (either Mac or PC; desktop or laptop) that has the programming language Python installed. **Netbooks, Chromebooks, and Smartphones are not suitable** – the computer must be running either Windows or a Mac operating system.

Text book required

There is no required text book. A supplementary source that is freely available includes:

“*Python for Everybody: Exploring Data Using Python 3*”, by Charles R. Severance . The textbook is freely available online under an open source license, and can be downloaded here:

http://do1.dr-chuck.com/pythonlearn/EN_us/pythonlearn.pdf

pCourse Web Page (Brightspace)

The course website is located at <https://carleton.ca/brightspace/> On this site you will find the course syllabus, slides, and any supplementary materials. Please note that the course slides are there for you to use and you are welcome and encouraged to do so, **but you are prohibited from sharing the slides**. My slides are my intellectual property, are Copyrighted and may not be shared or repurposed outside of this class. Sharing the slides either by electronic or non-electronic means is a violation of Copyright and I reserve the right to take action if you do so. For more information on Carleton's policy on Copyright infringement see: <https://calendar.carleton.ca/copyrightcompliance/>

Evaluation

Weighting of the Final Grade

Assignments:	17%	See table below for exact dates
Tutorials:	10%	Weekly – see table below for schedule
Test 1:	20%	Feb 1, in person during class
Test 2:	20%	March 7, in person during class
Final Exam:	33%	Regularly scheduled exam period, in person

Assignments

There are 5 assignments (see table below for due dates and weights). **All assignments are due by 9:30am on the specified date**. Please avoid putting the assignment off until the last minute as this does not work well with programming tasks. Note that the assignments are not weighted equally because they increase in difficulty.

Assignment	Due Date	Weight
A1	Thursday, January 25, 11:59pm	2%
A2	Thursday, Feb 8, 11:59pm	3%
A3	Thursday, Feb 29, 11:59pm	4%
A4	Thursday, March 21, 11:59pm	4%
A5	Monday, April 8, 11:59pm	4%

ChatGPT Policy: ChatGPT is a large language model capable of solving various tasks, including writing Python programs. In this class, you are allowed to use ChatGPT to help with assignments but there are number of important caveats:

- If you use ChatGPT for help with your assignment, **you must declare this in the assignment cover page**. This requirement is here to reflect general academic integrity (whenever an outside source is used for an assignment (in any class), this must be acknowledged). There is no downside for declaring use of ChatGPT but failure to do so is in violation of academic integrity.
- The tests and exams assess programming skills without access to ChatGPT. You will not learn how to program effectively if you ask ChatGPT to produce the answer right away without any reflection first. We will go over recommended ChatGPT usage strategies in class, but here are a few tips:

- Instead of asking for help from ChatGPT right away, generate a plan first, and then write the actual program yourself. If you get stuck, use ChatGPT to help you debug your program, to provide explanations, etc. You can also use it to compare your program to its program
- There is a wealth of research showing this strategy (*do it yourself first, ask for help only when really stuck*) results in better performance/learning than copying the answer (e.g., from ChatGPT) – I will share some of this research in class
- The prompts you give ChatGPT influence the quality of the answer it provides. We will go over prompt strategies in class.
- **Do NOT trust ChatGPT output!** It is not always correct and has produced conflicting and incorrect answers, even for basic Python programs. That's why it's so important to learn the foundations so that you can critically examine its output. In general, it is your responsibility to test and debug so that the program you submit is correct.
- This class allows the use of ChatGPT but not all classes do. It is your responsibility to check the syllabus for each class for the ChatGPT policy (in some classes, using it will correspond to an academic violation). If you are not sure, always check with your instructor.

Plagiarism and collaboration policy: As noted above, you may use ChatGPT to help with the assignments for this class. You may collaborate with others at the **conceptual** level of assignments and tutorials (where conceptual is the algorithmic level, but NOT the code level). You may also collaborate at the code level with **one** other person – if you do, you must clearly indicate the name of the person you worked with on the assignment you pass in. **Group collaboration at the code level with more than 2 people is not permitted. Using code from another source (e.g., a person outside of this class, a human tutor, or a website) is considered plagiarism.** Please see the notice on academic integrity towards the end of the syllabus (e.g., “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”).

Late policy: Assignments must be passed in on time – there is no grace period. This policy is to ensure that we can provide feedback in a timely manner. Late assignments will be accepted for up to 2 days after the posted deadline, but they incur a penalty of 10% for each 12 hours, as follows: 0-12 hours late = -10%; over 12 hours late up to 24 hours = -20%; over 24 hours up to 36 hours = -30%; over 36 hours up to 48 hours = -40%. If the submission is more than 2 days late (i.e., 48 hours) the assignment will be assigned a grade of 0. Technical problems such as connectivity issues do not exempt you from this penalty, so please don't wait till the last minute to submit. Some advice:

1. upload partially completed submissions as you work on them (you can submit multiple times)
2. submit the correct type of file (all the assignment require a python file, so please submit a file that ends in .py, not a word file or a PDF file; likewise pictures of a program will not be accepted)
3. aim to submit your final submission at least 30 minutes in advance of the due date and time
4. download your submission and verify the contents after submitting

Issues with uploaded files. You will be asked to upload python code, which must be a .py file, rather than a word/PDF document. It is your responsibility to ensure that the file you uploaded is correct (see point 4 above, i.e., after uploading, download to ensure the correct file(s) was uploaded). If you are not sure, please ask before the deadline – we are happy to help.

Appeals: Contact the TA that marked your assignment within one week of the date the assignment was returned (posted to Brightspace).

Tutorials

Like the class, the tutorials will be conducted in person. The goal of the tutorials is to provide hands on practice on concepts discussed in tests, and thus solidify learning of those concepts. To receive a grade for a given tutorial, you must be present* and work on the tutorial material. This is because the only way to learn

programming is through repeated practice, and the tutorials provide that practice over and beyond assignments. Each tutorial grade is out of 1, assigned as follows: 0 if did not show up or did not do any work during the tutorial, 0.5 if you came late, or left early, and/ or did minimal work even if you stayed the whole time, and 1 if came on time and worked on the tutorial materials the whole period (or until you finished the whole worksheet). To get a grade > 0 you must not only show up but also submit the worksheet at the end of the tutorial (it's okay if it is not done).

* You have **one** “work from home” pass, allowing you to complete a tutorial at another time; the work must be submitted before the following week’s tutorial by uploading it to brightspace **and** emailing your TA to let them know. Note: (1) you must let you TA know **before** the tutorial if you plan to use this pass and (2) you are responsible for figuring out the tutorial material on your own.

Tests + Exam

Test 1: The first test will cover content from the first portion of the course prior to test 1. More details will be provided before the test. The test will be conducted in person during class time.

Test 2: The second test will focus on content starting with material after test 1 up to the content covered prior to test 2, but it will also include concepts prior to test1 (since the nature of programming is inherently cumulative). The test will be conducted in person during class time.

Final Exam: The final exam will be **cumulative**. More details will be provided closer to the exam date. The final exam will be conducted in person on the Carleton campus.

The tests and exam are based on: (1) course slides, which will be made available on Brightspace, (2) problem solving exercises done during tutorials and/or homework, (3) any assigned readings, (4) information presented during class, including class discussions. In particular, class attendance is strongly encouraged because **information will be provided during class beyond that in the textbook or slides**, including explanations of course themes, perspectives that are not in the textbook or in the slides, hints for tests, etc.

Policies:

Tests: Illness and bereavement (supported by appropriate documentation – see Carleton procedures) are the only reasons accepted for missed tests – a zero grade will be assigned otherwise. If you miss a test for one of an accepted reason, please obtain the appropriate documentation, e.g., for illness, a self-declaration form (<https://carleton.ca/registrar/cu-files/covid-19-self-declaration-form/>) and contact me with the documentation within 24 hours to arrange a make-up test.

A make-up test is only available for one of the two tests (either test1 or test2). If a make-up was written for test1, and test2 needs to be deferred for medical or bereavement reasons, then its weight will be added to the final exam. Note this is the only situation in which reweighting the exam (to make it worth more) is possible. In particular, if you did not defer test 1 and could not write test2 for one of the accepted reasons, then you must write a make-up test for test2.

Exam: If you are unable to write the final exam, please follow the procedures listed in the section, Petitions to Defer, located later in the outline.

Bonus credits. If there are any bonus opportunities, they will be announced during the course and will be available to all students. I do get requests for individual bonus opportunities at the end of class to raise an individual’s grade – these are not possible, because implementing them is not fair to the class as a whole, so please plan accordingly.

E-mail Protocol and Guidelines

I will respond to e-mails within 24-48 hours (excluding weekends and holidays). Please do not send us code to be debugged over email unless you include a detailed code trace (details on what that involves will be provided in class) and a hypothesis for why it does not work. Often, if you have questions that require more than a yes/no type answer, the best forum for answering them is during class or office hours.

Lecture Schedule

Please note that dates for topics are approximate and may change; weeks colored blue have an assignment due; yellow highlighting indicates a test:

Lecture Date(s)	Lecture Topic	Tutorial Information
Week 1 Jan 9 + Jan 11	welcome and introduction foundations (variable, data types)	Tutorial 1
Week 2 Jan 16 + Jan 18	foundations, conditionals	Tutorial 2
Week 3 (A1 due, 25th) Jan 23 + 25	iteration	Tutorial 3
Week 4 Jan 30 + Feb 1	review test 1	Tutorial 4
Week 5 (A2 due, 8th) Feb 6 + Feb 8	iteration continued files	Tutorial 5
Week 6 Feb 13 + Feb 15	lists, algorithms	Tutorial 6
reading week (Feb 19 – 23)		
Week 7 (A3 due, 29th) Feb 27 + Feb 29	more lists, nested structures	Tutorial 7
Week 8 March 5 + March 7	review test 2	Tutorial 8
Week 9 March 12 + March 14	nested structures functions	Tutorial 9
Week 10 (A4 due, 21st) March 19 + March 21	functions	Tutorial 10
Week 11 March 26 + March 28	functions, algorithms	University closed – no tutorials
Week 12 April 2 + April 4	algorithms, review	Tutorial 11
Week 13 (A5 due, April 8th) April 9	No class- extra office hours	

In accordance with the Carleton University Undergraduate Calendar (p 34), the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100	B+ = 77-79	C+ = 67-69	D+ = 57-59
A = 85-89	B = 73-76	C = 63-66	D = 53-56
A - = 80-84	B - = 70-72	C - = 60-62	D - = 50-52
F = Below 50			

Grades entered by Registrar:

WDN = Withdrawn from the course

DEF = Deferred

PLAGIARISM

The University Academic Integrity Policy defines plagiarism as “presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.” This includes reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source. Examples of sources from which the ideas, expressions of ideas or works of others may be drawn from include but are not limited to: books, articles, papers, literary compositions and phrases, performance compositions, chemical compounds, artworks, laboratory reports, research results, calculations and the results of calculations, diagrams, constructions, computer reports, computer code/software, material on the internet and/or conversations.

Examples of plagiarism include, but are not limited to:

- any submission prepared in whole or in part, by someone else, including the unauthorized use of generative AI tools (e.g., ChatGPT);
- using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings without appropriate acknowledgement;
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one’s own; and
- failing to acknowledge sources through the use of proper citations when using another’s work and/or failing to use quotations marks.

Plagiarism is a serious offence that cannot be resolved directly by the course’s instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of “F” for the course.

Statement on Student Mental Health

As a University student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. Here is a list that may be helpful:

Emergency Resources (on and off campus): <https://carleton.ca/health/emergencies-and-crisis/emergency-numbers/>

Carleton Resources:

- Mental Health and Wellbeing: <https://carleton.ca/wellness/>
- Health & Counselling Services: <https://carleton.ca/health/>
- Paul Menton Centre: <https://carleton.ca/pmc/>
- Academic Advising Centre (AAC): <https://carleton.ca/academicadvising/>
- Centre for Student Academic Support (CSAS): <https://carleton.ca/csas/>
- Equity & Inclusivity Communities: <https://carleton.ca/equity/>

Off Campus Resources:

- Distress Centre of Ottawa and Region: (613) 238-3311 or TEXT: 343-306-5550, <https://www.dcottawa.on.ca/>
- Mental Health Crisis Service: (613) 722-6914, 1-866-996-0991, <http://www.crisisline.ca/>
- Empower Me: 1-844-741-6389, <https://students.carleton.ca/services/empower-me-counselling-services/>
- Good2Talk: 1-866-925-5454, <https://good2talk.ca/>
- The Walk-In Counselling Clinic: <https://walkincounselling.com>

Requests for Academic Accommodations

ACADEMIC ACCOMMODATION

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to me 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 accommodation regarding a formally-scheduled final exam, you must complete the Pregnancy Accommodation Form ([click here](#)).

Religious obligation: write to me 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 [click here](#).

Academic Accommodations for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, please request your accommodations for this course through

the [Ventus Student Portal](#) at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). Requests made within two weeks will be reviewed on a case-by-case basis. For final exams, the deadlines to request accommodations are published in the [University Academic Calendars](#). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).

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 where 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: <https://carleton.ca/equity/sexual-assault-support-services>

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 will be provided to students who compete or perform at the national or international level. Write to me 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. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

Important Information

- Students must always retain a hard copy of all work that is submitted.
- Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean
- For us to respond to your emails, we need to see your full name, CU ID, and the email must be written from your valid CARLETON address. Therefore, in order to respond to your inquiries, please send all email from your Carleton CMail account. If you do not have or have yet to activate this account, you may wish to do so by visiting <http://carleton.ca/ccs/students/>
- November 23, 2023: Last day for academic withdrawal from full fall and late fall classes
- March 15, 2024: Last day for academic withdrawal from full winter, late winter and fall/winter courses.

For a list of dates and deadlines, including holidays and exam dates, please visit:

<https://calendar.carleton.ca/academicyear/>